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Editorial.....

It is heartening to note that our journal is able to sustain the enthusiasm and covering various facets of knowledge. It is our hope that IJMER would continue to live up to its fullest expectations savoring the thoughts of the intellectuals associated with its functioning .Our progress is steady and we are in a position now to receive evaluate and publish as many articles as we can. The response from the academicians and scholars is excellent and we are proud to acknowledge this stimulating aspect.

The writers with their rich research experience in the academic fields are contributing excellently and making IJMER march to progress as envisaged. The interdisciplinary topics bring in a spirit of immense participation enabling us to understand the relations in the growing competitive world. Our endeavour will be to keep IJMER as a perfect tool in making all its participants to work to unity with their thoughts and action.

The Editor thanks one and all for their input towards the growth of the **Knowledge Based Society**. All of us together are making continues efforts to make our predictions true in making IJMER, a Journal of Repute

Dr.K.Victor Babu
Editor-in-Chief

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- (1) The old 'UGC Approved List of Journals' has been replaced with the new UGC-CARE Reference List of Quality Journals' (UGC-CARE List) and with effect from 14th June, 2019 research publications only from the journals indexed in UGC-CARE List should be considered prospectively for any academic purpose.
- (2) The Vice Chancellors, Selection Committees, Screening Committees, research supervisors and all/any expert(s) involved in academic/ performance evaluation and assessment are hereby advised to ensure that their decisions in the case of selections, promotions, credit-allotment, award of research degrees etc. must be based on the quality of published work rather than just numbers or a mere presence in peer reviewed or in old UGC Approved List of Journals which is available for reference on the UGC website.

(P.K. Thakur)

Secretary(Officiating)



EFFECTS OF EXPERIENCE ON TEACHING EFFECTIVENESS AND ATTITUDE TOWARDS TEACHING OF BODO AND ASSAMESE MEDIUM SECONDARY SCHOOL TEACHERS OF BAKSA DISTRICT OF ASSAM

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Abstract

Teaching is a multidimensional process that takes up difficult attributes of teaching and teachers personality. Teaching effectiveness deals with clarity on topic, capacity, ability to organize lesson plan and teach, motivate students, teach as students need or care the special child. It is also not easy to evaluate the teaching effectiveness as it is too multidimensional such as student, administrative, peer, teacher himself or parent's evaluation. In most of the cases different factor such as age, sex, medium, urban or rural associates in the teaching effectiveness. Baksa is a new district of Assam created in 2003 still much lagging behind in transport and communication. So, the differences of male and female as well as urban and rural teacher have their significant differences in their teaching. The field survey method was applied to carry out the proposed research work. The data obtained from field study analysed using mean, standard derivation, t- test, F-test and ANOVA. The data analysis consists of 320samples of Bodo and Assamese medium secondary school teachers with equal representation of 160 Bodo and 160 Assamese medium and equally representation of N=80 for urban and rural teachers, and again stratified in four experience groups with 40 samples each.

Keywords: Teaching Effectiveness, Attitude, Baksa District, Bodo & Assamese Medium Secondary School Teachers, Assam

Introduction

Throughout the centuries teachers have been played predominant role in moulding the children through the educational frame work. The effectiveness of teaching varies teacher to teacher and age of their experience. Thus the quality output of and value based student product depends upon personality of a teacher on how effectively he teaches. Teaching is a pious job and teachers are to maintain personality and cope up him with changing global scenario and changes of curriculum. The location of the school sure to have impact on the



teaching effectiveness as the basic amenities and communication is available in urban areas in rural counterpart. Educational psychology as branch of general psychology picks up learning process from both cognitive and behavioural perspectives, allows understanding individual differences in intelligence, cognitive development, affect, motivation, self regulation, self concept and their role in learning that leads to the scientific study of human learning. There is still want of investigation of different location and gender group of teachers and also at different teaching experiences. Thus, a study was conducted to find out the effects of age on teaching effectiveness and also in attitude towards teaching profession of secondary school teachers of Baksa district of Bodoland Territorial Council of Assam.

Objectives

The present study aims to investigate the effects of secondary school teachers of Baksa district of Assam teaching effectiveness and teacher's attitude towards teaching profession at the differences of their age groups.

Hypotheses

The hypotheses of the study were as follows:

1. It was hypothesised that there significant effect of age of teaching on teaching effectiveness and attitude towards teaching profession of secondary school teachers of in regards to medium of school.
2. It was hypothesised that there significant effect of Experience of Bodo and Assamese secondary school teachers at the differences of location i.e. Urban and Rural.
3. It was hypothesised that there significant effect of Experience of Bodo medium secondary school teachers at the differences of four level of teaching experiences.
4. It was hypothesised that there significant effect of Experience of Assamese medium secondary school teachers at the differences of four level of teaching experiences.

Method

The field survey method was applied to carry out the proposed research work. The data obtained from field study analysed using mean, standard derivation, t- test, F-test and ANOVA.

Data

The primary data of this study was collected first hand during field visit. Information was collected in personal data sheet and three different



schedules from the respondent teachers of Bodo and Assamese medium secondary schools from Baksa district of Assam.

The secondary data of this research were collected from records of government office, census report, published and unpublished thesis, books and journals of national and international repute to develop the research thesis and to establish the rapport.

Sample

The sample size of Assamese and Bodo Medium secondary school is 160 and Assamese and Bodo Medium secondary school is 160 in total 320 samples. Each 160 samples of Bodo and Assamese medium teachers are again stratified into four experience groups- E_1 (0-5 years), E_2 (6-10 years), E_3 (11-15 years), and E_4 (16-20 years) total 40 samples for each group.

Tools used:

The following tools were used to measure the concerned variables:

1. Personal Data Sheet (P.D.S.) containing 13 items was used to collect basic information of the teachers.
2. Teaching Effectiveness Scale containing 36 test items.
3. Attitude Scale containing 30 test items was used to collect responses.

Process

Teachers selected in the sample were personally contacted before conducting the experiment. Permission was taken for interviewing with teachers. First of all personal data sheet was given to each and every subject to know their personal information. During the period of getting personal information they were found well-familiar, so a very co-operative and healthy environment was found in all the settings in conducting the experiment. The teachers were requested to sit in a corner-place of a separate room where the atmosphere was created just like a lab-situation. Teaching Effectiveness and Attitude scale were administered.

Results

Table-1: Summary of ANOVA of mean square, F-ratio and p-value of effect of Experience of BMSS & AMSS teachers on Teaching Effectiveness, Attitude and Self Concept scores.

Dependant Variable	Sum of Squares	df	Mean Square	F-ratio	P-value
Teaching Effectiveness	366.300	3	122.100	11.902	0.000
Attitude	683.675	3	227.892	43.679	0.000
Self Concept	131.209	3	43.736	14.706	0.000

The result found from table-21 shows that there is significant difference of effect of experience of BMSS & AMSS teachers on all dependant

variables i.e. teaching effectiveness (df=3, F=11.902, p<.05), attitude (df=3, F=43.679, p<.05) and self concept (df=3, F=14.706, p<.05) is found significant at p<.05 level.

Mean Teaching Effectiveness and Attitude scores & t-ratio of Urban (N=160) and Rural (N=160) Teachers (BMSS & AMSS) total N=320 tested in ANOVA.

Table-2: The summary of mean and t-test in ANOVA of Teaching Effectiveness and Attitude scores of Urban and Rural Teachers (BMSS & AMSS) (N=320).

Dependant Variables	Location (Subject)	N	Df	Mean Difference	t-value	P-value
Teaching Effectiveness	Urban	160	158	2.013	3.656	0.000
	Rural	160	158	2.362	3.614	0.000
Attitude	Urban	160	158	0.188	0.404	N.S.
	Rural	160	158	-1.013	-2.492	0.014

The result of table-1 shows that Urban and Rural teachers of Bodo and Assamese medium teachers are found significant at p<.05 level of confidence (df=158, t=3.656, p<.05) and (df=158, t=3.614, P<.05) respectively on teaching effectiveness.

Teachers of Bodo and Assamese medium school located at urban area and their effect on attitude is found insignificant at p>.05 level of confidence (df=158, t=0.404, p=>.05). The rural Bodo and Assamese medium school teacher's effect on teaching effectiveness is significant at p<.05 level of confidence (df=158, t=-2.492, p<.05).

Effects of BMSS Teachers at Experience level E1, E2, E3 & E4

The effect of experience level E1, E2, E3 and E4 on teaching effectiveness and Attitude is studied at both BMSS and AMSS level.

Effects of Experience Level E1 (0-5yrs.) of BMSS

The study of E1 (0-5yrs.) experience group of BMSS total sample N=40 of which Urban=20 (Male=10 & Female -10), and Rural=20 (Male=10 & Female -10) was analysed.

Table-3: Summary of ANOVA of mean, t-value and p-value of experience level E1 (0-5 years) Teacher's Effect on Teaching Effectiveness and Attitude scores

Variances in Scales	Mean	df	Mean Difference	SD	t-value	P-value (2- tailed)
Teaching Effectiveness	133.75	39	133.750	3.061	276.320	0.000
Attitude	126.35	39	126.350	1.861	429.348	0.000
Self Concept	128.25	39	128.250	1.676	484.075	0.000

The table-3 shows that the teachers of E1 (0-5 yrs, experience) level of Bodo medium secondary school at level $p < .05$ on independent variable teaching effectiveness is found significant at $p < .05$ ($df=39$, $t=276.320$, $p < .05$) along with attitude ($df=39$, $t=429.348$, $p < .05$) and self concept ($df=39$, $t=484.075$, $p < .05$).

Effects of Experience Level E2 (6-10yrs.) of BMSS

The study of E2 (6-10yrs.) experience group of BMSS total sample $N=40$ of which Urban= 20 (Male= 10 & Female -10), and Rural= 20 (Male= 10 & Female -10) was analysed.

Table-4: Summary of ANOVA of mean, t-value and p-value of experience level E2 (6-10 years) Teacher's Effect on Teaching Effectiveness and Attitude scores.

Variances in Scales	Mean	df	Mean Difference	SD	t-value	P-value (2- tailed)
Teaching Effectiveness	135.88	39	135.875	3.465	247.973	0.000
Attitude	125.30	39	125.300	1.400	566.196	0.000
Self Concept	128.75	39	128.750	1.629	499.850	0.000

The table-4 shows that the teachers of E2 (6-10 yrs, experience) level of Bodo medium secondary school on independent variable teaching effectiveness is found significant at $p < .05$ level ($df=39$, $t=247.973$, $p < .05$), significant at $p < .05$ on attitude ($df=39$, $t=566.196$, $p < .05$) and also significant at $p < .05$ on self concept ($df=39$, $t=499.850$, $p < .05$).

Effects of Experience Level E3 (11-15yrs.) of BMSS

The study of E3 (11-15yrs.) experience group of BMSS total sample $N=40$ of which Urban= 20 (Male= 10 & Female -10), and Rural= 20 (Male= 10 & Female -10) was done.

Table-5: Summary of ANOVA of mean, t-value and p-value of experience level E3 (11-15 yrs.) Teacher's Effect on Teaching Effectiveness, Attitude and Self Concept scores.

Variances in Scales	Mean	df	Mean Difference	SD	t-value	Sig. (2- tailed)
Teaching Effectiveness	136.52	39	136.525	3.665	235.570	0.000
Attitude	124.30	39	124.300	1.418	554.467	0.000
Self Concept	129.20	39	129.200	1.924	424.660	0.000

The study in the table-5 finds that the teachers of E3 (11-15 yrs, experience) level of Bodo medium secondary school on independent variable teaching effectiveness is found significant at $p < .05$ level on three independent

variables that is teaching effectiveness ($df=39$, $t=235.570$, $p<.05$), significant at $p<.05$ on attitude ($df=39$, $t=554.467$, $p<.05$) and also significant at $p<.05$ on self concept ($df=39$, $t=424.660$, $p<.05$).

Effects of Experience Level E4 (16-20yrs.) of BMSS

The study of E4 (16-20 yrs.) experience group of BMSS total sample $N=40$ of which Urban= 20 (Male= 10 & Female -10), and Rural= 20 (Male= 10 & Female -10) was made.

Table-6: Summary of ANOVA of mean, t-value and p-value of experience level E4 (16-20 yrs.) Teacher's Effect on Teaching Effectiveness, Attitude and Self Concept scores.

Variations in Scales	Mean	df	Mean Difference	SD	t-value	Sig. (2- tailed)
Teaching Effectiveness	135.98	39	135.975	2.778	309.568	0.000
Attitude	122.48	39	122.475	1.935	400.378	0.000
Self Concept	125.32	39	125.325	5.537	174.704	0.000

The table-6 shows that the teachers of E4 (16-20 yrs, experience) level of Bodo medium secondary school is also found significant at level $p<.05$ on teaching effectiveness ($df=39$, $T=309.568$, $P=<.05$), significant at $p<.05$ on attitude ($df=39$, $T=400.378$, $P=<.05$) and significant at $p<.05$ also on self concept ($df=39$, $T=174.704$, $P=<.05$).

Effects of AMSS Teachers at Experience level E1, E2, E3 & E4

Effects of Experience Level E1 (0-5yrs.) of AMSS

The study of E1 (0-5yrs.) experience group of AMSS total sample $N=40$ of which Urban= 20 (Male= 10 & Female -10), and Rural= 20 (Male= 10 & Female -10) was done.

Table-7: Summary of ANOVA of mean, t-value and p-value of experience level E1 (0-5 years) Teacher's Effect on Teaching Effectiveness, Attitude and Self Concept scores.

Variations in Scales	N	Mean	df	Mean Difference	SD	t-value	Sig. (2- tailed)
Teaching Effectiveness	40	131.72	39	131.725	3.630	229.488	0.000
Attitude	40	127.05	39	127.050	2.698	297.820	0.000
Self Concept	40	129.40	39	129.400	1.533	534.009	0.000

The table-7 shows that the teachers of Assamese medium secondary school of experience level E1 (0-5 years) is also found significant at

level $p < .05$ on teaching effectiveness ($df=39$, $t=229.488$, $p < .05$), significant at $p < .05$ on attitude ($df=39$, $t=297.820$, $p < .05$) and also significant at $p < .05$ on self concept ($df=39$, $t=534.009$, $p < .05$).

Effects of Experience Level E2 (6-10yrs.) of AMSS

The study of E2 (6-10 yrs.) experience group of AMSS total sample $N=40$ of which Urban= 20 (Male= 10 & Female -10), and Rural= 20 (Male= 10 & Female -10) was done.

Table-8: Summary of ANOVA of mean, t-value and p-value of experience level E2 (6-10 years) Teacher's Effect on Teaching Effectiveness, Attitude and Self Concept scores.

Variates in Scales	N	Mean	df	Mean Difference	SD	t-value	Sig. (2 tailed)
Teaching Effectiveness	40	132.75	39	132.750	4.162	201.736	0.000
Attitude	40	125.50	39	125.500	2.253	352.268	0.000
Self Concept	40	129.45	39	129.450	1.584	516.741	0.000

The result got from the table-8 finds that the teachers of Assamese medium secondary school of experience level E2 (6-10 years) is found significant at level $p < .05$ on three independent variables that is teaching effectiveness ($df=39$, $t=201.736$, $p < .05$), attitude ($df=39$, $t=352.268$, $p < .05$), and self concept ($df=39$, $t=516.741$, $p < .05$).

Effects of Experience Level E3 (11-15yrs.) of AMSS

The study of E3 (11-15yrs.) experience group of AMSS total sample $N=40$ of which Urban= 20 (Male= 10 & Female -10), and Rural= 20 (Male= 10 & Female -10) was done.

Table-9: Summary of ANOVA of mean, t-value and p-value of experience level E3 (11-15 years) Teacher's Effect on Teaching Effectiveness, Attitude and Self Concept score.

The table-9 shows that the teachers of Assamese medium secondary school of experience level E3 (11-15 years) is found significant at

Variates in Scales	N	Mean	df	Mean Difference	SD	t-value	P-value
Teaching Effectiveness	40	134.05	39	134.050	4.290	197.605	0.000
Attitude	40	124.62	39	124.625	2.657	296.623	0.000
Self Concept	40	129.70	39	129.700	1.454	564.337	0.000

level $p < .05$ on all the independent variables i.e. teaching effectiveness ($df=39$, $t=197.605$, $p < .05$), attitude ($df=39$, $t=296.623$, $p < .05$) and self concept ($df=39$, $t=564.337$, $p < .05$).

Effects of Experience Level E4 (15-20yrs.) of AMSS

The study of E4 (16-20 years) experience group of AMSS total sample N=40 of which Urban=20 (Male=10 & Female -10), and Rural=20 (Male=10 & Female -10) was done.

Table-10: Summary of ANOVA of mean, t-value and p-value of experience level E4 (16-20 years) Teacher's Effect on Teaching Effectiveness, Attitude and Self Concept score.

Variances in Scales	N	Mean	df	Mean Difference	SD	t-value	Sig. (2-tailed)
Teaching Effectiveness	40	134.85	39	134.850	4.148	205.598	0.000
Attitude	40	122.90	39	122.900	3.795	204.833	0.000
Self Concept	40	130.15	39	130.150	1.511	544.587	0.000

The data obtained from table-10 illustrates the effects of teachers of Assamese medium secondary school at experience level E4 (16-20 years) on teaching effectiveness is found significant at level $p < .05$ ($df=39$, $t=205.598$, $p < .05$), significant at level $p < .05$ attitude ($df=39$, $t=204.833$, $p < .05$) and also significant at level $p < .05$ on self concept ($df=39$, $t=544.587$, $p < .05$).

Testing of Hypotheses

1. Ho-1 tested positive as there is found significant effect of age of teaching on teaching effectiveness and attitude towards teaching profession of secondary school teachers of in regards to medium of school (table-1).
2. Ho-2 tested positive as there is found significant effect of Age of secondary school teachers teaching effectiveness at the differences of location i.e. Urban and Rural (table-1). The effect of age on attitude towards teaching profession is insignificant at urban but significant at rural level (table-2).
3. Ho-4 tested positive as there is found significant effect of Age of Bodo medium secondary school teachers teaching effectiveness and attitude towards teaching profession at the differences of four levels of teaching experiences (table 3-6).
4. Ho-5 tested positive as there is found significant effect of Age of Assamese medium secondary school teachers teaching effectiveness and attitude towards teaching profession at the differences of four levels of teaching experiences (table 7-10).

The effect of experience is found significant at all levels of independent variable and dependant variables (tables 1-10). Thus the hypotheses-are tested as positive.



Conclusion

The study at experience level finds that the effect of experience of teachers of all Bodo and Assamese medium secondary school teachers of all age group is found significant on teaching effectiveness. Effect of teaching experience of Bodo and Assamese medium secondary school on teaching effectiveness was found significant. The effect of Bodo medium teacher at all experience level was also found significant difference on teaching effectiveness. Similarly the effect of Assamese medium teacher at all experience level was found significant difference on teaching effectiveness.

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EFFECT OF SOME DIETARY MICRONUTRIENTS ON OVERWEIGHT AND OBESITY

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Abstract

Overweight and obesity have been a global problem and it is the radical cause for most of the Non-communicable diseases. This condition is, in most of the situations, resistant to conventional management. The recent scientific studies reveals the fact that micronutrients plays pivotal role in maintaining health and reverse the patho-physiological process of many diseases including overweight and obesity. This includes minerals such as flouride, selenium, sodium, iodine, copper and zinc and vitamins such as vitamin A, C, D, E and K, as well as the B-complex. Articles were filtered in the databases PubMed and Google scholar. This review is limited to the role of Vitamin A, C and D in preventing and managing overweight and obesity. The review further reveals the fact that these vitamins acts in different mechanisms to maintain the body weight and dietary supplementation is the best option. Therefore the public should be encouraged to prevent and manage the overweight and obesity by resorting to healthy and nutritious foods which contain micronutrients also.

Key words: Overweight, Obesity, Vitamin A, Vitamin C, Vitamin D

Introduction

Micronutrients are commonly referred to as "vitamins and minerals". This includes minerals such as flouride, selenium, sodium, iodine, copper and zinc and vitamins such as vitamin A, C, D, E and K, as well as the B-complex vitamins (Sight & Life, 2011). Micronutrients are required by humans and other organisms throughout the lifetime in milligram and microgram to produce enzymes, hormones and other substances essential for proper growth and development (Canadian, 2006). Further, micronutrients are vital part in metabolism and in the maintenance of tissue functions. An adequate intake, therefore, is vital important. World Health Organization says that the body needs as tiny as the amounts of micronutrients, however, their absence will cause bad consequences. In addition, the Reference Nutrient Intakes (RNI) in UK (Panel, 1991) and the Dietary Reference Intakes (DRI) in the USA (Food and Nutrition, 1998; Food and Nutrition, 2002) defined the intakes of all



micronutrients ranges that suit for the healthy population. Therefore, the dietary intake should carefully be balanced in order to preserve health and reverse disease conditions.

Obesity is considered as mother of all diseases where dietary consumption is fairly high without balanced diet. Despite excessive dietary consumption, studies revealed that the obese individuals have affected high rates of micronutrient deficiencies (Ernst et al, 2006; Kimmonset al 2006). Modern agriculture and food processing methods too lead to a reduction in the micronutrient content of common foods in this new era (Kaidar-Person et al 2008). There are clear relationship between micronutrient deficiencies and obesity in different populations in the world, and there are evidences that such deficiencies can affect leptin and insulin metabolism which leads suppress appetite regulation and energy metabolism (Astrup & Bügel, 2010). It is understood that there are some micronutrients essential in order to control the excess weight. Some studies disclosed that certain micronutrient deficiencies in obese individuals are higher compared to normal weight controls of the same age and sex. In these studies, the micronutrients such as zinc, selenium, folate, vitamin B₁, vitamin B₁₂, vitamin A, vitamin E and 25-hydroxyvitamin D [25(OH)D] (Ernst et al 2006; Kimmonset al 2006; Kaidar-Person et al 2008) are mentioned in low levels. Further a gender wise study was disclosed that deficiency of retinol, β-carotene, vitamin D, vitamin E, vitamin C, folate, iron, and calcium was observed in obese individuals. (Antje et al, 2012). This review focused the pathophysiological aspect of vitamins on overweight / obesity.

Methods and Materials

To find the importance of Vitamins A, C and D, the published journal articles were filtered using online electronic databases such as PubMed advanced and Google scholar up to February 2020. The articles were selected only from English publications. To complete the systematic review in effective manner the articles were filtered using different search terms combining 'Obesity' OR 'Vitamin A' OR 'Vitamin C' OR 'Vitamin D. Animal studies and human trials were selected to confirm the effectiveness of Vitamins A, C and D on obesity. Duplicated publications were excluded.

Results and Discussion

The role of Vitamin A in obesity

Vitamin-A arises from two sources. One group is known as retinoids, which comes from animal sources and includes retinol. The second group is called as carotinoids, which comes from plants and includes beta-carotene. The beta-carotene is converted to vitamin-A by the body later. Literature evidences reveal



that vitamin-A plays main role in prevention and in case of imbalance causes metabolic diseases. Vitamin-A deficiency associated with obesity and the development of obesity-related diseases, type 2 diabetes, hepatic steatosis and steatohepatitis, and cardiovascular diseases. In addition, a number of proteins involved in vitamin-A metabolism, including retinol-binding protein 4 (RBP4) and aldehyde dehydrogenase 1A1 (ALDH1A1) have also been identified as being associated with metabolic diseases (Blaner, 2019) including obesity.

Retinol, the animal forms of vitamin A and is essential for vision, skin health, teeth remineralization and bone growth (Gropper et al, 2009). It is transported in a complex with retinol-binding protein - 4 (RBP4) and transthyretin (TTR) in the circulation. RBP4 is a protein belongs to the lipocalin family (National Library) and is produced in the liver where it binds vitamin A retinol, and transports it to tissues through the blood (Noyet al, 2015). Many researches revealed that the changes in RBP4 (retinol binding protein-4) levels were significantly correlated with the amounts of abdominal visceral fat loss but were not associated with the amount of total body fat loss or abdominal subcutaneous fat loss (Lee et al 2008).

A study concluded that the depot-specific expression of RBP4 in human subcutaneous and omental adipose tissues and among these high expression of RBP4 found in omental adipose tissue and as a result, there is an elevation in the level of serum RBP4 that may contribute to the pathogenesis of obesity and Insulin Resistance (Lu et al, 2010). In order to approve this statement, another study revealed that serum RBP4 levels are elevated in humans with obesity and with the intervention of fenretinide (a synthetic retinoid) increases urinary excretion of RBP4 and normalizes serum RBP4 levels and improves insulin resistance and glucose intolerance in mice with obesity induced by a high-fat diet (Qin-Yang et al, 2005).

Further studies revealed that chronic dietary supplements of Vitamin A at doses of 52 and 129 mg/kg in diet showed reduced body weight gain and adiposity index, and retroperitoneal white adipose tissue mass (without affecting food intake) in obese rats compared with their lean and carrier counterparts (Anamthathmakula et al, 2014; Jeyakumar & Vajreswari, 2015). Another study revealed that feeding a high but not toxic dose of vitamin-A (129 mg /Kg diet) for 2 months intervention reduces the adiposity index and retroperitoneal white adipose tissue in substantial amount in obese rats (Jeyakumar et al, 2005). Therefore, these studies proved that the contribution of dietary vitamin A in correcting and controlling obesity.



The name β -carotene comes from the Greek word beta and Latin word carota (carrot). It is the yellow/orange pigment that gives vegetables and fruits their rich colors. The human body converts β -carotene into vitamin-A (retinol). Nutritional status studies say that significantly lower plasma β -carotene levels found in obese children (Tamaset al, 1997 and Morinobuet al, 2002) and another study, concluded that serum β -carotene concentration was significantly and negatively associated with both general and central adiposity (Peteret al, 2001).

The role of Vitamin C in obesity

Vitamin C is a water-soluble vitamin and is necessary for normal growth and development. Leftover amounts of the vitamin C leave the body through the urine. However, our body is not able to make vitamin C on its own, and it does not store vitamin C. That means we need a continuous supply of this vitamins throughour diet. Therefore, it is important to include plenty of vitamin C-containing foods in our daily diet. Many studies revealed that Vitamin C (Ascorbic acid) has antioxidant properties (Proteggenteet al, 2002:Vojdaniet al, 2000). Antioxidants are nutrients that block some of the damage caused by free radicals and by which it would reduce the occurrence of chronic diseases such as obesity, diabetes and even cancers. In addition to the antioxidant activity, researches revealed that Vitamin C reduces the serum LDL cholesterol and triglycerides, significantly and elevation of serum HDL, also (McRae, 2008). Further it was found that increased intake of Vitamin C could reduce the belly fat that accumulates around the abdomen (Stephen, 2007). Vitamin C deficiency reduces the body's synthesis of L-carnitine, an amino acid that the mitochondria need to burn fatty acids. Nutritionist Carol Johnstons' view is that, in order to lose weight, there must be a subtle change in our diet such as simply to increase vitamin C intake (Johnston, 2005). Another review revealed that vitamin C intake (ascorbic acid) is negatively associated with many NCDs including obesity. Vitamin C may involve in modulattng adipocyte lipolysis; inhibits glucose metabolism and leptin secretion on isolated adipocytes; lead to an improvement in hyperglycemia and decrease glycosylation in obese-diabetic models; and reduce the inflammatory response.

The role of Vitamin D in obesity

Vitamin D (VD) is a group of fat soluble prohormones, with the two major forms being ergocalciferol (VD2) and cholecalciferol (VD3) (Martini & Wood, 2006). Certainly, more than 80 % of systemic VD3 derives from skin epidermis and the other 20 % is obtained through the diet from animal (cholecalciferol), or plant (ergocalciferol), and through supplementations (Fraser & Milan, 2013).



These D3 and D2 are hydroxylated on carbon 25, forming 25-hydroxy-vitamin D [25(OH)D] in the liver, and then on carbon 1, forming 1,25-dihydroxyvitamin D [1,25(OH)2D] in the kidney to become active VD(St-Arnaud & Glorieux, 1998). Along with obesity, deficiency in vitamin D is reaching epidemic proportions in the population, worldwide (Holick, 2007). The vitamin D stores can be assessed by 25(OH)D levels and which were directly associated with adiponectin levels, independent of age, BMI and ethnicity (Vaidya et al, 2012). Further, adiponectin levels have been found to be reduced in persons with obesity and type 2 DM. A meta-analysis disclosed that the consistent evidences of an association between the vitamin D deficiency and high risk of obesity incidence, irrespective of areas, age, latitude (Yao et al, 2015; Pereira,et al, 2019).Hence, another meta-analysis revealed that the potential clinical efficacy of cholecalciferol D supplementation as a potential therapeutic option for weight loss programs. In addition, they concluded that further studies are needed to confirm the validity (Perna, 2019).Many researchers suggest that treatment strategies are effective only as long as they are used, and combined therapy may be more effective than mono therapy.

Conclusion

This review was scrutinized to assess the pivotal role of some selected micronutrients in maintaining body weight and in the management of overweight and obesity. This study clearly exhibits the fact that minute amount of micronutrients; vitamin A, C, and D, plays major role in maintaining body weight and dietary supplementation is the best option. The value of the micronutrients in health and disease was overlooked in the past but from the recent past many authentic revelations have proved the therapeutic value of micronutrients in preventing and curing many disease conditions and in metabolic syndromes including obesity. Therefore, it is proposed to carry out extensive studies in this area and also to develop a proper mechanism to encourage the people to resort to dietary supplementation to acquire the so called micronutrition.

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DEVELOPMENT OF FLOATING TABLETS DOSAGE FORM OF THEOPHYLLINE

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Abstract

The objective of this research work was to formulation and evaluation the floating drug delivery system containing theophylline as a optimize the drug release profile. Theophylline tablets were prepared by direct compression. Formulation contain Acacia Gum ,Tragacanth Gum, Xanthan Gum, and gas generating agent such as sodium bicarbonate were taken independent variables. The effect of formulation variable on floating and drug release was evaluated. The pre compression and post compression parameters were evaluated within limits. The F8 formulation was showed good release 99.58% and it consider as a optimized.

Key words: theophylline,Acacia Gum ,Tragacanth Gum, Xanthan Gum

Introduction:

Floating drug delivery systems (FDDS) have a bulk density less than gastric fluids and so remain buoyant in the stomach without affecting gastric emptying rate for a prolonged period of time.

Floating drug delivery systems (FDDS) are aimed to retain the drug in the stomach and are useful for drugs that are poorly soluble or unstable in intestinal fluids. The underlying principle is very simple i.e., to make the dosage form less dense than the gastric fluids so that it can float on them. The density of the system can be reduced by incorporating a number of low density fillers in to the systems such as hydroxyl cellulose lactates or microcrystalline cellulose. However, this system is not ideal because its performance is highly dependent on the presence of food and fluid in the stomach.¹

The basic idea behind the development of such a system was to maintain a constant level of drug in the blood plasma inspire of the fact that the drug dose not undergoes disintegration. The drug usually keeps floating in the gastric fluid and slowly dissolves at a predetermined rate to release the drug from the dosage form and maintain constant drug levels in the blood ². The concept of floating tablets is mainly based on the matrix type drug delivery system such that the drug remains embedded in the matrix which after coming in contact with the gastric fluid swells up and the slow erosion of the drug

without disintegration of the tablet takes place. Sometimes for generating a floating system we even need to add some effervescent or gas generating agent which will also ultimately reduce the density of the system and serve the goal of achieving a floating system.³

These systems have a particular advantage that they can be retained in the stomach and assist in improving the oral sustained delivery of drugs that have an absorption window in a particular region of the GIT. These systems continuously release the drug before it reaches the absorption window, thus ensuring optimal bioavailability.⁴

Theophylline is a methylxanthine derivative from tea with diuretic, smooth muscle relaxant, bronchial dilation, cardiac and central nervous system stimulant activities. Mechanistically, theophylline acts as a phosphodiesterase inhibitor, adenosine receptor blocker, and histone deacetylase activator. Theophylline is marketed under several brand names such as Uniphyll and Theochron, and it is indicated mainly for asthma, bronchospasm, and COPD.⁵

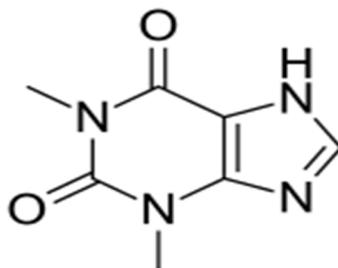


Figure 1: Structure of theophylline

2. MATERIALS & METHODS:

Theophylline Procured From BelcoPharma, Bahadurgarh, Haryana, India. Provided by SURA LABS, Dilsukhnagar, Hyderabad. Acacia Gum, Tragacanth Gum, Xanthan Gum, NaHCO₃ Citric acid, Talc, Mg stearate, MCC Qualikems Fine Chemicals Pvt Ltd, Delhi, India.

INSTRUMENTS:

Weighing Balance (Sartorius), Tablet Compression Machine (Multistation) (Lab Press Limited, India) Hardness tester (Monsanto, Mumbai, India) Vernier callipers (Mitutoyo, Japan)

Roche Friabilator (Labindia, Mumbai, India) Dissolution Apparatus and UV-Visible Spectrophotometer, pH meter Labindia, Mumbai, India.

2.1. Analytical method development:

a) Determination of absorption maxima:

A solution containing the concentration 10 µg/mL drug was prepared in 0.1N HCL UV spectrum was taken using Double beam UV/VIS spectrophotometer.

The solution was scanned in the range of 200 – 400 nm.

b) Preparation calibration curve:

10mg Theophylline pure drug was dissolved in 10ml of methanol (stock solution1) from stock solution1. 1ml of solution was taken and made up with 10ml of 0.1N HCL (100µg/ml). From this 1ml was taken and made up with 10 ml of 0.1N HCL (10µg/ml). The above solution was subsequently diluted with 0.1N HCL to obtain series of dilutions Containing 2, 4, 6, 8, 10µg /ml of per ml of solution. The absorbance of the above dilutions was measured at 271nm by using UV-Spectrophotometer taking 0.1N HCL as blank. Then a graph was plotted by taking Concentration on X-Axis and Absorbance on Y-Axis which gives a straight line Linearity of standard curve was assessed from the square of correlation coefficient (R^2)which determined by least-square linear regression analysis.

2.2. Drug – Excipient compatibility studies

Fourier Transform Infrared (FTIR) spectroscopy:

The compatibility between the pure drug and excipients was detected by FTIR spectra obtained on Bruker FTIR Germany(Alpha T).The solid powder sample directly place on yellow crystal which was made up of ZnSe. The spectra were recorded over the wave number of 4000 cm^{-1} to 550 cm^{-1} .

2.3. Preformulation parameters

The quality of tablet, once formulated by rule, is generally dictated by the quality of physicochemical properties of blends. There are many formulations and process variables involved in mixing and all these can affect the characteristics of blends produced. The various characteristics of blends tested as per Pharmacopoeia.

Optimization of Sodium bicarbonate:

Sodium bicarbonate was employed as effervescent gas generating agent. It helps the formulation to float. Various concentrations of sodium bicarbonate were employed; floating lag time and floating duration were observed. Based on the concentration of sodium bicarbonate was finalised and preceded for further formulations.

Table 1: Formulation composition for Floating tablets

Ingredients	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Theophylline	100	100	100	100	100	100	100	100	100	100	100	100
Acacia Gum	40	80	120	160	-	-	-	-	-	-	-	-
Tragacanth Gum	-	-	-	-	40	80	120	160	-	-	-	-
Xanthan Gum	-	-	-	-	-	-	-	-	40	80	120	160
NaHco ₃	40	40	40	40	40	40	40	40	40	40	40	40
Citric acid	20	20	20	20	20	20	20	20	20	20	20	20

Talc	5	5	5	5	5	5	5	5	5	5	5	5
Mg stearate	5	5	5	5	5	5	5	5	5	5	5	5
MCC	290	250	210	170	290	250	210	170	290	250	210	170
Total weight	500	500	500	500	500	500	500	500	500	500	500	500

2.4 In vitro Buoyancy studies:

The In vitro buoyancy was determined by floating lag time, and total floating time. (As per the method described by Rosa et al) The tablets were placed in a 100ml beaker containing 0.1N HCL. The time required for the tablet to rise to the surface and float was determined as floating lag time (FLT) and duration of time the tablet constantly floats on the dissolution medium was noted as Total Floating Time respectively (TFT).

In vitro drug release studies

Dissolution parameters:

Apparatus	--	USP-II, Paddle Method
Dissolution Medium	--	0.1 N HCL
RPM	--	50
Sampling intervals (hrs)	--	1,2,3,4,5,6,7,8,10,11,12
Temperature	--	37°C + 0.5°C

As the preparation was for floating drug release given through oral route of administration, different receptors fluids are used for evaluation the dissolution profile.

3. Results and Discussion

3.1. Analytical Method

a. Determination of absorption maxima

The standard curve is based on the spectrophotometry. The maximum absorption was observed at 271 nm.

b. calibration curve

A graph of Theophylline was taken in 0.1N HCL (pH 1.2).

Table no:2 Observations for graph of Theophylline 0.1N HCL

Concentration[µg/mL]	Absorbance
0	0
2	0.168
4	0.352
6	0.549
8	0.734
10	0.923

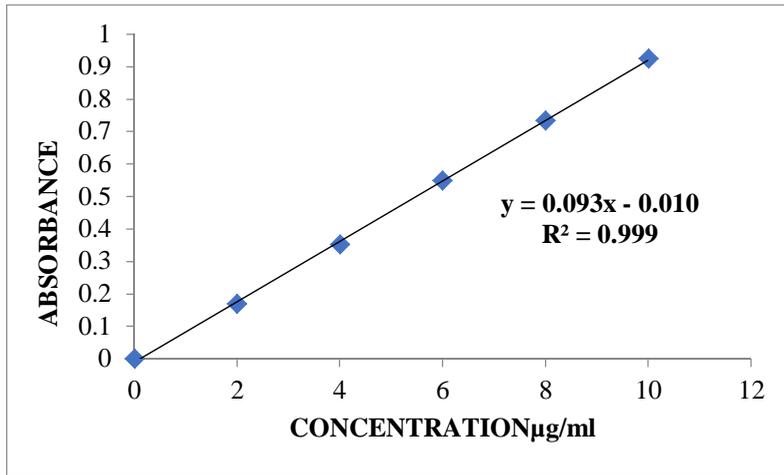


Figure 2:Standard graph of Theophylline 0.1N HCL

Standard graph of Theophylline was plotted as per the procedure in experimental method and its linearity is shown in Table and Fig. The standard graph of Theophylline showed good linearity with R^2 of 0.999, which indicates that it obeys “Beer- Lamberts” law.

3.2. Drug – Excipient compatibility studies Fourier Transform-Infrared Spectroscopy:

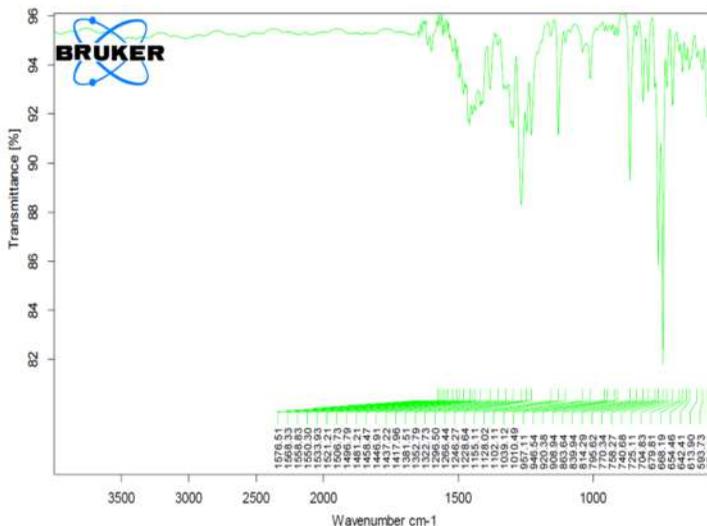


Figure 3: FTIR Spectrum of pure drug

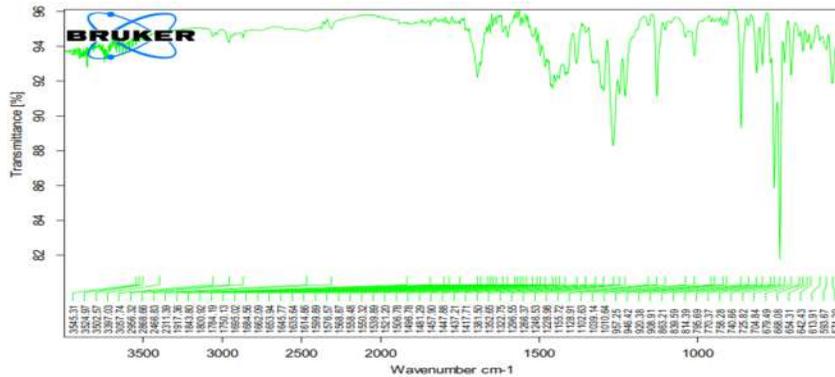


Figure: 4 FTIR Spectrum of optimized formulation

From the FTIR data it was evident that the drug and excipients does not have any interactions. Hence they were compatible.

3.3. Preformulation parameters of powder blend:

Table 3: Pre-formulation parameters of blend

Formulation Code	Angle of Repose	Bulk density (gm/ml)	Tapped density (gm/ml)	Carr's index (%)	Hausner's Ratio
F1	37.8	0.392	0.542	27.67	1.38
F2	35.6	0.388	0.573	32.28	1.47
F3	38.2	0.390	0.593	34.23	1.52
F4	39.4	0.398	0.485	17.9	1.21
F5	36.3	0.372	0.492	24.3	1.32
F6	34.2	0.380	0.511	25.6	1.34
F7	37.3	0.386	0.386	22.02	1.28
F8	33.5	0.394	0.482	18.25	1.22
F9	33.8	0.381	0.493	22.7	1.29
F10	36.2	0.376	0.532	29.32	1.41
F11	37.7	0.385	0.480	19.7	1.24
F12	34.4	0.344	0.526	26.4	1.36

3.4. Quality Control Parameters For tablets

Table 4: Invitro quality control parameters

Formulation codes	Average Weight (mg)	Hardness (kg/cm ²)	Friability (%loss)	Thickness (mm)	Drug content (%)	Floating lag time (min)	Total Floating Time (Hrs)
F1	498.54	4.5±0.14	0.42±0.18	3.6±0.32	99.47	12	12
F2	495.32	4.8±0.27	0.47±0.22	3.8±0.46	98.65	15	12
F3	496.81	4.7±0.34	0.64±0.29	3.4±0.75	99.28	18	12
F4	499.37	4.4±0.79	0.58±0.36	3.9±0.39	97.66	11	12

F5	497.65	5.2±0.54	0.27±0.62	4.2±0.55	99.48	16	12
F6	489.29	4.9±0.28	0.52±0.57	3.5±0.87	98.39	13	12
F7	490.76	5.1±0.62	0.35±0.92	4.1±0.63	99.12	15	12
F8	495.55	4.3±0.91	0.44±0.44	3.8±0.27	97.95	17	12
F9	500.96	4.7±0.38	0.53±0.12	3.2±0.34	99.67	20	12
F10	498.47	4.4±0.76	0.61±0.39	3.7±0.48	98.52	16	12
F11	497.84	4.7±0.84	0.74±0.27	3.4±0.35	97.33	11	12
F12	499.33	4.5±0.66	0.49±0.76	3.6±0.52	99.22	19	12

3.5. In Vitro Drug Release Studies

Table no 5: Dissolution data of Floating Tablets (F1-F4)

TIME (hr)	CUMULATIVE PERCENT DRUG RELEASED			
	F1	F2	F3	F4
0	0	0	0	0
1	8.53	10.38	13.59	16.12
2	17.94	19.74	20.56	25.53
3	27.45	28.77	31.28	33.74
4	36.53	35.15	38.45	39.65
5	43.59	42.35	43.42	44.56
6	50.48	47.93	49.26	50.17
7	55.65	52.65	54.56	53.97
8	61.86	57.44	61.32	61.38
9	66.51	61.14	67.89	66.39
10	71.23	63.35	71.94	73.55
11	73.31	73.24	73.25	76.91
12	76.29	77.47	76.65	78.64

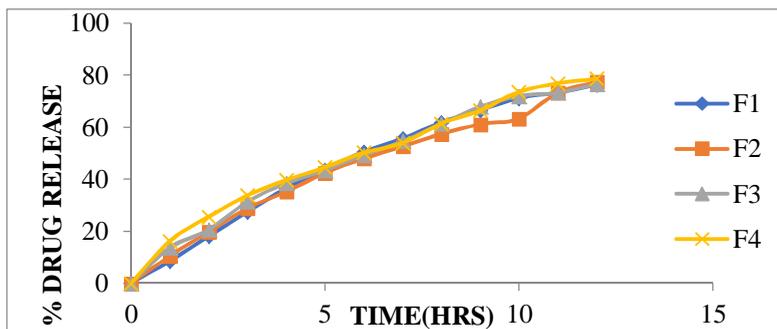


Figure 5:Dissolution data of Theophylline Floating tablets

Table no 6: Dissolution data of Floating Tablets (F5-F8)

TIME (hr)	CUMULATIVE PERCENT DRUG RELEASED			F8
	F5	F6	F7	
0	0	0	0	
1	20.33	18.81	11.63	16.16
2	26.93	26.42	13.25	20.46
3	37.57	35.92	23.94	31.65
4	43.52	41.33	35.68	42.27
5	48.45	46.93	47.63	49.19
6	52.74	49.44	55.65	57.86
7	60.95	55.18	63.17	73.36
8	67.49	62.59	69.88	84.37
9	72.26	69.65	77.06	89.68
10	78.14	75.36	81.64	93.57
11	83.44	78.28	84.59	96.28
12	86.62	80.46	87.21	99.58

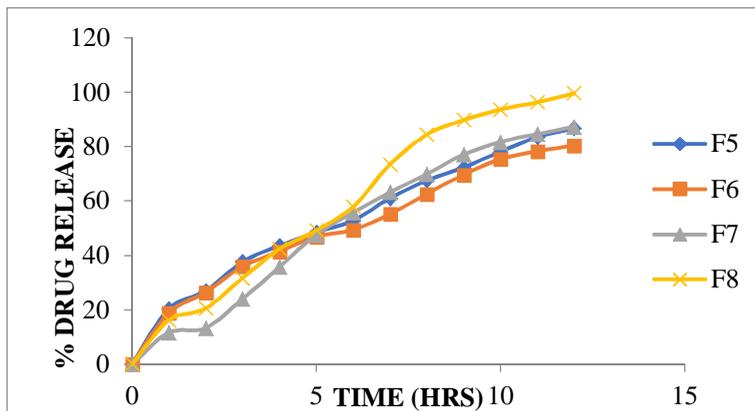


Figure 6: Dissolution data of Theophylline Floating tablets

Table no 7: Dissolution data of Floating Tablets (F9-F12)

TIME (hr)	CUMULATIVE PERCENT DRUG RELEASED			F12
	F9	F10	F11	
0	0	0	0	0
1	14.21	13.73	11.47	9.47
2	18.73	16.67	12.24	13.12
3	35.63	33.94	25.26	22.57
4	40.52	37.22	32.57	28.67
5	48.62	45.67	41.82	36.93

6	56.13	51.44	48.71	42.33
7	63.23	58.32	53.88	49.25
8	71.92	67.29	57.09	55.17
9	79.28	74.45	69.55	63.26
10	82.53	78.83	73.56	68.58
11	87.11	85.48	78.41	74.37
12	95.87	93.99	89.49	86.67

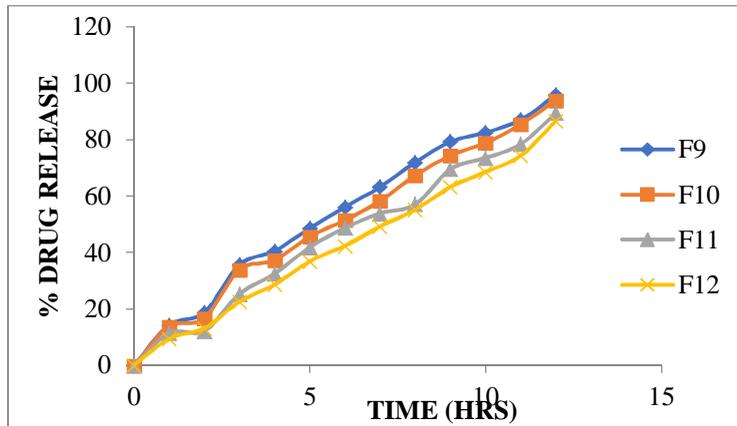


Figure 7:Dissolution data of Theophylline Floating tablets

Table No 8: Application kinetics for optimised formulation

TIME (T)	ROOT (T)	LOG(%) RELEASE	LOG (T)	LOG (%) REMAIN	RELEASE RATE (CUMULATIVE % RELEASE / t)	1/CUM% RELEASE	PEPPAS log Q/100	% Drug Remaining	Q01/3	Qt1/3	Q01/3-Qt1/3
0	0			2.000				100	4.642	4.642	0.000
1	1.000	1.270	0.000	1.911	16.16	0.0538	-0.730	81.4	4.642	4.334	0.308
2	1.414	1.433	0.301	1.863	20.46	0.0369	-0.567	72.9	4.642	4.177	0.464
3	1.732	1.535	0.477	1.818	31.65	0.0292	-0.465	65.7	4.642	4.035	0.606
4	2.000	1.668	0.602	1.728	42.27	0.0215	-0.332	53.4	4.642	3.766	0.876
5	2.236	1.713	0.699	1.685	49.19	0.0194	-0.287	48.4	4.642	3.644	0.997
6	2.449	1.777	0.778	1.604	57.86	0.0167	-0.223	40.2	4.642	3.426	1.216
7	2.646	1.822	0.845	1.526	73.36	0.0151	-0.178	33.6	4.642	3.227	1.415
8	2.828	1.862	0.903	1.435	84.37	0.0137	-0.138	27.2	4.642	3.007	1.634
9	3.000	1.903	0.954	1.303	89.68	0.0125	-0.097	20.1	4.642	2.719	1.923
10	3.162	1.931	1.000	1.167	93.57	0.0117	-0.069	14.7	4.642	2.450	2.192
11	3.317	1.967	1.041	0.869	96.28	0.0108	-0.033	7.4	4.642	1.949	2.693
12	3.464	1.982	1.079	0.613	99.58	0.0104	-0.018	4.1	4.642	1.601	3.041

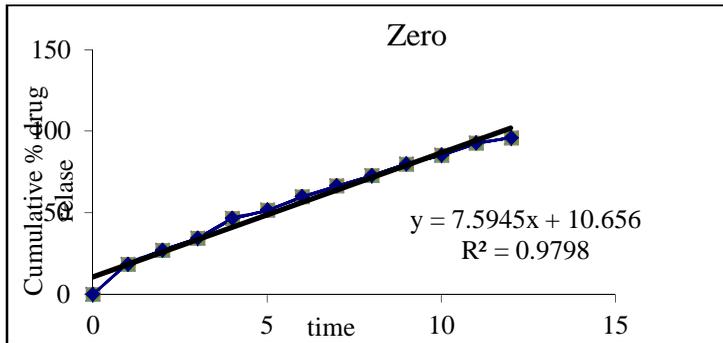


Figure 8: Zero order release kinetics

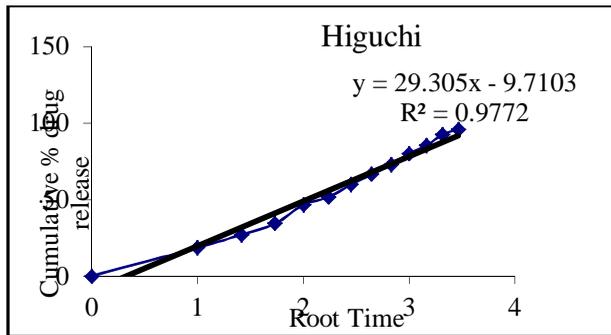


Figure 9: Higuchi release kinetics

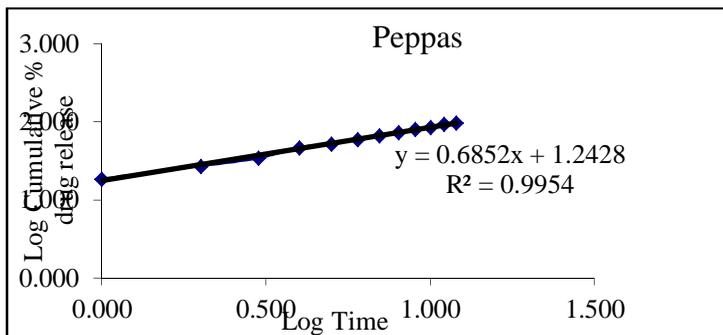


Figure 10 : Kors mayer peppas release kinetics

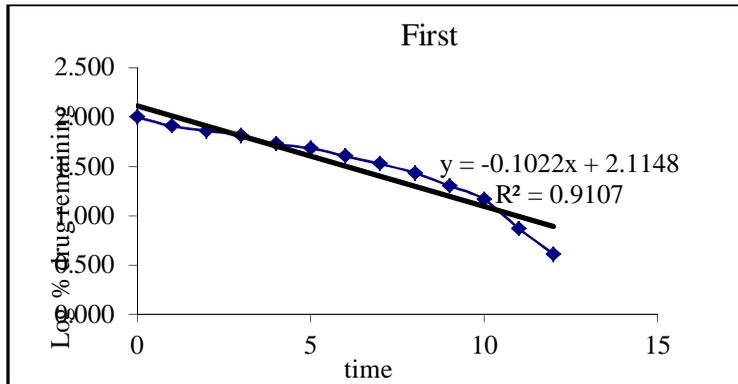


Figure 11 : First order release kinetics

4. DISCUSSION:

The absorption maximum of theophylline was found to be 271nm. Standard graph of Theophylline was plotted as per the procedure in experimental method and its linearity is shown in Table and Fig. The standard graph of Theophylline showed good linearity with R^2 of 0.999, which indicates that it obeys “Beer- Lamberts” law.

From the FTIR data it was evident that the drug and excipients doses not have any interactions. Hence they were compatible.

Tablet powder blend was subjected to various pre-formulation parameters. The angle of repose values indicates that the powder blend has good flow properties. The bulk density of all the formulations was found to be in the range of 33.5 to 37.8(gm/cm³) showing that the powder has good flow properties. The tapped density of all the formulations was found to be in the range of 0.386 to 0.593 showing the powder has good flow properties. The compressibility index of all the formulations was found to be ranging between 17.9 to 34.23 which shows that the powder has good flow properties. All the formulations has shown the hausner ratio ranging between 1.22 to 1.52 indicating the powder has good flow properties.

All the parameters such as weight variation, friability, hardness, thickness, drug content were found to be within limits.

Formulations prepared with Tragacanth Gum were revealed that increase in the concentration retards the drug release. Among all formulations F8 formulation was considered as optimized formulation. It was shown 99.65% drug release at 12hrs.

Optimised formulation F8 was kept for release kinetic studies. From the above graphs it was evident that the formulation F8 was followed Higuchi release mechanism.



5. Conclusion:

In accordance with present study it was concluded that, floating tablet of Theophylline can increase the gastric residence time as well as bioavailability and there by shows increased therapeutic efficacy. The addition of gl forming polymer Tragacanth Gum and gas generating agent sodium bicarbonate and citric acid was essential to achieve. Method of preparation is simple , cost effective and scalable.

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OFFERING HUMAN HAIR- A DONATION OR POLLUTION?

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Abstract

Human hair is considered to be a waste material causing many environmental problems; however, it has many known uses. Preventing accumulation and wastage of human hair in environment may automatically reduce pollution. This issue may be addressed by developing a better human hair utilization system, identifying and popularizing the versatility of human hair as a resource and preventing pollution due to human hair.

The scope of this article is to popularize the comparatively newer sectors of business where human hair is used as a resource. Hopefully this will trigger newer ideas among entrepreneurs with employees ranging from unskilled to highly technicians.

Key words: Human hair, Donation, Human hair utilization system, Versatility of human hair, Resource, Pollution, Offering hair, Preventing pollution, Human hair waste, Hair auction, Human hair export, Human hair exporting companies, Horticulture, Soil engineering, Nutrient source for plants, Suturing material, Hair protein extraction, Wound healing, Reinforcement of Concrete, Supply chain of human hair

Introduction:

The motive behind writing this article was to find an answer to the question, “How can offering of one’s own hair be a donation?” Hinduism in India believes that offering hair to God is auspicious. It is a ritual. This article assumes that an offer to almighty is actually an offer to society. In this context the motive of this article was to identify how an offer of human hair helps the society, or simply how is human hair a useful resource?

Human hair is considered to be a waste material causing many environmental problems; however, it has many known uses. Preventing accumulation and wastage of human hair in environment may automatically reduce pollution. This issue may be addressed by developing a better human hair utilization system, identifying and popularizing the versatility of human hair as a resource and preventing pollution due to human hair.



The scope of this article is to popularize the comparatively newer sectors of business where human hair is used as a resource. Hopefully this will trigger newer ideas among entrepreneurs with employees ranging from unskilled to highly technicians.

Research methodology:

This is a theoretical article which proposes to publicize the concept of using human hair waste as a resource. It also intends to publicize the alternative uses and applications of human hair. Most of the data obtained was from secondary sources. Roughly fifty articles were collected from journals and magazines, around thirty websites were visited, and informal discussions on blogs and social media were made. The data so obtained was classified into categories based on the variety of uses/ application. Conclusions were drawn after carefully analyzing the data.

Literature review:

According to an article by Joanna Sugden, titled “The Great Indian Hair Auction” in The Wall Street Journal, on May 31, 2012 10:00 am IST, a revenue of around 200 million rupees (\$3.6 million) was generated in the year 2011 through e-auction, compared to the 54 million rupees the previous year. Conventional bidding was replaced by e-auction to prevent the formation of bidder “rings” and their tricks to keep price low. Switching to e-auction from traditional bidding permitted access to open market, permitted transparency, generated better revenue, and competition. Metal Scrap Trading Corporation, which is an arm of Ministry of Steel, provided a market place for auction of hair.

According to Daniel Workman’s report titled “Top Human Hair Exporters by Country” published on August 10, 2019, top 15 countries that exported the highest dollar value worth of human hair during 2018 include:

1. India: US\$35.1 million (46.7% of total human hair exports)
2. Hong Kong: \$17.9 million (23.8%)
3. Myanmar (Burma): \$8.9 million (11.8%)
4. United Kingdom: \$3 million (3.9%)
5. Italy: \$1.8 million (2.4%)
6. Pakistan: \$1.5 million (2%)
7. United States: \$1.4 million (1.8%)
8. Singapore: \$1.1 million (1.4%)
9. Indonesia: \$759,000 (1%)
10. Uzbekistan: \$730,000 (1%)
11. Brazil: \$540,000 (0.7%)



12. Thailand: \$475,000 (0.6%)
13. Tanzania: \$377,000 (0.5%)
14. Japan: \$269,000 (0.4%)
15. South Africa: \$200,000 (0.3%)

The following countries posted their very best positive net exports for human hair during 2018. Investopedia defines net exports as value of a country's total exports minus the worth of its total imports. Thus, the statistics below present the excess between the worth of every country's exported human hair and its import purchases for that very same commodity.

1. India: US\$34.4 million (net export surplus down -38.4% since 2014)
2. Hong Kong: \$8.5 million (up 83.9%)
3. United Kingdom: \$1.9 million (reversing a -\$428,000 deficit)
4. Pakistan: \$1.5 million (down -3.5%)
5. Uzbekistan: \$730,000 (up 15.5%)
6. United States: \$477,000 (down -49.5%)
7. Thailand: \$475,000 (reversing a -\$153,000 deficit)
8. Tanzania: \$372,000 (reversing a -\$17,000 deficit)
9. Singapore: \$279,000 (up 136.4%)
10. South Africa: \$169,000 (down -84.3%)
11. Tajikistan: \$154,000 (up 214.3%)
12. Japan: \$152,000 (reversing a -\$17,000 deficit)
13. Canada: \$96,000 (reversing a -\$56,000 deficit)
14. Nepal: \$65,000 (down -60.8%)
15. Belarus: \$45,000 (down -31.8%)

India earned a surplus within the international trade of human hair. In turn, this positive cashflow confirms India's strong competitive advantage for this specific product category.

Human Hair Exporting Companies:

According to global trading platform Alibaba, the following suppliers are examples of human hair exporters. The home-country location for every business is shown within parentheses:

- B & K Import & Export (United States)
- Business-Salon Group Ltd (Ukraine)
- Evergreen Products Factory Ltd (Hong Kong)
- GRV Exports (India)



- Rawhair Import Export Company (Vietnam)
- UNICS Co, Ltd (Japan)
- Waheed Universal Hair Company (Pakistan)
- Widya International (Indonesia)

Some Indian company profiles:

GRV Exports¹ was established in 2002, it has made a name for itself in the list of top suppliers of Human Hair & Accessories, Hair Extension in India. The supplier company is located in Madurai, Tamil Nadu and is one of the leading sellers of listed products.

GRV EXPORTS is listed in Trade India's list of verified sellers offering supreme quality of Indian Machine Weft Hair, Asian Human Hair, Machine Weft Wavy Hair etc. Buy Human Hair & Accessories, Hair Extension in bulk from us for the best quality products and service. They are exporters to countries like USA, UK, Germany, France, Switzerland, China, Netherlands, Spain, Belgium.

Om Vinayaka Enterprises² was established in the year 2000. It is a well-known name in the field of manufacturing, exporting and supplying South Indian Human Hair & Accessories. It has created a niche market in Indian as well as international market by providing quality hair, well-approved and accepted as per the global standards. It has expanded its wings to UK, USA, Germany and Europe. It offers natural, ornamental, straight, curly weft, single drawn, double drawn, bleached blond and several other types of hair.

Rajkamal wigs³, located in Mumbai, Maharashtra is a manufacturer, supplier and exporter of Human hair, wigs, toupees, hair replacements, hair extensions, beards, mustaches, hair accessories.

Literature review on various application areas:

1. Zheljzkov et al. (2008a, b) reported that human hair (HH) generated in barbershops are often safely used for horticultural crops as composting feed.

2. Renju R Pillai and Ayothiraman Ramanathan from IIT Delhi, India, in their article titled "An Innovative Technique of Improving the Soil Using Human Hair Fibers", stated that the test results reveal that the inclusion of

¹ <https://www.globalsources.com/si/FL/GRV-Exports/6008838166596/Homepage.htm>

² <https://omvinayakenterprises.com/>

³ <https://www.rkwigs.com/>



randomly distributed human hair fiber in soil significantly improves the engineering properties of soil.

3. Valtcho D. Zheljzakov et al. 2007 , suggested that non-composted hair waste might be used as a nutrient source for container-grown plants. t once the degradation and mineralization of hair waste starts, it can provide sufficient nutrients to container-grown plants and ensure similar yields to those obtained with the commonly used fertilizers in horticulture. However, it takes time for the hair to start out degrading and releasing nutrients. Human hair waste might be composted, as has been demonstrated with sheep wool (Das et al., 1997; Plat et al., 1984; Verville, 1996), another similar keratinaceous product. Overall, the amount of residual nutrients in growth medium after the harvest of the second crops was above that of the control, indicating a possibility for additional cropping. Furthermore, further mineralization of hair waste would be expected in the hair treatments, which might be able to supply phyto-available nutrients for a subsequent crop. Further research is required to match nutrient release from hair waste to crop requirements and to estimate optimal rates of application of hair waste to different containergrown crops. Because human hair may carry biohazards like human pathogens or chemicals, further research is required to deal with possible health concerns of consumers and therefore the general public on the use of human hair waste as nutrient source for edible crops.

Renju R Pillai and Ayothiraman Ramanathan IIT Delhi , India concluded that inclusion of randomly distributed human hair fiber in soil significantly improves the engineering properties of soil.

4. G. C. Sood, D. K. Sen, and L. D. Sota, Among the various suture materials which have been recommended from time to time are silk (Halsted, 1913), absorbable surgical gut (Hughes, Guy, and Romaine, 1944; Davis, 1944), virgin silk (Hoppenbrouwers, 1962), wire (Hofmann, 1962), and rat-tail tendon (Pischel, 1930; Larmi, 1961; Gopal, Gupta, and Gupta, 1968). Adhesive synthetic material has been used experimentally by Bloomfield, Barnert, and Kanter (1963). Our good results with human hair were almost like those of Leigh (1966). The advantages of using human hair are as follows: (1) It is freely available and easily sterilized by autoclaving. (2) It is very fine, the average diameter being 87 54 μ or approximately 0.000,000, so that it passes easily through the eye of the finest needle, and also passes smoothly through the tissues; it is therefore useful for post-placed sutures especially if vitreous leakage is threatened. (3) it's strong enough to carry the tissues together, is flexible, and doesn't crack or fray. (4) It is easily visible



for handling and picking up during operations, but the knot produced is small and does not slip. (5) The capillarity is negligible, so that there is little chance of introducing external infection, and as it is non-irritant it produces hardly any tissue reaction or scarring.

5. Clarence R. Robbins (2012) stated that depending on its moisture content (up to 32% by weight), human hair, consists of approximately 65% to 95% proteins. Proteins are condensation polymers of amino acids. Because of the massive number of chemical reactions that human hair is subjected to by permanent waves, chemical bleaches, alkaline straighteners and sunlight exposure, many of the proteins are fragmented and a number of other of those aminoalkanoic acid s are converted to amino acid derivatives.

6. Limat A.a • Hunziker T, 2002, During wound healing, outer root sheath (ORS) cells of hair follicles can substitute for interfollicular epidermal keratinocytes and thus act as precursor cells for interfollicular epidermal keratinocytes. Owing to improved culture techniques, ORS cells are often induced to develop highly differentiated epidermal equivalents, which are on the brink of the traditional human epidermis in terms of histological, ultrastructural, biochemical and immunohistological criteria. Such epidermal equivalents provide a flexible system for various applications in vitro.

7. Jain D. and Kothari A. suggest the use of human hair fibre in concrete reinforcement of concrete. Fibre reinforced concrete can offer a convenient, practical and economical method for overcoming micro-cracks and similar type of deficiencies. Since concrete is weak in tension hence some measures must be adopted to overcome this deficiency. Human hair is strong in tension; hence it can be used as a fibre reinforcement material. Hair Fibre (HF) an alternate non-degradable matter is available in abundance and at a very cheap cost. It also creates environmental problem for its decompositions.

Summary of literature review:

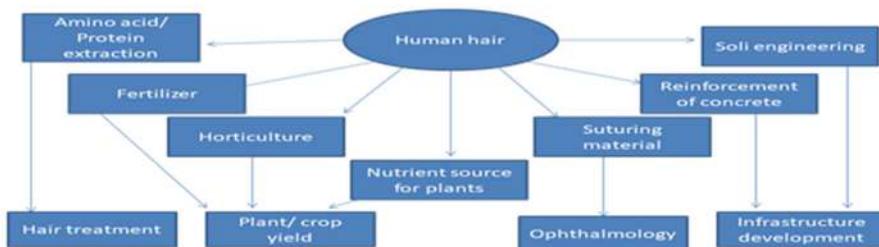
Human hair finds its utility in many areas other than rope making, hair extension and wig making industries, some of them are as listed below:

1. Horticulture
2. Soil engineering
3. Nutrient source for plants
4. Suturing material
5. Hair protein extraction
6. Wound healing
7. Reinforcement of Concrete

Supply Chain of Human Hair as a resource:

In India human hair is harvested from temples, barber shops and other minor sources. This hair is auctioned and it fetches millions of dollars. Wholesale distributors sell it to factories. In the factories, this hair is sorted based on its length and quality. It is washed and dried. It is then drawn into bundles. These bundles are exported all over the world. This resource finds its application in wig making, hair extension, crafting ropes, manufacture of fertilizer, suturing material, extraction of amino acids, soil engineering, and wound healing and so on.

Human Hair Utilization System



Conclusion:

With so many possible applications, human hair may be treated as a natural resource and not as a waste material, blocking, clogging and polluting the environment. Voluntarily parting with human hair may be considered to be a true donation for one's own nation as it may be a resource acquired at zero cost, which may find its application in infrastructural, pharmaceutical, agricultural, medical, financial and economic development of the country.

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HOW ENTREPRENEURS NAME ENTERPRISES IN TAMIL SPEAKING REGIONS

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Abstract

Over the years world over businesses have picked up the best of knowledge, technology, concepts and cultural aspects from across the world. All of these don't have a corresponding nomenclature in regional languages. They are mostly in global language. Tamil, one of the world's oldest languages is used for business in regions of India, Sri Lanka, Malaysia and Singapore where it is the official language. Apart from this, Urdu speaking communities who are uncomfortable with Tamil reading and writing are also heavily available in this region. This paper details English word in display (or) Signage language used by Tamil business community and understood by Tamil customers. A new Tanglish language (Tamil + English) has emerged as a positive necessity. This study details benefits of preferring English word(s) for name board and other sign display.

Keywords: Enterprise Signage, English spelt Tamil words, Tanglish, Tamglish.

Introduction

Currently in India, there are numerous necessary but non-native/ non-indigenous products and services which do not have an equivalent name in Tamil one of its regional language. Businesses have brought in so many products, which have English names ranging from Apple (this fruit does not grow in this region) to Zip. English words are preferred over the regional language (Tamil) the national language (Hindi) or Urdu. The Dravidian language (Tamil) has completely different script (Brahmi) as compared to Devanagiri script of Hindi language. Urdu speaking Muslims in this region know how to read and write Arabic for religion and only talk in Urdu mixed with Tamil. In this context English gets equal status as Tamil for business communication. Signage (Boards and displays) use Tamil (or) English or both.

Words used in English in Tamil speaking regions are specific and contextual by the business. These words may be available in other business too but they don't

have the same meaning. For eg. Repair is a word used in every business and it always has a meaning both ways, implying non functional and reset after service. This study details how the shop names have dependency on the generic term of the product and/or service for business growth. The sample collected is random stratified in Tamil speaking region.

The collected data has been treated with Sentiment Analysis (Positive, Negative, Neutral) in order to assess the exact impact of the word in contributing to the

1. Business gains due to understanding of the meaning of this word
2. Business goodwill
3. Retention of customer
4. Success over competitor due to use of this word

Sentiment Analysis of Nomenclature of Enterprises

Sentiment analysis is the interpretation and classification of emotions (positive, negative and neutral) within text data using text analysis techniques. Sentiment analysis allows businesses to identify customer sentiment toward products, brands or services in print signage and online conversations and feedback.



A new language has emerged for the usage of business communication in the state of Tamilnadu. This study has listed common noun words in English language or literals (or) keywords which are mandatory for doing businesses in the state of Tamilnadu. They are not used like any other common words or a specific name. They have a typical style for writing and also specific spelling in Tamil (native language). These words and many such terms for business purpose generate this new language “Tamlish”. These words are specific to Tamil speaking people and generally valid across India.

This Indianized English language should be taught at school level (higher secondary level) and under graduate level. Words such as to-let (for rent), puncture, repair, glass (for the eyes and cups for drinking), jacket (ladies blouse to go with a saree), cutting (a portion or half a glass of tea), Xerox (photocopier), are in fact only contextually relevant. In native English speaking regions these words don't have the same meaning and may be such words don't even exist. Since there exists no single word equivalent for the same in Tamil they are mandatory words for those businesses.

1. Brand name proper noun word used as a common noun

Xerox is a proper noun – a brand name of a photocopier manufacturing company. But in India Xerox is used as a substitute for photocopier machine. 100 % shops have simply used the word xerox as shop name. It is not known if those shops have any business name.



2. Some common noun words used as Proper nouns for shop names

Mobile, Puncture, Repair, Photography, Tea Stall, these words are the only way that industry gets its identity. We can see these are unavoidable words of survival for these businesses.



3. People with Urdu as mother tongue use English words to identify business.

The Urdu speakers living in Tamil speaking region use only Proper noun names but they don't use Tamil words to identify business. They use English lettering and also words like “kalyana” which means marriage for Hindu religion while the Urdu word is nikah which the people in this region will not be familiar with. Eg Bharkath Bikes, Hakkim Fast foods



4.

Displays and Show cards, Dangles using English word with special meanings

The business communication displays in Tamil speaking region use some fixed terms like Jacket in Tailor shop. A Jacket is layer of clothing worn to warm up in cold season. In Tamil speaking region a jacket would mean the blouse, which goes along with a saree. These set of words like Nightie, cutting, lining, bit, don't have the same meaning in proper English but then the business should not correct it and use as the customers will then not be able to identify the same.





Banana Leaf is a name for a restaurant in Tamil Nadu and it has a very auspicious connotation when said in English. They cannot use the Tamil equivalent of the same, since it means did not live life well in the colloquial pronunciation of the word “Vazzhai Ellai”.

5. New words with definition for Tamil speaking customers

Valet parking is a new service in the region and hence there is a board explaining the concept to public in Tamil. Makeover is even tougher and hence all details are here.



The interpretation of valet has to be given more like command than request as people in this region are not used to handing over their car with keys to the employee of the shop. It says in Tamil “ here all the vehicles should be brought in only by our driver from outside the shop. Once you finish your purchase our driver alone shall bring out the vehicle and handover to you right outside our shop. Sorry for the inconvenience.”

The sentiment analytics show that all the shops that have used some proper noun or name of any individual have to add the common noun word which is the service compulsorily in order to get assured business and profits and a Positive sentiment. Also in order to face competition they have to clarify their product and service scope in the signage itself. A standalone name on the banner like “Medical” is the product and that is in English. “Kadai” means shop or stall and they write it in English. Mess is a location where groups of military personnel socialize, eat, and live. In all towns with conurbation area, eatery joints use the word mess. Road in English is “Rottu”.



Conclusion

- In Tamil speaking region explanation of the service or the product in details is part of the signage. If they are going to use some jargon like Valet or Makeover then a detailed explanation is provided on the signage. With any and every clarification.
- Brand name proper noun wordshave to be used as a common noun to earn assured income.
- Some common noun words have to be used as Proper nouns for shop names to invite customers
- People with Urdu as mother tongue use English words to identify business as an entity without any religious connotation
- Displays and Show cards, Dangles explain new words with definition for Tamil speaking customers

In Tamil speaking region the businesses and customers have their own set of habitual English words mandatory for business. **They cannot be changed, substituted or translated or corrected** as they disturb the expectation of customers and profit for businesses. Hence **a dictionary is essential** for the future generation. English words are written in Tamil and many Tamil words especially proper nouns are spelt in English based on pronunciation. In this given context this study wishes a new Pictionary a dictionary with the picture showing the signage. This will be a dictionary, which will help the coming generations. The specialty of this dictionary is that the English words collected have many a times very special meaning exclusive to this Tamil speaking community and it will not be any ways relevant to the native English speakers any where in the world. Unless people have lived here they will not be able to even gather the context for most words.

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THE CHANGING DYNAMICS OF PANCHAYATHRAJ SYSTEM IN INDIA: A STUDY OF E- PANCHAYATH INITIATIVES

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Abstract

The Information and Communication Technologies play an important role in rural development. So e-Panchayat is a need of present scenario. This system is web-based and n-tiered and functions like an Application Service Provider enabling Panchayat level digital services for all stakeholders. The stakeholders are citizens, elected representatives, Gram Panchayat officials, the governments and the knowledge workers. It is a fact that the developed 50 countries have taken the full advantages of Information Communication Technologies. In the year 2002 the Government declared a comprehensive program to accelerate e-governance at all levels of the government to improve efficiency, transparency and accountability for Government-Citizen interface. e-Panchayat is an e-Governance initiative for the rural sector providing comprehensive software solution attempting automation of Gram Panchayat functions.The present Article will discuss about the Panchayathraj system and its adoption of ICT particularly e panchayat functioning.

Keywords: Information Communication Technology, E-Panchayat, Stakeholders, Citizen Interface, Efficiency

Introduction

The Information and Communication Technologies play an important role in rural development. So e-Panchayat is a need of present scenario. This system is web-based and n-tiered and functions like an Application Service Provider enabling Panchayat level digital services for all stakeholders. The stakeholders are citizens, elected representatives, Gram Panchayat officials, the governments and the knowledge workers. It is a fact that the developed 50 countries have taken the full advantages of Information Communication Technologies. In the year 2002 the Government declared a comprehensive program to accelerate e-governance at all levels of the government to improve efficiency, transparency and accountability for Government-Citizen interface. As per the World Bank, "E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the



Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government." Government of India (GoI), with an intention to transform the governance landscape by ensuring participation of citizens in policy making and providing ease of access to information to the citizens, introduced the National e-Governance Plan (NeGP) in 2006. The vision of the NeGP was to "Make all Government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realise the basic needs of the common man." e- Panchayat is one of the Mission Mode Project (MMP), currently being implemented with a vision to empower and transform rural India.

e-Panchayat is an e-Governance initiative for the rural sector providing comprehensive software solution attempting automation of Gram Panchayat functions. The services offered are Birth & Death Registrations which include Capturing of event details, Name inclusion, Non-availability Certificates, Registration of events, Issuance of Certificates, Statistics, House Tax including Automation of Assessment, Demand Collections, Arrear Processing and Annual Demand Enhancement, Special Notices/Demand Notices, Registers/Field Books/Defaulters Trade License includes Issue of Licenses,Cancellations,Renewal,Demand Notices, Fee Collection etc. Benefits are improved citizen services, better transparency, streamlining of procedures and monitoring of revenues & services.

Panchayat Raj System in India:

In 1993, India has established one of the largest systems of Panchayat Raj of the world through the 73rd Constitutional amendment. Panchayati Raj Institutions (PRIs) in rural areas signify India's experiment with direct democracy at the grassroots level. It has adopted a decentralized strategy based on the principles of subsidiary with a more active and area-based approach to rural development. Panchayat Raj have been given a wide range of powers and duties related to rural development. The main focus of the Panchayati Raj is that the people in the village should undertake the responsibilities of governing themselves. In the present scheme of Panchayati Raj, the villagers have been held responsible for all-round improvement in the village life, including education, sanitation, medical relief curative and preventive, lighting, housing, maternity and child welfare along with the administration of civil, criminal and revenue justice. It was thought that this system would be powerful means for self-preservation in the arena of social life.



Changing Nature of Panchayat Raj:

After a more than a decade and half, there is a growing realization that the system of Panchayati Raj needs to be re-energized and strengthened to address persistent development challenges more effectively and also to be responsive to emerging problems such as climate change, water scarcity, natural disasters, etc. Globalization and the information revolution have changed the nature of local polity through increasing competition and awareness among the villagers. The technology that is most transformative in today's society is Information and Communication Technology (ICT). Information and Communication Technology does not impact physical objects directly; instead, it moves and processes information. U.S. is global leader in e-governance.

Background of e-Panchayat:

The National e-Governance Plan has identified Panchayats as one of the Mission Mode Projects(MMP), since Panchayats provide a large number of basic services for millions of citizens living in India's rural centers. Introduction of e-Governance shall help improve the delivery of services and good governance. The seventh Round Table conference of State Ministers of Panchayati Raj, organised by the Ministry of Panchayati Raj (MoPR) held at Jaipur in December 2004 recommended taking e-Governance in Panchayati Raj Institutions (e-PRI) as mission mode through NIC and other solution providers. The MMP has been designed to overcome the challenges being faced in the villages such as lack of reliable communication infrastructure, delay in providing services to the citizens (Licenses, Certificate etc), Low revenue mobilization for implementing schemes at the GP level, lack of 132 monitoring mechanism for the schemes.

Use of IT in Panchayat:

The e-PRI campaign aims to progressively support all State Governments and Panchayats in the country to make effective use of IT in various activities defined below-

- Improving internal management processes and decision making in Panchayats
- Panchayats using IT as a tool for transparency, disclosure of services to Citizens and social audit
- Enabling Panchayats to better deliver its mandated services to the Citizens through IT.
- Panchayats using IT for electronic tagging and tracking of funds transferred to Panchayats from higher level of governments, including rapid bank transfer of funds, tracking fund transfers to, expenditures of the Panchayats.



The Panchayat represents the first-level of government interaction for over 60 per cent of the Indian populace, and provides a large number of basic services for millions of citizens living in rural locations across the nation. It is against this backdrop that the Panchayat MMP has been included in NeGP. The MMP aims to address and overcome the typical challenges faced in the villages, such as lack of reliable communication infrastructure, delay in delivery of services to citizens, low revenue mobilisation for implementing schemes at the Gram Panchayat level, and lack of monitoring mechanisms for schemes.

The MMP envisages implementation of various modules across the services and management functions within Gram Panchayat, such as the following:

- Issue of trade licensees and NoC
- House-related services
- Issue of certificates of Birth and Death, Income and Solvency
- Dissemination of internal process of Panchayat agenda, voting, and resolution
- Copy of proceedings of Gram Sabha and Action Taken Report (ATR)
- Receipt of funds/progress report
- Dissemination of BPL data

Objectives of e-Panchayat:

The key objectives of e-Panchayat Mission Mode Project are to use ICT for:

- Automation of internal workflow processes of Panchayats
- Improving delivery of services to citizens
- Capacity building of Panchayat Representatives and Officials
- Social Audit
- Transparency, Accountability, Efficiency and RTI compliance of Panchayats
- Improving Governance of local self-government
- Problems and Prospects of e-Panchayat:

Establishment of the e-Panchayat in every village across the country is an elaborate process. ICT intervention should not be understood in isolation. ICT's function in a socio-cultural, political, and economic milieu. Their efficacy is contingent on the various forces and realities that coalesce to shape the environment into which they are introduced. To equip every Panchayat with a computer and to provide it with Internet connectivity would not be an easy task, if we look at the current status of Internet connectivity and other prerequisites for ICT enabled system of governance in rural areas. A workable system of e-Panchayats warrants financial resources, computer applications, skilled human resource and political will.

The primary technological factors that can impede the reach of ePanchayats are the lack of infrastructure and trained human resources. Despite India being



called the Information Technology capital of the world, its computer and Internet penetration (at 2.7 per cent and 4.9 per cent, respectively) are among the lowest in the world. (The Financial Express, Connectivity, Penetration keep IT away from Rural India , May 7, 2009). Teledensity in rural areas is around 14 per cent. (Ministry of Finance, Government of India , Economic Survey 2008-09, p. 246)

Slow progress in rolling out common services centers would delay process of ePanchayats. 100,000 common services center were to be opened up in rural areas by March 2009, but only 50,008 have been rolled out until now. Some states, namely Bihar, Jharkhand, Gujarat , Sikkim and Haryana have already operationalized more than 75 per cent of common services centers while others such as Rajasthan, Andhra Pradesh , Jammu and Kashmir , and Uttarakhand lag far behind in the process. (<http://www.mit.gov.in/download/CSC310809.pdf>)

Key Challenges in e-Panchayat:

The key challenges being faced for implementation of computerization in Panchayat include

- The issue of electricity comes first. More than half of the rural households are still not connected with electricity.
- Most Gram (village) Panchayat representatives and villagers are not computer-literate; even a simple computer application would be difficult to handle for them.
- Content creation in local language is another challenge. English is still an alien language in rural areas.
- High Capacity Building
- No Back-end support at all levels of PRIs/ PR Departments for
- Operationalising computerization of services 136
- No Centralized decision support system (MIS) for monitoring the
- Schemes and taking informed decisions
- The genuine problems of infrastructure and other prerequisites for ePanchayats in rural India.
- Application of ICT is a political issue because it has the potential to transform the socio-political dynamics of national and local polity.

Process of e-governance:

The process of e-governance has already been started. The Government of India has decided to open one lakh common services centers across the country under National e-Government Plan (NeGP) in order to make all Government services accessible to the common man in his locality, and ensure efficiency, transparency and reliability of such services at affordable costs to realise the basic needs of the common man.



(<http://www.mit.gov.in/default.aspx?id=837>) Now the Government of India has initiated the process to equip all Gram Panchayats with computers, or provide access to computers with broadband connectivity. All Panchayats at all levels need to be equipped with computing hardware and connectivity over the next few years. The approach would be to first use the kiosks being set up under the NeGP's Common Services Centres initiative. For the remaining Panchayats, it is proposed to engage independent service providers who would be selected on the basis of a bidding process. It has been also planned to equip all Panchayats with necessary software and skills to handle e-Governance for better delivery of services to citizens. The other major component of ePanchayats would be that of capacity building of functionaries of Panchayati Raj Institutions. The infrastructure that is proposed to be created through e-PRI would be utilised for training of elected representatives about their responsibilities and for giving them functional knowledge of the schemes that are implemented through the Panchayats or their statutory committees.(D. K. Jain, "ePanchayats in India ", I4D, Vol. 7, No. 4, April 2009, pp. 6)

Action Taken by Indian Government:

Governments at both the central and state levels have the vision and strategies to bridge the digital divide and provide supporting infrastructure in rural areas to enhance the capacity of Panchayats. Under the Bharat Niram programme, the Government of India has emphasized connectivity and other basic facilities. The Ministry of Power has introduced a scheme that aims at providing electricity in all villages and habitations within four years, thereby providing access to electricity to all rural households.(Ministry of Power, Government of India, Bharat Nirman-Electrification)It has been also proposed to achieve a rural tele-density of 25 per cent by means of 200 million rural connections by the end of the Eleventh Five Year Plan. The Eleventh Five Year Plan has also targeted providing broadband connectivity for all secondary and higher secondary schools, all public health care centers and Gram Panchayats. (Ministry of Finance, Government of India, Economic Survey 2008-09, p.247)

Conclusion:

Lastly, it may be conclude that e-Panchayats are the need of the hour as people in rural areas are still deprived of basic facilities for a decent life. Common wisdom says that poverty and deprivation exist not only due to lack of resources but also persist because of inefficient and malfunctioning institutions. In the emerging knowledge society and information revolution, Panchayats should not be left in isolation. They should be provided with adequate technological resources in order to be able to play a meaningful role in the course of development. Information communication technology enabled



services are provided through Panchayathraj system is very significant in present rural society. The central and state government taking initiatives to provide better citizen services.

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FORMULATION AND EVALUATION OF AN ORAL FLOATING TABLET OF ALFUZOSIN HYDROCHLORIDE

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Abstract

In the present research work gastro retentive floating matrix formulation of Alfuzosin by using various polymers were developed. Initially analytical method development was done for the drug molecule. Absorption maxima was determined based on that calibration curve was developed by using different concentrations. Gas generating agent sodium bicarbonate concentration was optimised. Then the formulation was developed by using different concentrations of polymers Xanthan gum, guar gum and Karaya Gum as polymeric substances. The formulation blend was subjected to various preformulation studies, flow properties and all the formulations were found to be good indicating that the powder blend has good flow properties. Among all the formulations the formulations Karaya Gumas polymer were retarded the drug release more than 12 hours. whereas in low concentrations the polymer was unable to produce the desired action. The formulations prepared with guar gum were also retarded the drug release up to 12 hours (F6=96.32%). The optimised formulation dissolution data was subjected to release kinetics, from the release kinetics data it was evident that the formulation followed zero order mechanism of drug release.

Keywords: Alfuzosin, Xanthan gum, guar gum and Karaya Gum, Floating Tablets

1. Introduction

Oral delivery of drugs is the most preferable route of drug delivery. Oral route is considered most natural, uncomplicated, convenient and safe due to its ease of administration, patient compliance and flexibility in formulation and cost effective manufacturing process¹. Many of the drug delivery systems, available in the market are oral drug delivery type systems Pharmaceutical products designed for oral delivery are mainly immediate release type or conventional drug delivery systems, which are designed for immediate release of drug for rapid absorption.

Thus the objective of the pharmacist is to develop systems that can be as ideal system as possible. Attempts to develop a single- dose therapy for the whole duration of treatment have focused attention on controlled or sustained release drug delivery systems. An orally administered controlled drug delivery system encounters a wide range of highly variable conditions, such as pH, agitation intensity, and composition of the gastrointestinal fluids as it passes down the G.I tract. Considerable efforts have been made to design oral controlled drug delivery systems that produce more predictable and increased bioavailability of drugs.

Majority of the drugs are well absorbed from all the regions of the G.I tract while some are absorbed only from specific areas, principally due to their low

permeability or solubility in the intestinal tract, their chemical instability, the binding of the drug to the gut contents, as well as to the degradation of the drug by the microorganisms present in the colon. Therefore, in instances where the drug is not absorbed uniformly over the G.I tract, the rate of drug absorption may not be constant in spite of the drug delivery system delivering the drugs at a constant rate into the G.I fluids. More particularly, in instances where a drug has a clear cut absorption window, i.e., the drug is absorbed only from specific regions of the stomach or upper parts of the small intestine; it may not be completely absorbed when administered in the form of a typical oral controlled drug delivery system.

Alfuzosin is a non-subtype specific alpha(1)-adrenergic blocking agent that exhibits selectivity for alpha(1)-adrenergic receptors in the lower urinary tract. Inhibition of these adrenoreceptors leads to the relaxation of smooth muscle in the bladder neck and prostate, resulting in the improvement in urine flow and a reduction in symptoms in benign prostate hyperplasia. Alfuzosin also inhibits the vasoconstrictor effect of circulating and locally released catecholamines (epinephrine and norepinephrine), resulting in peripheral vasodilation. The alfuzosin of the present investigation is designed to retain in the stomach and deliver the drug alfuzosin for longer periods of time.

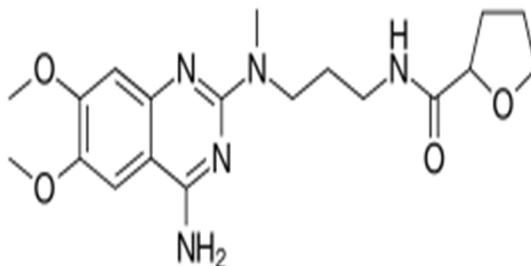


Figure 1: Alfuzosin

2. Materials & Methods:

Alfuzosin was Procured from Cipla Pvt. Ltd. Provided by **SURA LABS**. Xanthan Gum, Guar Gum, Karaya Gum, Sodium bicarbonate, Citric Acid, PVP K 30, Magnesium stearate, Micro crystalline cellulose and Talc are purchased from Merck Specialities Pvt Ltd, Mumbai, India.

Instruments:

Ten station rotary tablet punching machine (lab press), Electronic balance (shimadzu), Digital vernier calipers (Remi equipments Ltd), UV/Visible-spectrophotometer (Lab India), Dissolution tester (USP) (Lab India), Digital pH meter (Lab India), Roche Friabilator (Lab India), and FT-IR spectrophotometer (Bruker)

2.1 Analytical method development :

a) Determination of absorption maxima

A solution containing the concentration 10 µg/ mL drug was prepared in 0.1N HCL UV spectrum was taken using Double beam UV/VIS spectrophotometer. The solution was scanned in the range of 200 – 400 nm.

b) Preparation calibration curve:

10mg Alfuzosin pure drug was dissolved in 10ml of methanol (stock solution1) from stock solution1 1ml of solution was taken and made up with10ml of 0.1N HCL (100µg/ml). From this 1ml was taken and made up with 10 ml of 0.1N HCL (10µg/ml). The above solution was subsequently diluted with 0.1N HCL to obtain series of dilutions Containing 5, 10, 6, 8, 10 µg /ml of per ml of solution. The absorbance of the above dilutions was measured at 243 nm by using UV-Spectrophotometer taking 0.1N HCL as blank. Then a graph was plotted by taking Concentration on X-Axis and Absorbance on Y-Axis which gives a straight line Linearity of standard curve was assessed from the square of correlation coefficient (R^2) which determined by least-square linear regression analysis.

2.2 Formulation of Tablets:

Table 1: Formulation composition for Floating tablets

Formulation Code	F1	F2	F3	F4	F5	F6	F7	F8	F9
Alfuzosin	10	10	10	10	10	10	10	10	10
Xanthan Gum	5	10	15	-	-	-	-	-	-
Guar Gum	-	-	-	5	10	15	-	-	-
Karaya Gum	-	-	-	-	-	-	5	10	15
PVP K30	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
NaHCO ₃	15	15	15	15	15	15	15	15	15
Citric Acid	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Mg. Stearate	3	3	3	3	3	3	3	3	3
Talc	3	3	3	3	3	3	3	3	3
MCC PH 102	69	64	59	69	64	59	69	64	59
Total weight	120	120	120	120	120	120	120	120	120

2.3 In vitro drug release studies:

Dissolution parameters:

Apparatus -- USP-II, Paddle Method

Dissolution Medium -- 0.1 N HCL

RPM -- 50

Sampling intervals (hrs) -- 0.5,1,2,3,4,5,6,7,8,10,11,12

Temperature -- 37°C + 0.5°C

Procedure:

900ml Of 0.1 HCL was placed in vessel and the USP apparatus –II (Paddle Method) was assembled. The medium was allowed to equilibrate to temp of 37°C +

0.5°C. Tablet was placed in the vessel and the vessel was covered the apparatus was operated for 12 hours and then the medium 0.1 N HCL was taken and process was continued from 0 to 12 hrs at 50 rpm. At definite time intervals of 5 ml of the receptors fluid was withdrawn, filtered and again 5ml receptor fluid was replaced. Suitable dilutions were done with media and analyzed by spectrophotometrically at 243 nm using UV-spectrophotometer.

3. Results

3.1 Analytical Method

Determination of absorption maxima

The standard curve is based on the spectrophotometry. The maximum absorption was observed at 243 nm.

calibration curve

Graphs of Alfuzosin was taken in 0.1N HCL (pH 1.2)

Table 2: Observations for graph of Alfuzosin in 0.1N HCL

Conc [µg/mL]	Abs
0	0
5	0.139
10	0.284
15	0.44
20	0.578
25	0.702

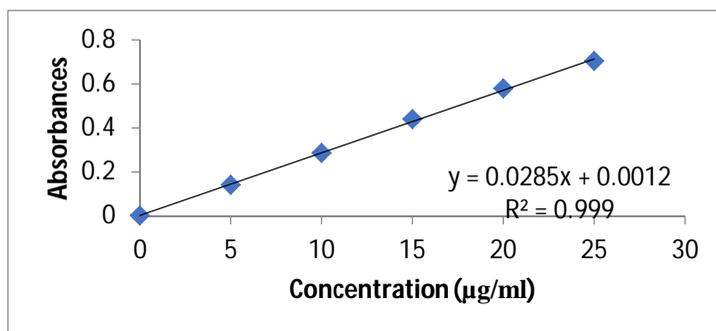


Figure 2: Standard graph of Alfuzosin in 0.1N HCL

3.2 Drug – Excipient compatibility studies:

Fourier Transform-Infrared Spectroscopy:

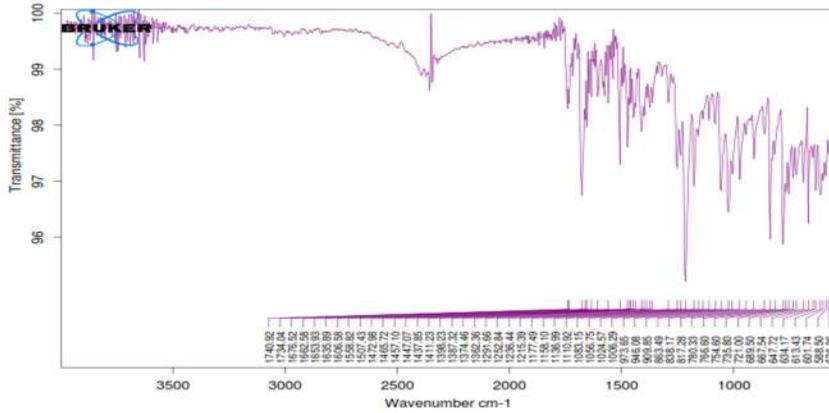


Figure 3: FTIR Spectrum of pure drug

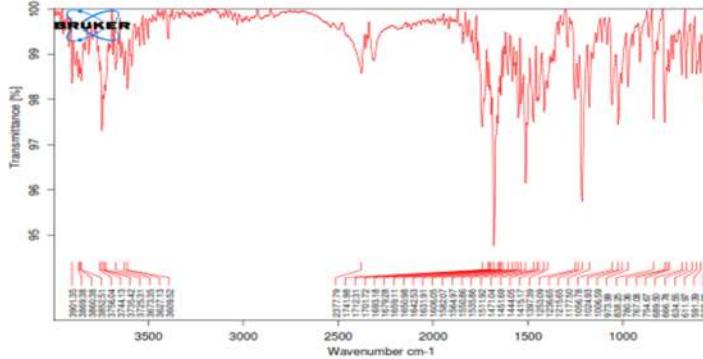


Figure 4: FTIR Spectrum of optimised formulation

3.3 Preformulation parameters of powder blend:

Table 3: Pre-formulation parameters of blend

Formulation Code	Angle of Repose	Bulk density (gm/mL)	Tapped density (gm/mL)	Carr's index (%)	Hausner's Ratio
F1	25.12	0.59	0.66	11.86	1.11
F2	26.8	0.48	0.54	12.5	1.12
F3	23.74	0.56	0.66	17.85	1.17
F4	26.33	0.44	0.55	18.18	1.18
F5	25.21	0.48	0.57	16.66	1.16
F6	27.18	0.51	0.59	15.68	1.15
F7	24.29	0.46	0.56	17.85	1.21
F8	26.01	0.50	0.59	15.25	1.18
F9	26.12	0.52	0.63	17.46	1.21

3.4 Quality Control Parameters For tablets

Table 4: In vitro quality control parameters

Formulation codes	Average Weight (mg)	Hardness (kg/cm ²)	Friability (%loss)	Thickness (mm)	Drug content (%)	Floating lag time (min)	Total Floating Time (Hrs)
F1	300.4	5.1	0.61	3.3	98.42	5.5	4
F2	301.2	5.2	0.58	3.2	99.65	4.2	6
F3	299.3	5.5	0.45	3.4	99.12	5.0	12
F4	299.8	5.1	0.61	3.3	98.42	5.1	6
F5	298.6	5.3	0.59	3.5	99.65	4.0	8
F6	300.4	5.5	0.65	3.4	99.12	3.2	12
F7	301.6	5.3	0.62	3.6	98.16	4.5	5
F8	298.2	5.2	0.59	3.4	98.11	3.6	12
F9	297.5	5.4	0.60	3.3	98.25	4.7	12

3.5 In Vitro Drug Release Studies:

Table 5: Dissolution data of Floating Tablets

Time (hr)	F1	F2	F3	F4	F5	F6	F7	F8	F9
0	0	0	0	0	0	0	0	0	0
0.5	35.32	30.04	24.63	19.17	14.90	10.49	23.56	16.76	10.15
1	54.53	47.56	30.63	24.12	20.45	17.63	46.45	21.89	15.41
2	69.90	54.35	42.52	38.64	32.02	26.55	51.23	28.24	20.98
3	74.96	63.52	50.31	50.20	39.31	32.84	70.54	33.32	25.09
4	86.14	74.75	58.25	69.56	47.82	39.39	79.73	37.75	29.54
5	92.85	82.54	65.78	75.43	53.47	44.71	86.46	42.09	33.36
6		89.26	70.17	83.01	59.74	53.05	98.12	49.16	39.67
7		95.95	75.79	95.57	64.05	60.87		53.36	44.36
8			82.27		79.93	67.02		59.12	50.77
9			89.64		84.26	74.15		63.78	56.42
10			94.87		95.45	79.24		67.79	60.02
11						87.54		76.31	64.46
12						96.32		84.45	69.39

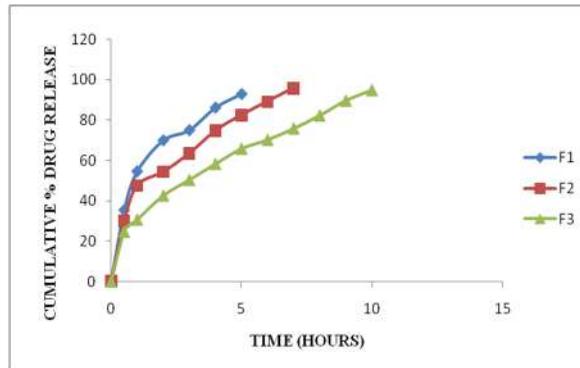


Figure 5: Dissolution data of Alfuzosin Floating tablets containing Xanthan Gum

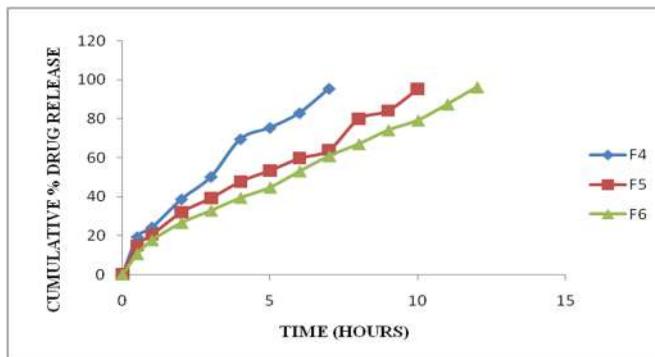


Figure 6: Dissolution data of Alfuzosin Floating tablets containing Guar Gum

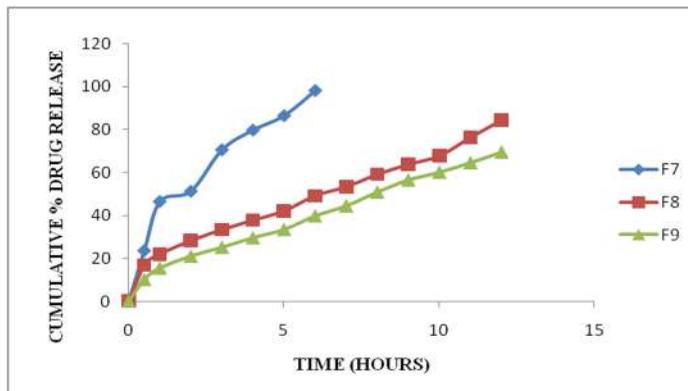


Figure 7: Dissolution data of Alfuzosin Floating tablets containing Karaya Gum

3.6 Application of Release Rate Kinetics to Dissolution Data for optimised formulation:

3.7

Table 6:Application kinetics for optimised formulation

Cumulative (%) release	Time (t)	root (t)	log(release %)	log (t)	log (%) remain	release rate (cumulative % release / t)	1/cum% release	Pappas log q/100	% drug remaining	Q01/3	Qt1/3	Q01/3-qt1/3
0	0	0			2.000				100	4.642	4.642	0.000
10.49	0.5	0.707	1.021	-0.301	1.952	20.980	0.0953	-0.979	89.51	4.642	4.473	0.168
17.63	1	1.000	1.246	0.000	1.916	17.630	0.0567	-0.754	82.37	4.642	4.351	0.291
26.55	2	1.414	1.424	0.301	1.866	13.275	0.0377	-0.576	73.45	4.642	4.188	0.454
32.84	3	1.732	1.516	0.477	1.827	10.947	0.0305	-0.484	67.16	4.642	4.065	0.577
39.39	4	2.000	1.595	0.602	1.783	9.848	0.0254	-0.405	60.61	4.642	3.928	0.713
44.71	5	2.236	1.650	0.699	1.743	8.942	0.0224	-0.350	55.29	4.642	3.810	0.832
53.05	6	2.449	1.725	0.778	1.672	8.842	0.0189	-0.275	46.95	4.642	3.608	1.034
60.87	7	2.646	1.784	0.845	1.593	8.696	0.0164	-0.216	39.13	4.642	3.395	1.247
67.02	8	2.828	1.826	0.903	1.518	8.378	0.0149	-0.174	32.98	4.642	3.207	1.435
74.15	9	3.000	1.870	0.954	1.412	8.239	0.0135	-0.130	25.85	4.642	2.957	1.685
79.24	10	3.162	1.899	1.000	1.317	7.924	0.0126	-0.101	20.76	4.642	2.748	1.893
87.54	11	3.317	1.942	1.041	1.096	7.958	0.0114	-0.058	12.46	4.642	2.318	2.323
96.32	12	3.464	1.984	1.000	0.566	8.027	0.0104	-0.016	3.68	4.642	1.544	3.098

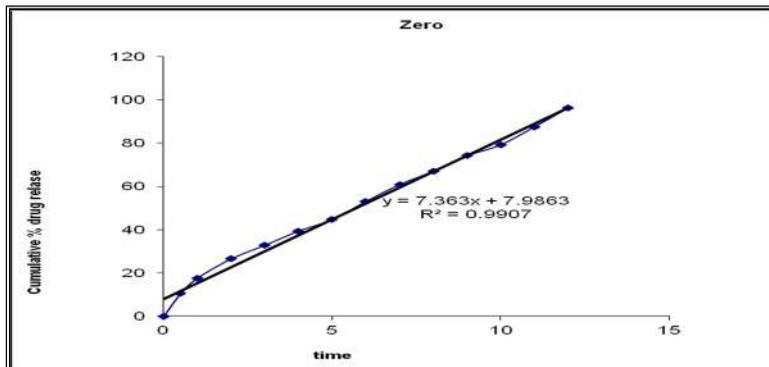


Figure 8: Zero order release kinetics

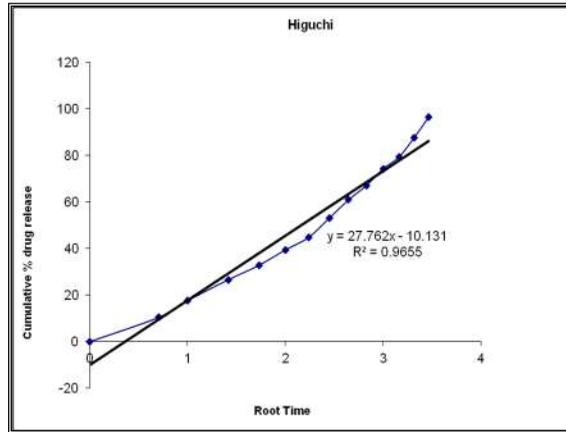


Figure 9: Higuchi release kinetics

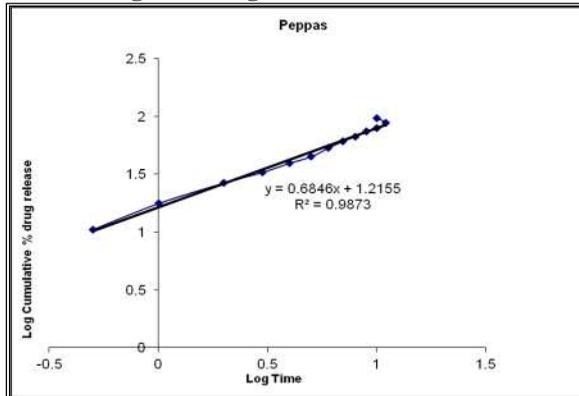


Figure 9 : Kors mayer peppas release kinetics

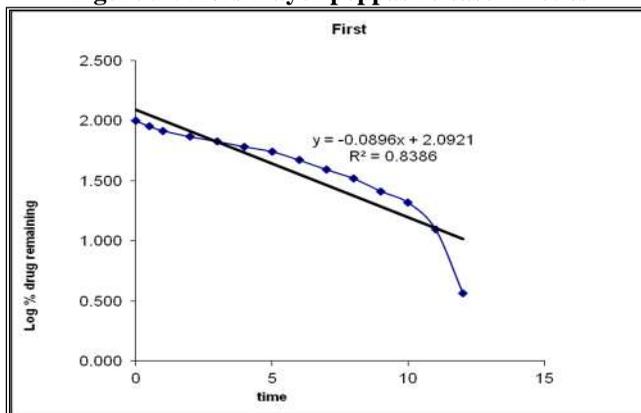


Figure 10: First order release kinetics



4: Discussion:

The standard curve is based on the spectrophotometry. The maximum absorption was observed at 243 nm.

There was no disappearance of any characteristics peak in the FTIR spectrum of drug and the polymers used. This shows that there is no chemical interaction between the drug and the polymers used. The presence of peaks at the expected range confirms that the materials taken for the study are genuine and there were no possible interactions.

Alfuzosin are also present in the physical mixture, which indicates that there is no interaction between drug and the polymers, which confirms the stability of the drug.

Tablet powder blend was subjected to various pre-formulation parameters. The angle of repose values indicates that the powder blend has good flow properties. The bulk density of all the formulations was found to be in the range of 0.48 to 0.59 (gm/ml) showing that the powder has good flow properties. The tapped density of all the formulations was found to be in the range of 0.54 to 0.66 showing the powder has good flow properties. The compressibility index of all the formulations was found to be below 18 which shows that the powder has good flow properties. All the formulations has shown the hausners ratio ranging between 0 to 1.2 indicating the powder has good flow properties. Tablet quality control tests such as weight variation, hardness, and friability, thickness, Drug content and drug release studies were performed for floating tablets. All the parameters for tablets such as weight variation, friability, hardness, thickness, drug content were found to be within limits.

Optimised formulation F6 was kept for release kinetic studies. From the above graphs it was evident that the formulation F6 was followed Zero order release mechanism.

5: Conclusion:

Development of Gastro retentive floating drug delivery of Alfuzosin tablets is to provide the drug action up to 12 hours.

Gastro retentive floating tablets were prepared by direct compression method using various various polymers like Xanthan gum, guar gum and Karaya Gum.

The formulated gastro retentive floating tablets were evaluated for different parameters such as drug excipient compatability studies, weight variation, thickness, hardness, content uniformity, In vitro Buoyancy studies, In vitro drug release studies performed in 0.1N HCL for 12 hrs and the data was subjected to zero order, first order, Higuchi release kinetics and karsmayerpeppas graph.

The following conclusions could be drawn from the results of various experiments

- ✓ FTIR studies concluded that there was no interaction between drug and excipients.
- ✓ The physico-chemical properties of all the formulations prepared with different polymers Xanthan gum, guar gum and Karaya Gum were shown to be within limits.
- ✓ Quality control parameters for tablets such as weight variation, Hardness, Friability, thickness, drug content and floating lag time were found to be within limits.
- ✓ In-vitro drug release studies were carried out for all prepared formulation and from that concluded F6 formulation has shown good results.
- ✓ Finally concluded release kinetics to optimised formulation (F6) has followed Zero order kinetics.



- ✓ Present study concludes that gastro retentive floating system may be a suitable method for Alfuzosin administration.

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FORMULATION AND EVALUATION OF FAST DISSOLVING SUBLINGUAL TABLETS OF LOVASTATIN

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Abstract

The present study was investigated that enhancement of dissolution rate of Lovastatin using solid dispersion method and decrease the disintegration time by adding superdisintegrants by formation of fast dissolving sublingual tablet. sublingual route is avoiding firstpassmetabolism and drug directly enters into the systemic circulation. For this study Macroglol4000 and Kolliphor P 188 were used as carriers and Polyplasdone XL used as super disintegrate. Different ratios between drug and carriers were prepared. All formulations were evaluated for pre and post compression studies and those results were found to be within limits. Dissolution studies revealed that formulations F6 formulation was optimized formulation which contains Drug and Kolliphor P 188 in the ratio of 1:2. The optimized formulation was compared with F9 formulation which does not contain super disintegrate. That comparison data revealed that drug release was high when it contains super disintegrate.

Keywords: Lovastatin, MACROGOL 4000, Kolliphor P 188, Polyplasdone XL, Fastdissolving sublingual tablet.

Introduction

Drugs have been applied to the mucosa for topical application for many years. However, recently there has been interest in exploiting the oral cavity as a portal for delivering drugs to the systemic circulation. Notwithstanding the relatively poor permeability characteristics of the epithelium, a number are offered by this route of administration. Foremost among these are the avoidance of firstpass metabolism, ease of access to the delivery site, and the opportunity of sustained drug delivery predominantly via the buccal tissues.

Oral mucosal drug delivery is an alternative method of systemic drug delivery that offers several advantages over both injectable and enteral methods. Because the oral mucosa is highly vascularised, drugs that are absorbed through the oral mucosa directly enter the systemic circulation, by passing the gastrointestinal tract and first-pass metabolism in the liver. For some drugs, this results in rapid onset of action via a more comfortable and convenient delivery route than the intravenous route. Not all drugs, however, can

beadministered through the oral mucosa because of the characteristics of the oral mucosa and the physicochemical properties of the drug¹.

The sublingual route usually produces a faster onset of action than orally ingested tablets and the portion absorbed through the sublingual blood vessels bypasses the hepatic first-pass metabolic processes²⁻⁴. The main mechanism for the absorption of the drug in to oral mucosa is via passive diffusion into the lipoidal membrane.

The absorption of the drug through the sublingual route is 3 to 10 times greater than oral route and is only surpassed by hypodermic injection. For these formulations, the small volume of saliva is usually sufficient to result in tablet disintegration in the oral cavity. Sublingual absorption is mostly rapid in action, but also short acting in duration.⁵⁻⁶

Present drug Lovastatin is an antihyperlipidemic drug used to reduce cholesterol in the treatment of hyperlipidemias particularly in type – 2a and 2b hyperlipoproteinaemias. It is also given prophylactically for both primary and secondary prevention of ischemic heart diseases. The absorption of Lovastatin following oral administration is approximately 30%⁷. It is practically insoluble in water and sparingly soluble in methanol. The very poor aqueous solubility of Lovastatin give rise to problems in the design of formulation and this led to variable oral bioavailability. Based on the above physicochemical properties, Lovastatin was selected as a drug candidate for improving its solubility and bioavailability by increasing the dissolution rates.⁸

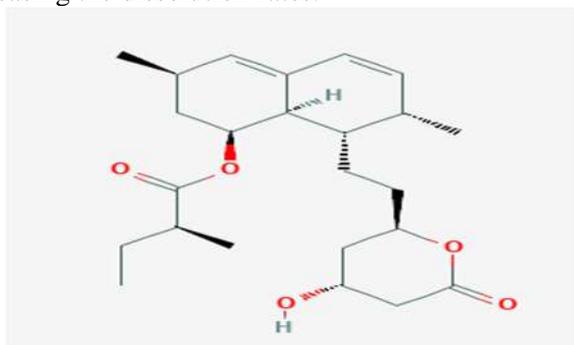


Figure 1: structure of lovastatin

1. MATERIALS AND METHODS:

Lovastatin (SURA LABS) Macrogol 4000 , MCC, Polyplasdone XL and Kolliphor P 188 from Nihar traders pvt Ltd, Magnesium stearate, Sodium hydroxide from Himedia Laboratories Talc Nice chemicals Ltd Potassium dihydrogen ortho phosphate Finar chemicals Ltd



Instruments:

Weighing Balance (Sartorius), Tablet Compression Machine (Multistation) (Lab Press Limited, India) Hardness tester (Monsanto, Mumbai, India) Vernier callipers (Mitutoyo, Japan)

Roche Friabilator (Labindia, Mumbai, India) Dissolution Apparatus and UV-Visible Spectrophotometer, pH meter Labindia, Mumbai, India

2.1 Analytical method development for Lovastatin:

a) Determination of Absorption maxima

A spectrum of the working standards was obtained by scanning from 200-400nm against thereagent blank to fix absorption maxima.

b) Preparation of standard graph in pH 6.8 medium

10 mg of Lovastatin was dissolved in 10 ml methanol (Primary stock). From this primary stock 1ml was transferred to another volumetric flask made up to 10ml with Phosphate buffer of pH 6.8(Secondary stock). From this secondary stock was taken to produce 5, 10, 15, 20 and 25 µg/ml respectively. The absorbance was measured at 237 nm by using a UV spectrophotometer.

2.2 Drug-Excipients compatibility studies:

Drug Excipients compatibility studies were carried out using FTIR by mixing the drug with various excipients in different proportions.

2.3 Preformulation Studies

Pre formulation involves the application of biopharmaceutical principles to the physicochemical parameters of drug substance are characterized with the goal of designing optimum drug delivery system.

Table 1: Formulation of solid dispersion showing various compositions

	SD1	SD2	SD3	SD4	SD5	SD6	SD7	SD8
Lovastatin	1000	1000	1000	1000	1000	1000	1000	1000
Macrogol 4000	1000	2000	3000	4000				
Kolliphor P188					1000	2000	3000	4000

All the ingredients were taken in mg only

Table 2: Formulation of fast dissolving sublingual tablet by using solid dispersion

	F1	F2	F3	F4	F5	F5	F6	F7	F8
Lovastatin equivalent to 20mg	SD1	SD2	SD3	SD4	SD5	SD6	SD7	SD8	SD9
Polyplasdone XL	10	10	10	10	10	10	10	10	-
Mg.stearate	3	3	3	3	3	3	3	3	3
Talc	3	3	3	3	3	3	3	3	3
MCC	QS								
Total weight	150	150	150	150	150	150	150	150	150

All the ingredients were taken in mg only

2.4 In vitro dissolution studies:

The dissolution study of was performed over a 1 hr period using USP type II (paddle) Dissolution Testing Apparatus (Lab india) 900ml of pH 6.8 Phosphate buffer was used as dissolution medium agitated at 50 RPM, at temperature of 37 ± 0.5 o C. 5 ml samples were withdrawn at 5, 10, 15, 20, 30, 45 and 60 min to estimate the drug release. The samples were analyzed by UV Spectrophotometry at their respective λ max value.

2. Results & Discussion

3.1 Analytical method development

Determination of λ max:

The prepared stock solution was scanned between 200-400 nm to determine the absorption maxima. It was found to be 237 nm.

Calibration curve of Lovastatin:

The standard graph of Lovastatin was obtained and good correlation was obtained with R^2 value of 0.999. The medium selected was pH 6.8 phosphate buffer.

The standard graph values of Lovastatin are tabulated as below-

Table 3: Standard Graph values of Lovastatin at 237 nm in pH 6.8 phosphate buffer

Concentration ($\mu\text{g/ml}$)	Absorbance
0	0
5	0.184
10	0.336
15	0.521
20	0.68
25	0.85

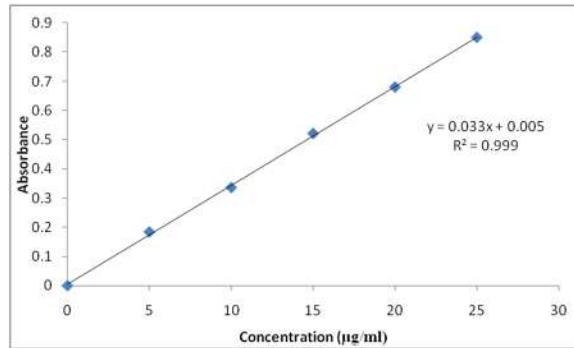


Figure 2: Standard Curve of Lovastatin

Drug – Excipient Compatibility Studies By FTIR Studies:

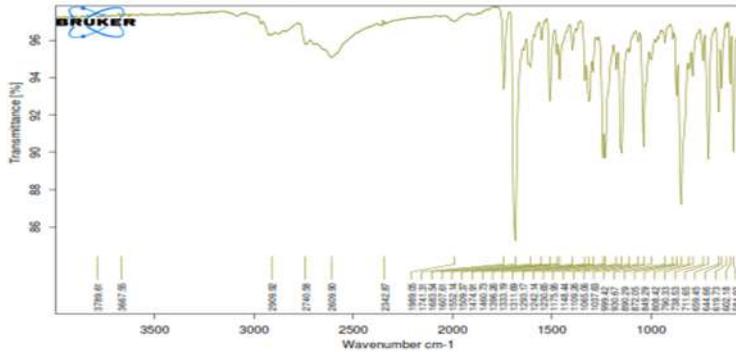


Figure 3: FTIR spectra of pure drug

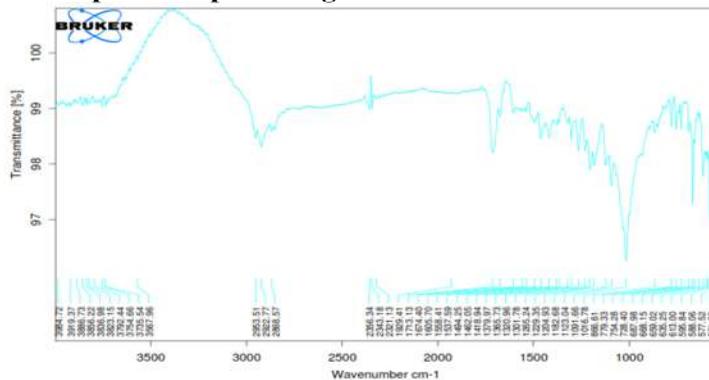


Figure 4: FTIR spectra of optimized formula (f6)

The FTIR compatibility tests were passed. there was no interaction between drug and excipients. there was no disappearance of characteristic peak of pure drug.

Table 4: Physical properties of precompression blend

Formulation Code	Angle of repose (°)	Bulk density (gm/cm ³)	Tapped density (gm/cm ³)	Carr's Index (%)	Hausner's ratio
F1	24.10	0.58±0.01	0.63±0.04	7.93±0.01	1.08±0.06
F2	26.43	0.59±0.06	0.64±0.06	7.81±0.02	1.08±0.04
F3	27.41	0.54±0.04	0.58±0.03	6.89±0.06	1.07±0.07
F4	24.40	0.51±0.08	0.61±0.01	16.39±0.04	1.19±0.05
F5	26.12	0.56±0.04	0.63±0.02	11.11±0.03	1.12±0.03
F6	25.31	0.53±0.07	0.58±0.04	8.62±0.07	1.09±0.02
F7	23.11	0.54±0.06	0.61±0.06	11.47±0.01	1.12±0.04
F8	24.15	0.53±0.03	0.59±0.08	10.16±0.06	1.11±0.01
F9	26.10	0.54±0.05	0.64±0.01	15.62±0.02	1.18±0.06

Table 5: Physical Evaluation of Lovastatin tablets

Formulation code	Weight variation (mg)	Thickness (mm)	Hardness (Kg/cm ²)	Friability (%)	Content uniformity (%)
F1	150±1.24	2.1±0.15	2.5±0.24	0.42±0.03	99.44
F2	148±1.63	2.4±0.13	2.2±0.31	0.34±0.06	100.84
F3	151±1.11	2.2±0.18	2.6±0.19	0.36±0.04	96.09
F4	149±1.52	2.1±0.16	2.8±0.13	0.56±0.03	98.34
F5	145±1.16	2.3±0.13	2.8±0.26	0.48±0.08	95.23
F6	152±0.91	2.4±0.12	2.4±0.29	0.51±0.02	97.35
F7	147±1.24	2.4±0.16	2.5±0.33	0.41±0.01	98.94
F8	149±1.82	2.1±0.17	2.6±0.28	0.43±0.06	99.48
F9	150±1.13	2.4±0.16	2.5±0.19	0.51±0.03	100.03

Table 6: Invitro drug release results for all formulations

TIME(Min)	F1	F2	F3	F4	F5	F6	F7	F8	F9
5	16.38	13.92	10.84	8.71	42.34	69.85	20.36	14.82	19.46
10	30.62	22.87	19.63	15.93	67.14	99.63	39.61	28.67	32.51
15	36.31	31.66	27.32	23.86	98.62		61.82	41.71	58.17
20	43.29	39.45	36.18	31.94			84.66	50.12	79.64
30	56.91	51.63	48.26	40.68			95.63	63.46	96.82
45	72.63	69.48	59.72	51.34			95.63	75.14	96.82
60	91.62	83.47	74.18	63.56				88.62	

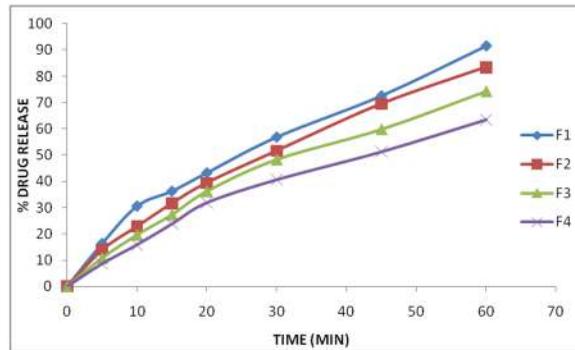


Figure 5 : In vitro dissolution data for formulations F1-F4 containing Macroglol 4000 as carrier

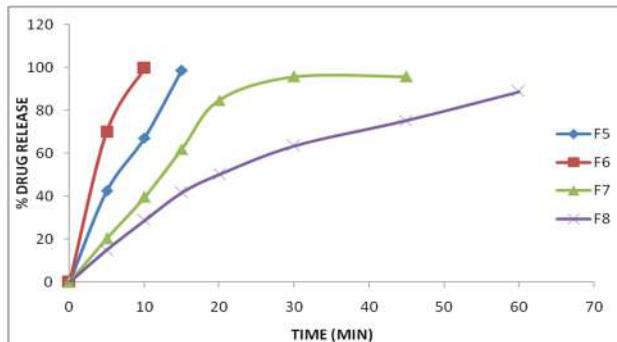


Figure6: In vitro dissolution data for formulations F5-F8 containing Kolliphor P 188 as carrier.

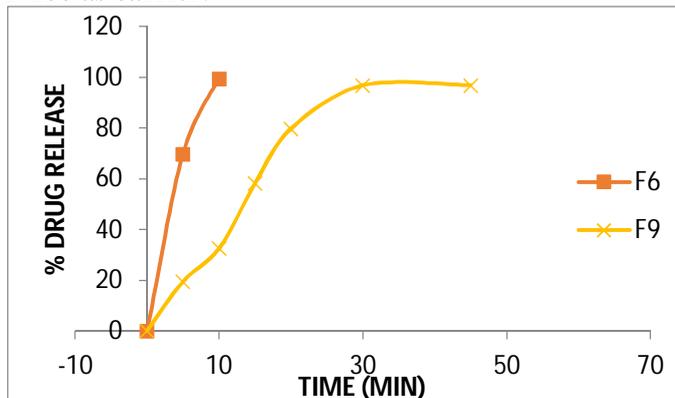


Figure 7: Comparison dissolution data for formulations F6 and F9 containing Kolliphor P 188 as carrier



Discussion:

Standard graph of Lovastatin was plotted as per the procedure in experimental method and its linearity is shown in Table and Fig.2 The standard graph of Lovastatin showed good linearity with R^2 of 0.999, which indicates that it obeys “Beer- Lamberts” law.

The FTIR compatibility tests were passed. there was no interaction between drug and excipients. there was no disappearance of characteristic peak of pure drug.

The precompression blend of Lovastatin solid dispersions were characterized with respect to angle of repose, bulk density, tapped density, Carr’s index and Hausner’s ratio. Angle of repose was less than 28° , Carr’s index values were less than 18 for the precompression blend of all the batches indicating good to fair flowability and compressibility. Hausner’s ratio was less than 1.25 for all the batches indicating good flow properties.

The results of the weight variation, hardness, thickness, friability, and drug content of the tablets are given in Table 5. All the tablets of different batches complied with the official requirement of weight variation as their weight variation passes the limits. The hardness of the tablets ranged from 2.2 ± 0.31 to 2.8 ± 0.26 kg/cm² and the friability values were less than 1% indicating that the tablets were compact and hard. The thickness of the tablets ranged from 2.1 ± 0.15 to 2.4 ± 0.16 mm. All the formulations satisfied the content of the drug as they contained 95-100% of Lovastatin and good uniformity in drug content was observed. Thus all the physical attributes of the prepared tablets were found to be practically within control limits.

From the dissolution data, Formulations containing Kolliphor P 188 as carrier was shown good drug release compared to formulations containing Macrogol 4000 as carrier. F1 to F4 formulations were not shown maximum drug release within 60 min. Hence those formulations were not taken into consideration.

Among all formulations F6 formulations containing Drug and Kolliphor P 188 in the ratio of 1:2 was shown maximum drug release at 10 min. Hence F6 formulation was concluded as optimised formulation.

After getting the optimised formulation, that was compared with F9 formulation which does not contain Polyplasdone XL as super disintegrate. (F6 – drug, Kolliphor P 188 and Polyplasdone XL, F9- drug and Kolliphor P 188 only).

From the comparison graphs revealed that Formulation F9 (without Super disintegrate) was delayed drug release up to 45 min. Hence Among all formulations F6 was considered as optimised formulation.



Summary & Conclusion

- Lovastatin has statin activity, so used in combination with diet, weight-loss, and exercise for lowering cholesterol (hypolipidemic agent) in those with hypercholesterolemia to reduce risk of cardiovascular disease. It is poorly soluble in water.
- In the present research work an attempt has been made to enhance the dissolution by preparing solid dispersion with Macrogol 4000 and Kolliphor P 188.
- The standard curve of Lovastatin was obtained and good correlation was obtained with R^2 value of 0.999. The medium was selected was pH 6.8 phosphate buffer.
- FTIR studies revealed that no interactions between drug and excipients.
- The pre compression blend of Lovastatin solid dispersions were characterized with respect to angle of repose, bulk density, tapped density, Carr's index and Hausner's ratio. The precompression blend of all the batches indicating good to fair flowability and compressibility.
- Solid dispersions were prepared with various concentrations of carriers, the prepared solid dispersions were compressed into tablets.
- The formulated sublingual fast dissolving tablets were evaluated for various quality control parameters. The tablets were passed all the tests.
- Among all the formulations F6 formulation containing, Drug and Kolliphor P 188 in the ratio of 1:2 showed good result that is 99.63 % in 10 minutes.

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INTEREST, ATTITUDE AND UTILIZATION OF ICT (INFORMATION AND COMMUNICATION TECHNOLOGY) AMONG THE TEACHER EDUCATORS

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Abstract

The importance of ICT in empowering teachers and learners, and enhancing the students achievement has been highlighted in several studies. Similarly, the digital divide between the developed and developing nations had been of a serious concern to educators. In this study we understand the truth and effectiveness of ICT for teacher educators.

Keywords: Interest, Attitude, ICT, and B.Ed students]

Introduction:

“The quality of education is not to be measured by its length and breadth but only by its depth” -**Vinoba Bhave**

“A teacher who is attempting to teach without inspiring the pupil with a desire to learn is hammering on a cold iron”. - **Horace Mann**

With several educational options available to students today, newer trends are emerging in this field which has completely changed the traditional held perceptions about education in India. Various career options in like radio jockeying, mass-media management, news anchoring, program anchoring, news reading and reporting for the electronic media, content writing, fashion designing, event management, hospital management, medical transcription etc, have opened up several newer avenues for education.

WHAT IS ICT?

- ❖ ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form.
- ❖ ICT is a learning process that is facilitated and enhanced by using digital tools such as CD-ROMs, video conferencing, websites, e-mail and many more, where the content and instruction is delivered electronically.



Advantages of ICT

The Advantage of **ICT** in teaching and learning process, for instance, consist of the improvement of new, pioneering ways to interact and communicate with students, higher commitment rates, faster learning and improved teaching methods.

The ascend of artificial intelligence, big data analytics and increased reality contributes to the efficient growth of this Education Field. Organizations worldwide can influence the advantages of **ICT** to increase productivity in the administrative center, cut equipped costs and improve teacher, student experience. **ICT** includes all of the tools and resources used to create, store, process and exchange information. These include but are not limited to:

- Individualization -Learn in own pace
- Distance, money & time constraint –cost savings
- Improved access and flexibility -Transfer information faster, available 24/7, everywhere.
- Improved control and standardization
- Get the right information
- Enhanced communication and collaboration -Share & manage knowledge and skills,
- Demonstrating concepts that are difficult to convey in any other medium

Truth of ICT

- Internet has started reshaping education.
- The traditional classroom has to be transformed
- It can include text, video, audio, animation and virtual environments. It can be a very rich learning experience that can even surpass the level of training you might experience in a crowded classroom. It's self-paced, hands-on learning.
- The quality of the electronic-based training, as in every form of training, is in its content and its delivery. **ICT** can suffer from many of the same pitfalls as classroom preparation, such as boring slides, monotonous speech, and little opportunity for interaction. The beauty of **ICT**, however, is that new techniques allow the creation of very effective learning environments that can overwhelm you in the material.

Effectiveness

Online Continuing Education

Equal or Higher Quality of Learning, Time Savings of 40-60%, 30% Increase in Learning Retention



- ❖ In an on-line multimedia learning environment:
 - teaching & learning is 'one-to-one' (individual)
 - more interactivity (in normal classroom, it varies with the class size)
 - learner-centered ,Learner monitoring & grading system
 - ❖ Convenient
 - self-service (mix and match),on-demand (anytime, anywhere),private learning
 - self-paced, Flexibility: (modular package)
 - ❖ Cost-effective
 - Virtual learning environment, Share lessons among schools, Colleges, Reduce material cost
 - Reduce travel/accommodation.
 - ❖ Consistent
 - Central control of content, Same quality of content for all ,Same quality of education for all
 - ❖ media-rich
 - Easier to understand & more engaging
 - ❖ repeatable
 - As many times as you like
 - ❖ easier to monitor progress
 - Less administrative work can be more precise.
- (E-mail, chat, forum, web, Video conference, LMS,)**
- ❖ Every teacher should have an e-mail account.
 - ❖ Communicate with students, Communicate with parents, Students can submit assignment.
 - ❖ Can have attachments, Create a paperless environment, Simple but effective.
 - ❖ Efficient and cost effective, Synchronous communication tool, More students participate
 - ❖ Collaborative learning, Wide range of materials available, Teacher will need to narrow down
 - ❖ It is a resource centre, Supported by images, audio, simulation and multimedia.

Digital classroom

- ❖ Teacher use the Intranet to initiate and measure learning
- ❖ E Mail is a focal educational exchange medium
- ❖ Students are able to manage and produce digitally edited movies
- ❖ Multimedia visual literacy is a valued learning focus
- ❖ Teachers can comfortably use digital multimedia to enhance learning



Student- centered Flexible Learning

Learning is a process in which four components interact:

- ❖ the teacher, the student, curriculum content and goals,
- ❖ instructional materials and infrastructure

ICT allows for different learning experiences through:

- On - line students group: allowing students to interact with each other
- On - line lecturing: allowing faculty to interact with students
- On - line counseling: helps students in decision- making
- On - line libraries and resource center: providing text, documents, articles for reference.
- E-mail enables students and faculty to communicate with each other and with people all over the world.
- Students send questions to the instructor and instructor can transmit the answer instantaneously to all students.
- Structured face-to-face telephone interviewing where computer is used to prompt the interviewee and record the answer in a format convenient for further processing.
- It opens up possibilities for interviewing research subjects from different parts of the world.
- E- Interviews ,Technology-enhanced pedagogical practices
- Promote active and autonomous learning in students;
- Provide students with competencies and technological skills that allow them to search for, organize, and analyze information, and communicate their ideas in a variety of media forms;
- Enable teachers, students, and their parents to communicate and share information on-line;
- Engage students in collaborative, project-based learning in which students work with classmates on complex, real-world-like problems or projects;
- Provide students with individualized or differentiated instruction, to meet the needs of students with different achievement levels, interests, or learning styles.

What Students, Teachers Need to Know: 21st Century Skills and ICT Literacy?

The future will demand people who can express themselves effectively with images, animation, sound, and video, solve real world problems that require processing and analysis of thousands of numbers, evaluate information for accuracy, reliability, and validity; and organize information into valuable knowledge, yet students are not learning these skills in school.

Current Infrastructure available

- Stable and quality education system



- Primary Schools junior high schools inter colleges post graduate colleges technical colleges universities and national institutions.(This is what the value chain refers to)
- But it plays a very passive role in the current scenario due to reasons best known to them.
- As the whole network of education is supported and regulated by the government this network could play a crucial role in e-learning for the rural sector.

The Knowledge Society for All Agenda

There is a commonly accepted public speaking that education systems need to effect changes in the preparation of its citizen for lifelong learning in a 21st Century Knowledge-based or Information Society. The public speaking can be characterized as follows:

- Education is a major pillar of a knowledge economy and a human right;
- Through access ICT to an inclusive high-quality education by all – regardless of gender, ethnicity, religion, or language – benefits to individual, business, private and public enterprise are multiplied and will lead to economic growth that is more equitably distributed and enjoyed by all.

Suggestions

- Make ICT part of assessment criteria for classes (i.e. : online forum discussions, online quizzes, learning tracks, podcasting)
- Study what are student's academic achievements before and after using ICT?
- Extend quality assurance enhancement to ICT, To support and enhance virtual mobility
- Undertaking more research, Involve the professional environment.
- Co-ordinate actions and resources in the ICT field

Conclusions

- ICT offers opportunity to raise educational standards in Institution.
- Large ranges of ICT tools are available for teaching and learning.
- Schools will need funding, access and training.
- It is said that ICT can save cost but the important factor
- ICT can improve the quality of education.

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WORK LIFE BALANCE OF WORKING WOMEN IN HEALTH SECTOR OF SELECTED DISTRICTS OF HIMACHAL PRADESH

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Abstract

The present study examines the work life balance among working women in the field of healthsector in the state of Himachal Pradesh. This study identifies the work life balance amongworking women with regard to work environment, work life expectation and work life satisfaction. An empirical study has been conducted among the working women of health sectorwhich further evaluates the impact of work life balance on job satisfaction. The study also examines the factors affecting work life balance and identifies the challenges faced by and causes of stress in working women. The study concluded that working women experience greater struggle than men in balancing personal and professional life. It is also concluded that they experience struggle as their jobs tumble over into the domestic life more frequently than domestic life over into workplace. The study recommends that work life balance can be attained by forming inspiring societal groups, creating cooperative working conditions, introducing unbiased rewards and implementing employee-oriented policies.

Keywords: Job satisfaction, Workplace, Challenges, Personal life, Professional, Heath, Stress

1. Introduction

1.1. Work Life Balance: The Concept

In Today's world career-oriented women are frequently confronted by the demands of full-time work and when they leave from their organizations, they carry more of the responsibilities, duties and promises at home. In one of the surveys it was revealed that the widely held working women are working 40-45 hours per week and 53% of the working women report that they are stressed to achieve work life balance.

Working women feel that their lives are a disguising act that includes various responsibilities and duties at work, hefty meeting schedules, frequent business tours, and at the same time managing family and domestic life.

The present era has seen many working women entering the workplace and competing equal to their opposite gender in every aspect of work. This progress and change in roles played by the women have not unbound them from the personal life roles that they have. An individual's work life and personal life may bring in differing demands on one another and the demands from both the roles are equally important. Hence Work Life Balance among working women has gained additional attention from society.



More women are expressing into areas that were habitually dominated by men. Women have now become an important part of the workforce. There is a tremendous shift from where men treated as bread winners and women as house manager or child bearer. Now women are capable of handling multiple roles. Working mother is a foundation in herself and aiming at successful career with financial independence, she has to also support her growing child to accomplish motherhood. Both these jobs are extremely demanding and doing justice to each other without neglecting the other is a formidable task. Many moms struggle finding better ways to balance these two domains and often are confronted with this guilt from outside sources like pressure from husband, family and friends.

Over the past few decades, there is tremendous change in the work and global business arena and the work atmosphere becomes more competitive. This change has taken place in public sector companies, nationalized, private and foreign banks too. In India, there has been a tremendous increase in women employment in banking sector from the year 1950. A gradual but remarkable increase in the women employment has been seen from 1960 in metropolitan cities. These days one can find women working in almost all types of banks. Few of the significant reasons for increase in the recruitment rate of women are qualification, honesty, and time-consciousness, sense of responsibility, performance and completion of work within the stipulated time.

Over the last decade Indian society has witnessed a surge in participation of women in labour force, especially in IT industry which is a direct fall out of globalization and brought a lot of opportunity for educated women. In the light of the increasing number of women in IT industry, there is a need to examine the phenomenon of the work-life balance of Indian women IT professional in greater depth.

Education sector is critical in the development of any country. It has been revealed from various researches that most of the parents are supportive towards their daughter serving in the education sector. It has been observed that married women face more challenges than the unmarried working women. Although their husbands are co-operative but their children are highly neglected. But even unmarried women face various difficulties such as transportation and managing time between personal and social life. Most of the respondents, married or unmarried, believed that their salary and promotion system is not satisfactory for which they blame "Bias".

Throughout history, work and life were same as life things like public involvement, child care, and elder care occurred together with the work. Work-Life Balance is not a new thought it has changed over time. Anne-Marie Slaughter, most recently known for her provocative portion, "why women still cannot have it all" forced a discussion among the company, political and educational circles about how much and when women can balance their personal lives with their careers. Speaking at Harvard Business School she encouraged an appraisal of how much a balance between the personal and professional life can be struck by arranging different goals through different life stages.

First and foremost, women need to take hold of control and inoculate the planned changes themselves at the professional and the personal level. Women need to find their seat at the table and declare themselves instead of self-constructing glass ceiling that cause their professional ascent to fade into yesteryear oblivion. Second, female leaders also need not to be ashamed & trust upon their family as a strength. Women shift the form of their careers by revolving different aspects of their lives to organize their roles and relationships in new ways. More women are now sacrificing more in order to take care of their family and motherhood. Maybe this is because women no longer feel as if they have to "do it all" the career, the husband, the children and are



ready to make some hard choices that result in sacrifices the career of their lives. This might be the cause as in past the men were to work and women were to stay at home and look after the family.

Working women are mostly in full time services and are working 8 hours per day and 5 days in a week minimum and are challenged by increasing workload every day. So, most of them carry work and responsibilities to home but balancing between these two is some difficult situations as in today's world fast life requires talent, thoughtfulness, skills and attentions according to Lisa A. Mainiero and Sherry E. Sullivan (2007) in past era women's role was naturally limited to the family, children and she was fully engaged with her responsibilities as a mother and homemaker. According to Rajasekhar (2013) he had studied that man's responsibility was to provide the household with raw materials, which were then transformed by the woman into useable products. According to Department for Education and Employment (2000) stated that Work-Life Balance, is not just about women manipulating a home and family-although that is an important part of it but adjusting working patterns so that everyone, in spite of age, race or gender, can find an easy way to combine work with their other responsibilities. Life is a balancing act, and it is right to say that in current era everyone is constantly looking for the right Work-Life Balance.

The various Hindu associations such as the Arya Samaj and the Brahma Samaj gave great motivation to the wakening of women. In middle of 19th century, the practice of "Satr was stopped by law. In 20th century, the women's organizations such as (Mahila Samitis) ended the purdah and child marriage and encouraged widow for marriage. The Indian reforms Act of 1921 empowered a small section of Indian population and women were also included. Also, Mahatma Gandhi set the step for the growth of Indian women and asking them to step out of the kitchen. Due to this appeal thousands of women came out of their houses to take part in Gandhi's movement.

The Hindu Succession Act, 1956 may be considered as milestone in the history of Hindu women in which for the first time the equality of men and women in property rights were announced. In current era Indian women should contribute to the economic, social and national development of the country; by their enriched knowledge. In today's era many laws constituted to the improvement in the status of women.

The married working women usually has a positive rather than negative effect on married life. The consequence exposed that working women with children were pointedly lower in work-related promise comparative to working women without children. The consequence of the work-related stress was obviously superior than that of the stress related with the family function, though the connection between family, stress and wellbeing was also noteworthy.

Work-Life Balance of working women emphases on two main characteristics called Accomplishment and satisfaction which means the working women should be satisfied with their job and at the same time enjoy the accomplishments or achievements both in personal level and professional level which helps in attaining positive attitude. After the Industrial Revolution, there was an incredible change in the pattern and concept of professionalism and expertise which gives the new height to work-life balance. But work-life balance varies from individual to individual due to the priorities differ due to individual life styles, status, like when one is unmarried, after marriage, after childbirth, when a new career begins and this keeps on changing till one's get retired. With increasing technological development and education, employment opportunities for women have also improved. And with increasing economic conditions, it has become an essential for both husband and wife to work to have a normal and good life. In this fast growing and



competitive world, as every possible opportunity for employment is increased, the organizations need to create a friendly atmosphere where working women can balance their professional and personal life. Only when working women has a positive Work Life Balance, she can be fruitful to give her best to the organization. Hence various organizations are working out on their schemes which can retain their employees.

2. REVIEW OF LITERATURE

Work life balance brings better efficiency to all facets of life. Employees work better when they do make time for their personal and professional lives. Therefore, the challenges have become relevant not only in India but has become main issue of concern to all the service sectors. Lot of work has been done scholars in order to discover the ways to uphold the balance life both personally and professionally. The literature recognizes its effect on several quality life conditions i.e. Work Satisfaction, Work Stress, Career Growth, Revenue, Absence, Gratitude and competitive environment in context with Work-life Balance and its practices.

In this research, an attempt has been made to provide a synopsis of various aspects of Work-Life Balance through the review of existing literature. The sources used are various journals, books, doctoral thesis, working papers, reports, magazines, internet sites, newspapers etc. and has been replicated as references at the end. This chapter marks an attempt to review of existing studies related to Work Life Balance among working women in different sectors. Some of the research reviews are as follows:

Abubaker, M., & Bagley, C (2016) reported that attaining a balance between the demands of the role requirements of work, family, and social life is a challenging problem for modern society and is particularly relevant for the growth of women's participation in the workforce. These role conflicts may result in significant psychological stress for individuals. For corporations, stressed employees are also a problem. Work-life balance (WLB) programs have arisen in Western countries in the past three decades and have been evaluated in various ways in sociological and psychological methodologies. WLB programs in developed countries often reflect the ethos of cultures, and Western models may not be wholly relevant for cross-cultural comparison. The present study explores these issues using the methodology of critical realism in companies in the telecommunications sector of Palestine. This qualitative study develops a complex model of a newly identified set of factors, which may be relevant for other Arabic cultural settings. Further exploration of this model using psychometric techniques is proposed.

Aaker (1996), Clark(1989) Another most important reason for studying teachers on the aspect of Work life balance is that, this is the profession that has overwhelmingly female than in any other profession concluded that it is the teaching profession that has different dimensions such as pattern of work, authority, identification and career etc., and most important thing is that all these dimensions differ with different institutes and subjects that is why this field is most preferred for Work family conflict.

Acker, (1992); Biklen, (1995) Thomas & O'Brien, (1984) stated that numerous researches have revealed that female faculty members are very busy in their occupation. Acker et.al, (1992); Claesson & Brice, (1989) stated that earlier studies also indicated that teaching is a stressful profession for working mothers and that a noteworthy resistance characterizes the connection between personal and professional life according to Blase & Pajak, (1986); Spencer, (1986).

Addagabottu, R. S, & Battu, N. (2015) reported that medicine is a profession in which dedication to the wellbeing of others is of paramount importance. Career in health sector generally demanded a selfless motive on caring for one's patients, sometimes at the expense of one's marriage, children, and personal life. Such a skewed focus worked more easily in the past when most Doctors were men. When male Doctors spent long hours at work or travelling to meetings, their



wives were home to run the household and care for the children. As women entered the medical field in increasing numbers, how-ever, the tensions between career and family became more prominent. As a Doctor/Nurse and single mother of four children, it is well known that it can be done successfully, but there are many challenges that female Doctors and Nurses must confront in balancing their multiple roles as Doctor, Nurse, mother, and spouse. It is also evident from many studies that causes of work life balance among working people and its impact have been verified. But studies with the focus of examining the attitude have been yet to be made. The scholar is able analysis an effort of studying the attitude of work life balance and its influence among Women Doctors and Nurses in government and private hospitals of Guntur district. It also focused the aspects related to their job roles, role clarity, job authority and its influences on their job. This study aims the Work and Family/ Life related variables that influence the Work life balance of women Doctors and Nurses. In addition to that this study aims to determine the Work and Family/ Life related variables and their impact, the ways and means employed by women to manage and overcome various forms of work and family related conflicts.

Aggarwal, N. (2015) studied work life balance considering Indian perspective and found that the anxiety over work-life balance is progressively becomes a common talk especially for women employees. Work life balance is a condition of equilibrium in which the demand of both professional and personal life is equal. Handling growing demands from the work and family areas represented a source of high stress for many employees which leads to the health issues. Although it is believed that work family role strain is more common among women employees, but men also experienced stress resulting from differing roles and demands. Chi square test was applied in this paper to check the authenticity of data given by the respondents. The study was based on working women in banks with special reference to State Bank of India, Patiala city (Punjab). Work-Life Balance is nowadays, no doubt a major concern to be discussed as a serious matter and has to be managed.

AlamSageer, Dr. SameenaRafat, Ms. Puja Agarwal (2012) undertook a study by analyzing various variables which affects the employee satisfaction. Through their observation they stated an organization should target at emerging policies that support the work environment and improves the worker confidence and their satisfaction so that the employee's performance and efficiency will increase the profit of the organization.

3. RESEARCH METHODOLOGY

The study is based on work life balance of working women which focuses on obtaining of in-depth knowledge and the facts to be analyzed and evaluate to meet the objectives of the study. Absence of work flexibility, high work stress and longer working hours are stressing out many working women. These are reducing their job performance and productivity as well as causing stress in their personal lives. In the Indian society, there is growing concern that the value of home and social life is deteriorating. These have caused poor input and poor performance at her work place, because a working woman, who finds it difficult to appropriately balance her personal and professional life. Empirical studies provide some sign that when working women spend too much of time at workplace, and spend less with their families, their health and work performance begin to fall which causes stress.

With the above concept in mind, the present study is focused on evaluating the Work Life balance of Women working in health sector.

3.1. NEED OF THE STUDY

In today's world of never-ending technological development world is giving equal opportunities to all regardless of the gender. Women have also started realizing the fact that the world of work today is open to dynamic employees who are ready to give their best. There is no doubt that



women are proving themselves in each and every field. We can't argue the fact that it is not at all an easy job especially for women who are playing a dual role and that too with equal ease. They put in a lot of efforts to attain a balance between their personal and professional lives. They usually have to undergo a lot of stress. The study explores and examines different sectors where women face problems and challenges due to the multiple roles they play. It also highlights the way working women are coping up with these problems and challenges.

It has usually been observed that women employees face a lot of uncertainties and hitches as they set their professional goals. Even if they make it their one mind destination and start putting in their best efforts, they are usually pulled backward either by their social responsibilities that come in terms of their family or by their family or motherhood responsibilities. Though effectively planned strategies, good time management and goals setting can help women employees attain a balance between their professional lives and family obligations but at the same time there is always a need to bring about the required changes by the organization over safety measures, planning and adopting human resource management system related strategies to facilitate working women employees in achieving their set targets both in their professional as well as personal lives.

3.2. Objectives of the Study:

1. To study work life balance among working women with regard to work environment, work life expectation and work life satisfaction.
2. To examine the factors affecting work life balance among working women in health sector of Himachal Pradesh
3. To identify the challenges faced and causes of stress by working women in Himachal Pradesh.

3.3. HYPOTHESES OF THE STUDY

- The working environment in health sector have a positive outlook about work environment, work life expectations and work life satisfactions.
- The factors affecting work life balance and challenges faced does cause stress to working women.

3.4. SAMPLE DESIGN

The sample design is based on demographic people of working women in service sector. Women employees working in service sector of Himachal Pradesh was selected as respondents for the sample. The sample size was based on women employees working in selected organizations of service sector in the state of Himachal Pradesh. From health sector 350 respondents have been selected.

3.5. LIMITATIONS

- The ratio of male versus female employee is very uneven which resulted in narrowing the sectors to be taken for this study.
- The study assumed that the responses received from the respondent is honest and true in nature.

3.6. SCOPE OF THE STUDY

The area of study is the state of Himachal Pradesh. For the purpose of collecting data, selected districts of Himachal Pradesh were included Shimla, Solan and Kullu. The working women are continuously on rise in these regions and they are stressed to strike a balance between their personal and professional lives. The study is specific to Shimla, Solan and district Kullu as these



areas are undergoing transition of women moving out of their houses to the world of work. The study confines to health sector of Himachal Pradesh.

For this research work samples were drawn from the Health sector 20 samples were collected from different private and government hospitals and health care centers.

3.7. RESEARCH METHODOLOGY

The sample has been drawn from health sector situated in Shimla, Solan and Kullu districts of Himachal Pradesh. The data collection for the research is based on both primary and secondary data.

3.7.1. Primary Data

A set of questionnaires has been established to collect the answers from the working women of the banking, educational, tourism and health sector to perceptualize the opportunities, scope and constraints and grey areas with regard to Work Life balance of Women in health sector situated in Shimla, Solan and Kullu districts of Himachal Pradesh. Data on environmental, socio cultural and psychological viewpoints of the study area has been collected for preparing this questionnaire.

- **Questionnaire:** A well-structured schedule of questions containing different aspects of the study has been developed and circulated to persons concerned.
- **Interview:** Data has been personally collected by investigator from the informants' associated with the health sector directly or indirectly.
- **Observation:** Certain information has been collected through personal observations. There are some incomplete questionnaires, which give ambiguous information. Therefore, personal observation has been made to reveal the data.

3.7.2. Secondary Data

To get the vital details on policies and planning government and other geographical and socio-cultural perspective of the study area has been collected from authentic resources such as books, research papers and journals, Project analyses, unpublished reports of government departments and other reliable sources of data broadcast.

3.7.3. SAMPLING

The Stratified Random Sampling technique has been used in order to collect the primary data. 1,155 respondents have been taken both from health sector situated in Shimla, Solan and Kullu districts of Himachal Pradesh, India. Sample comprised of women employee at different managerial level

3.7.4. TOOLS OF ANALYSIS

The data collected from different sources has been classified and arranged in tables in one or more forms according to the requirements of analysis. For the analysis of results, the following techniques have been applied:

3.7.5. MATHEMATICAL TOOLS

In the present research work, mathematical tools viz. percentage and simple average have been used to analyze the data.

3.7.6. TABULAR ANALYSIS

In tabular analysis, percentages have been calculated to draw the implications; it is very scientific and perfect analysis. In the present study, it has been used to support the implications drawn from the statistical analysis. For the respondents, the responses have been asked on the five parameters of 'I strongly agree, I agree to some extent, neutral, I do not agree, and I do not agree at all'. For ranking purposes where the sum total of a row has been equal, those higher either in response to fully agreed or very likely have been placed higher. For data calculation, "strongly agree" has been given 5 points, "Agree" has been given 4 points, "neutral" has been given 3 points, "disagree" has been given 2 points and "strongly disagree" has been given 1 point.

3.7.7. STATISTICAL METHOD

Various statistical tools have been applied to data presentation in tabular form. The following tools are used in present research work:

3.7.8. RELIABILITY ANALYSIS

Dependability refers to the level to which a scale produces reliable results, if the measurements are repeated a number of times. The analysis on dependability is called dependability analysis. Dependability analysis is determined by finding the proportion of systematic variation in a scale, which can be done by determining the association between the scores obtained from different managements of the scale. Therefore, if the association in dependability analysis is high, the scale yields consistent results and it is reliable.

The limitation in this analysis is that the outcomes will depend on how the items are split. In order to overcome this limitation, coefficient alpha or **Cronbach's alpha** is used in dependability analysis. Cronbach's alpha is a measure of internal reliability, that is, how closely related a set of substances are as a group. It is measured to be a measure of scale reliability. A "high" value for alpha does not suggest that the measure is unidimensional.

3.7.9. MEAN

One of the most useful and widely used techniques for doing this –one quite well known, is the average, or, as it is known in statistics, the mean. It is possible to arrive at the mean by simply adding up a set of scores and then dividing it by number of scores. This can also be done with the help of the most basic statistical formula:

$$\bar{x} = \frac{\sum x_i}{n}$$

3.7.10. STANDARD DEVIATION

It is the most significant and usually used measure of studying dispersion. The standard deviation is also known as root mean square deviation from the arithmetic mean. The standard deviation measures the absolute variability of distribution. The greater the standard deviation, the greater have been the magnitude of the deviations of the values from their arithmetic mean. A small standard deviation means a high degree of uniformity of the observation as well as homogeneity of the series or vice-versa.

$$\sigma = \sqrt{\frac{\sum x^2}{N}}$$



3.7.11. ANOVA

Analysis of variance (ANOVA) separates the variance of the variable into two components. One component is the variability among group means. It is computed by summing square of the differences between every group mean and overall mean of the distribution. This value is divided by the degree of freedom $k-1$ where k number of groups to obtain Mean Sum of squares between groups (MSB) The other component is the variability within the groups (also called residual variation). It is measured as the sum of squares of the variances between each observation and its respective group mean. This value is separated by degrees of freedom $n-k$ where n is over-all number of observations and k is number of groups, to find Mean Sum of squares within groups (MSW). The ratio of the most significant bit (MSB, also called the high-order bit) and MSW (statistical quantity) is called the F ratio. The calculated F ratio values are compared to the standardized table value of F from the F-distribution. If the calculated F-ratio value is bigger than the table value at a satisfactory level of significance, we will reject the null hypothesis of equality of means and conclude that the means of the groups are meaningfully different. In other words, large F ratios signify that the variation among group means is more than it would be if this variation were simply outcome of chance.

3.7.12. TUCKEY HSD – POST HOC TEST

When significant mean differences were detected, further evaluation was needed to identify exactly where differences existed. In the case of only two groups, simply looking at the group means could establish the relationship between the groups. With more than two groups, post hoc multiple comparisons were required to establish precisely which pairings had statistically significant mean differences. I opted to use the Tuckey HSD post hoc procedure because it is robust to unbalanced designs where there are a different number of participants in each subgroup. To maintain an overall, experiment-wise alpha level of .05, the Tuckey HSD procedure conducts each pair-wise comparison (t-test) at an alpha level of .05 over the number of comparisons. For instance, there are six pairs of comparisons for four groups (1 vs. 2, 1 vs. 3, 1 vs. 4, 2 vs. 3, 2 vs. 4, and 3 vs. 4) so the pair-wise alpha would be $.05/6$ or .0083. To conduct the Tuckey HSD procedure in SPSS, the researcher selects an experiment-wise alpha and the program automatically divides the alpha by the number of comparisons so each pair-wise comparison is done at the appropriate alpha level. SPSS then adjusts the reported significance by multiplying by the number of comparisons to make it easier to interpret. The sign (positive or negative) of the mean difference reported by SPSS indicates the direction of the relationship between the groups. Thus, if the comparison is group 1 vs. group 2 and the mean difference is negative, then the mean for group 1 is less than the mean for group 2.

3.7.13. RELIABILITY ANALYSIS – CRONBACH ALPHA

Since the questionnaire was spread over many dimensions of work life balance and satisfaction from workplace, it was intended to test the reliability of using such scales for measurement purpose. Dimensions of work life balancing for women employees include Job Demands, Job Autonomy, Job Involvement, Job Time, Job Security, Job Stress, Household Demands, Family support, Family to work spillover, Attitude towards Gender role, Personal Financial Strain, Life Satisfaction, Work to Family Role Spillover, Support from Colleagues, Support from Superior, Organizational work life support, Opportunity for advancement, Organization Communication, Organization Commitment. Similarly, dimensions of Satisfaction from work environment include General Working Conditions, Pay and Promotion, Work relationships, Use of Skills and Abilities, Work Activities. The most common tool used for reliability analysis is Cronbach alpha. The same has been used for all these dimensions. For this



purpose, a pilot study was conducted initially on 60 respondents. Table 3.2 and 3.3 discuss the results of reliability analysis.

Table 3.2 Reliability Analysis of Work life balance in personal environment

Variable Name	No. of Items	Cronbach Alpha
Support from family	22	0.89
Child care, dependent care	8	0.94
Self-management	7	0.92

Reliability Analysis of work life balance and personal life expectation

Personal life expectation	18	0.70
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Reliability Analysis of work life balance and personal life satisfaction

Personal life satisfaction	18	0.72
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Reliability Analysis of work life balance and work Environment

Work life balances policies	9	0.82
Work play support	14	0.87
Workload	11	0.71
Financial assistance	8	0.88

Reliability Analysis of work life balance and work expectations

Work expectation	14	0.77
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Reliability Analysis of work life balance and work satisfaction

Work satisfaction	14	0.90
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The generally acknowledged social science cut-off is that alpha should be .70 or higher for a set of items to be measured a scale, but some use .75 or .80 while others are as lenient as .60.



That .70 is as small as one may request to go is reflected in the fact that when alpha is .70, the standard error of measurement will be over half (0.55) a standard deviation. In the above table, minimum Cronbach alpha value has been 0.71 and maximum has been 0.94. Hence, it can be said that the scale develops to measure work life balance of women employees of health sector is ideal.

3.7.14. Statistical Analysis & Techniques:

The study is based on descriptive statistics, ANNOVA F test, Post Hoc test, mean plot etc. which is applied in the research. The study also involves the measurement of Work life Balance (WLB) of working women in health sector. The primary and secondary data has been collected based on the specified objectives of the study.

4. FINDINGS, RECOMMENDATIONS AND CONCLUSION

Work life balance is not same for working women as in case of male. It is rather challenging for working women. Women in our society were earlier restricted to household work only but today scenario has very fast changed for women. Now women are found both in personal and professional life. Their responsibility of household responsibilities and child care has hardly reduced. But they are now likely to outshine and accept challenges at work place and in their personal lives. With this theme in mind, the present study has been undertaken to examine the level of work life balance among working women in health sector.

FINDINGS

- I. The study finds that women employees who are above the age of 50 have a balanced work life as per their personal environment, personal life satisfaction and personal life expectation, compared to women less than 50 age group in health sector.
- II. The study also indicates that women employees who are above the age of 50 have a balanced work life as per their work environment, work life satisfaction and work life expectation, compared to women in 41- 50 age group in health sector.
- III. The study finds that women having more than 20 years of experience in the health sector are highly satisfied as compared to 1-10 years women employees have least work life balance based on personal and work environment, personal and work life expectation and personal and work life satisfaction.
- IV. The study also indicates that women whose income is more than 10 lakhs are more satisfied as compared to working women whose income is less than 2.5lakhs in health sector as per their work and personal environment, work and personal life expectation and personal and work life satisfaction.
- V. The study finds that married working women are more satisfied in their personal and work environment, personal and work life expectation, personal and work life satisfaction compared to single women.
- VI. The study finds that women having 2 number of dependents have highest work life balance as per their personal and work environment, personal and work life expectation, personal and work life satisfaction as compared to 2+ number of dependents have least work life balance.

SUGGESTIONS:

- Many doctors and nurses are required to work long hours, night shifts and this causes a struggle between their personal and professional lives. The natures of work at hospitals demand that the doctors, nurses are present at the work at odd hours. This also has a peal on the working women ability to take care of her own health.
- The doctors and nurses are continually struggling to ensure a balance between the care she gives to her patients and the care she gives to herself and to her family. According to Sara



Hedderwick³⁴⁴ (2012), a consultant in infectious diseases at Belfast, there is no boundary for what one wants to do to help patients get better, but to do that, health care specialists must certify that they remain healthy too. Trying to achieve this work life balance between personal and professional lives is very difficult, particularly for those who have families and dependents. This struggle often leads to stress in the doctors and nurse's life.

- Hospitals today are succeeded like a business and are no longer dull and miserable places. Yet, this hasn't taken away the serious importance of devoted medical and paramedical professionals. Neither has it made any change in the stress that these categories of working women face because of the long and unreasonable hours' they have to put in. This is specifically true for the nursing staff.

4.1. CONCLUSION AND FUTURE PROSPECTUS

Women establish a significant section of the workforce. Yet, the present situation of a large number of well-qualified working women who due to various situations have been left out of their jobs needs to be addressed. The difficulties faced are numerous but, meaningfully, most often the "break in their professions" ascends out of motherhood and family responsibilities." It is obvious from the above study that working women working in the tourism industry to maintain a balance of work can have serious consequences on the life of an individual.

The study concluded that the work life balance has become an expedition for professionals of health sector of Shimla, Solan and Kullu districts of Himachal Pradesh and also that working women work better when they do make time for family and personal life.

Future research must focus on a broader sample in order to get more comprehensive results. Furthermore, it must be focused at understanding individual changes so that employee specific initiatives to improve work life balance could be introduced by officialdoms.

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1/2 LokLF; I j{k.k ,oa l o) Ū %& _f'k vkJela vīś xq dyl/ka ea f'k'; kō ds "kjhfd vīś ekufi d LokLF; ds I j{k.k vīś l o) Ū ij fo"ksk cy fn; k tkrk Fk vīś mlga mfpr vkgj&fogj vīś vpkj&fopkj dh f'k'kk nh tkrh FkA "kjhfd LokLF; ds I j{k.k ,oa l o) Ū ds fy, f'k'; kō dks ikr% cāēgrz ea mBuk gkrk FkK nūr&i kkyu ,oa Luku djuk gkrk FkK 0; k; ke djuk gkrk FkK I krk Hkktu djuk gkrk FkK fu; fer fnup; kZ dk ikyu djuk gkrk Fk vīś 0; I uka l s nī jguk gkrk FkA f'k'; kō ds ekufi d LokLF; ds I j{k.k ,oa l o) Ū ds fy, mlga mfpr vpkj&fopkj dh vīś mbeqf{k fd; k tkrk FkA

1/2 tkfodkī Ū ,oady&dīky dh f'k'kk % oīnddky ea f'k'; kō dks mudh ; k; rkuq kj dī'k'j i "kīkyu ,oa vī; dy&dīskyā dh f'k'kk nh tkrh FkA ml l e; gekjk nsk /ku&kkl; l s l Ei lu FkK ykx cgr vPNk thou thrs FkS ijUrq mūkj oīnd dky ea deē vk/kfjr o.kz 0; oLFk tīe vk/kfjr o.kz 0; oLFk ea cny xbzftl ds i j.kkeLo; i ykxka dks o.kkZq kj f'k'kk nh tkus yxhA

1/4 l dīfr dk I j{k.k ,oafodkī % oīnddky ea f'k'kk dk , d mīś; viuh l dīfr dk I j{k.k vīś glrUrj.k FkA ml dky ea xq dyl/ka dh l Ei wkZ dk; Zi) fr /keZ i kku FkA ml dky ea f'k'; on el=ka dks ; kn djrs FkS l U; k&olnu dh fof/k; k; fl [kkbz tkrh Fk vīś vJekuq kj dk; Z djus dk mīnsk fn; k tkrk FkA f'k'k i klr djus ds dky dks cāp; kZe dgrs gā cāp; kZe dk i kJk vFkz f'k'k xg.k dk i kJk miu; u l dīkj dh fof/k l sgkrk FkA miu; u vFkz~xq ds ikl ys tkukā xq ds ikl tkus ij fo | kFkZ mudh vkKk l s vius gkFk dh l fe/kk dk vīXu ea gē dj cāp; br dh nh{k ysk FkA cāp; kZe vFkz~f'k'k xg.k ds dky ea l c nī'V l s i fo= jgrs gq i R; {k xq dh nī'k j s k ea or ds ukr} , d xfpYk l s fo | k xg.k djuk gkrk FkA oīnd dky ea f'k'kk dk , d k Ōe pyk fd ml ds i Hkko l s vuq ykx xglFk vkJe ds ckn okui LFk vkJe ea i dsk djrs FkS vīś ou ea jgrs gq v/; ; u) fpUrj euu vīś fufn?; kl u djrs FkS vīś u, &u, rF; kō dh [kkt djrs FkA buea l s dī'N ykx l ū; kl vkJe ea i dsk djrs FkS vīś /; ku vīś l ekf/k } kj ekk i klr djrs FkA bl l s nsk dh l dīfr dk I j{k.k vīś fodkl gvrkA

1/5 uīrd ,oapīj=d fodkl % oīnd dky ea pīj= fuekZk l s rīRi ; Z euq; dks /kel Eer vpkj.k ea i f'k'k'kr djus l s fy; k tkrk Fk ml ds vkgj&fogj vīś vpkj&fopkj dks /keZ ds vk/kj ij mfpr fn'kk nus l s fy; k tkrk FkA

1/6 vī; kRed mlūr % oīnd dky ea f'k'kk dk l oZSB mīś; euq; ds cāā ,oa vīUrj d nkuā i {kka dks i fo= cukdj mlga pje y{; ekk dh i klr dh vīś vxl j djuk FkA

1/6 f'k'kk dk i zkk u ,oafok % oīnd f'k'kk iz kkyh ds i zkk u ,oafok ds l Ecl/k ea rhu rF; mYy{kuh; gā &

1/4 jkT; dsfu; U=.k l seā % oīnddky ea f'k'kk dh 0; oLFkK djuk jkT; dk mūkj nīf; Ūo ugha FkA i j.kker% ml ij jkT; dk dkbZ fu; U=.k Hkh ugha FkA ml l e; f'k'kk i wkZ : i l s xq vka ds 0; fDrxr fu; U=.k ea FkA

1/2 fu%kd f'k'kk % oīnd dky ea f'k'kk i wkZ : i l s fu%kd jghA f'k'; kō ds vkokl ,oa Hkktu dh 0; oLFk Hkh xq Lo; a djrs FkA yfdu f'k'kk i wkZ gkus ij f'k'; xq vka dks viuh l keF; kZq kj nī{k.kk vo"; nrs FkA

1/3 vk; ds l=k&nku fīk vīś xq nī{k.k % oīnd dky ea xq vka dks vkt dh Hkkr jkT; l s dkbZ fuf'pr vuqku i klr ugha gkrk FkA ml l e; jkT; egkj ktk vīś l ekt ds /kuhoxZ ds ykx



bu xq dya ka dks LoBNk l s Hkne] i "kj vlu] oL= ik= vlsj epnk] nku Lo: i Hk/ djrs FkA xq dya ka dh nBud vko"; drkva dh i firZ ds fy, f"K"; l ekt l s fur; fHk{kk epk dj ykrs FkA bu xq dya ka dh vk; dk rhl jk L=kr Fk & xq nf(k.k.A

¼½ f"K{kk dk iB;Øe % ofnddkyhu f"K{kk ds ikB;Øe dks ml dh idfr ds vk/kkj ij fuEufyf[kr nls: i ka eafoHkkftr fd; k tkrk gS &

¼½ vijk iB;Øe % bl ds vlrXr Hk'kk] 0; kdj .k] df'k] i "kj kyu] dyk YuR; , oa l ahr¼ dks ky %dVkb] çukb] jaxkb] dk'B dk; l /krrq dk; l , oa f"KYi½ vFk'kkL=] jktuhfr"kkL=] Hk'kkZ'kkL=] ikf.k'kkL=] l i fo |k] rdZ'kkL=] T; ksrfoKku] vk; foKku , oa l sud f"K{kk dk v/; ; u vlsj 0; k; kej xq dya 0; oLFk , oa xq l ok fØ; k; j l feefyr FkA

½½ ijk iB;Øe % bl ds vlrXr ofnd l kfgR; }on] onk , oa mi fu'kn½ /ke'kkL= vlsj uhfr"kkL= dk v/; ; u vlsj bflnz; fuxg] /keLuphy vkpj .k] b'oj Hk'fä] l U; k olnu vlsj ; Kkfn fØ; kvka dk i f"K{k.k l feefyr FkA

¼½ vuqkl u % ikjfehkd ofnd dky ea vuqkl l l s rkrri; l "kkjhfd] ekuf d vlsj vkfRed l ae l sfy; k tkrk FkA ml dky ea "kkjhfd l ae l s rkrri; l Fk & cāp; l or dk ikyu] jaxk] u djuk] l xfu/kr inkFkA dk iz; x u djuk] uR; vlsj l ahr ea vkuUn u yau] eknd inkFkA iz; x u djuk] tpx u [kyuk] xk; u ekjuk] >B u dkyuk vlsj pxyh u djukA ekuf d l ae l s rkrri; l Fk & bflnz; fuxg] l R;] vlg l k] vLrs] vijxg vlsj cāp; l dk ikyu vlsj dke] Øksk] ykk] eksj vlsj en l snj jguk vlsj vkfRed l ae l s rkrri; l Fk & vRk ds Lo: i dks igpkuuk] l c ea , dkrE Hko nq'kuk vlsj l cds dY; k.k ds fy, dk; l djuk ijuRq mUkj ofnd dky ea f"K; ka }kj xq vka ds vkn'ska vlsj fu; eka ds ikyu dks gh vuqkl l ekuk tkus yxk vlsj tks f"K; budk ikyu ugla djrs Fk mUga n.M fn; k tkrk Fk ij "kkjhfd n.M fo"sk ij flFkr; ka ea gh fn; k tkrk FkA

¼½ xq f"K{kk½ ofnd dky ea vfr fo}ku] Lok; k; hj /kel jk; .k vlsj l Ppfjr 0; fdR gh xq gks l drs FkA ; s vfrKkuh gks ds l kFk & l kFk vfr l ae eh Hk gks FkA ml l e; blga l ekt ea l oLp LFkku ikr FkA ; sn: i ea ifr'Br FkA blga f/k; kol q¼tl dh çq] gh /ku gS] l R; tUek ¼ R; dks tkus oky½ vlsj fo"oonk ¼ oK½ vkn fo"sk.kka l s l EckS/kr fd; k tkrk FkA ; s vius xq dya ka ds iwZ Lokeh gks Fk ij iwZ LokfeRo ds l kFk iwZ mUkjnkf; Ro tUk FkA ; s vius xq dya ka dh l Ei iwZ 0; oLFk ds fy, mUkj; h gks FkA ; s vius f"K; ka ds vkokl] Hkst u] oL=kfn dh 0; oLFk djrs FkA muds LokLE; dh nq'kHky djrs Fk vlsj muds l okkch.k fodkl ds fy, iz Ru djrs FkA

¼½ xq & f"K; l Ecl/k % f"K{k.k dgrs gh xq o f"K; ds l Ecl/k dh ckr vkrh gA ; g l Ecl/k ftruk l j l i o i iwZ gksk mruk gh fo l ktZu Hk l q; ofLFkr gkskA bl s n"kkZs ds fy, ān; Li "kZu dh , d fof/k dh tkrh FkA bl fof/k ea xq f"K; ds ān; ij gkFk j [kdj bl vk"K; ds ea dgrk Fk fd ge nku ka ea fpjd ky rd i e o fo"okl cuk jgA bl ds vullrj v"ekj ky .k dh fof/k l Ei l u dh tkrh Fk] ftl ea xq f"K; dks iRFk ds Åij [kVl dkj ds ml l s dgrk Fk fd rw "kj hj o fuf"p; ea bl ik'kk.k l jh [kk n'+cuA bl fof/k ds i "pkr-miu; u l ddkj iwZ gks tkrk FkA bl idkj igys miu; u l ddkj ds ijs gks tkus ij ckn ea l kfo=h ea xg.kimZd onfo |k dk ikjEHk gksk FkA ofnd dky ea xq & f"K; l Ecl/k vR; Ur ifo= vlsj Lug iwZ FkA muea fir k & i e dk Lug l Ecl/k ik; k tkrk FkA vkpk; l dh l ok rFk vkKk & ikyu f"K; viuk ifo= dUk; l e >rk FkA **vkpk; l noks Hko** bl idkj dh f"K{kk dk og iwZ; k ikyu djrk FkA vkpk; l Hk f"K; ka ds viuk i e l e >dj ml ds Hkst u] oL= rFk jgu & l gu dh 0; oLFk djrk FkA xq f"K; ds "kkjhfd] çk] d rFk v/; kfred fodkl dk mUkjnkf; Ro FkA , d se/kj , oa Lu fgy okroj .k ea vuqkl ughurk ux.; l h FkA e; kñk dk mYyZku djus ij nku ka gh n.M , oa ik; f"pr ds Hkxh



gksr FkA xq dh mPprk Lohdkj djrs gq Hkh xq vj f'k'; ds l Ecluk Øe"lk lerk ij vk/kkfjr gks jgs FkA Hkkjrh; xq ikFkZuk djrs FkA ****I g ukooqrl g uksHqDrql goh; ãdjokogã**** vFkkr-ge l kFk&l kFk pyh l kFk ea Hkks tu djavkj l kgl iwz dk; Zge l kFk&l kFk dja

½½ ijh{k;k; rFk miK/k; k % vkt ds l eku nfr kr ijh{k;k izkkyh ugha FkA v/; ; u dh l ekfir ij dkbz ijh{k;k ugha gksr FkA fo | kFkZ døy vflre ikB dh vPNh rjg 0; k[: k dj nrk FkA f'k{k dh l ekfir ij fo | kFkZ %Lukrd% dks fo|kua dh l Hkk ea ys tk; k tkrkA ogk; ml dh "ykdk ijh{k;k gksr FkA ; g l ekoru l ãdkj ds i"pkr-gksr FkA bl l s Li'V g\$fd l ekoru dk v/ãdkj ; k miK/k/ fo|ku- l Hkk dh Lohdfr ij fuHkz ugha Fk vfir vpkp; Z ij fuHkz FkA

bl i) fr dk l cl scMk ytk; ; g Fk fd ml ; q ea vkt ds l eku f'k{k dk iez[k m's; ; ijh{k;k mÜk. lz djuk rFk miK/k ikr djuk u Fk vfir Kku ikr djuk FkA Lukrdka dks l Ei wZ Kku viuh thk ij j [kuk i m'rk Fk vFkkr- d. BLFk djuk gksr FkA ; gh dkj. k Fk fd os ik; % v/; ol k; ea yxs jgs Fks vj mudk ikf. MR; Bk gksr Fk u fd vkt os l eku iYyoxghA ofnd f'k{k. k i) fr ea; g fo/ku Fk fd xq ds vJ e ajgdj gh fo | kFkZ dks viuk f'k{k. k xg. k djuk pfg, A ; svJe tu l epk; l snj vj.; ka ea gw/ djrs FkA bl dkj. k viuk thou xBu djs ds fy, l nxq ds v/ku jgs okys fo | kFkZ ka ds thou ij ukxjh thou ds foyl h okroj. k dk dkbz d'ã dkj gksr dh l Hkkouk ugha jgrh FkA xq ds vJ e ajgs ds dkj. k tgl fo | kFkZ ds l e f'k vius pkfj; ; l Ei lu xq dk vkr "lz l nð mi fLFkr jgrk FkA ogk; ml fo | kFkZ ds Nks/ l s Nks/ s nkska dh vj Hkh xq dk iwz y{; jgrk Fk vj bl dkj. k ml dh mPNã k yrk , oa Lo\$ kpkj ij ifrcL/ k yxdj ml dk l k jk thou vuqkkl u ea c) gks tkr FkA ofnd f'k{k. k i) fr , d JsB jkV^o dk fodl døy bl fy, dj l dh D; kãd og dhkh jkt l Ük/ku ugha jgh ml ij l nk __f'ls ka dk fu; U= . k jgkA

ik'pR; i) fr dsnk % vesj dk dh , oa l eLr ik"pR; i) fr; ka ea thou dk l qBu djs okys vk/; kRed n'Vdksk dk vHko , d cMk Hkh nsk gA 0; fDrxr thou vFok l ekftd thou l Eclukh fd l h idkj dk eyHwr fopkj muds ikl ugha g\$ vj bl dkj. k vkr fjd thou fodl r djus dh fd l h Hkh idkj dh i fØ; k dk muds ikl l oFk vHko gA ml dk eglo Hkh os ugha l e> ik; s gA thou dh vk/; kRed /kj. kk ds dkj. k mRi lu gks okys o\$ fDrd , oa l ekftd xq kka dh vkt vesj dk ea vko"; drk g\$ ij urq bu l eLr xq kka ds fy, vk/kj Hwr] vk/; kRed rüoKku ds l r' + n'Vdksk ds vHko es fd l h Hkh idkj ds l nkpj vFok usrd 0; ogk; dh LFk\$ Z i kr ugha gks l drk l ozkel ãHksnrhr vk/; kRed vk/kj dk l eLr ; jk\$ ds thou ea rFk muds "k\$kf. kd {k= ea Hkh iwz i l s vHko gA l nkpj , oa uhrw; ka dk vk/kj gh vfuf"pr gks ds dkj. k ; gk; ds "k\$kf. kd {k= ea mudh [kjh ifr' Bk ugha g\$ l drhA vesj dk dh f'k{k. k izkkyh ea /; ; "k; rk Hkh , d ml jk cMk foy{. k nsk gA l eLr ik"pR; ; f'k{k. k i) fr ea , d l cl scMk nsk ; g\$fd ogk; f'k{k. k dk ifo= eLuj jkt l Ük/ku gA f'k{k. k dk /; ; l ãdkj nsuk ugha jgk] , d vkfFkZ Lrj inku djuk ek= gh ml dk m's; ; jg x; k vj bl dkj. k f'k{k. k dks 0; ki kj dk Lo: i ikr gks x; kA f'k{kã ds ifr mPp Hkkouk u'V g\$ xbz rFk bl dk eglo o LFkku nð; nsuk okys ekfyd dh l ok djs okys l od ds vfrfjDr vj dñ u jgkA l LFkfi r l Ük dks fpj LFk; h cuk; sj [kuk gh f'k{k. k; ã dk vkt m's; ; jg x; kA vkt dk Hkkjrh; f'k{k. k rã Hkh ml h fr"kk ea xfreku gks ds dkj. k ml ea Hkh ; g nsk nq ey gksuk i kj EHk gks x; k gA ofnd dky ea ekuk tkrk Fk ****fo | ; k er"uqã**** vFkkr-fo | k l s verRo] ijekuln , oa ek\$ dh ikfir l EHko gA **fu'd'k %**

tc xq dty 0; olFk n'sk ea Fk rc ; qk ih<ã dk pfj= d\$ k Fk\ D; k ogk; Hkz Vpkpj Fk] cyRdkj Fk\$ ekR&fir k) kJeka ea Hksts tkr Fks. D; k 10 l s 17 o'kz dh vk; q ds djkk/ka cPps efnjki ku djrs FkA ofnd dky ea L=h&iq 'k l Hkh f'k{k(kr FkA o. k] vkJe] /kz dk ikyu djrs FkA



egur djds dka/ dj [kkrs FkA fuf"pr gh bl h dkj.k fo"oxq ds in ij Hkkjr vkl hu jgkA D; k vkt ge viuh ubz ih<h dks l Hkkjydj oS h gh f"kk{kk ughans l drs tS h gekjh i dZt ka us nhA gekjs xq dya ka ea "kL= vSj "kkL= nksuka ea gh ikjar cukdj fo | kffkZ ka dks deZ {ks= ea Hkst k tkrk FkA vkt ge D; ka pud x, A D; ka gekjh ; pk ih<h viuh "kke ml "kjkC] gpd ds vSj tq; ea [kjkC dj jgh gS vSj D; ka njn"ku fokki ukaea v"yhyrk i jkd jgs gA

f"kk{kk dk ; g <ak T; knk vPNk Fkk tks jkLrk Lokh n; kuanth us fn[kk; k vSj Lokh J) kuanth us xq dya i) fr ikjEHk dhA dkbz Hkh dg l drk gSfd vkt ds ; q; ea bl dh dkbz vko"; drk ugha ij /; ku nus; kK; gSfd gfj}kj ea vk/kud ; q; dh "kSf.kd l fo/kvka , oa pfj= fuekZ k dks /; ku ea j[kdj ikjEHk fd; k x; k xq dya vo"; gh ml deh dks ij k djxkA ge f"kk{k.k l l Fkkvka dks /ku dekus dk dhnz u cuus nA ge gekjs l kjs l a k/ku , oa /ku ubz f"kk{kk uhr dks l gh cukus vSj gj ckyd&ckfydk rd f"kk{kk i gpkus dk dke vHkh l s "kq dja rks vxys , d n"kd rd ge mu vucl cjk bZ ka l s Nj/dkjk ik yxS ftuds dkj .k vij k/kj 0; fHkpkj] u"kk[kkSj h vSj ; pkvka dh fons'kka ea cl us dh vkdkh nkM+dks jkdk tk l drk gA

I UnHZ xbfk %

1/4 1/2 ikphu Hkkjrh; f"kk{kk vSj f"kk{kk"kkL=h & MNW ukFloyky xqr& jk/kk ifyds'kUI] ubz fnYyh & 110002

1/2 1/2 ofnd jk"V n"ku & [k.M % 2 onka dk varjx & egki k/; k; cky"kkL=h gj nkl & l q fp l kfgR; ds'ko dqt] >.Mokyk] ubz fnYyh & 110055

1/3 1/2 __Xon l fgrk & l Eiknd & ia Jh jke "kekZ vkpk; l & Hkx 1 l s 4 rd & izdk"kd & caop l "kkfurdq] gfj}kj mUkjky

1/4 1/2 BAED 301 & f"kk{kk vSj Hkkjrh; fojkl r & mUkj k[kM epr fo"ofokj;

1/5 1/2 vFkobn l fgrk & l Eiknd & ia Jh jke "kekZ vkpk; l izdk"kd & caop l } "kkfurdq] gfj}kj & mUkjky Hkx 1 , oa2



DOES GST A GAME CHANGER FOR INDIAN FMCG COMPANIE'S SHARE RETURN?(EVENT STUDY ANALYSIS)

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Abstract:

The present study focuses on "A Study of Impact of Goods & Services Tax (GST) on Shares return of Indian FMCG Companies". This study aims to find the reaction of Indian FMCG Companies Share return with respect to the announcement of GST rates and also tries to test efficiency of the stock market. The performance of stock market and its behavior serves as an indicator of the reactions of the economy of the nation. The Goods and Services Tax is a major tax reform in India which is most likely to boost the economic growth of the country. This expectation of the investors is assumed to be transformed to stock price returns that are either negative or positive. So for GST impact is concerned, here Daily, Monthly and Yearly, pre and post GST implementation share return is taken and different statistical tools applied to find impact of GST on these returns.

Key Words: (GST, FMCG, EVENT STUDY, PAIRED T TEST etc.)

Introduction:

Goods and Services Tax (GST) implementation is one of the biggest tax reforms in India since independence. The current tax structure is very complex and differs from state to state. The evolution of GST can be seen as a gradual transformation of a disparate, complex and cascading tax structure into a largely unified value added system of taxation. The current tax structure can be classified into three categories:

- Central indirect tax: Custom duty, Central excise duty, Central service tax etc.
- State indirect tax: Value added tax (VAT), entry tax, luxury tax, entertainment tax etc.
- Local tax: Octroi and other entry tax

Highlights of the GST tax structure are:

- Dual GST for centre and states, Integrated GST (IGST) on interstate transactions
- Free credit flow- No cross credit for Central GST (CGST) & State GST (SGST)
- Refund of unutilized accumulated ITC (income tax credit)

The impact of current fiscal policies has been such that most companies had to give priority to tax benefits over operational efficiency. As an example, many companies have established warehouses in all states where they have a significant market size and transact on "stock transfer" as a way to nullify CST which is paid during interstate sales. Post GST, the very existence of many of these facilities has come into question.

GST regime has brought several benefits for the economy and has vitalised the fast-moving consumer goods (FMCG) industry. While there are big players in the industry, a big share of the market is unorganized.

GST is helping level the field. However, the GST rate structure reflects not all FMCG companies stand to benefit from the new regime. The rates for various FMCG segments have mostly been along expected lines. Items of mass consumption - toothpaste, soaps, hair oil have been put under the 18% tax slab, significantly lower than the pre- GST 22-24% tax rate.

This is in accordance with the government's stance of keeping tax rates low for mass consumption products. As a matter of fact, the GST rate schedule indicates that most of the items are in the 18% tax bracket or below. Only 50 items fall in the 28% tax slab.

Review of Literature:

Nisa, 2017 evaluate the impact of GST on India's foreign trade. It highlights that GST will make life easier for businesses in India due to development of common national market. With even taxation and cost effectiveness owing to reduced time and costs in transportation, one obvious effect would be that 'Made in India' products would now be more cost competitive in the global markets.

D. Amutha, 2018 discuss the economic consequences on Indian economy due to introduction of GST. The paper also discusses the future predictions and obstacles for GST implementation. It states that GST is enormous concept which simplifies current tax system in India.

Sehrawat, 2015 focus on advantages of GST and challenges faced by India in execution. It also highlights that its implementation stands for a coherent tax system which will subsume most of current indirect taxes which in long term will lead to higher output, more employment opportunities and flourish GDP.

S. Thowseef, 2016 studied the benefit of Goods and Services Tax on the economy, business, industry and consumer and analyze the implementation strategy of GST in India. If GST properly implemented with tax exemption for certain goods like agricultural commodities, it will result in increasing revenue at the Centre as the tax collection system becomes more clear, making tax avoidance problem vanish and leading to economic growth, helping Indian people regain the wealth lost within country.

Nayyar, 2018 concluded that all sectors in India - manufacturing, service, telecom, automobile and small SMEs will bear the impact of GST. One of the biggest taxation reforms- GST will bind the entire country under a single taxation system rate.



As predicted by experts, GST will improve tax collections and boost up India’s economic development and discontinue all tax barriers between State and Central Government.

Bhattacharjee, 2018 evaluates the impact of GST after implementation and completion of one year. It emphasis that now government officials and experts have also been considering the need to make several changes in the GST architecture e.g. taking off the 28% tax bracket and shifting towards fewer tax-slabs by merging 12% and 18% rates, taking in electricity, real estate sector and petroleum products under its purview in a systematic way. It also simplify the submission by taking out the requirement of submission of so many returns at short intervals, besides improving the strength of anti-evasion measures.

Research Methodology:

- RESEARCH STATEMENT:** “A Study of Impact of Goods & Services Tax (GST) on Shares return of Indian FMCG Companies”
- ABOUT THE RESEARCH PROBLEM:** The present study focuses on “A Study of Impact of Goods & Services Tax (GST) on Shares return of Indian FMCG Companies”. This study aims to find the reaction of Indian FMCG Companies Share return with respect to the announcement of GST rates. So for GST impact is concerned, here Daily, Monthly and Yearly, pre and post GST implementation share return is taken and different statistical tools applied to find impact of GST on these returns.
- RESEARCH DESIGN:** The present research study is based on Descriptive, Exploratory and Event Study. Descriptive method used when the researcher wants to describe specific behaviour as it occurs in the environment. It provides an accurate description of characteristics of a particular individual, situation or Group. These studies are a mean of discovering new meaning, describing what exist, determining the frequency with which something occurs and categorizing information. Exploratory research studies that are mainly formative, for the purpose of gaining new insights, discovering new ideas and increasing knowledge of phenomena. An event study is an analysis of the impact of any specific new or event directly or indirectly affected to a company and its stock. An event study mostly conducted for the specific company looks at the changes in its stock price relative to the news or event.
- OBJECTIVES OF THE STUDY:** To determine the impact of Goods and Services tax (GST) on share returns of Selected Indian FMCG Companies of BSE.
- HYPOTHESIS: H₁:** There is no significant difference in return of the Selected Indian FMCG Companies of BSE before and after GST implementation.
- NATURE AND SOURCES OF DATA:** The present study is mainly based on secondary data. Secondary data are those which have been collected by someone else and which have already been passed through the statistical process. All the related data are collected from the official sites of the companies and financial website like (www.bseindia.com).
- SAMPLE SIZE:** Out of numbers of companies of FMCG sector, researcher has selected Top 5 companies in a sample on the basis of Market Capitalization. Here; sample has been selected by convenient sampling method.
- TOOLS AND TECHNIQUES:** Here, researcher has used Paired sample T-test for the study of impact of GST on share returns of Indian FMCG Companies. Paired sample T-test is used for the two measurement on the same items, person or thing and also use for two items that are being measured with unique condition.
- PERIOD OF STUDY:** In present study “A Study of Impact of Goods & Services Tax (GST) on Shares return of Indian FMCG Companies” period of study is selected according to the date of implementation of GST. Date of GST implementation is 1/7/2017 (Saturday). So before and after implementation selected share opening and closing price taken.

Analysis period	Before GST Implementation	After GST Implementation
7 Working Days Analysis	21 st June to 30 th June 2017	3 rd July to 11 th July 2017
15 Working Days Analysis	9 th June to 30 th June 2017	3 rd July to 21 st July 2017
30 Working Days Analysis	19 th May to 30 th June 2017	3 rd July to 11 th Aug 2017
6 Months Analysis	January to June 2017	July to December 2017
1 Year Analysis	July 2016 to June 2017	July 2017 to June 2018

Event study was employed to examine the effect of implementation of GST on Bombay Stock Exchange and selected Automobile companies of Bombay Stock Exchange. The entire sample period is divided into two parts i.e. the estimation window and event window. The event window again was classified as event window before the event day (t 0 to t-10) and event window after the event days (t 0 to t+10). The estimation window is created with the aim of calculating expected return by considering past experience of the Stock market on the selected FMCG companies’ returns and the event window is the actual study period. The data is secondary in nature and has been collected from national stock exchange.

Table No: 1.1 COLGATE – PALMOLIVE LTD (Event Study Analysis)
 H_0 : There are no abnormal returns within the event window

DAY	Daily Return (%)	Expected Return (%)	AR (%)	CAR (%)	T value AR	T value CAR
-10	0.015	0.001	0.014	0.014	1.244	1.244
-9	0.003	0.003	0.000	0.014	0.012	1.256
-8	-0.016	0.001	-0.017	-0.003	-1.509	-0.253
-7	0.020	0.001	0.019	0.016	1.652	1.399
-6	-0.002	0.001	-0.004	0.012	-0.321	1.077
-5	0.005	0.000	0.005	0.017	0.409	1.486
-4	-0.011	0.000	-0.011	0.006	-0.988	0.498
-3	-0.006	0.000	-0.007	-0.001	-0.567	-0.070
-2	0.001	0.002	-0.001	-0.002	-0.071	-0.140
-1	0.022	0.002	0.020	0.019	1.777	1.636
0	0.014	0.004	0.011	0.029	0.933	2.569
1	-0.001	0.001	-0.002	0.027	-0.215	2.354
2	-0.011	0.002	-0.012	0.015	-1.064	1.290
3	-0.007	0.002	-0.009	0.006	-0.774	0.515
4	-0.018	0.001	-0.020	-0.014	-1.708	-1.192
5	0.006	0.004	0.002	-0.012	0.153	-1.040
6	-0.013	0.002	-0.014	-0.026	-1.261	-2.300
7	-0.003	0.002	-0.005	-0.031	-0.400	-2.700
8	-0.002	0.003	-0.005	-0.036	-0.417	-3.117
9	-0.003	0.001	-0.004	-0.040	-0.376	-3.493
10	0.000	0.002	-0.002	-0.042	-0.183	-3.676
Average	0.000	0.002	-0.002	-0.001	-0.175	-0.127

(Source: As computed and compiled by researcher.) (T-table value @ 5% = 1.96)

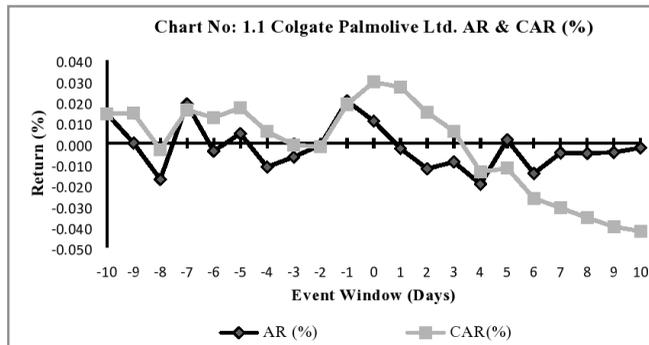




Table No: 1.2 COLGATE-PALMOLIVE LTD (t-Test: Paired Two Sample for Means)
 H_0 : There is no significant difference in share return of the Colgate - Palmolive Ltd. of BSE before and after GST implementation.

t-Test: Paired Two Sample for Means		Mean	Variance	Observations	Pearson Correlation	df	P(T<=t) two-tail	Result
7 Working Days Pre and Post GST Analysis	Change in Price Before GST	0.54286	352.125	7	0.1334	6	0.3898	H_0 failed to reject
	Change in Price After GST	-6.4214	90.7524	7				
15 Working Days Pre and Post GST Analysis	Change in Price Before GST	1.64	302.51	15	0.0969	14	0.1876	H_0 failed to reject
	Change in Price After GST	-4.9533	64.1559	15				
30 Working Days Pre and Post GST Analysis	Change in Price Before GST	1.55833	281.575	30	0.3533	29	0.1100	H_0 failed to reject
	Change in Price After GST	-3.58	159.648	30				
6 Month Pre and Post GST Analysis	Change in Price Before GST	35.6333	2929.22	6	0.2296	5	0.1601	H_0 failed to reject
	Change in Price After GST	-5.6167	1912.41	6				
1 Year Pre and Post GST Analysis	Change in Price Before GST	16.0708	2007.27	12	-0.2312	11	0.6841	H_0 failed to reject
	Change in Price After GST	6.34167	3307.89	12				

(Source: As computed and compiled by researcher.)

Interpretation:

Table no 1.1 represents an event study analysis of Colgate Palmolive Ltd for the data of 10 days before and after the GST implementation. On the day of event, 'T' value of abnormal return (AR) is 0.933 which is less than 'T' table value 1.96. So, Null hypothesis is failed to reject i.e. there is no abnormal return (AR) to Colgate Palmolive Ltd on date of event. But 'T' value of cumulative abnormal return (CAR) is 2.569 which is more than 'T' table value 1.96. So, Null hypothesis is rejected i.e. there is cumulative abnormal return (CAR) to Colgate Palmolive Ltd on date of event.

Chart no 1.1 shows abnormal return (AR) and cumulative abnormal return (CAR) of Colgate Palmolive Ltd for -10 to +10 day's event window. Here, researcher has found that there are 7 positive and 14 negative abnormal returns (AR) during event window. Similarly, there are 11 positive and 10 negative cumulative abnormal returns (CAR) during event window. So, a researcher may conclude that during event study window abnormal return (AR) and cumulative abnormal return (CAR) reflect fluctuating trend during event window.

From table no 1.2 a researcher has observed that p-value 0.3898 for the share return of 7 working days pre and post GST analysis of Colgate Palmolive Ltd is more than 0.05. So, here Null hypothesis is failed to reject. i.e. there is no significance difference in share returns of Colgate Palmolive Ltd. In case of, 15 days, 30 days, 6 months and 1 year pre and post GST analysis of Colgate Palmolive Ltd p-value for the share returns is higher than 0.05. So, for all the analysis Null hypothesis is failed to reject and a researcher may conclude that there is no significance difference in share returns of Colgate Palmolive Ltd during pre and post GST implementation. Colgate Palmolive India Ltd has reduced product prices in the range of 5-10 percent extending the tax benefits the company has got under the Goods and Services Tax regime to consumers. The overall tax incidence on toothpaste fell to 18 percent from 24 percent under the new indirect tax regime. As a result GST implementation does not affect share return of Colgate Palmolive Ltd. Hence, researcher may conclude that there is no significance difference in share return of Colgate Palmolive Ltd over different time frame.

2) ITC LTD

Table No: 2.1 ITC LTD (Event Study Analysis)
H₀: There are no abnormal returns within the event window

DAY	Daily Return (%)	Expected Return (%)	AR (%)	CAR (%)	T value AR	T value CAR
-10	0.015	0.000	0.015	0.015	1.063	1.063
-9	0.014	0.010	0.004	0.018	0.251	1.315
-8	-0.006	0.000	-0.006	0.012	-0.448	0.866
-7	0.002	0.000	0.002	0.014	0.154	1.020
-6	0.005	0.001	0.004	0.018	0.306	1.326
-5	0.000	-0.005	0.006	0.024	0.407	1.733
-4	0.003	-0.006	0.009	0.033	0.633	2.366
-3	-0.011	-0.004	-0.007	0.026	-0.506	1.859
-2	0.011	0.001	0.009	0.035	0.659	2.519
-1	0.040	0.003	0.037	0.072	2.661	5.180
0	0.057	0.012	0.045	0.117	3.244	8.424
1	-0.015	0.000	-0.015	0.102	-1.093	7.330
2	-0.018	0.002	-0.020	0.082	-1.419	5.912
3	0.017	0.005	0.012	0.094	0.870	6.782
4	-0.008	0.000	-0.008	0.086	-0.576	6.205
5	-0.003	0.014	-0.016	0.070	-1.163	5.042
6	-0.009	0.002	-0.010	0.060	-0.731	4.311
7	-0.005	0.003	-0.008	0.052	-0.556	3.755
8	0.030	0.009	0.021	0.074	1.527	5.282
9	-0.004	0.000	-0.004	0.069	-0.299	4.984
10	-0.034	0.002	-0.036	0.033	-2.613	2.371
Average	0.004	0.002	0.002	0.053	0.113	3.793

(Source: As computed and compiled by researcher.) (T-table value @ 5% = 1.96)

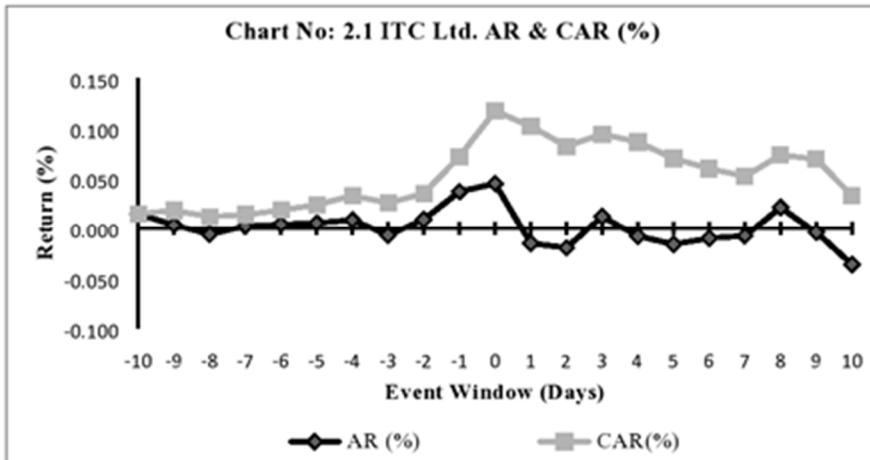


Table No: 2.2 ITC Ltd. (t-Test: Paired Two Sample for Means)
 H_0 : There is no significant difference in share return of the ITC Ltd. of BSE before and after GST implementation.

t-Test: Paired Two Sample for Means		Mean	Variance	Observations	Pearson Correlation	df	P(T<=t) two-tail	Result
7 Working Days Pre and Post GST Analysis	Change in Price Before GST	2.00714	25.9054	7	-0.1466	6	0.0832	H_0 failed to reject
	Change in Price After GST	-3.1786	12.4874	7				
15 Working Days Pre and Post GST Analysis	Change in Price Before GST	0.13	20.1778	15	-0.3115	14	0.1406	H_0 failed to reject
	Change in Price After GST	-2.83	20.8967	15				
30 Working Days Pre and Post GST Analysis	Change in Price Before GST	1.11333	25.0074	30	-0.2347	29	0.0084	H_0 rejected
	Change in Price After GST	-2.4983	14.9003	30				
6 Month Pre and Post GST Analysis	Change in Price Before GST	12.775	156.713	6	-0.3846	5	0.0959	H_0 failed to reject
	Change in Price After GST	-14.2	640.579	6				
1 Year Pre and Post GST Analysis	Change in Price Before GST	5.87917	176.809	12	0.0590	11	0.0875	H_0 failed to reject
	Change in Price After GST	-7.0167	422.917	12				

(Source: As computed and compiled by researcher.)

Interpretation:

Table no 2.1 represents an event study analysis of ITC Ltd for the data of 10 days before and after the GST implementation. On the day of event, 'T' value of abnormal return (AR) is 3.244 which is more than 'T' table value 1.96. So, Null hypothesis is rejected i.e. there is an abnormal return (AR) to ITC Ltd on date of event. Even 'T' value of cumulative abnormal return (CAR) is 8.424 which is more than 'T' table value 1.96. So, Null hypothesis is rejected i.e. there is a cumulative abnormal return (CAR) to ITC Ltd on date of event.

Chart no 2.1 shows abnormal return (AR) and cumulative abnormal return (CAR) of ITC Ltd for -10 to +10 day's event window. Here, researcher has found that there are 11 positive and 10 negative abnormal returns (AR) during event window. But, there are 21 positive cumulative abnormal returns (CAR) during event window. So, a researcher may conclude that during event study window abnormal return (AR) reflect fluctuating trends and cumulative abnormal return (CAR) reflect positive trend during event window.

From table no 2.2 a researcher has observed that p-value 0.0832 for the share return of 7 working days pre and post GST analysis of ITC Ltd is more than 0.05. So, here Null hypothesis is failed to reject. i.e. there is no significance difference in share returns of ITC Ltd. In case of, 15 days, 6 months and 1 year pre and post GST analysis of ITC Ltd p-value for the share returns is higher than 0.05. But in 30 days pre and post GST analysis of ITC Ltd p-value for the share returns is lower than 0.05. So, here Null hypothesis is rejected. i.e. there is a significance difference in share returns of ITC Ltd for 30 working days pre and post GST analysis. The new GST regime has had an adverse effect on the production as well as the trading sector despite the refund of tax paid on shipments. Even the benefit of GST composition scheme, under which lower tax rate is applicable, provided the turnover does not exceed the specified limit, is not allowed to the manufacturers. As a result GST implementation does not affect share return of ITC Ltd. Hence, researcher may conclude that there is no significance difference in share return of ITC Ltd over different time frame.

3) NESTLE INDIA LTD

Table No: 3.1 NESTLE INDIA LTD (Event Study Analysis)
H₀: There are no abnormal returns within the event window

DAY	Daily Return (%)	Expected Return (%)	AR (%)	CAR (%)	T value AR	T value CAR
-10	0.012	0.000	0.012	0.012	1.118	1.118
-9	-0.002	0.003	-0.006	0.006	-0.525	0.593
-8	-0.006	0.000	-0.006	0.000	-0.582	0.011
-7	0.009	0.000	0.009	0.009	0.841	0.852
-6	0.001	0.001	0.000	0.009	0.018	0.870
-5	-0.023	-0.001	-0.022	-0.012	-2.025	-1.155
-4	-0.002	-0.001	-0.001	-0.013	-0.072	-1.227
-3	0.005	-0.001	0.005	-0.008	0.508	-0.719
-2	0.018	0.001	0.017	0.010	1.611	0.891
-1	-0.005	0.001	-0.006	0.004	-0.551	0.341
0	0.001	0.004	-0.003	0.001	-0.253	0.088
1	0.018	0.000	0.017	0.018	1.601	1.689
2	0.009	0.001	0.008	0.026	0.722	2.410
3	0.002	0.002	0.000	0.026	0.045	2.456
4	-0.008	0.000	-0.008	0.018	-0.793	1.663
5	-0.009	0.004	-0.013	0.005	-1.221	0.441
6	-0.003	0.001	-0.003	0.001	-0.326	0.115
7	0.004	0.001	0.003	0.004	0.287	0.402
8	-0.005	0.003	-0.008	-0.004	-0.766	-0.364
9	0.004	0.000	0.003	-0.001	0.313	-0.051
10	0.008	0.001	0.006	0.006	0.604	0.553
Average	0.001	0.001	0.000	0.006	0.026	0.523

(Source: As computed and compiled by researcher.) (T-table value @ 5% = 1.96)

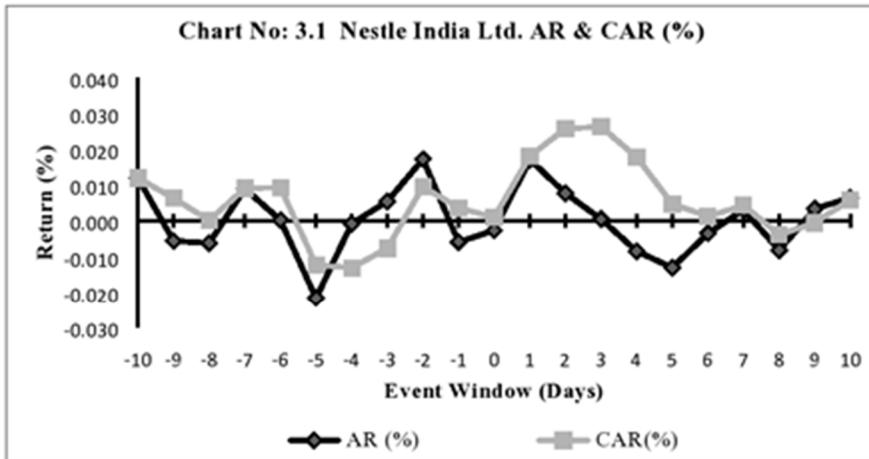


Table No: 3.2 Nestle India Ltd. (t-Test: Paired Two Sample for Means)
 H_1 : There is no significant difference in share return of the Nestle India Ltd. of BSE before and after GST implementation.

t-Test: Paired Two Sample for Means		Mean	Variance	Observations	Pearson Correlation	df	P(T<=t) two-tail	Result
7 Working Days Pre and Post GST Analysis	Change in Price Before GST	-3.2286	5005.93	7	-0.6219	6	0.8636	H_0 failed to reject
	Change in Price After GST	-12.929	7741.17	7				
15 Working Days Pre and Post GST Analysis	Change in Price Before GST	0.66667	3110.61	15	-0.3793	14	0.7173	H_0 failed to reject
	Change in Price After GST	-9.29	4836.55	15				
30 Working Days Pre and Post GST Analysis	Change in Price Before GST	-5.67	2622.63	30	-0.2975	29	0.4540	H_0 failed to reject
	Change in Price After GST	-17.815	3307.77	30				
6 Month Pre and Post GST Analysis	Change in Price Before GST	117.833	62422.4	6	0.3029	5	0.5725	H_0 failed to reject
	Change in Price After GST	181.908	32495	6				
1 Year Pre and Post GST Analysis	Change in Price Before GST	9.79583	177173	12	-0.1248	11	0.2073	H_0 failed to reject
	Change in Price After GST	242.838	145724	12				

(Source: As computed and compiled by researcher.)

Interpretation:

Table no 3.1 represents an event study analysis of Nestle India Ltd for the data of 10 days before and after the GST implementation. On the day of event, 'T' value of abnormal return (AR) is (-0.253) which is less than 'T' table value 1.96. So, Null hypothesis is failed to reject i.e. there is no abnormal return (AR) to Nestle India Ltd on date of event. But 'T' value of cumulative abnormal return (CAR) is 0.088 which is more than 'T' table value 1.96. So, Null hypothesis is rejected i.e. there is cumulative abnormal return (CAR) to Nestle India Ltd on date of event.

Chart no 3.1 shows abnormal return (AR) and cumulative abnormal return (CAR) of Nestle India Ltd for -10 to +10 day's event window. Here, researcher has found that there are 11 positive and 10 negative abnormal returns (AR) during event window. Similarly, there are 16 positive and 5 negative cumulative abnormal returns (CAR) during event window. So, a researcher may conclude that during event study window abnormal return (AR) reflect fluctuating trends and cumulative abnormal return (CAR) reflect positive trend during event window.

From table no 3.2 a researcher has observed that p-value 0.8636 for the share return of 7 working days pre and post GST analysis of Nestle India Ltd is more than 0.05. So, here Null hypothesis is failed to reject. i.e. there is no significance difference in share returns of Nestle India Ltd. In case of, 15 days, 30 days, 6 months and 1 year pre and post GST analysis of Nestle India Ltd p-value for the share returns is higher than 0.05. So, for all the analysis Null hypothesis is failed to reject and a researcher may conclude that there is no significance difference in share returns of Nestle India Ltd during pre and post GST implementation. The overall incidence of tax after implementation of GST will be less, especially in case of the consumer goods than the present incidence of tax. Therefore, it is imperative on part of trade and industry to pass on these benefits to the consumers at large. Nestle India Ltd has reduced product prices in the range of 5-10 percent extending the tax benefits to consumers. As a result GST implementation does not affect share return of Nestle India Ltd. Hence, researcher may conclude that there is no significance difference in share return of Nestle India Ltd over different time frame.

4) BRITANNIA INDUSTRIES LTD

Table No: 4.1 BRITANNIA INDUSTRIES LTD (Event Study Analysis)

H₀: There are no abnormal returns within the event window

DAY	Daily Return (%)	Expected Return (%)	AR (%)	CAR (%)	T value AR	T value CAR
-10	0.001	0.000	0.001	0.001	0.061	0.061
-9	0.007	0.007	0.000	0.001	0.030	0.091
-8	-0.004	0.001	-0.004	-0.003	-0.336	-0.245
-7	0.025	0.001	0.024	0.021	1.939	1.694
-6	-0.008	0.001	-0.009	0.012	-0.722	0.972
-5	0.003	-0.003	0.005	0.017	0.423	1.395
-4	-0.003	-0.003	0.000	0.017	0.012	1.407
-3	0.000	-0.002	0.002	0.020	0.187	1.593
-2	0.000	0.001	-0.002	0.018	-0.152	1.441
-1	0.016	0.002	0.013	0.031	1.057	2.499
0	0.004	0.008	-0.004	0.027	-0.290	2.209
1	0.011	0.001	0.010	0.037	0.814	3.023
2	-0.005	0.002	-0.007	0.031	-0.540	2.483
3	0.001	0.004	-0.003	0.027	-0.260	2.223
4	-0.011	0.001	-0.012	0.016	-0.965	1.258
5	0.005	0.009	-0.004	0.012	-0.324	0.935
6	-0.006	0.002	-0.008	0.004	-0.625	0.309
7	0.003	0.002	0.001	0.005	0.061	0.370
8	0.006	0.006	-0.001	0.004	-0.049	0.321
9	-0.001	0.001	-0.002	0.002	-0.129	0.192
10	-0.006	0.002	-0.008	-0.005	-0.635	-0.443
Average	0.002	0.002	0.000	0.014	-0.021	1.133

(Source: As computed and compiled by researcher.) (T-table value @ 5% = 1.96)

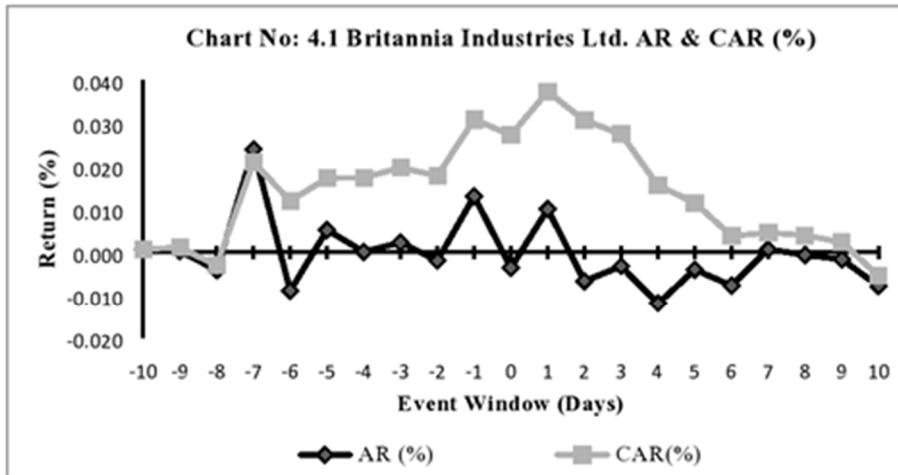


Table No: 4.2 Britannia Industries Ltd. (t-Test: Paired Two Sample for Means)
 H_0 : There is no significant difference in share return of the Britannia Industries Ltd. of BSE before and after GST implementation.

t-Test: Paired Two Sample for Means		Mean	Variance	Observations	Pearson Correlation	df	P(T<<=t) two-tail	Result
7 Working Days Pre and Post GST Analysis	Change in Price Before GST	9.78571	2387.4	7	-0.2205	6	0.3915	H_0 failed to reject
	Change in Price After GST	-14.464	1583.76	7				
15 Working Days Pre and Post GST Analysis	Change in Price Before GST	-3.8367	1644.14	15	-0.0743	14	0.7806	H_0 failed to reject
	Change in Price After GST	0.38667	1443.99	15				
30 Working Days Pre and Post GST Analysis	Change in Price Before GST	-10.577	2361.43	30	0.1913	29	0.1193	H_0 failed to reject
	Change in Price After GST	7.64833	2422.13	30				
6 Month Pre and Post GST Analysis	Change in Price Before GST	121.775	14622.7	6	0.3157	5	0.5654	H_0 failed to reject
	Change in Price After GST	161.55	21713.8	6				
1 Year Pre and Post GST Analysis	Change in Price Before GST	67.8458	45827.5	12	0.1853	11	0.1738	H_0 failed to reject
	Change in Price After GST	176.783	36711.9	12				

(Source: As computed and compiled by researcher.)

Interpretation:

Table no 4.1 represents an event study analysis of Britannia Industries Ltd for the data of 10 days before and after the GST implementation. On the day of event, 'T' value of abnormal return (AR) is (-0.290) which is less than 'T' table value 1.96. So, Null hypothesis is failed to reject i.e. there is no abnormal return (AR) to Britannia Industries Ltd on date of event. 'T' value of cumulative abnormal return (CAR) is 2.209 which is more than 'T' table value 1.96. So, Null hypothesis is rejected i.e. there is a cumulative abnormal return (CAR) to Britannia Industries Ltd on date of event.

Chart no 4.1 shows abnormal return (AR) and cumulative abnormal return (CAR) of Britannia Industries Ltd for -10 to +10 day's event window. Here, researcher has found that there are 9 positive and 12 negative abnormal returns (AR) during event window. Similarly, there are 19 positive and 2 negative cumulative abnormal returns (CAR) during event window. So, a researcher may conclude that during event study window abnormal return (AR) reflect fluctuating trends and cumulative abnormal return (CAR) reflect positive trend during event window.

From table no 4.2 a researcher has observed that p-value 0.3915 for the share return of 7 working days pre and post GST analysis of Britannia Industries Ltd is more than 0.05. So, here Null hypothesis is failed to reject. i.e. there is no significance difference in share returns of Britannia Industries Ltd. In case of, 15 days, 30 days, 6 months and 1 year pre and post GST analysis of Britannia Industries Ltd p-value for the share return is higher than 0.05. So, for all the analysis Null hypothesis is failed to reject and a researcher may conclude that there is no significance difference in share returns of Britannia Industries Ltd during pre and post GST implementation. GST rate is tax neutral if you look at the current rate. So it is not going to impact Britannia Industries Ltd either way, positively or negatively. Britannia Industries Ltd has reduced product prices and extending the tax benefits to consumers. As a result GST implementation does not affect share return of Britannia Industries Ltd. Hence, researcher may conclude that there is no significance difference in share return of Britannia Industries Ltd over different time frame.

5) PROCTER & GAMBLE LTD

Table No: 5.1 PROCTER & GAMBLE LTD(Event Study Analysis)

H_0 : There are no abnormal returns within the event window

DAY	Daily Return (%)	Expected Return (%)	AR (%)	CAR (%)	T value AR	T value CAR
-10	-0.007	0.000	-0.008	-0.008	-0.614	-0.614
-9	-0.003	0.004	-0.007	-0.014	-0.552	-1.167
-8	0.010	0.001	0.010	-0.004	0.813	-0.353
-7	0.005	0.001	0.005	0.000	0.375	0.022
-6	-0.001	0.001	-0.002	-0.002	-0.165	-0.143
-5	0.008	-0.001	0.009	0.007	0.717	0.574
-4	-0.007	-0.001	-0.005	0.002	-0.431	0.144
-3	-0.003	-0.001	-0.002	-0.001	-0.193	-0.050
-2	0.007	0.001	0.006	0.006	0.501	0.451
-1	0.002	0.001	0.001	0.006	0.045	0.496
0	-0.004	0.004	-0.008	-0.002	-0.672	-0.176
1	0.003	0.001	0.003	0.001	0.224	0.048
2	0.002	0.001	0.001	0.002	0.086	0.134
3	-0.002	0.002	-0.004	-0.002	-0.323	-0.190
4	0.000	0.001	0.000	-0.003	-0.038	-0.227
5	0.000	0.005	-0.005	-0.008	-0.425	-0.652
6	-0.008	0.001	-0.009	-0.017	-0.731	-1.383
7	0.004	0.001	0.002	-0.014	0.204	-1.179
8	-0.003	0.003	-0.006	-0.020	-0.496	-1.674
9	0.004	0.000	0.003	-0.017	0.284	-1.390
10	0.002	0.001	0.000	-0.017	0.025	-1.366
Average	0.000	0.001	-0.001	-0.005	-0.065	-0.414

(Source: As computed and compiled by researcher.) (T-table value @ 5% = 1.96)

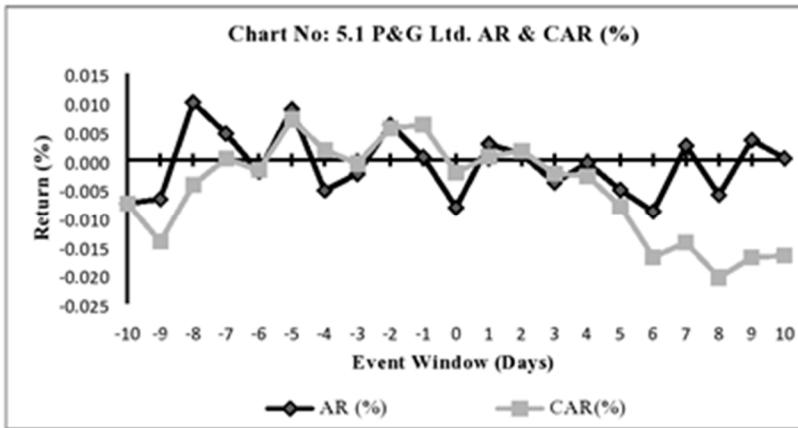


Table No: 5.2 PROCTER & GAMBLE LTD. (t-Test: Paired Two Sample for Means)
 H_0 : There is no significant difference in share return of the Procter & Gamble Ltd. of BSE before and after GST implementation.

t-Test: Paired Two Sample for Means		Mean	Variance	Observations	Pearson Correlation	df	P(T<=t) two-tail	Result
7 Working Days Pre and Post GST Analysis	Change in Price Before GST	10.2357	3926.48	7	-0.3863	6	0.9137	H_0 failed to reject
	Change in Price After GST	5.87857	3588.61	7				
15 Working Days Pre and Post GST Analysis	Change in Price Before GST	1.33667	4479.89	15	-0.3049	14	0.7723	H_0 failed to reject
	Change in Price After GST	-6.4467	3535.25	15				
30 Working Days Pre and Post GST Analysis	Change in Price Before GST	1.79333	5371.82	30	0.2029	29	0.8535	H_0 failed to reject
	Change in Price After GST	-1.415	5780.34	30				
6 Month Pre and Post GST Analysis	Change in Price Before GST	139.65	97468.2	6	-0.3808	5	0.7489	H_0 failed to reject
	Change in Price After GST	206.542	72878.5	6				
1 Year Pre and Post GST Analysis	Change in Price Before GST	127.546	83451.6	12	-0.1595	11	0.8774	H_0 failed to reject
	Change in Price After GST	108.438	68314.2	12				

(Source: As computed and compiled by researcher.)

Interpretation:

Table no 5.1 represents an event study analysis of Procter & Gamble Ltd for the data of 10 days before and after the GST implementation. On the day of event, 'T' value of abnormal return (AR) is (-0.672) which is less than 'T' table value 1.96. So, Null hypothesis is failed to reject i.e. there is no abnormal return (AR) to Procter & Gamble Ltd on date of event. 'T' value of cumulative abnormal return (CAR) is (- 0.176) which is less than 'T' table value 1.96. So, Null hypothesis is failed to reject i.e. there is no cumulative abnormal return (CAR) to Procter & Gamble Ltd on date of event.

Chart no 5.1 shows abnormal return (AR) and cumulative abnormal return (CAR) of Procter & Gamble Ltd for -10 to +10 day's event window. Here, researcher has found that there are 10 positive and 11 negative abnormal returns (AR) during event window. Similarly, there are 7 positive and 14 negative cumulative abnormal returns (CAR) during event window. So, a researcher may conclude that during event study window abnormal return (AR) reflect fluctuating trends and cumulative abnormal return (CAR) reflect negative trend during event window.

From table no 5.2 a researcher has observed that p-value 0.9137 for the share return of 7 working days pre and post GST analysis of Procter & Gamble Ltd is more than 0.05. So, here Null hypothesis is failed to reject. i.e. there is no significance difference in share returns of Procter & Gamble Ltd. In case of, 15 days, 30 days, 6 months and 1 year pre and post GST analysis of Procter & Gamble Ltd p-value for the share returns is higher than 0.05. So, for all the analysis Null hypothesis is failed to reject and a researcher may conclude that there is no significance difference in share returns of Procter & Gamble Ltd during pre and post GST implementation. Since different products are taxed at different rates, the average tax and the final prices that the end customer ends up paying will average out, with some products becoming more expensive and others becoming cheaper. Hence goods and services tax does not affect Procter & Gamble Ltd positively or negatively. As a result GST implementation does not affect share return of Procter & Gamble Ltd. Hence, researcher may conclude that there is no significance difference in share return Procter & Gamble Ltd over different time frame.

Conclusion:

Implementation of GST throughout India is the biggest change in India. It is an outstanding step for a comprehensive indirect tax reform in India. Implementation of GST has put mixed impact on FMCG sector. Those FMCG companies whose tax incidence lowered, like Dabur, HUL, ITC have started to pass on the effect in the form of low prices. Changes in GST rates on regular intervals is very fruitful for some firms but not for other firms in the FMCG industry. GST may become game changer in the long run for the FMCG sector and may also have deep impact on Indian economy as well. But the short term impact reveals that GST has failed in bringing down overall cost of commodities, interestingly cost of some products has increased much more than cost of pre GST regime. Here researcher concluded that over all analysis of GST show that there is no impact on GST on FMCG companies share return.

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THE EMERGENCE OF CYBER LITERATURE: LITERATURE, TEXT AND HYPERTEXT

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Abstract

In a digital age, people live in a cyberspace where they become part of modern society. The information acquired comes from the World Wide Web (WWW). This WWW has become an important means for people around the world to spread information. Thanks to web technology, cybernetic literature emerges. This study talks about the emergence of cybernetic literature that changes the way we read and teach in various institutions. It becomes a challenge for people who teach literature because they have to leave the printed text and switch to digital text as hypertext. The existence of cybernetic literature also leads them to change their style to analyze and criticize the work of literature. Therefore, it becomes a challenge for them to teach literature from text to hypertext.

Key words: computer literature, emergency, text, hypertext, cyberspace, challenge, development

Introduction

The influence of technology changes all aspects of people's lives around the world. They become a modern society that always gets information and communicates in a virtual space. Influence can be seen in the workplace, in homes and in educational institutions. Most of them acquire information from the World Wide Web (WWW). It is a space for users to read, write and access information with Internet-connected devices. According to Jonassen in his book "Computers in the Classroom: Mindtools for Critical Thinking", this WWW is the largest and most common use of hypermedia related to the links that connect information units and the organization of information through relationships between the units (Jonassen, 1996). Due to web technology, cybernetic literature emerges. It is a new genre of literature created and presented on the computer (Koskimaa, 2007). Researchers have been interested in researching cybernetic literature and use different terms for cybernetic literature as cybernetic text (Aarseth, 1997; Eskelinen, 2012), the literary machine (Nelson, 1993), electronic literature (Hayles, 2002), literature digital



(Hoover, et al., 2014) and digital literature (Sanz and Romero, 2007). Hence, discussion of cybernetic literature can develop terminological and aesthetic questions.

The emergence of cybernetic literature with the use of electronic space as a medium also offers people the opportunity to read, write and access literary works. In relation to active production in computer literature, Neuage (1997) points out that there are many communities of computer literature that use homepages, e-mails, forums and blogs to publish and promote their literary works. They can freely write without limitation and upload their work to the WWW. It shows that the authors' works are stored in the Internet space and that people all over the world can see it. It is not necessary to print books with high prices that they can limit the spread of literature (Nanda, 2016).

The existence of cyber literature opens up new literary works such as fan fiction (Schulz, 2008). According to Ryan (2013), the computer not only provides a transmission channel for fan fiction texts, but it can also become a production tool. Fan fiction that refers to texts created as a "pseudo-sequel" of a book, a comic, a television series or a movie and which are not written by professional authors but by fans. Computer literature may include: i) all literary texts such as prose or poetry, anthologies in prose or digitized poetry, online literature journals and collections of classical texts available on the World Wide Web (WWW), ii) non-professional literary texts available on Internet and iii) hypertext literature and cybertext in relation to literary texts of a more complex structure. Thanks to the various literary texts available on the Internet, it enriches the common opinions of cybernetic literature and builds new concepts from a literary point of view, such as cybertext and hypertext.

Acceptance of cybernetic literature can give a good signal to the field of literature itself. Thanks to the development of technology, the authors could make many possibilities. They can share their literary works without any other limitations. Dissemination of authors' information helps people understand global culture. It is a turning point in computer literature.

Hypertext: a new way of reading literature

The emerging field of computer literature can change the way people read. People are exposed by reading more digital literary texts than printed ones. Reading them with the help of the Internet leads them to a different type of reading. It's because they use hypertext. Hypertext, as Patterson (2000) states, is the electronic text link that can be found on the Internet. Through the use of electronic text linking, people experience a new way of reading. He adds that by clicking to show another screen with a new theme, a reader constructs the meaning differently.



Hypertext is based primarily on the text and is characterized by the connection of several blocks of text. It can be integrated with the form of multimedia works that combine writings texts with video clips, musical sounds and other multimedia arts. The establishment of this new way of reading literary texts can replace the conventional linearity of literary texts. For example, digital literary texts are consumed with their navigation options (Landow and Delany, 1991; Landow, 1997; Bolter, 1991).

Furthermore, Aarseth (1997) and Hayles (2002) assume that hypertext may be the source of the narrative embedded in cybertext and that it needs a new approach to understand its textuality globally. The approach can take advantage of a hypertext reading experience with a simple presence of a cursor on a screen. The cursor is a physical means of inserting the reader into the text. Create a visual reminder that the reader is always present (Landow, 1997; Lanham, 1993).

To examine the notion of hypertext, the reader experiences reading the existence of concrete on the page as a material artifact that can be cut / glued; redesigned through channels, margins and space; and redesigned through the material fibers of the page that interact with different paintings in various ways of connection (Hayles, 2002). Since cybernetic literature cannot be read in a conventional way, the way of reading has changed. Significant change profoundly affects the reader and makes him fast. Therefore, reading cybernetic literature requires additional effort to get past the text.

The challenge of teaching literature from text to hypertext

Cyber literature can have educational and pedagogical impacts if incorporated into an existing curriculum. Therefore, teaching literature from text to hypertext can be a challenge. To meet the possible challenge, educational innovations are needed to accommodate the solution for educational purposes. One of the strategies is through online discussion based on the roles of teaching literature, which is called the "Ivanhoe Game" approach (Koskimaa, 2007). In this approach, each student is assigned a specific character based on literary works and must find information about the characters. They should be able to conduct an online discussion that personifies the assigned characters.

Another strategy is to use literary blogs that offer great potential for literary education. In addition, a teacher can also develop a new design unit on the blog. When designing a unit to teach literature in the form of hypertext, it is necessary to work with the literary production of hypertext. WWW as a medium for literary hypertext needs some large and different formats to allow the student to write their own idea, criticize and comment on computer literature. Figure 2 shows Haiku's poetry in the form of hypertext and there are some menus for students to comment on literary works.



Basically, providing the menu for comments can facilitate a new strategy, that is, reader-writer interactivity (Jauss, 1982) to appreciate literary works. You can develop the focus on distributing the attention that other readers access and may require answers tracked digitally on the blog. Interaction can lead consumers of the literary work to contemplate and immerse themselves in the text. In addition, a new idea can be developed by sharing and commenting on the text.

Conclusion

In a cyberspace, literary works in digitized forms are consumed together with printed ones. And the development of web technology makes people a different way of reading literature that is not based on conventional linearity, but on navigation. Using Internet aids, the linearity of navigation leads to a different type of reading, i.e. hypertext, which has the electronic connection of the text. Clicking to show the new screen is one of the experiences that readers gain when reading hypertext literature for more information. Therefore, the emergence of cybernetic literature with hypertext as a medium of communication encourages access to literature as a means of expression. For educators who teach literature in the digital world, it is a challenge and requires educational innovations, p. conduct online debates based on the roles of computer literary works and use literary blogs with reader-writer interactivity.

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Assam relation with Border States in Linguistic Scenerio : Absorption and Assimilation

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Abstract

Assam has a diverse linguistic area. The historical and descriptive area of its structure and development provides numerous possible research elements. According to the rates by HsÜng-tsang , the language of ancient kamrup and pragjyotishpur was completely different from the language of the other states from the earliest times. Although Assam's political and geographical boundary changed along with time, the development and expression of the language since the age of Kali purana or Kalika Tantra and Yogini Tantra opened new scopes of linguistic study. The geographical boundaries cannot find the Tibet-Burmese speaking people living in Assam or the modified language speaking people of the border state areas. Nagamese, Nefamese and such other borders language have provided a linguistic absorption and assimilation of language of Assam simultaneously with the other states even through the short sightedness of the political faoteres have disintegrated the nationalism which was based on various social, cultural and political factors, the Assamese language is the only factor that binds this friendship beyond borders. The study of linguistic adaptation and assimilation is very important in bilingual and multilingual Assam as well as the North-East. In this research paper, an attempt has been made to study the border relation and adaptation and assimilation of language from the socio-linguistic aspects. This paper aims at discussing the linguistic area of Assam, the use of Assamese language in the North Eastern states and its influence.

Key words: linguistic area, nagamese, nefamese, linguistic adaptation, assimilation, bilingualism, multilingualism, socio-linguistic, linguistic inter-relationship.

Introduction :

In regards to population, India is the second largest country and the seventh largest country in the world. The states of India displays diversity through different races and tribes. Similarly Assam shows diverse assimilation of the



tribes and clans. These assimilation makes Assam culturally and linguistically diverse.

HsÜng-tsang's notes on ancient Assam makes it clear that the Assamese language of Assam, then Kamrup or Pragjyotishpur, was different from any other language of India. This language which was established during the times of Kalika Puran, Yogini Tantra, maintained its individuality even after the arrival of the Assam. The Ahoms adopted the adaptation and assimilation process in the multi tribal society of Assam. Instead of forcing their own religion, language or culture on other groups, the Ahoms contributed in creating a unified Assamese society by embracing the ancient language, customs and rituals. Sukapha was able to establish a flourishing, strong, unified Assam. Likewise all the tribes and clans of Assam, together forms unity of diversity. After the burmese invasion and as a result of the signing of the treaty of Iyandabo, the British came to Assam. During the arrival of the British, this language was the Lingua franca of the people of the plains as well as the hills. And it was on of the factors that had psychologically bound the people of the entire Brahmaputra valley. But the consolidation policy of British and the preference of the missonaries for English language made a significant change in the Assamese society, its geographical boundaries and the easy going relationship of the tribes with the passing of time, Assam only saw an increase in territorial disputes, murder, jealousy and political instability. In spite of everything, the seven sisters of North-East, namely Assam, Mizoram, Monipur, Tripura, Meghalaya, Ngaland and Arunachal Pradesh has created literary and cultural unity in the entire North-East. Sikkim has got the recognition of being an indispensable state of North East recently. This aspect makes the language a possibility of being contemporary assimilation language in case o structure and development.

Objectives

The main Objectives of the Research paper are as Followes

- 1) To study how the bilingual and multilingual states of North-East, a linguistic inter relation can be easily identified.
- 2) To study how language plays an important role in the assimilation of Assam and its neighbouring states and national unity.
- 3)To study the Assam and neighbouring states interrelation, language connection, boarder problem in the method of socio linguistics.

Importance of the study :

Assam is always considered a diverse place for linguistic research. The scope of language and geographical scope are two different aspects. But in Assam, due to living together for so many years, the North-East, firstly known as seven states, prevails a linguistic unity among the states even after being divided. Mainly in



Nagaland and Arunachal we can find adaptations of the Assamese language, Nagamese and Nefamese respectively. In other states, mostly the border states, linguistic assimilation is prominent. The ethnic groups living in the border areas use registered language mostly. It is an important aspect of adaptation and assimilation process. In this research paper attempt has been made to study the border relation of Assam with other states and the different aspects of language from the socio-linguistic point of view. National unity and integration is still possible assimilation of the tribes.

Methodology :

In this paper, analytical and descriptive method has been adopted.

Main analysis :

Now a days the North-East refers to the eight states namely Assam, Arunachal, Meghalaya, Mizoram, Monipur, Tripura, Nagaland, Sikkim. North-Eastern language and tribes are none other then these eight states and the dialects prevalent there in. Although these languages have undergone research, no proper scientific research has been made yet. Due to lack of research, most dialects are endangered and many are on their way. According to UNESCO's survey, out of 780 languages in India, 220 are endangered. Only after a proper survey of the North-Eastern languages, the condition of these languages can be determined. Also, due to linguistic diversity some languages receive less importance or are used occasionally, or due to minority, which makes them endangered. Among all these languages of the North-East, Assamese language acts as the standard language that unites the entire North-East.

While studying the border relation of Assam with its neighbouring states, adaptation and assimilation of language plays a vital role. Most of languages of North-East have its origins in the Chinese-Tibetan language. Aurtic language is used to some extent in Arunachal. The language prevalent in Assam has Indo-European origin. It acts as the bonds that unites the entire North-East region although the geographical and linguistic boundaries vary. The scope of the Assamese language is quite broad and diverse. The North-East was divided in different states soon after India's independence but their infrastructure remained the same. So, even after being politically divided, they have created an ambience through assimilation. Mainly, the languages used by the people residing in border areas in their day to day life are significant which can be considered a registered language or a mixed language. Shillong, presently situated in Meghalaya, was once the capital of Assam. Therefore, some tribes living in Shillong still have sincere feelings towards the Assamese language. Assamese language is even included in the colleges as a subject in present day Shillong. Similarly the Garo tribes living they are now the citizens of



Meghalaya. It can be studied as Garo-Assamese language or Garomese. In this research paper, two neighbouring states, Nagaland and Arunachal are taken as subjects to discuss the adaptation and assimilation of Assamese language with their languages.

There are several problems in the language of these border states. Therefore they have to adopt a second language to do trade and commerce, as a medium of expression and education. Some of the problems are as follows –

- a) Most of the Tibet-Burmese languages are from hilly areas which lack communication due to its remoteness. Therefore the regional languages developed and due to lack of interaction with other languages, there is no link with the other languages.
- b) The people speaking these languages are mostly illiterate and therefore lack of linguistic consciousness.
- c) Although these languages have developed internally, they fail to fulfill the tribal demand in the broad sense.
- d) Since the people speaking these languages became bilingual by adopting broad languages. This provided lesser scope of their using their own language.
- e) The colonial rule of the developed languages and the use of Assamese language restricts the development of these indigenous languages.

Thus, the Tibet-Burmese languages of Nagaland and Arunachal are unintelligible to each other. Whereas the Assamese language, in its oral and written form since ancient times, rich in literary works, has crossed all political barriers through richness and elevates itself even in Nagaland and Arunachal.

Similarities between the Naga language and the Assamese language :

The inhabitants of Nagaland are known as Nagas. There are fourteen tribes in Nagaland rich in culture and language. These fourteen tribes are- Konyak, Aao, Sema, Lotha, Angami, Sakhechang, Phum, Rengma, Chang, Chongtam, Yimchungri, Khinmungam and Jeliang (axomiya Bhasha, Bhimkanta Borua, p. 152). These tribes were not fluent in each other's language which caused social barriers and problems in trade and commerce as well. But due to socio-linguistic reasons, Assamese language has been able to create a bridge to communicate their feelings and thoughts. This mixed language of the Nagas and Assamese is called **Nagamese** (Naga+Assamese).

Due to their age old relationship, the people of Nagaland and Assam benefited mutually. On the one hand Assamese as a lingua franca became Nagamese through adaptation and assimilation in Nagaland, and on the other hand, the Nagas contributed a lot of word stock, phrases and idioms of the Assamese language. Such as :

- a) There are six 'vowel' and twenty three 'consonant' in Nagamese. The /ae/ and /ao/ of vowel are absent in Nagamese. There is no significant difference between the two languages. The consonants are : unaspirated



sound/p b t d k g/, Aspirated sound /f bha tha dha kha gha/, the Frictionless continuant are –fricatives or spirants /ha j cha ha/, nasal sound /m n nga/, lateral /l/, trilled /r/, semi vowel / ya wa/

b) The change in Nagamese according to case, gender and verb. To determine the gender, the gender determining words are used in front of noun. In Assamese, too male and female determining words are used.

c) The negative identifiers are placed in front of the verb to form the negative in Assamese. Similarly in Nagamese, the negative identifier ‘no’ is added before the verb and is pronounced according to first letter of the word. Such as :

No + thoka > Nathaka (Assamese)

Nu + thoka > Nathaka (Nagamese)

d) Many Assamese words becomes descriptive in Nagamese. For example :

Nagamese

Assamese

Kapur bonua khori
(The wooden stich used for wearing)

Maaku

Mota nothoka maiki
(A man whos wife has died)

Bidhoba

Kopal

Bhagyaban (Lucky)

e) The word ‘kintu’ (but) is used to show contrast in a sentence in both the languages. For example :

“Moibhi jaga jagate beraboloi asile kintu naparilu.” (Nagamese)

“Muru bhaleman thai furiboloi asile kintu nuwarilu.” (Assamese
(I too had many places to explore but couldn’t.)

f) Many Assamese words are used in the dialects of the Naga tribes. But some low stress words becomes high in their dialect. For example :

Assamese

Aao Naga

Bhendi (Oakra)

Bindi

Aalo

Aalo

In Lotha dialect :

Assamese

Lotha

Bakos

Pakos (b > p)

Kothal

Kuthal

Tenga

Thenga (t > th)

In Aangami Naga dialect :

Assamese

Aangami

Kotari (knife)

Kutari

Seni (sugar)

Sini

Apart from these associations, there are certain words in Naga language that provide uniqueness in Assamese language. These are ;

Nogatenga, Noga kosu, Noga gha, Noga baat, Noga dhari, Noga saki, Noga dhuli idioms such as ‘Nogatu sai hurato’ etc and phrases indicates the blooming relationship of the Nagas and the Assamese. Although the present Naga people consider these use of words embarrassing and disrespectful.

Just like the Nagas, Assam had a friendly relationship with Arunachal. Trade and Commerce prevailed between the two states through barter system and accordingly there was prosperity between the hills and the plains. The mention of the Misimi Nagas bringing poison to the plains in a Bihu song proves this point.

“Misimi ahibo borbih anibo
Taake khai pahorim tuk”

(The Misimi Nagas will come and will bring poison with them. I will drink that poison in order to forget you)

Similarities between the Arunachal language and the Assamese language :

Arunachal too has many tribes. They are – Monpa, Lipsa or Sugpa, Sherdukpen, Oka, Khoa, Mizo, Dofola or Nisi, Miris of the hills, Rao, Risi Mosi, Nidu-Mura, Chikum Dui, Chulung, Unga, Apatani, Tagin, Aadi, Memba, Khamba, Misimi, Khamti, Singphow, Nocte, Wangsu, Tangsa etc. (Axomiya Bhasha, Bhimkanta Borua, p. 152). Although there might be some similarities between one or two their languages, the oral language of these tribes are unintelligible to each other. Therefore social conflicts arise among these tribes. So, they use the Assamese language to interested with other tribes. This modified Assamese language used by the Arunachalies is called ‘Nefamese’ or ‘Arunamese’.

The Nefamese language too is influenced by the Assamese language. The similarities between Nefamese and Assamese language are given below :

a) The words such as – bur, bilak, hot, hokol etc are used to determine collective nouns. In this case, Nefamese uses only ‘bilak’.

b) To, khon, jon, joni, dal, gus etc are used in Assamese language to determine ‘affix’. In Nefamese, only ‘To’ is used.

Collegeto, Apunato, Bostuto etc.

c) Similar to Assamese, Nefamese, too, have singular and plural forms. In Nefamese, Aai (singular) and Aami (plural) are gender determiner.

d)The sixth inflective ‘r’ is used in both Assamese and Nefamese. For example : ghoror, manuhor etc.

e) In Nefamese, the object of the verb is indicated by adding ‘-t’ or ‘-te’ after the word. Such as –

‘Basote jale dos gonta lage’

(It takes ten hours by bus)

f) ‘Kintu’ is used in Assamese to show contrast or difference. But in Nefamese ‘toh’ is used. For example –

‘Moi bhi khabo bisarisilu toh nuwarilu’



(I, too, wanted to eat but couldn't)

g) The Nefamese language has only a few words that are borrowed from other languages. It mainly uses the simple Assamese word stock.

Apart from such synthesis, there is a good relationship between Assam and Arunachal from the literary aspect. The development of the literary elements creates new relations among the neighboring states. By using the Assamese language as a medium for their literary practice, writers such as Yese Dorje Thongsi, Lumber Dai elevate the literary aspect of Assam and also contribute to the unity of the two states. In 'Mouna Uth Mukhor Hridoy', Yese Dorje Thongsi shows the language barrier prevalent in the tribes of Arunachal, Serdukpen and Monpa. In this novel the author shows the initiations taken by the Assam government to develop the transportation system between Assam and Arunachal. On the other hand, these two tribes are seen using Nefamese to interact with each other.

Due to political, economic, communalism and some miscreants, conflicts are a common phenomena between Assam and the hilly states. Therefore, in order to maintain a steady relationship among the states, some unified steps should be practised in the linguistic area. These steps can be discussed as follows –

a) The linguistic scientists, the intellectuals and the political leaders should have a generous in sight.

b) The North-East states as well as the tribes, along with establishing Assamese language as *Lingua franca*, should work for the spread of their native dialects simultaneously for a healthy environment.

c) The language problem of the North-East can be easily solved by freely accepting the attributes of the dialects, local dialects, mixed dialects etc to create a public Assamese language for Assam and its neighbouring states. Where there will no emotional pride of any one region or tribe and not one region's language or its structure will feel neglected or will have inferiority complex.

d) Just as the bordering states of Assam have adopted Assamese language to overcome their linguistic barriers, if these people made efforts to promote literature keeping their linguistic difference in consideration, then the hilly tribes will shine with their fundamental as well as their individual characteristics or facts.

e) Emotional as well as warlike tendencies will never uplift a language. Only the literary and linguistic development over time can help in the evolution of a language.

f) To strengthen the population structure and the upliftment of language, efforts should be made to produce a regional dictionary which would embrace a nationalistic feeling and among the small tribes.



g) While establishing linguistic interrelations, the national organisations and state governments will have to implement united, common policies to solve the border problems.

h) Instead of limiting the study of Assamese language to the Brahmaputra basin, the researchers should adopt a generous outlook towards the language study.

i) By reviving the faith in ancient history and traditions of the language, the advance of Hindi and English languages can be stemmed in the present scenerio. This effort might establish nationalism, develop the language and promote language integration.

Conclusion :

The Assamese language has established unity among different linguistic and cultural groups making the Assamese people proud Indian citizens. Also, it binds the entire North-East in a single linguistic knot and elevates its position in the Indian's socio-political scenerio. On the one hand, Assamese language has mentioned its individuality as a literary language. And on the other hand, it plays an important role as an oral language in national unity and integration. The expressive power of this innate language can be assumed from the analysis. It can be understood from the adoption of Assamese language as their second language by the people of Nagaland and Arunachal. Even in the present day, many schools in Arunachal use Assamese language as their medium of instruction. There are other synthesis of Assamese language with other neighbouring states simultaneously with the formation of Nagamese and Nefamese. There is no distinct tribe called Assamese, and no one desires division of the greater Assam or the North-East comprising of numerous tribes and sub-tribes. Therefore the bilingual and multilingual Assam or the North-East emphasises the importance of linguistic unity and assimilation study of the region.

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ELECTORAL POLITICS IN BARAK VALLEY, ASSAM: AN ANALYSIS

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Abstract

Election forms the bedrock of any democracy. It expresses the people's mind, attitude, opinion and most importantly, their general verdict on the programmes and policies of the contesting political parties and performance of the ruling government. That is how election has influenced the ways in which the priorities of the political parties and broad parameters of the incumbent government are laid down. Thus, the study of electoral politics is imperative not only to understand the electoral process but also to understand the changing and emerging trends of the political system of a society. Keeping in this mind, the present paper made an attempt to analyse the electoral politics in Barak Valley from the perspective of the Lok Sabha and Assembly elections held from 1952 to 2019 in the region. The study found that the electoral politics in Barak Valley evolved mainly on the communal line. Political parties often used the communal issues in order to win the battle of the ballot box. Such communal politics influenced the voting behaviour of the people of the region and manifested in election results in case of both the Lok Sabha and Assembly elections.

Keywords: Election, Vote, Electoral Politics, Barak Valley

1. Introduction

Election is an inalienable feature of any democracy. It ensures peaceful and orderly transfer of power from one hand to another. It expresses the people's mind, attitude, opinion and most importantly, their general verdict on the programmes and policies of the contesting political parties and performance of the ruling government (Mazumder & Deb, 2004, p. 2). That's why, election is very significant in any participatory democracy. It assumes great worth in a democratic country like India in which ultimate power over major authoritative decisions is concentrated on the hands of citizens. In fact, election forms the bedrock of the world's largest democracy. In India, election is considered as the most serious affair as our Constitution gives equal opportunity to every citizens of India to choose their representatives and change them if they wish to do so. That is how election has influenced the ways in which the priorities of the political parties and broad parameters of the incumbent government are laid



down (Suri, 2002, p. 2). Here comes the importance of electoral politics. Electoral politics is one of the most frequently used terms in cotemporary democratic politics. It is regarded as an index of popular consciousness, articulation and participation of the electorates in the decision making process (Grover, 1997, p. 513). Indeed, electoral politics is mainly concerned with the citizens' will and involvement in a representative democracy. Hence, political parties and politicians during the election process have adopted pro-people policies, with an intention either to consolidate their existing electoral base or obtain support from newer sections (Suri, 2002, p. 2). Election strategies and planning that are created by them and political events and incidents that are occurred during the course of election have focused only on the voters. Thus, the study of electoral politics is imperative not only to understand the electoral process but also to understand the changing and emerging trends of the political system of a society. Through the study of electoral politics, the will of the people can be ascertained, the government determined and the responsiveness of the leaders to the public ensured (Mazumder & Deb, 2004, p. 1). Keeping in this mind, the present paper made an attempt to analyse the electoral politics in Barak Valley from the perspective of the Lok Sabha and Assembly elections held from 1952 to 2019 in the region. It mainly focused on the poll verdict, voting pattern and performance of the political parties in these elections.

2. Description of the Research Area

The present study is conducted in the Barak Valley region which consists of three districts of the Southern part of Assam viz. Cachar, Karimganj and Hailakandi. The total population in the region as per the 2011 Census is 3624599 of which males and females are 51.04% and 48.96% respectively. The region is mostly inhabited by the Bengali-speaking Hindus (50.10%) and Bengali-speaking Muslims (48.10%). It has two Lok Sabha Constituencies viz., Karimganj and Silchar. Among the three districts of Valley, Karimganj and Hailakandi districts jointly have one Parliamentary Constituency viz., 'Karimganj' and Cachar district has one Parliamentary Constituency viz., 'Silchar'. Karimganj and Silchar Parliamentary Constituencies are comprised of eight and seven Assembly Constituencies respectively.

3. An Outline of the Politics and Elections in Barak Valley since Independence

The first Lok Sabha election in independent India was held in 1952. It was conducted for 489 seats in 400 constituencies, represented 26 Indian states. The Indian National Congress (INC) stood to win in most of the states. The party won 364 seats and secured around 45% of the total votes polled. Barak Valley did not remain aloof from the rest of India. In Barak Valley, the INC

won both the Lok Sabha seats in the 1952 Parliamentary election. The party performed well in the first Assembly election of 1952 as well. It got absolute majority, winning 13 of the 15 Assembly seats of the region. Like the first Lok Sabha and Assembly elections, the Congress candidates got extensive support from the voters of Barak Valley in the next four Lok Sabha (1957, 1962, 1967 and 1971) and four Assembly (1957, 1962, 1967 and 1972) elections. The Congress party enjoyed an uninterrupted dominance in the electoral politics of Barak Valley for two decades from 1952 to 1972.

Table - 1: Winners of the Lok Sabha Elections in Barak Valley from 1952 to 1971

Year	Lok Sabha Constituency	Winner	Party
1952	Cachar Lushai Hills (Reserved)	Nibaran Chandra Laskar	INC
	Cachar Lushai Hills	Suresh Chandra Deb	INC
1957	Cachar (Reserved)	Nibaran Chandra Laskar	INC
	Cachar	Dwarika Nath Tewari	INC
1962	Karimganj (SC)	Nihar Ranjan Laskar	INC
	Silchar	Jyotsna Chanda	INC
1967	Karimganj (SC)	Nihar Ranjan Laskar	INC
	Silchar	Jyotsna Chanda	INC
1971	Karimganj (SC)	Nihar Ranjan Laskar	INC
	Silchar	Jyotsna Chanda	INC

Source: www.eci.nic.in

Table - 2: Seats Won by Political Parties in the Assembly Elections in Barak Valley from 1952 to 1972

Year	Total Seats	Seats won by Political Parties						
		BJS	CPI	CPI (M)	INC	PSP	IND	Others
1952	15	0	0	-	13	0	1	1
1957	13	-	1	-	10	1	1	0
1962	13	-	0	-	9	0	4	0
1967	14	0	0	0	10	0	4	0
1972	15	-	0	0	15	-	0	0

Source: www.eci.nic.in

The 1974 Silchar Lok Sabha By-poll brought a notable change in Barak Valley's electoral politics. In this election, Nurul Huda contested as the CPI (M) candidate and the INC gave ticket to Mahitosh Purkayastha. Difference of opinion was there among the Congress leaders regarding his candidature. While, the CPI (M) candidate Nurul Huda was a popular leader. His simple life style, straightforwardness and commitment to the ideology yielded great reverence and love for him from the cross section of people. Ultimately, one non-Congressman Nurul Huda won Silchar Lok Sabha seat. For the first time, the Congress party lost any Parliamentary seat in the region. However, the party



recaptured its monopoly over Barak Valley's electoral politics through the Lok Sabha election of 1977, winning both Silchar and Karimganj Parliamentary Constituencies. The election took place after the end of national emergency imposed by the PM Indira Gandhi in 1975. The strong anti-incumbency wave that brought disastrous result for the INC in the country did not have any impact on the region. The voters of Barak Valley chose the party whom they have preferred since the first Lok Sabha election of 1952. This was owing to that the people of the region did not experience the dreadful aspects of emergency like demolition and forcible vasectomy which created strong resentment and antagonism among the people of other parts of India. But, in the next 1978 Assembly election, Congress faced a miserable defeat in Barak Valley. The 'emergency issue' which did not get weight in 1977 gained prominence in the Assembly election of 1978. All opposition parties had made the 'emergency issue' one of their major poll planks and strongly campaigned against Congress. The Congress was further weakened by a major split and resignation of many prominent members of the party. As a result, Congress got only 3 Assembly seats in the election. However, the party regained its lost status through the 1980 Lok Sabha election. Due to anti-foreigners' agitation in Assam, election was held only in two Parliamentary Constituencies of the state viz., Karimganj and Silchar. Assam movement demanded the detection of names of foreign nationals, deletion of their names from the electoral rolls and their deportation from Assam before conducting any election in the state (Nath, 2005, p. 145). The supporters of Assam movement adopted both violent and non-violent methods to postpone the election. They succeeded in preventing election being held in 12 out of 14 Parliamentary Constituencies of Assam. On the contrary, the election was passed off without any disturbance in Bengali-dominated Barak Valley. Like in other parts of the country, Congress (I) did well even in Barak Valley. Voters of the region didn't seem impressed with the Janata Party because of its weak position. Further, they wanted to ensure their safety and security in Assam. In such a situation, they found the Congress (I) was better than other alternatives. They expressed their faith in the party by electing the Congress (I) candidates for both the Lok Sabha seats in Barak Valley. Congress was able to repeat its success in the next two Assembly elections of 1983 and 1985. The party got extensive support from the voters of the region as it gave assurance to the Bangladeshi immigrants that they would not be expelled from Assam. However, in the 1985 Lok Sabha election, Congress failed to retain Karimganj Lok Sabha seat. The party lost mainly due to the presence of strong anti-incumbency against the sitting Congress MP Nihar Ranjan Laskar. People were angry with Laskar because of his long absence from the Constituency. It was alleged that he did nothing for Karimganj Lok Sabha area. As a result, Sudarshan Das of the Indian Congress (Socialist) had succeeded to integrate

mass support and wrested Karimganj Lok Sabha seat from Laskar by a huge margin of 74421 votes, whereas from Silchar Parliamentary Constituency, INC's Santosh Mohan Dev was reelected to the Lok Sabha.

Table - 3: Winners and Runners-up of the Lok Sabha Elections in Barak Valley

from 1974 to 1985

Year	Lok Sabha Constituency	Winner	Party	Runner up	Party
1974 By Poll	Silchar	Nurul Huda	CPI (M)	Mahitosh Purkayastha	INC
1977	Karimganj (SC)	Nihar Ranjan Laskar	INC	Lilamoy Das	BLD
	Silchar	Rashida H. Choudhury	INC	Nurul Huda	CPI (M)
1980	Karimganj (SC)	Nihar Ranjan Laskar	INC (I)	Kamdeb Das	CPI (M)
	Silchar	Santosh Mohan Dev	INC (I)	Rashida H. Choudhury	INC (U)
1985	Karimganj (SC)	Sudarshan Das	ICS	Nihar Ranjan Laskar	INC
	Silchar	Santosh Mohan Dev	INC	Nurul Huda	CPI (M)

Source: www.eci.nic.in

Table - 4: Seats Won by Political Parties in the Assembly Elections in Barak Valley from 1978 to 1985

Year	Total Seats	Seats won by Political Parties								
		BJP	CPI	CPI (M)	ICS	INC	INC (I)	JNP	IND	Others
1978	15	-	0	4	-	3	2	4	2	0
1983	15	-	0	0	0	12	0	-	3	0
1985	15	0	0	1	1	10	-	0	3	0

Source: www.eci.nic.in

A new phase in Barak Valley's electoral politics was begun with the rise of BJP as the strongest political party in the 1991 Assembly election. The Hindutva brigade BJP thrown a bigger challenge before the Congress in Barak Valley, a traditional Congress bastion. Since its inception, BJP has been concentrating on turning this Valley into a stronghold by capitalizing on the pro-Hindutva sentiment. Accordingly, in the 1991 election, BJP tried to ride on the back of Ram Janmabhoomi-Babri Masjid controversy (Biswas, 2016, para. 1). The party's agenda worked well. The Hindutva wave had an electrifying effect on the Hindu voters throughout the Valley. In the wake of saffron surge, Bengali Hindu votes were divided and most of them went to the BJP candidates. As a result, Congress received a crushing defeat in the 1991 Assembly election and managed to win only 4 seats, while BJP captured 9 seats. The election outcomes



reflected a major change in the voting pattern in Barak Valley. The same voting trend was again noticed in the 1991 Lok Sabha election. In this election, BJP captured both Karimganj and Silchar Lok Sabha seats. It was because of the strong Hindutva wave, BJP's Dwaraka Nath Das won Karimganj seat. Jatindra Chandra Das of the Janata Dal came second and AGP's Narayan Chandra Das got the third position. The sitting MP and INC candidate Sudarshan Das was relegated to the fourth position. He secured only 9.43% votes, the lowest ever vote share received by the Congress party in Karimganj Parliamentary Constituency. From Silchar Lok Sabha seat, BJP's Kabindra Purkayastha was elected to the Lok Sabha. This time, the two times MP of Silchar and potent Congress leader Santosh Mohan Dev filed his nomination from Tripura West Lok Sabha seat. Congress gave ticket to a new comer, Prabhas Sen Majumder in Silchar. The election outcomes went in favour of BJP and Congress faced a humiliating defeat. The CPM candidate Nurul Huda came second and INC's Majumder got the third rank by securing 16.73% votes, the lowest ever vote share received by any Congress candidate in Silchar Parliamentary Constituency. However, the next 1996 Assembly election gave some relief to the INC in Barak Valley. On the other hand, BJP failed to repeat its 1991 splendid performance. This time, both the Congress and the BJP had mainly focused on the foreigners' issue. During the election campaign, the Congress party assured that it would see that the IMDT Act of 1983, which deals with the procedures to detect and deport illegal immigrants, will not misuse (Talukder, 2004, p. 107). The main aim behind this promise is to lure the immigrant voters. In contrast, BJP strongly campaigned for detection and deportation of foreigners and advocated the demand of Assam Agitation (Goswami, 2003, p. 230). This stand brought huge loss for BJP in Barak Valley. Further, the people of the region were not satisfied with the work of BJP in the last five years. Factionalism was also there within the BJP. Thus, the 1996 Assembly election took place in an unfavourable political environment for BJP. Ultimately, the poll verdict went against the party. It came down to 4 seats from the tally of 9 seats that it had won in 1991. On the other hand, Congress won 7 Assembly seats as against 4 seats in the last 1991 Assembly election. Like the Assembly election of 1996, Congress did well even in the 1996 Lok Sabha election. The INC candidate Santosh Mohan Dev wrested Silchar Lok Sabha seat from BJP's Kabindra Purkayastha by a big margin of 68141 votes. Congress won the seat at the expense of BJP. Besides, Santosh Mohan Dev's personalised mass appeal also benefitted the Congress party in Silchar. However, BJP had succeeded to retain Karimganj Lok Sabha Constituency. This time, Congress had fielded Sabita Das, a resident of Silchar. As she was an outsider, she was not known to the voters of Karimganj Lok Sabha area. Besides, there was dissatisfaction among the leaders of Karimganj Congress regarding her candidature. Taking



advantage of the situation, BJP's Dwaraka Nath Das could easily bring the people's mandate in his favour. Although the Congress failed to win Karimganj seat, it improved its position. In the last Lok Sabha election of 1991, the party got the fourth rank in Karimganj, but in 1996, it finished to the second.

The 1998 Lok Sabha election brought mixed fortune for both the BJP and the Congress. In this election, Congress won Karimganj Lok Sabha seat. This time, Nepal Chandra Das, a veteran politician was entrusted by the Congress to bring back its lost dominance in Karimganj, whereas BJP gave ticket to a greenhorn in politics, Swapan Kumar Das. As a result, BJP failed to save Karimganj Lok Sabha seat that it had captured in two consecutive terms. While in Silchar Lok Sabha Constituency, BJP's Kabindra Purkayastha defeated the INC candidate Santosh Mohan Dev. Congress lost the seat because the party failed to amalgamate its traditional Muslim vote bank. In contrast, the division of Muslim votes between Santosh Mohan Dev and CPM's Nurul Huda turned out to be fruitful for Kabindra Purkayastha. But, in the next 1999 Lok Sabha election, Congress received a resounding victory in both the Parliamentary Constituencies of Barak Valley. This time, the foreigners' issue did not gain prominence in the election manifestos of most of the political parties of Assam. But, the State Committee of BJP decided to make the foreigners' issue one of its main poll planks (Goswami, 2003, p. 238). The BJP leaders pointed their fingers only at the Muslim Migrants and promised to repeal the IMDT Act (Srikanth, 1999, p. 3413). The party further alleged that major political parties of Assam kept silence on illegal immigration to keep the Muslim voters in their favour. BJP's position on the immigration issue frightened the Muslims of Assam. Taking advantage of the fear of immigrant religious minority of the state, Congress sought to consolidate its traditional Muslim electoral base. Accordingly, in this election, INC's Santosh Mohan Dev got a remarkable victory in Silchar Parliamentary Constituency. He wrested the seat from BJP's Kabindra Purkayastha by a huge margin of 107752 votes. From Karimganj Parliamentary Constituency, Nepal Chandra Das of the INC was reelected to the Lok Sabha by defeating BJP's Parimal Suklabaidya. The next 2001 Assembly election did not give clear verdict to any political party in Barak Valley. On the eve of election, two major political parties viz., AGP and BJP announced their alliance. The supporters of both the camps in Assam were not happy with the decision. The poll verdict did not go in favour of the alliance. In this election, BJP managed to win 4 Assembly seats in Barak Valley. The BJP's alliance partner AGP suffered as the party got victory only in one seat and Congress captured 5 seats. BJP lost its supporters only because of its alliance with the AGP. BJP failed to perform well in the next 2004 Lok Sabha election as well. This time, both BJP and Congress attempted to ride on the back of foreigners'



issue in Assam. During the poll campaign, BJP supported the repeal of IMDT Act and drew attention to the rigorous outcomes of the continuous migration from across the border. On the other hand, Congress strongly opposed the repeal of IMDT Act. This move was directed to appease the Bangladeshi immigrants of the state. Besides, the party promised to give Permanent Land Pattas and OBC status to the people living in Char areas (Baruah, 2012, p. 67). The party played this master stroke in order to win the confidence of Char dwellers. In addition, Congress tried to banking on the nationwide anti incumbency against the BJP-led NDA government. The strategies of Congress party brought the expected result in Barak Valley. It got victory in both the Parliamentary Constituencies.

The next 2006 Assembly election was one of the most significant ones in the history of electoral politics in Barak Valley. The entry of AUIFD into the electoral race gave a new dimension to Barak Valley's politics. Since its emergence, the party has tried to strengthen the process of polarization among the Muslims of Barak Valley. It posed a tough challenge to the Congress vote base among the religious minorities, both domiciled and immigrants. The 2006 Assembly election verdict was clearly a reflection of the battle of vote-bank. This battle brought huge benefits for BJP. Further, BJP had succeeded to integrate a larger section of the Bengali Hindu votes. Though AUIFD won 3 LAC seats in its debut Assembly election, it was able to feel its presence in the electoral politics in Barak Valley. Similar voting pattern was observed again in the 2009 Lok Sabha election. In this election, BJP's Kabindra Purkayastha won from Silchar Lok Sabha seat. He defeated the AUIFD candidate Badruddin Ajmal by a margin of 41470 votes, while the sitting MP and Congress heavyweight Santosh Mohan Dev was relegated to the third rank. From Karimganj Lok Sabha seat, the sitting Congress MP Lalit Mohan Suklabaidya managed to win by defeating his nearest rival, the AUIFD candidate Rajesh Mallah by a meager margin of 7920 votes, while BJP's Sudhangshu Das got the third position. The loss of Congress's vote share was caused by the extreme polarisation of votes on communal lines between the BJP and the AUIFD. But, the Congress party made a splendid comeback in Barak Valley's electoral politics through the 2011 Assembly election by winning 13 Assembly seats. This time, Congress played the Hindutva card much better than BJP. The party assured that it would ratify the Immigrants Act of 1950 for the protection of Bangladeshi Hindu refugees. This announcement helped the Congress to recapture its lost strength among the Bengali Hindus. Because of the shifting of Hindu votes from the BJP to the Congress, BJP failed to win a single Assembly Constituency in Barak Valley in 2011. It was the worst ever Assembly election result that the party faced since its entrance in the region. Therefore, in the next



2014 Lok Sabha election, BJP tried hard to regain its old electoral base i.e., the Bengali Hindu voters by chasing on the 'Modi Magic' and by employing the Hindutva card. BJP alleged that the Congress tried to use the D (Doubtful) voters mark on 1.43 lakh people, whom are mostly Bengalis, as a means of blackmailing them (Bhattacharjee, 2014, para. 9). The BJP's Prime Ministerial candidate, Narendra Modi in his election rally in Silchar on February 22, 2014 promised to close the detention camps and assured the Hindu Bangladeshis to give accommodation if the BJP comes to power at the centre. But, unfortunately, the election outcomes went against the BJP. It lost both the Lok Sabha seats of Barak Valley. In Karimganj Lok Sabha Constituency, BJP's Krishna Das came second to the AIUDF candidate Radhyeshyam Biswas and the sitting MP and Congress candidate Lalit Mohan Suklabaidya got the third position. The decline in the Congress's vote share was suggestive of the damage that is caused by the presence of AIUDF in the electoral race. However, Congress's Sushmita Dev snatched Silchar Lok Sabha seat from BJP's Kabindra Purkayastha in 2014. This time, Congress could easily integrate its traditional Muslim votes that it had lost in the last 2009 Parliamentary election because of the presence of strong AIUDF candidate Badruddin Ajmal. Besides, Congress got huge support from the tea garden areas. On the other hand, BJP failed to beat the strong anti-incumbency against its candidate. The party's performance was not such impressive in the rural areas as like in the urban areas. Out of seven Assembly segments of the Silchar Parliamentary Constituency, BJP came first only in Silchar LAC segment.

The 2016 Assembly election also witnessed large scale polarisation of electorates along religious lines. In this election, BJP won the confidence of Bengali Hindus by issuing two central notifications which allowed the Hindu refugees who came to India due to religious persecution from Bangladesh and Pakistan up to December 31st, 2014 to stay in India (Biswas, 2016, para. 6). In addition, BJP tried to banking on the development agenda. It criticized the Congress-led state government of Assam for ignoring the issues relating to the development of Barak Valley. The party's strategies worked well and it had succeeded to win 8 Assembly seats, whereas Congress dropped to 3 seats and AIUDF captured 4 Assembly seats in Barak Valley. Most of the Hindu Bangladeshis gave their votes to BJP with the hope of getting the citizenship status in India. BJP continued its success story in the last Lok Sabha election of 2019 as well. The party emerged victorious in both the Parliamentary Constituencies of the Valley. The BJP candidate Rajdeep Roy defeated the sitting MP and renowned Congress leader Sushmita Dev in Silchar Lok Sabha seat. Dev lost mainly because of her dual stand on the Citizenship Amendment Bill (CAB), while BJP got people's mandate by giving commitment to pass the



CAB once voted back to power. Besides, the people of Silchar were dissatisfied with Sushmita Dev as she spent more time in Delhi than her own Constituency. Such allegations made the way easy for BJP in Silchar Parliamentary Constituency. While in Karimganj, BJP’s Kripanath Mallah clinched the seat from AIUDF’s Radhyeshyam Biswas. The Constituency has a Muslim majority population, and so it was expected that BJP will face a tough challenge. But, a major shift in the Hailakandi District Congress, which falls under the Karimganj Lok Sabha area, changed the whole political scenario. In Hailakandi, heavyweight Congress leader Gautam Roy reportedly went against his party and asked all Hindus to vote for BJP, leading to both Congress’s and AIUDF’s defeat in Karimganj (Mazumdar, 2019, para. 4).

Table - 5: Winners and Runners-up of the Lok Sabha Elections in Barak Valley from 1991 to 2019

Year	Lok Sabha Constituency	Winner	Party	Runner up	Party
1991	Karimganj (SC)	Dwaraka Nath Das	BJP	Jatindra Chandra Das	JD
	Silchar	Kabindra Purkayastha	BJP	Nurul Huda	CPM
1996	Karimganj (SC)	Dwaraka Nath Das	BJP	Sabita Das	INC
	Silchar	Santosh Mohan Dev	INC	Kabindra Purkayastha	BJP
1998	Karimganj(SC)	Nepal Chandra Das	INC	Swapan Kumar Das	BJP
	Silchar	Kabindra Purkayastha	BJP	Santosh Mohan Dev	INC
1999	Karimganj (SC)	Nepal Chandra Das	INC	Parimal Suklabaidya	BJP
	Silchar	Santosh Mohan Dev	INC	Kabindra Purkayastha	BJP
2004	Karimganj (SC)	Lalit Mohan Suklabaidya	INC	Parimal Suklabaidya	BJP
	Silchar	Santosh Mohan Dev	INC	Kabindra Purkayastha	BJP
2009	Karimganj (SC)	Lalit Mohan Suklabaidya	INC	Rajesh Mallah	AIUDF
	Silchar	Kabindra Purkayastha	BJP	Badruddin Ajmal	AIUDF
2014	Karimganj (SC)	Radhyeshyam Biswas	AIUDF	Krishna Das	BJP
	Silchar	Sushmita Dev	INC	Kabindra Purkayastha	BJP
2019	Karimganj (SC)	Kripanath Mallah	BJP	Radhyeshyam Biswas	AIUDF
	Silchar	Rajdeep Roy	BJP	Sushmita Dev	INC

Source: www.eci.nic.in

Table - 6: Seats Won by Political Parties in the Assembly Elections in Barak Valley from 1991 to 2016

Year	Total Seats	Seats won by Political Parties							
		AGP	AIUDF	BJP	CPI	CPM	INC	IND	Others
1991	15	1	-	9	0	0	4	0	1
1996	15	3	-	4	0	0	7	0	1
2001	15	1	-	4	0	0	5	2	3
2006	15	0	3	5	0	0	6	1	0
2011	15	1	1	0	0	0	13	0	0
2016	15	0	4	8	0	0	3	0	0

Source: www.eci.nic.in

4. Concluding Remarks

From the above discussion, it is cleared that the electoral politics in Barak Valley evolved mainly on the communal line. Political parties and politicians often use the communal issues in order to win the battle of the ballot box. Their main aim is to capture power not the welfare of the people of the region. Such communal politics influenced the voting behaviour of the people of the Valley and manifested in the election results in case of both Lok Sabha and Assembly elections. Issues relating to the development of the region and its people are often sidelined at the face of communal division. Other factors like ideology of the political party, local issues, caste, gender and personality of the candidate are given priority only when the question of religion disappears. The main reason behind the utmost bias towards religion is the almost even polarization of Barak Valley into two major religious groups, viz., Hinduism and Islam. However, there are visible signs that Indian electorates are maturing and election is becoming a more competitive enterprise. Barak Valley is also not exception to that. May be the days to come, communalization of politics may not remain a strong card to win election in the region and it is obvious to change the course of electoral politics in Barak Valley. Hope is likely not belied.

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THE BARE TRUTHS OF INDIAN EDUCATION SYSTEM

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Abstract

India is a welfare state and therefore Article-21A of Education is one of the fundamental rights of the citizens and Article-45 also talks about that government shall provide free and compulsory education to all children until they complete the age of 14 years. But somewhere or other the concept of welfare state seems blurred when we look towards several incidents of mal practices. India Today News on 29th August 2019 reported that primary students of UP's Rampur's primary school bring their own plates and sits separately from SC, ST and Dalit students for the mid-day meal. One student of primary class said "Anyone can eat in the plates available in schools, so we bring separate plates from home". It's very ashamed that a student of a primary class can't proper pronounce English words but he knows discrimination and untouchability. Article-46 of Indian Constitution talks about Promotion of educational and economic interest of SCs, STs and other weaker section so to implement this, there are many educational scholarship schemes are being run but due to caste feudal society still students are unable to avail their scholarship benefits. According to National Commission of SC report of 2016, more than 500 complaints has been received of No scholarship is being provided, late scholarship, no fee reimburses etc. apart from this there are lots of obstacles which are being faced by SC students in their educational career.

This educational discrimination was used to happen before independence but it is still continued in the present scenario but after independence, the nature of discrimination is same but ways of discrimination has been changed by the vernacular society. So there is a need to increase the visibility of the difficulties which are being faced by the scheduled caste people in the still present situation after 70 years of independence. It is directly related to the Brahmanism ideology which triggers the mind-set of the people to discriminate and restrict SC students to become equal. This research will enlighten the people about the ground reality of discrimination & different behaviour towards SC students. This study will suggest some significant recommendations regarding implementation of provisions of equality of constitution. It will also contribute to the literature regarding education of SC community.

Contemporary Scenario



Education has been recognized as a key & catalytical input for socio-economic development of any society or nation. Education is the most indispensable phenomenon to create an egalitarian aspect of society for the poorest of the poor. It is one of the most essential fundamental rights (i.e. Article 21A) of the Indian Constitution which mandate the state to provide free and compulsory education to all children till the age of 14 years. But somewhere or other the concept of welfare state seems blurred when we look towards several incidents of mal practices. According to the Indian media house

Primary students of UP's Rampur's primary school bring their own plates and sits separately from SC, ST and Dalit students for the mid-day meal. One student of primary class said "Anyone can eat in the plates available in schools, so we bring separate plates from home".ⁱ

Inspite of the black shade fact that the primary class students can't proper pronounce English words but they were aware about the discrimination and untouchability. One of the most significant case covered byBBC News on 19th January, 2016, regarding 'Rohit Vemula' reported that

on 17 January, 2016 Rohit Vemula was very prominent Ph.D. scholar who hanged himself in Hyderabad Central University because of discriminated by other students & faculty members.

On 4 June 2019, Firstpost News published that

on 22nd May 2019, Dr Payal Tadvi; a second year post-graduate student ended her life in BYL Nair Hospital under the pressure, suppression, humiliating entourage of seniors.

On 23 Sept 2016, The Hindu (newspaper) reported that

10 students threatened the JNU administration to commit suicide if their research grant would not be extended.

In 2015-2016, UGC received 142 complaints of caste discriminationⁱⁱ, and in 2017-2018 there are 72 complaints are registered by UGC for caste related issues & problemsⁱⁱⁱ and beside this statistico-factual description, there are ample number of students who do not raise their voice or unable to raise their voice because of lack of proper social security which is the mandatory responsibility of the government.

In India, certain sections of the society getting benefits of reservation, scholarships & fee waiver, not because they are in power or privileged but

because they have been deprived and isolated for past more than thousand years ago and after the 70 years of independence they are compelled to commit suicide or leave their education which is one of the ashamed shade on the concept of welfare state. In India, the condition of scheduled caste is miserable, humiliating, horrific & pathetic. It's not hard to state that caste discrimination is a zeitgeist. If we stress on statistics so it will be analysed that there is a huge gap between the scheduled caste people & others.

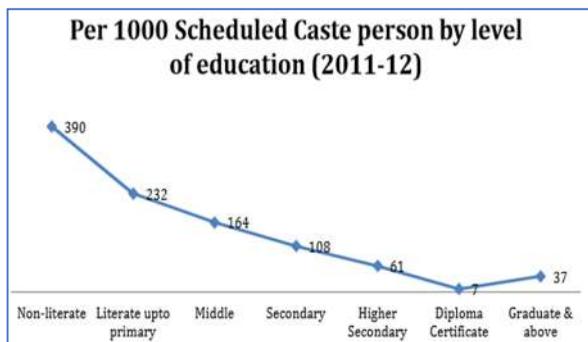
Literacy Rate 2011	
Overall	Scheduled Caste
73%	66.1%
Enrolment in Primary Education 2014-2015	
24.3%	19.1%
Enrolment in Higher Education 2014-2015	
34.2%	4.6%

Source- Ministry of Social Justice and Empowerment

The above mentioned statistics depict the critic-analyses of scheduled caste people in educational sector. They are far behind the wall of literacy & education. If we stress more on these numbers than it will observe that there is no large gap in enrolment of primary education in scheduled caste and others but this gap escalates to the huge trench in enrolment in higher education.

After having a look on the mentioned figure in per 1000 scheduled caste person by level of education, anyone can easily inculcate that how the number goes down with the upgradation of educational level. After the 70 years of independence the enrolment rate of SC in higher education is quite stunned. There is a need to increase the visibility of causalities which is being faced by scheduled caste students.

Despite of this, exclusion of Scheduled Caste students is still practiced from educational opportunities & exposures because education is the only prominent way to accelerate the community's situation from beneath to equal therefore the feudal ideological society have started to create



Source: NCSC Report. 2016



obstacles in the path of attainment of education for Scheduled Caste students. These bottlenecks are such as physical, mental, social, cultural, educational and emotional in educational institution. National commission of Scheduled Caste accepted the discriminatory & scholarship problems in the report of 2016, more than 500 complaints has been received of No scholarship is being provided, late scholarship, no fee reimburses etc. apart from this there are lots of obstacles which are being faced by SC students in their educational growth.

Constitutional Provision

The principal question is—why the deteriorating condition of educational status of scheduled caste is a problem? It implicate towards the constitution of India. As a welfare state Indian constitution contains various provision of education for scheduled caste and weaker section of society but even after being so all the condition of scheduled caste is devastating & terrible and this is an absolute problem. India is a welfare state and therefore

1. Article-21A states that Education is the fundamental right of the citizens & constitution provides free & compulsory education to all below the 14 years of age,
2. Article-45 talks about that government shall provide free and compulsory education to all children until they complete the age of 14 years,
3. Article-46 of Indian Constitution talks about Promotion of educational and economic interest of SCs, STs and other weaker section of the society,
4. Article 51A talks about the fundamental duties of citizens and 11th fundamental duty was incorporated in 86th amendment in 2002 that this is duty of every parents that they should send their children to school minimum the age of 14 years.

In 2009, The Right to Education was enacted by Parliament of India under Article 21A of the constitution. This Act gives the equal right to every child irrespective of caste, class, sex, religion etc. to get free & compulsory education to their neighbourhood school of within 1 km whether it is private or government, it reserves 25% seats for the poor or economic weaker section of society.^{iv} It is concluded that education is the fundamental right of every citizen and it is the government's responsibility to ensure that individuals are able to exercise their right.

There is no doubt that, in India, people have educational rights, scholarships, educational institutions, councils, & committees etc. but it is stunned that it is only on papers and for impress the audience therefore in every month we encounter some news of violation of rights, suicide, discrimination in school or Colleges etc.

In India we more focus on other sectors like defence, corporate etc. but do not focus on education. Kothari commission recommended that 6% of GDP should



be spent on education (Madaan, 2019) but it never happened yet. Government spent only 2.8% in 2014-15, 2.4% in 2015-16, 2.6% in 2016-17 & 2.7% in 2017-18 (News 18, 2019). It's very interesting fact that Central Education Institutions (Reservation in Admission) Act, 2006 was enacted and only 4 IITs out of 13 provide reservation & no IIM out of 6 provides reservation in education, they violate the Act. The UGC has given mandate to establish Equal Opportunity Cell (EOC) & committee to resolve caste discrimination but only 155 out of 800 universities appeared to have responded to the UGC's letter (seeking 'action taken reports' on establishing cells to look into caste-based discrimination) for the year 2015-16. Of them, only about half had a webpage where SC/ST students could lodge complaints of discrimination.

Out of total, 47% had constituted committees or cells specifically meant to look into complaints of discrimination against SC/ST students (Firstpost, 2019). So now anyone can understand that if the government had given attention to education, so many students would not have to commit suicide. And who committed suicide, they were at their peak (in M.Phil., PhD, MD).

These are such lines which was written by Rohit Vemula before committing suicide-

"Please give us poison at the time of admission itself instead of humiliating us like this,"

"For some people life itself is a curse. My birth is my fatal accident. I can never recover from my childhood loneliness. I am not hurt at this moment. Not sad, just empty. That is pathetic. That is why I am doing this."

Obstacles

After mentioning various provisions, reservation, Acts in the constitution but still the scenario is not in the favour of scheduled caste. There are still such forces which restrict these policies from implementing at the ground level.

Segregated behaviour of the people-This educational discrimination was used to happen before independence but it is still continued in the present scenario but after independence, the nature of discrimination is same but ways of discrimination has been changed by the vernacular society. Earlier the upper caste used to boycott them but after Article 17 came in existence people make distance with them and segregated oneselves from SC students. This practice happen among students, teachers, friends, neighbours etc. this practice hit the mentality of victims and realise them that they are still untouchable and lower than from them (Satyamev Jayate, 2012).

Forced hindrances- There are ample number of practice which restricts SC students to stride their career. SC students are forced to sweep the whole school,

toilets, class rooms and other things after accompanied these practices it's absurd to concentrate on studies, here is a line which is said by a father of a SC student- Hamara desh to azad ho gya per hum abhi bhi gulam hai (our country has gotten freedom but still we are slaves)(Satyamev Jayate, 2012).besides this, they have to sit in separate row they can't sit with all students, they can't use same tap to drink water, they can't sit in a front seats, they are beaten-up by teachers so these practices collapse the dreams, desires and willingness to study of SC students in their childhood age (India Today News, 2019).

Demographic Profile of SC families- Our quality of education is directly related to our economic condition. No one can get good schooling except having good money. A poor child can take admission under EWS quota but he can't survive there. A poor student can't match flow accompanied with the other students. In India the people who are poor or living under below poverty line in that lion's share comes from SC community.

Population Living in Urban & Rural Area-2011			
Urban		Rural	
All	SC	All	SC
31.2%	23.6%	68.8%	76.4%

(Source- Ministry of Social Justice & Empowerment)

Above mentioned figure illustrates that all population consist SC people also that's why the number is high otherwise if there would be figures of only upper caste then figures would be very different.

Population Living Under Below Poverty Line-2011-12 by Tendulkar Committee			
Urban		Rural	
Others	SC	Others	SC
8.2%	21.7%	15.5%	31.5%

(Source- Ministry of Social Justice & Empowerment)

This figure apparently demonstrates that the poverty figures escalate from others to SC is more than twice in numbers. Besides this, the drop-out rate from class I-X is approx 50% in SC community so now everyone can assumes that how the situation would be difficult from this community to send their children to school rather than send to economic activity and then they face terrible discrimination so it's obvious to leave study for them. And this is they want that's why they do this so that this community will never be grown-up.

Nutritional Status of SC community- Gautam Buddha said- "if our body is not fit so our mind cannot be fit". This state is absolutely correct because empty stomach can't focus on studies. In India the most mal-nutrition children comes from SC community

Early Childhood Mortality Rates per 1000 Live Births During 2015-



16					
India		Rural		Urban	
Others	SC	Others	SC	Others	SC
38.5%	55.8%	45.4%	61.1%	27.8%	38.9%

(Source- Ministry of Social Justice & Empowerment)

Above mentioned figure depicts that how the nutritional status of SC community of India is still at the edge of the development. The mortality rate is very high in rural area and all knows yet majority of the population lives in rural area.

These above all mentioned socio-economic forces compel to the SC community to commit suicide & leave their education or to be dropout students.

Suggestions

Problem emerged with its solution. Caste Discrimination is just a matter of abstract discussion and serious concerning entertainment point of view for Bollywood industry but in reference to contemporary scenario, this issue, itself a serious cognitive concern for government as well as other respective authorities. This problem can be solved when everyone considers it as a problem and discussed at state and national platforms like seminars, conferences, conclave, debate & discussion, cinema & media. Apart from this, there are some practical suggestions, mentioned below, that can help in revamping the condition of Scheduled Castestudents-

1. Rescindment of Surname-

Earlier, caste was quite openly asked by people and one behaved accordingly. But after the enforcement of Article 17 in the constitution which completely forbids such behaviour, nobody can discriminate candidly. So in the present scenario, people do not ask the other person’s caste rather they ask a person’s full name or surname and assume their caste and expand their relation accordingly. In some parts of our country, people reveal their caste on their vehicles, name plates of their house etc. to display their upper status. Such expositions of surname instil a sense of fear among others and make them feel that they are inferior. Government can forbid people from adding surnames with their names. Apart from this, for identification, anyone can be asked for their DOB (date of birth) or their parents name.

2. Heterogeneous Caste Marriages-

Pillar of the Caste system rests on purity of blood. So, if inter-caste marriages are promoted, hierarchy of caste system can be clamped down. Further, options of finding a good companion will increase. But it’s an ugly truth of the society that if a couple tries to attempt inter-caste, honour killing takes place and couples are killed by their own parents. To ensure inter-caste marriages, the government should enforce a stern legal system to protect the innocent lives and establish a legal cell in police stations or anywhere else which supports them



until the marriage takes place to legally assure their lives until the matter gets resolved.

3. Awareness Programme-

Ministry of Social Justice and Empowerment provides Pre-Matric Scholarship, Post Matric Scholarships, Coaching Scheme and various Scholarships for obtaining Higher Education but it fails to reach its full impact due to unawareness among people. A good endeavour is proven good when its outcomes are remarkable or accomplished, but these schemes are not known by students in order for them to avail the provisions. So the government should spread awareness among students, teachers in schools & colleges. Besides this, several workshops should be organised for the SC students to avail their overseas scholarships & can guide the SC students to get their higher education in foreign universities.

4. Tracking Mechanism-

Central and State governments release their funds but they don't have proper accountable mechanism. Online transaction systems are not established everywhere, so the government should appoint a monitoring cell to enhance transparency. All scholarships should be sent directly to the beneficiaries account and that all the SC students in school are getting scholarships or not should be checked and, if not what are the reasons behind that.

5. Grievance redressal mechanism & toll free number-

In schools and colleges, there should be a grievance redressal mechanism where a student can register their complaint. This mechanism should also monitor the courtesy of the school and bar the bad practices of discrimination. In addition to this, a toll free number should be provided to the school where students can register their discrimination related complaints.

6. Majority in Planning & Implementing Authority-

There should be a majority or more than 50% members should hail from the SC community because a heightened sense of empathy is shown in the justice delivered by people who have the same sense of experience and attachment in relation to the victims or the community.

These are some of the suggestions to make a congenial entourage for SC students. The circumstances can only be changed with the intransigent endeavours of the government by considering it as a significant problem of our society.

Conclusion

Education is one of the fundamental rights given by the constitution of India for each and every citizen without any discrimination or biasness. Education itself



defines a key element for those who want to become 'haves' from 'have nots'. There is an essential requirement who understand that it is the responsibility of government to provide education for its citizens.

From the above mentioned discussion & on the basis of empirical fact that has been mentioned in this paper, it is crystal clear defined that somehow education is a matter of business rather a subject of development of the society, in present scenario. One of the most important social evil that raised silently in our society is caste based institutional discrimination includes the many ways in which the education system denies equitable education opportunities, education services and supportive mechanisms to facilitate Scheduled Caste students to access an equal quality of education and to lessen educational inequalities between Dalits and non-Dalits. It may comprises both active and passive forms of discrimination, default and intentional. It is a known fact that the education can change the attitude towards under developed to upmost development.

Education is important not only for preservation and transmission of culture but is also a vital instrument for accelerating development in all spheres – political, economic and social. Education is considered as the most powerful instrument of social change and development. It is only through education that people can bring desirable changes and development by developing their social and economic conditions. But in a caste ridden and hierarchical society like India access to educational opportunities is unequal and unjust.

Given the socio-structural denial of opportunities and freedoms historically, the representation of SCs and STs in various domains/sectors of public life has remained abysmally low. The broader concerns for upliftment of weaker sections was put in place with India adopting a social democratic form of government – in which explicit constitutional guidelines were placed to promote the participation and development of SCs and STs.

Notes and References

ⁱIndia Today News, on 29th August 2019

ⁱⁱIndia Today, 28th June, 2019

ⁱⁱⁱPIB Delhi, 8th July, 2019

^{iv}Oxfam India, 2019

⁵Acharya Tulasi (2009), Strategies for Overcoming Barriers to Education Development of Schedule Caste students of Cuttack City: Journal of Social Sciences, Vol.21, No.2, 2009

⁶KabeerNalia (2015), Gender Equality and Women's Empowerment: A Critical Analysis, The Millennium Development Goal, Gender & Development 13, no, 1, 13-14



DEVELOPING SELF ESTEEM THROUGH SELF DEFENSE

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Abstract

This article explores the effectiveness of self- defense training for students. Self-defense training is very much important for students as it aid them in developing self-discipline, improve their physical condition and street awareness and self-confidence. In this article, researcher is trying to study the impact of self-defense training on self-confidence of the school students. Now a day's lots of activities are taking place at school as well as in the surroundings, which make impacts student's confidence in terms of their safety. If adequate training is provided to them, then their self-confidence will be uplifted. The research findings indicate that self-confidence of the students increased post training.

Keywords: Self-Defense, Self-Confidence, School Students

Background

Self- defense is an art that involves defending one's health and wellbeing from harm. Now a day's learning self-defense is necessary for all the age groups of women hood. The environment around female gender is quiet harsh and brutal, in order to maintain safety of oneself, it's very much important to know self-defense techniques. Once the individual has leant the self-defense techniques, it brings a sense of self confidence in the individual, that he or she will be able to protect themselves.

Life is a gift. It's also unpredictable. Self-defense helps to prepare for unexpected situations and also helps to develop increase mental and physical well-being. Self-defense and self-protection are an important priority for women in particular for students. Self-defense is important because statistics say that all women are good candidates to become victims of violent crime at any point in their lives. Self-defense, especially for women, is of extreme importance in the style of the world we live in today. Women, usually referred as the weaker sex, are considered easier targets. In a country like India where the cases of gender violence are on rise, out of which many go unreported, self-defense for women has become a necessity more than ever.



Self-confidence is closely related to the concept of self-efficacy, or the perception that one can be effective in carrying out a particular behavior. According to Bandura (1977, 1997), self-efficacy is key to learning new behaviors, approaching new situations confidently, and performing competently. Perceived self-efficacy can be increased in four principal ways: mastery experiences (i.e., successfully performing the behavior in question), modeling (watching similar and/or respected others perform the behavior), social persuasion (including feedback about one's own abilities), and interpretations of physiological states, such as rapid heartbeat or calm relaxation. Self-defense training includes all these elements: It includes practice in physical and verbal self-defense techniques, observation of others performing such techniques, information about self-defense and feedback on one's own performance, and practice in reinterpreting bodily cues as signs of power or outrage, not fear. Such training has been shown to increase self-efficacy both in domains related to self-defense (Ozer & Bandura, 1990; Weitlauf et al., 2000) and in other domains (Weitlauf, Cervone, Smith, & Wright, 2001). Importantly, this change in self-confidence can reduce a woman's risk of victimization; "a confident demeanor is a deterrent to attack and a woman's belief that she can fight, and the concomitant willingness to put up a fight, are central components to successfully thwarting attacks in the vast majority of situations" (McCaughy, 1998, p. 293).

Review of Literature

Self-defense is an art to protect oneself from others' harsh behavior. Learning this art at school level is very much important as from childhood; the individual is able to protect oneself and is aware of the surroundings. There is hardly any research done on the student population regarding self-defense and self-confidence.

Saravana Prabha, R. (2017). Studied a study on developing awareness for self-defense among varsity girls and found that self-defense classes boosted students' self-confidence.

Hollander (2016) studied the importance of self-defense training and found that self-defense training empowered women in all spheres.

Problem

The aim of the present study is "**developing self-esteem through self-defense**". There is surprisingly little research on the present study in India as compared to voluminous research studies done in western countries. There is a need to study the importance of self-defense training for girls and how it develops the self-efficacy, self-esteem and self-confidence among them, therefore to know the



present scenario of how self-defense can boost self-esteem of the students, the researcher in the present study is exploring these variables.

Objectives

1. To compare the impact of self-defense training on the self-confidence of students pre and post interventions.

Hypothesis

1. There will be significant difference on self- confidence post self-defense training.

Method

Sample

The sample of the present research will consist of 50 school students. The age range of the students will be 12 -18 years and purposive random sampling technique will be used for selecting the subjects.

Research Design

The current research employed pre-post exploratory research study assessing the impact of self-defense on self-confidence. T-test was used for studying the impact of self-defense on self-confidence

Phase I – Pre examination, the administration of questionnaire on all the research participants.

Phase II – Intervention

Phase III- Post examination, assessing the participants after intervention

Selection of Tool

The following measures were used for collecting information regarding the subject's experience of self-confidence.

1. Self-defense and self-confidence Assessment Questionnaire: The questionnaire consists of 10 item scale that measures esteem level and self-worth by measuring both positive and negative feelings about the self.

Administration and Procedure

Students were contacted in their respective class rooms and the nature of the study was explained to them. The questionnaire was given to them and the students were requested to read the instructions carefully and to ask the administrator if there is any difficulty in understanding the instructions. They were asked to respond to each and every statement and not to omit. The subjects were assured that their responses will be kept confidential. After completion of the tests, it was taken back and scoring was done.



Data Analysis

Data for the study will be analysed using the Statistical package for social science, SPSS version 20. SPSS Statistics is leading statistical software used to solve a variety of business and research problems. It provides a range of techniques including ad-hoc analysis, hypothesis testing and reporting – making it easier to manage data, select and perform analyses, and share your results

Means, standard deviations, significance level and the student t-test will be performed to find the difference between variable. The level of significance chosen for this study will be $p \leq 0.05$ at 95% confidence interval.

The Ethical Issue

Consent was taken from each individual participating for the study

Inclusion criteria

The students studying only in school will be considered

Students having no psychological problems

Students having no serious health issues

Exclusion criteria

Students having any psychological problems

Result

Table 1 showing the comparison between pre and post intervention assessment on self-confidence of students

Variable	Group	N	Mean	S.D	t	df	Sig.
Self-confidence	Pre-assessment	100	23.15	5.75	16.862	99	.000
	Post-assessment	100	34.60	5.97			

The results displayed in table 1 clearly indicates that there is a significant difference between pre and post assessment score on self-confidence ($t=16.86$, $p < 0.05$). The mean score of post assessment is 34.60 which are higher than the mean score of pre assessment, as the mean score of pre assessment is 23.15. Therefore, it can be predicted from the table that there is a difference between pre and post assessment score on self-confidence and it lead to acceptance of which states that there will be significant difference on self- confidence of students.



Discussion

The status of women in India has been subject to many great changes over the past few millennia. With a decline in their status from the ancient to medieval times, to the promotion of equal rights by many reformers, the history of women in India has been eventful. Self-defense, especially for women, is of extreme importance in the style of the world we live in today. Women, usually referred as the weaker sex, are considered easier targets. In a country like India where the cases of gender violence are on rise, out of which many go unreported, self-defense for women has become a necessity more than ever. The present study aim was to develop self-esteem of the students through self-defense, as now days, it's very much necessary to train student's self-defense techniques. In the present scenario, lots of bullying incidence takes place at school as well as sexual assault outside the school premises. The training really developed the awareness for self-defense among students to be more aware, prepared and ready for any situation that may occur every day. They developed the real sense of feeling that how to take care of oneself mentally, socially and physically. Being able to protect oneself in all situations is a confidence booster as much as it is a reassurance.

In present study, researcher found that there is a difference between pre and post self-defense training on self-confidence; this is because it developed a sense of feeling that they can protect themselves in all situations which boosted their confidence level.

Most of the students reported that the biggest advantage of taking self-defense training was the way it makes feel afterwards. A lot of students are not confident with their abilities to protect themselves; self-defense training built their confidence in oneself.

Conclusion

To summarize, in the present study researcher found difference between pre and post self-defense intervention on self-confidence. After the intervention, the self-esteem, confidence got boosted up. The students felt confident about protecting themselves.

Recommendations and Suggestion

When a researcher begins a study, he or she plans the program trying his best to make it free of limitations and loopholes. However, hindsight is always wiser than foresight. Therefore after the work is over, there is a feeling that something different and additional would have made the work better. The educational level plays important factor that can have impact on self-confidence. The present study was done only in urban area of the country and neglected the rural region



of the country, so rural section can be taken for further study. The major limitation is that only female group was catered in the present study, the comparison can be done between male and female group in future study.

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FORMULATION AND EVALUATION OF ACETAZOLAMIDE SUSTAINED RELEASE TABLETS

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Abstract:

The aim of the present study was to develop sustained release formulation of acetazolamide to maintain constant therapeutic levels of the drug for over 12 hrs. Carbopol, Guar Gum, HPMC K100 were employed as polymers. All the formulations were passed various physicochemical evaluation parameters and they were found to be within limits. Whereas from the dissolution studies it was evident that the formulation (F3) showed better and desired drug release pattern i.e., 96.72% in 12 hours. It contains the HPMC K100 polymer Acetazolamide as sustained release material. It followed karsmayerpeppas kinetic mechanism

Keywords: Acetazolamide, Carbopol 934, HPMC k100 , guar gum, sustained release tablets.

1. Introduction:

Sustained release tablets are commonly taken only once or twice daily, compared with counterpart conventional forms that may have to take three or four times daily to achieve the same therapeutic effect. The advantage of administering a single dose of a drug that is released over an extended period of time to maintain a near-constant or uniform blood level of a drug often translates into better patient compliance, as well as enhanced clinical efficacy of the drug for its intended use.¹

Sustained release dosage forms provide a better control of plasma drug levels, less dosage frequency, less side effect, increased efficacy and constant delivery. There are certain considerations for the preparation of extended release formulations:

- ✓ If the active compound has a long half-life, it is sustained on its own,
- ✓ If the pharmacological activity of the active is not directly related to its blood levels,
- ✓ If the absorption of the drug involves an active transport and
- ✓ If the active compound has very short half-life then it would require a large amount of drug to maintain a prolonged effective dose.²⁻³

The above factors need serious review prior to design.

Introduction of matrix tablet as sustained release (SR) has given a new breakthrough for novel drug delivery system in the field of Pharmaceutical technology. It excludes complex production procedures such as coating and Pelletization during manufacturing and drug release rate from the dosage form is controlled mainly by the type and proportion of polymer used in the preparations. Hydrophilic polymer matrix is widely used for formulating an SR dosage form.⁴ Because of increased complication and expense involved in marketing of new drug entities, has focused greater attention on

development of sustained release or controlled release drug delivery systems. Matrix systems are widely used for the purpose of sustained release. It is the release system which prolongs and controls the release of the drug that is dissolved or dispersed.⁴

In present work acetazolamide used as API it is a medication used to treat glaucoma, epilepsy, altitude sickness, periodic paralysis, idiopathic intracranial hypertension⁵ (raised brain pressure of unclear cause), and heart failure. It may be used long term for the treatment of open angle glaucoma and short term for acute angle closure glaucoma until surgery can be carried out. It is taken by mouth or injection into a vein.⁶

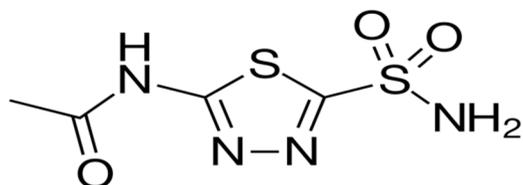


Figure no 1: structure of acetazolamide

2. Materials & Methods:

Acetazolamide procured from Sura Labs carbopol, Guar gum, HPMC, MCC pH 102, Magnesiumstearate and Talc purchased from Merck Specialities Pvt Ltd, Mumbai, India

Instruments:

Weighing Balance (Sartorius), Tablet Compression Machine (Multistation)(Lab Press Limited, India), Hardness tester (Monsanto, Mumbai, India), Vernier callipers (Mitutoyo, Japan), Roche Friabilator (Labindia, Mumbai, India), Dissolution Apparatus (Labindia, Mumbai, India), UV-Visible Spectrophotometer (Labindia, Mumbai, India), pH meter (Labindia, Mumbai, India), FT-IR Spectrophotometer (Agilent)

2.1 Analytical method development:

a) Determination of absorption maxima:

10mg of Acetazolamide pure drug was dissolved in 10ml of Methanol (stock solution) 1ml of above solution was taken and make up with 10ml by using 0.1 N HCl (100µg/ml). From this 1ml was taken and make up with 10 ml of 0.1 N HCl (10µg/ml) and pH 6.8 Phosphate buffer UV spectrums was taken using Double beam UV/VIS spectrophotometer. The solution was scanned in the range of 200 – 400.

b) Preparation calibration curve:

10mg of Acetazolamide pure drug was dissolved in 10ml of Methanol (stock solution) 1ml of above solution was taken and make up with 10ml by using 0.1 N HCl (100µg/ml). From this 1ml was taken and make up with 10 ml of 0.1 N HCl (10µg/ml). The above solution was subsequently diluted with 0.1N HCl to obtain series of dilutions Containing 2,4,6,8, and 10 µg/ml of Acetazolamide per ml of solution. The absorbance of the above dilutions was measured at 298nm by using UV- Spectrophotometer taking 0.1N HCl as blank. Then a graph was plotted by taking Concentration on X-Axis and Absorbance on Y-Axis which gives a straight line Linearity of standard curve was

assessed from the square of correlation coefficient (R^2) which determined by least-square linear regression analysis. The above procedure was repeated by using pH 6.8 phosphate buffers.

2.2 Drug – Excipient compatibility studies

Fourier Transform Infrared (FTIR) spectroscopy:

The formulations were subjected to FT IR studies to find out the possible interaction between the drug and the excipients during the time of preparation. FT IR analysis of the pure drug and optimised formulation were carried out using an FT IR spectrophotometer (AGILENT)

Table no: 1 formulation composition for acetazolamide sustain release tablets

Formulation code.	Acetazolamide	Hpmc K-100	carboxypol	gumgum	Magnesium Stearate	Talc	MCC PH102
F1	250	50	-	-	10	10	QS
F2	250	100	-	-	10	10	QS
F3	250	150	-	-	10	10	QS
F4	250	-	50	-	10	10	QS
F5	250	-	100	-	10	10	QS
F6	250	-	150	-	10	10	QS
F7	250	-	-	50	10	10	QS
F8	250	-	-	100	10	10	QS
F9	250	-	-	150	10	10	QS

All the quantities were in 500 mg

2.3 In vitro drug release studies:

Dissolution parameters:

Apparatus	--	USP-II, Paddle Method
Dissolution Medium	--	0.1 N HCl, pH 6.8 Phosphate buffer
RPM	--	50
Sampling intervals (hrs) --		0.5,1,2,3,4,5,6,7,8,10,11,12
Temperature	--	37°C + 0.5°C

3. Results and Discussion

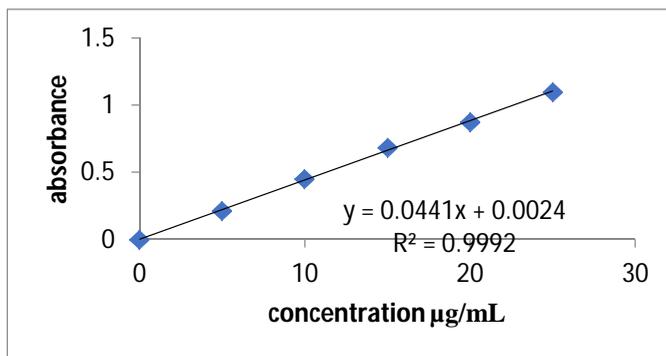
The present study was aimed to developing Sustain release tablets of Acetazolamide using various polymers. All the formulations were evaluated for physicochemical properties and in vitro drug release studies.

3.1 Analytical Method

Graphs of Acetazolamide were taken in Simulated release matrix (pH 1.2) and in pH 6.8 phosphate buffer at 298 nm and 294 nm respectively.

Table no: 2 Observations for graph of Acetazolamide in 0.1N HCl (298nm)

Concentration [µg/ml]	Absorbance
0	0
5	0.214
10	0.449
15	0.685
20	0.876
25	1.1

**Figure no: 2 Standard graph of Acetazolamide in 0.1N HCl****Table no3: Observations for graph of Acetazolamide in p H 6.8 phosphate buffer (294nm)**

Conc [µg/ml]	Absorbance
0	0
5	0.143
10	0.263
15	0.408
20	0.537
25	0.67

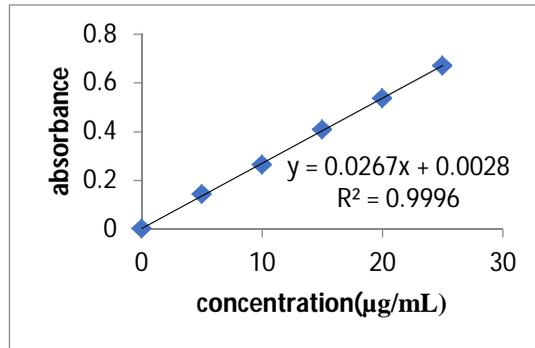


Figure no 3: Standard graph of Acetazolamide pH 6.8 phosphate buffer

3.2 Drug – Excipient compatability studies Fourier Transform-Infrared Spectroscopy:

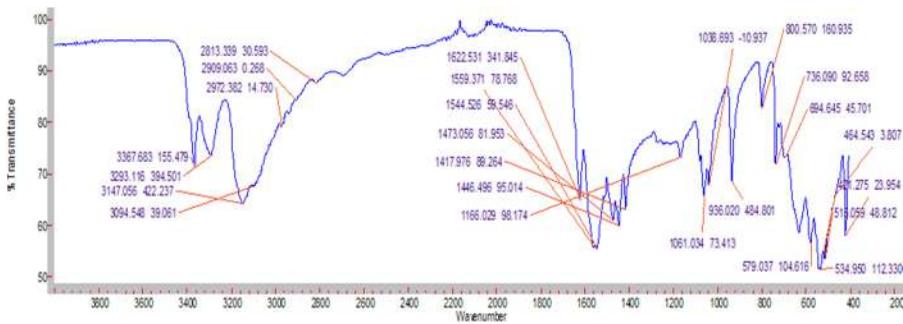


Figure no 4: FT-TR Spectrum of Acetazolamide pure drug

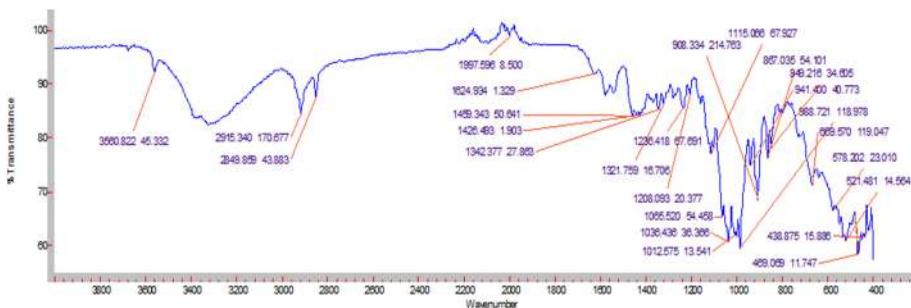


Figure no 5: FT-IR Spectrum of Optimised Formulation

Table no 4: Preformulation parameters of powder blend:

Formulation Code	Angle of Repose	Bulk density (gm/ml)	Tapped density (gm/ml)	Carr's index (%)	Hausner's Ratio
F1	25.01	0.59	0.57	14.03	1.16
F2	26.8	0.46	0.67	16.41	1.19
F3	27.7	0.32	0.54	18.75	1.23
F4	25.33	0.54	0.64	15.62	1.18
F5	25.24	0.52	0.65	18.46	1.22
F6	28.12	0.46	0.56	15.15	1.17
F7	27.08	0.58	0.69	15.94	1.18
F8	25.12	0.48	0.67	15.78	1.18
F9	26.45	0.54	0.65	16.92	1.25

Tablet powder blend was subjected to various pre-formulation parameters. The angle of repose values indicates that the powder blend has good flow properties. The bulk density of all the formulations was found to be in the range of 0.48 to 0.59 (gm/ml) showing that the powder has good flow properties. The tapped density of all the formulations was found to be in the range of 0.57 to 0.69 showing the powder has good flow properties. The compressibility index of all the formulations was found to be ranging from 14.03 to 18.75 which shows that the powder has good flow properties. All the formulations have shown the Hausner ratio ranging between 1.16 to 1.25 indicating the powder has good flow properties.

Table no 5: Invitro quality control parameters for tablets

Formulation codes	Weight variation(mg)	Hardness(kg/cm ²)	Friability (%loss)	Thickness (mm)	Drug content (%)
F1	495	4.5	0.40	2.79	95.1
F2	498	5.0	0.19	3.08	94.8
F3	500	4.5	0.08	3.05	91.34
F4	496	4.4	0.29	2.93	96.55
F5	498	4.5	0.30	2.79	94.13
F6	502	4.7	0.72	2.76	99.30
F7	505	4.3	0.41	2.74	94.82
F8	503	4.9	0.20	2.75	95.86
F9	504	4.5	0.19	2.76	96.55

In Vitro Drug Release Studies**Table no 6: Dissolution Data of Acetazolamide Tablets Prepared With HPMC K 100**

In Different Concentrations

TIME (hr)	CUMULATIVE PERCENT DRUG DISSOLVED		
	F1	F2	F3
0	0	0	0
0.5	27.41	6.48	4.61
1	39.53	12.61	9.14
2	48.16	21.49	17.96
3	63.81	32.67	26.49
4	76.39	41.93	34.81
5	89.14	50.31	45.13
6	98.69	61.94	52.64
7		72.19	61.48
8		83.12	70.68
9		94.36	77.62
10		97.36	84.12
11			91.54
12			96.72

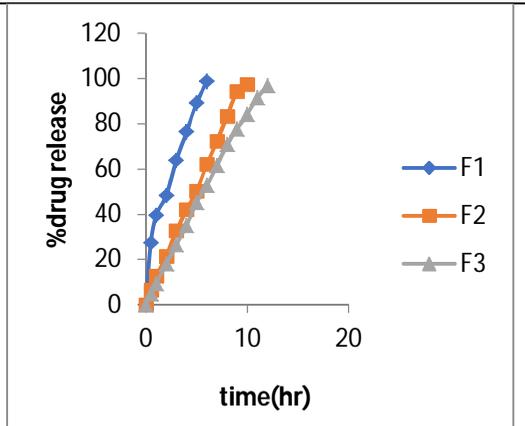


Figure no 6: Dissolution profile of Acetazolamide (F1, F2, F3 formulations).

Table 7: Dissolution Data of Acetazolamide Tablets Prepared With carbopolIn Different Concentrations

TIME (hr)	CUMULATIVE PERCENT DRUG DISSOLVED		
	F4	F5	F6
0	0	0	0
0.5	42.55	32.86	13.89
1	55.63	38.18	19.64
2	61.24	43.96	25.65
3	77.62	49.71	34.69
4	85.36	54.62	38.16
5	95.56	63.19	42.26
6		70.45	54.31
7		85.65	69.69
8		97.47	76.36
9			85.58
10			98.21
11			
12			

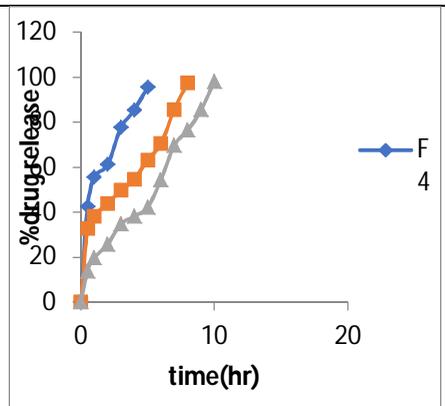


Figure no7: Dissolution profile of Acetazolamide (F4, F5, F6 formulations).

Tableno8: Dissolution Data of Acetazolamide Tablets Prepared with guar gum in Different Concentrations

TIME (hr)	CUMULATIVE PERCENT DRUG DISSOLVED		
	F7	F8	F9
0	0	0	0
0.5	60.94	48.68	31.82
1	68.09	54.83	37.19
2	75.82	61.72	42.24
3	82.13	68.48	48.72
4	96.56	74.36	53.49
5		80.65	56.52
6		89.25	61.71
7		95.25	74.84
8			86.47
9			98.65
10			
11			
12			

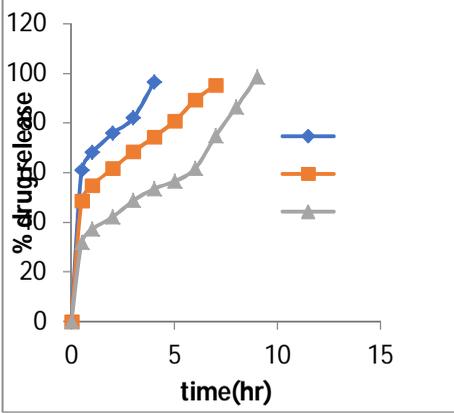


Figure no 8: Dissolution profile of Acetazolamide (F7, F8, F9 formulations).

From the dissolution data, it was revealed that formulations prepared with carbpol and guar gum did not retard the drug release up to 12 hrs. Hence those formulations did not take into consideration.

Formulations prepared with HPMC K100 were revealed that increase in the concentration retards the drug release. Among all formulations F3 formulation was considered as optimised formulation. It was shown 96.72% drug release at 12hrs

3.3 Application of Release Rate Kinetics to Dissolution Data:

Various models were tested for explaining the kinetics of drug release. To analyze the mechanism of the drug release rate kinetics of the dosage form, the obtained data were fitted into zero-order, first order, Higuchi, and Korsmeyer-Peppas release model.

Table No: 9Release kinetics data for optimised formulation:

CUMULATIVE (%) RELEASE Q	TIME (T)	ROOT (T)	LOG(%) RELEASE	LOG (T)	LOG (%) REMAIN
0	0	0			2.000
4.61	0.5	0.707	0.664	-0.301	1.980
9.14	1	1.000	0.961	0.000	1.958
17.96	2	1.414	1.254	0.301	1.914
26.49	3	1.732	1.423	0.477	1.866
34.81	4	2.000	1.542	0.602	1.814
45.13	5	2.236	1.654	0.699	1.739



52.64	6	2.449	1.721	0.778	1.675
61.48	7	2.646	1.789	0.845	1.586
70.68	8	2.828	1.849	0.903	1.467
77.62	9	3.000	1.890	0.954	1.350
84.12	10	3.162	1.925	1.000	1.201
91.54	11	3.317	1.962	1.041	0.927
98.72	12	3.464	1.994	1.079	0.107

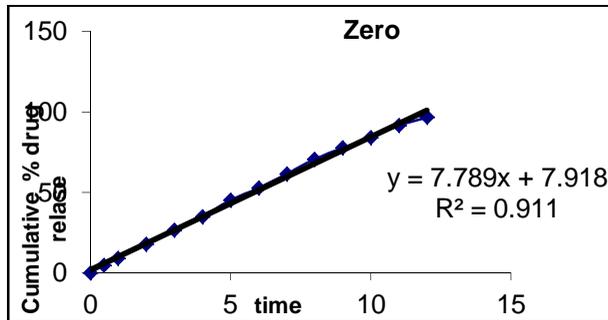


Figure no 9: Zero order release kinetics graph

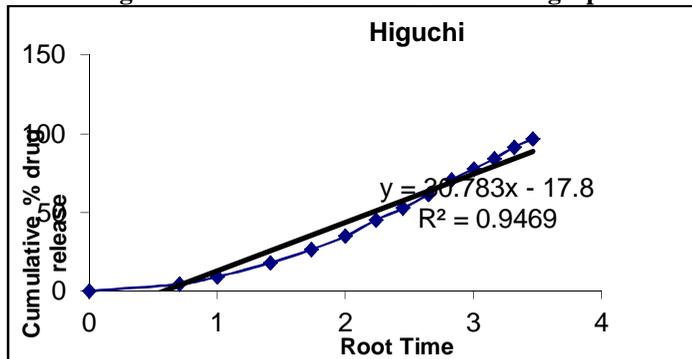


Figure no: 10 Higuchi release kinetics graph

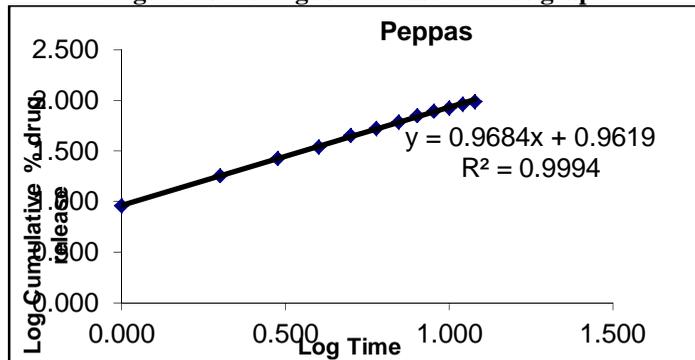


Figure no:11Karsmayerpeppas graph

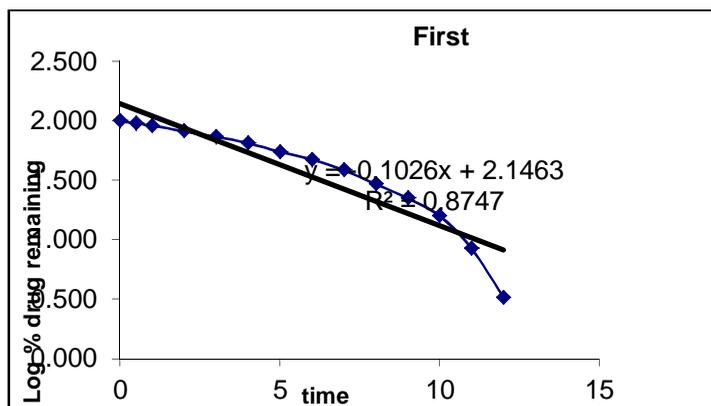


Figure no: 12first order release kinetics graph

From the above graphs it was evident that the formulation F3 was followed Karsmayerpeppas kinetics.

4. Conclusion

The aim of the present study was to develop sustained release formulation of acetazolamide to maintain constant therapeutic levels of the drug for over 12 hrs. Carbopol 934, HPMC K100, and guar gum were employed as polymers. All the formulations were passed various physicochemical evaluation parameters and they were found to be within limits. From the dissolution studies it was evident that the formulation (F3) showed better and desired drug release pattern i.e., 96.72% in 12 hours. It contains the HPMC K100 polymer. It followed karsmayerpeppas kinetic mechanism.

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FORMULATION AND IN VITRO EVALUATION OF RANITIDINE HYDROCHLORIDE FLOATING TABLETS FOR GASTRIC RETENTION

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Abstract

The purpose of this investigation was to prepare a gastro retentive drug delivery system of ranitidine hydrochloride. Currently , Floating tablets are one of important categories of drug delivery system with gastric retentive behavior. Ranitidine is a H₂ blocker and absorbed from the upper part of GIT and hence there is need to develop a dosage form that release the drug in stomach so that it can be absorbed from upper part of GIT leading to improved bioavailability. Ranitidine hydrochloride were prepared direct compression method with different excipients like Gum Copal, Gum Damar ,Ethyl Cellulose. The formulations were evaluated for pharmacopoeia quality control tests and all the physical parameters evaluated for quality control were within the acceptable limits of pharmacopoeia. All the formulations were subjected to in vitro drug release study. The floating lag time of the prepared formulations is good in 12 hours F6 formulation was considered as a optimized it released 96.32 %.

Key words :Ranitidine , Gum Copal, Gum Damar , Ethyl Cellulose.

1. Introduction:

Oral delivery of drugs is the most preferable route of drug delivery. Oral route is considered most natural, uncomplicated, convenient and safe due to its ease of administration, patient compliance and flexibility in formulation and cost effective manufacturing process¹. Many of the drug delivery systems, available in the market are oral drug delivery type systems Pharmaceutical products designed for oral delivery are mainly immediate release type or conventional drug delivery systems, which are designed for immediate release of drug for rapid absorption. These immediate release dosage forms have some limitations such as:

1. Drugs with short half-life require frequent administration, which increases chances of missing dose of drug leading to poor patient compliance.
2. A typical peak-valley plasma concentration-time profile is obtained which makes attainment of steady state condition difficult.

3. The unavoidable fluctuations in the drug concentration may lead to under medication or overmedication as the C_{ss} values fall or rise beyond the therapeutic range.

4. The fluctuating drug levels may lead to precipitation of adverse effects especially of a drug with small therapeutic index, whenever overmedication occurs.²

In order to overcome the drawbacks of conventional drug delivery systems, several technical advancements have led to the development of controlled drug delivery system that could revolutionize method of medication and provide a number of therapeutic benefits.

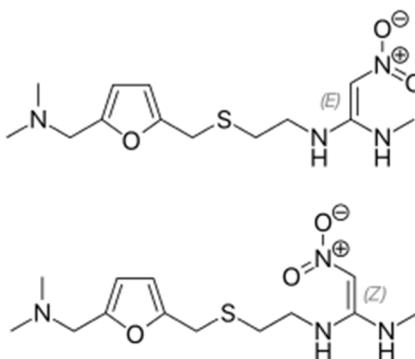


Figure: 1 Structure of RANITIDINE HYDROCHLORIDE

2. Materials & Methods:

Ranitidine Hydrochloride was From Alembic Limited, Vadodara, Procured India. Provided by **SURA LABS, Dilsukhnagar, Hyderabad.** From Alembic Limited, Vadodara, Procured India. Provided by **SURA LABS, Dilsukhnagar, Hyderabad.** Gum Copal, Gum Damar, Ethyl Cellulose, Sodium bicarbonate, Citric acid, Talc, Mg stearate and Lactose are purchased from S.D. Fine-Chem Ltd, Ahmedabad, India.

Instruments:

Ten station rotary tablet punching machine (lab press), Electronic balance (shimadzu), Digital vernier calipers (Remi equipments Ltd), UV/Visible-spectrophotometer (Lab India), Dissolution tester (USP) (Lab India), Digital pH meter (Lab India), Roche Friabilator (Lab India), and FT-IR spectrophotometer (Bruker)

2.1 Analytical method development:

a) Determination of absorption maxima:

A solution containing the concentration 10 $\mu\text{g}/\text{mL}$ drug was prepared in 0.1N HCL UV spectrum was taken using Double beam UV/VIS spectrophotometer. The solution was scanned in the range of 200 – 400 nm.

b) Preparation calibration curve:

10mg Ranitidine Hydrochloride pure drug was dissolved in 10ml of methanol (stock solution1) from stock solution1 1ml of solution was taken and made up

Ingredients(mg)	F1	F2	F3	F4	F5	F6	F7	F8	F9
Ranitidine Hydrochloride	150	150	150	150	150	150	150	150	150
Gum Copal	50	75	100	-	-	-	-	-	-
Gum Damar	-	-	-	50	75	100	-	-	-
Ethyl Cellulose	-	-	-	-	-	-	50	75	100
Sodium bicarbonate	10	10	10	10	10	10	10	10	10
Citric acid	10	10	10	10	10	10	10	10	10
Talc	3	3	3	3	3	3	3	3	3
Mg stearate	3	3	3	3	3	3	3	3	3
Lactose	74	49	24	74	49	24	74	49	24
Total weight	300	300	300	300	300	300	300	300	300

with 10ml of 0.1N HCL (100 μ g/ml). From this 1ml was taken and made up with 10 ml of 0.1N HCL (10 μ g/ml). The above solution was subsequently diluted with 0.1N HCL to obtain series of dilutions Containing 2, 4, 6, 8, 10 μ g /ml of per ml of solution. The absorbance of the above dilutions was measured at 387nm by using UV-Spectrophotometer taking 0.1N HCL as blank. Then a graph was plotted by taking Concentration on X-Axis and Absorbance on Y-Axis which gives a straight line Linearity of standard curve was assessed from the square of correlation coefficient (R^2) which determined by least-square linear regression analysis.

2.2 formulation of Tablets:**Table 1: Formulation composition for Floating tablets****2.3 Invitro drug release studies:****Dissolution parameters:**

Apparatus	--	USP-II, Paddle Method
Dissolution Medium	--	0.1 N HCL
RPM	--	50
Sampling intervals (hrs)	--	0.5,1,2,3,4,5,6,7,8,10,11,12
Temperature	--	37 $^{\circ}$ c + 0.5 $^{\circ}$ c

3. RESULTS:**3.1 Calibration Curve**

The standard curve is based on the spectrophotometry. The maximum absorption was observed at 313 nm. Graphs of Ranitidine Hydrochloride was taken in 0.1N HCL (pH 1.2)

Table 2: Observations for graph of Ranitidine Hydrochloride in 0.1N HCL

Concentration (µg/ml)	Absorbance
0	0
2	0.188
4	0.374
6	0.532
8	0.729
10	0.933

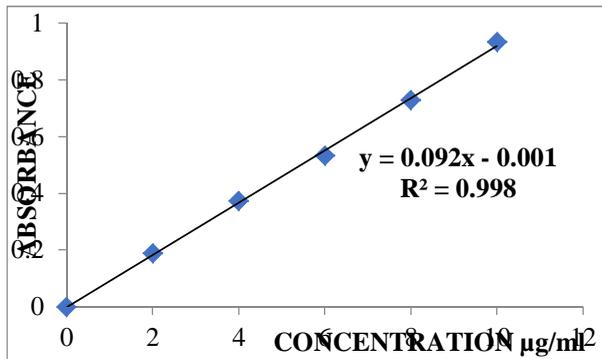


Figure2:Standard graph of Ranitidine Hydrochloride in 0.1N HCL

3.2 Drug – Excipients compatibility studies

Fourier Transform-Infrared Spectroscopy:

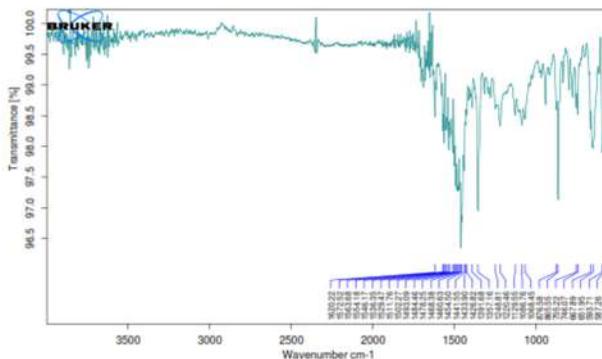


Figure 3: FTIR Spectrum of pure drug

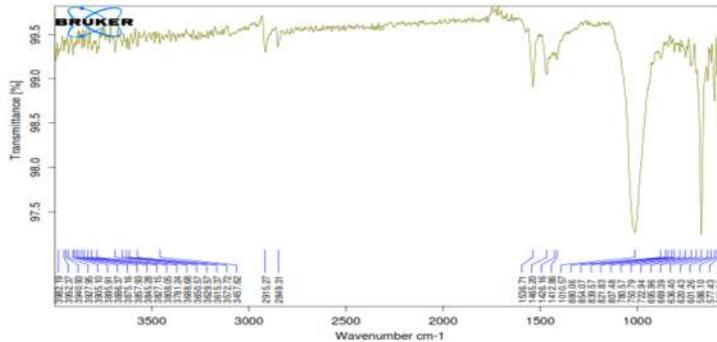


Figure 4: FTIR Spectrum of optimised formulation

Table 3: Pre-formulation parameters of blend

Formulation Code	Angle of Repose	Bulk density (gm/mL)	Tapped density (gm/mL)	Carr's index (%)	Hausner's Ratio
F1	27.528±0.235	0.561±0.032	0.634±0.043	0.115	1.130
F2	24.512±0.290	0.567±0.045	0.660±0.057	0.141	1.164
F3	27.210±0.352	0.574±0.058	0.652±0.083	0.119	1.135
F4	27.050±0.252	0.582±0.026	0.674±0.048	0.136	1.158
F5	24.625±0.374	0.575±0.048	0.680±0.061	0.154	1.182
F6	28.561±0.380	0.624±0.043	0.691±0.053	0.096	1.107
F7	24.840±0.972	0.607±0.057	0.667±0.063	0.089	1.098
F8	29.653±0.784	0.605±0.086	0.682±0.049	0.113	1.127
F9	28.462±0.850	0.611±0.048	0.679±0.057	0.100	1.111

Table 4: Invitro quality control parameters

Formulation codes	Average Weight (mg)	Hardness (kg/cm ²)	Friability (%loss)	Thickness (mm)	Drug content (%)	Floatin g Lag Time (Seconds)	Total Floatin g Time (Hours)
F1	298.84	4.25±0.8	0.48±0.08	2.26±0.6	99.48	68.59	5
F2	297.63	5.00±0.91	0.48±0.07	2.48±0.19	98.63	62.52	7
F3	299.37	4.28±0.27	0.47±0.05	3.01±0.27	99.72	42.51	10
F4	295.96	5.25±0.67	0.43±0.02	2.85±0.36	97.39	39.02	7
F5	299.62	4.20±0.29	0.49±0.09	2.79±0.74	98.83	34.01	10
F6	300.27	4.05±0.62	0.40±0.08	2.86±0.61	99.27	30.52	12
F7	298.99	4.50±0.18	0.53±0.06	2.57±0.28	97.69	51.05	7
F8	297.74	5.25±0.25	0.58±0.08	2.64±0.38	98.88	71.57	12
F9	299.45	4.25±0.38	0.61±0.04	2.91±0.54	99.43	70.53	12

3.3 In Vitro Drug Release Studies

Table 5: Dissolution data of Floating Tablets

Time (hr)	F1	F2	F3	F4	F5	F6	F7	F8	F9
0	0	0	0	0	0	0	0	0	0
0.5	35.32	30.04	24.63	19.17	14.90	10.49	23.56	16.76	10.15
1	54.53	47.56	30.63	24.12	20.45	17.63	46.45	21.89	15.41
2	69.90	54.35	42.52	38.64	32.02	26.55	51.23	28.24	20.98
3	74.96	63.52	50.31	50.20	39.31	32.84	70.54	33.32	25.09
4	86.14	74.75	58.25	69.56	47.82	39.39	79.73	37.75	29.54
5	92.85	82.54	65.78	75.43	53.47	44.71	86.46	42.09	33.36
6		89.26	70.17	83.01	59.74	53.05	98.12	49.16	39.67
7		75.79	95.57	64.05	60.87	58.62	53.36	44.36	95.95
8			82.27		79.93	67.02		59.12	50.77
9			89.64		84.26	74.15		63.78	56.42
10			94.87		95.45	79.24		67.79	60.02
11						87.54		76.31	64.46
12						96.32		84.45	69.39

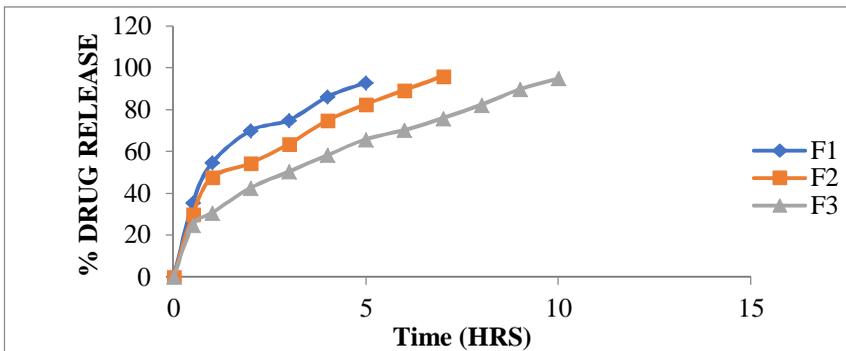


Figure 5: Dissolution data of Ranitidine Hydrochloride Floating tablets containing Gum Copal

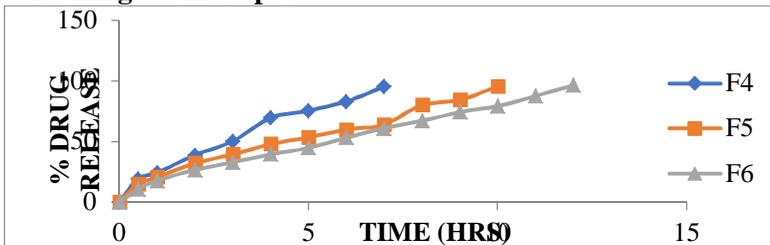


Figure 6: Dissolution data of Ranitidine Hydrochloride Floating tablets containing Gum Damar

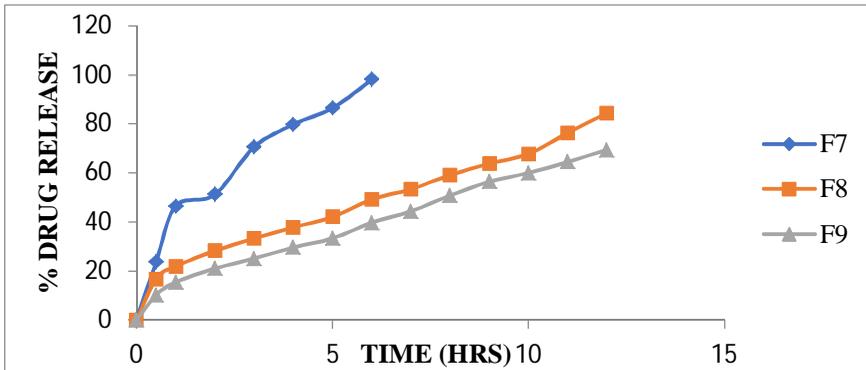


Figure 7: Dissolution data of Ranitidine Hydrochloride Floating tablets containing Ethyl Cellulose

3.4 Application of Release Rate Kinetics to Dissolution Data for optimised formulation:

Table 6: Application kinetics for optimised formulation

CUMULATIVE (%) RELEASE Q	TIME (T)	ROOT (T)	LOG(%) RELEASE	LOG (T)	LOG (%) REMAIN	RELEASE RATE (CUMULATIVE % RELEASE / t)	1/CUM% RELEASE	PEPPAS log Q/100	% Drug Remaining	Q01/3	Qt1/3	Q01/3-Qt1/3
0	0	0			2.000				100	4.642	4.642	0.000
10.49	0.5			0.301	1.952	20.980	0.0953	-0.979	89.51	4.642	4.473	0.168
17.63	1	1.000	1.246	0.000	1.916	17.650	0.0567	-0.754	82.37	4.642	4.351	0.291
26.55	2	1.414	1.424	0.301	1.866	13.275	0.0377	-0.576	73.45	4.642	4.188	0.454
32.84	3	1.732	1.516	0.477	1.827	10.947	0.0305	-0.484	67.16	4.642	4.065	0.577
39.39	4	2.000	1.595	0.602	1.783	9.848	0.0254	-0.405	60.61	4.642	3.928	0.713
44.71	5	2.236	1.650	0.699	1.743	8.942	0.0224	-0.350	55.29	4.642	3.810	0.832
53.05	6	2.449	1.725	0.778	1.672	8.842	0.0189	-0.275	46.95	4.642	3.608	1.034
58.62	7	2.646	1.769	0.845	1.617	8.374	0.0171	-0.232	41.38	4.642	3.459	1.183
67.02	8	2.828	1.826	0.903	1.518	8.378	0.0149	-0.174	32.98	4.642	3.207	1.435
74.15	9	3.000	1.870	0.954	1.412	8.239	0.0135	-0.130	25.85	4.642	2.957	1.685
79.24	10	3.162	1.899	1.000	1.317	7.924	0.0126	-0.101	20.76	4.642	2.748	1.893
87.54	11	3.317	1.942	1.041	1.096	7.958	0.0114	-0.058	12.46	4.642	2.318	2.323
96.32	12	3.464	1.984	1.000		8.027	0.0104	-0.016	3.68	4.642	1.544	3.098

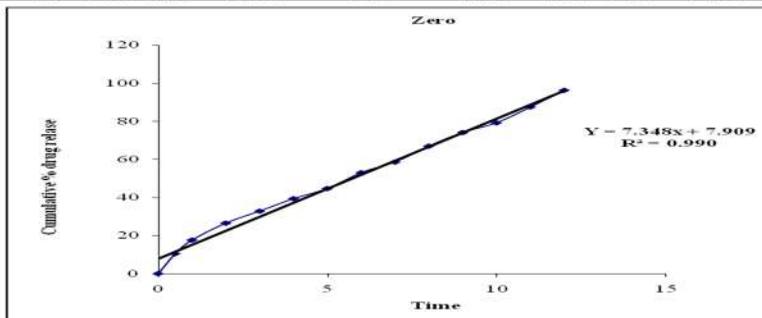


Figure 8: Zero order release kinetics

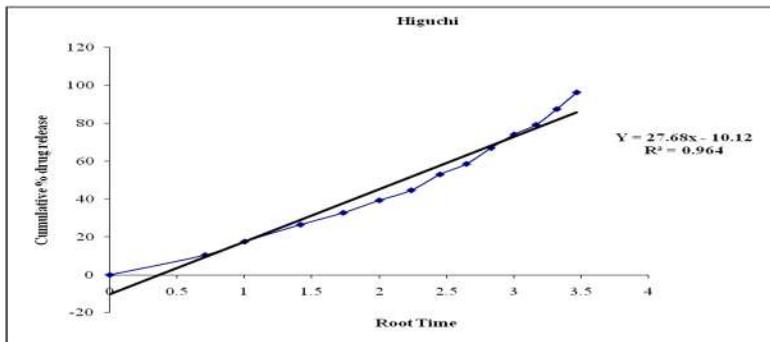


Figure 9: Higuchi release kinetics

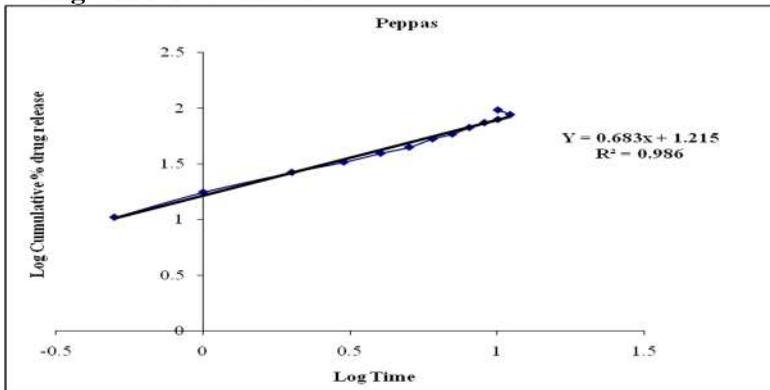


Figure 10: Kors mayer peppas release kinetics

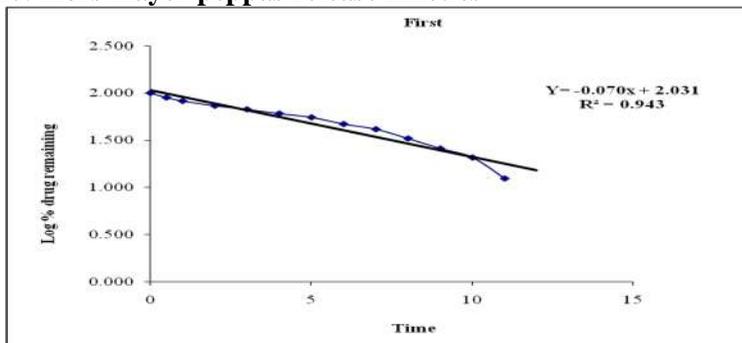


Figure 11: First order release kinetics

4. Discussion:

The standard curve is based on the spectrophotometry. The maximum absorption was observed at 313 nm. Graphs of Ranitidine Hydrochloride was taken in 0.1N HCL (pH 1.2).

Standard graph of Ranitidine Hydrochloride was plotted as per the procedure in experimental method and its linearity is shown in Table and Fig. The standard graph of Ranitidine Hydrochloride showed good linearity with R^2 of 0.998, which indicates that it obeys “Beer- Lamberts” law.

Tablet powder blend was subjected to various pre-formulation parameters. The angle of repose values indicates that the powder blend has good flow properties. The bulk density of all the formulations was found to be in the range of 0.561 to 0.624 (gm/ml) showing that the powder has good flow properties. The tapped density of all the formulations was found to be in the range of 0.634 to 0.682 showing the powder has good flow properties. The compressibility index of all the formulations was found to be below 0.096 - 0.141 which shows that the powder has good flow properties. All the formulations has shown the hausners ratio ranging between 1.098 to 1.164 indicating the powder has good flow properties.

All the parameters for Floating Tablets such as weight variation, friability, hardness, thickness, drug content were found to be within limits.

From the dissolution data it was evident that the formulations prepared with Gum Copalpolymer were retarded the drug release more than 12 hours.

Whereas the formulations prepared with higher concentration of Gum Damarretarded the drug release up to 12 hours. In lower concentrations the polymer was unable to retard the drug release.

The formulations prepared with Ethyl Cellulose showed very less retardation capacity hence they were not considered.

Hence from the above dissolution data it was concluded that F6 formulation was considered as optimised formulation because good drug release (96.32%) in 12 hours.

Optimised formulation F6 was kept for release kinetic studies. From the above graphs it was evident that the formulation F6 was followed Zero order release mechanism.

There was no disappearance of any characteristics peak in the FTIR spectrum of drug and the polymers used. This shows that there is no chemical interaction between the drug and the polymers used. The presence of peaks at the expected range confirms that the materials taken for the study are genuine and there were no possible interactions.

Ranitidine Hydrochloride are also present in the physical mixture, which indicates that there is no interaction between drug and the polymers, which confirms the stability of the drug.

5. Conclusion

Ranitidine hydrochloride Floating tablets were prepared by direct compression method. The optimized formulation F6 float in the stomach for 12



hrs. A satisfactory drug release 96.32% was observed in F6 at the end of 12 hrs. Hence the prepared tablets enhances the bioavailability making it as promising drug delivery system.

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FORMULATION AND IN VITRO EVALUATION ALLOPURINOL FAST DISSOLVING TABLETS BY SOLID DISPERSION

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Abstract

In the present study Allopurinol solid dispersions were formulated. Allopurinol belongs to class II drugs, that is, characterized by low solubility and high permeability therefore, the enhancement of its solubility and dissolution profile is expected to significantly improve its bioavailability and reduce its side effects. allopurinol was mixed with various proportions of excipients showed no colour change at the end of two months, proving no drug-excipient interactions. The precompression blend of allopurinol solid dispersions were characterized with respect to angle of repose, bulk density, tapped density, Carr's index and Hausner's ratio. The precompression blend of all the batches indicates good to fair flowability and compressibility. Solid dispersions were prepared with various concentrations of carriers, the prepared solid dispersions were compressed into tablets. The formulated tablets were evaluated for various quality control parameters. The tablets were passed all the tests. Among all the formulations F1 formulation containing, Drug and Peg 4000 in the ratio of 1:0.5 showed good result that is 94.95 % in 50 minutes. As the concentration of polymer increases the drug release was decreased. While the formulations containing PEG 6000 showed less release. Hence from the dissolution data it was evident that F1 formulation is the better formulation.

Keywords: Allopurinol, solid dispersions , PEG 4000, PEG 6000, Polyplasdone XL

1. Introduction:

From the several previous years, the pharmaceutical scientists were working to enlarge patient compliance and secure dosage forms due to improved requirement in the market for them. As a result, developing the novel technologies has been growing annually because the growth of novel drug molecule requires high cost rather than novel technology. So the current trend in the greater part of pharmaceutical industries is development of dosage form with new formulation technology using old drug molecules to improve safety, efficacy and patient compliance¹.Development of solid dispersion compacts is

one such technology to enhance dissolution rate of poorly soluble drugs, thereby improving efficacy of drug molecules².

Solid dispersions can be defined as molecular mixtures of poorly water soluble drugs in hydrophilic carriers, which present a drug release profile that is driven by the polymer properties³.

During the solid dispersion preparation, the aim is to disperse the drug homogeneously within the carrier matrix and to encapsulate the hydrophobic drug to ensure complete wetting, fast carrier dissolution and improved drug stability. The most commonly used hydrophilic carriers for solid dispersions include polyvinylpyrrolidone^{4,5}, polyethylene glycols⁶, and lipids, such as polyglycolized glycerides (Gelucire)⁷. The solvent evaporation, melt adsorption, fusion, spray drying, spray freezing, spray congealing⁸, and supercritical fluid precipitation⁹, are the techniques reported for the preparation of solid dispersions.

In Present Study Allopurinol Is Used. Allopurinol, sold under the brand name Zyloprim among others, is a medication used to decrease high blood uric acid levels. It is specifically used to prevent gout, prevent specific types of kidney stones and for the high uric acid levels that can occur with chemotherapy. It is taken by mouth or injected into a vein.¹⁰

It is a poorly water-soluble drug known to demonstrate dissolution or solubility limited absorption. Based upon its aqueous solubility and various dissolution parameters, the drug bioavailability can unambiguously be regarded as limited solely to dissolution. It is relatively insoluble in water, and freely soluble in alkaline aqueous solutions. Therefore, improvements in solubility or dissolution rate of poorly water-soluble drugs may be achieved through the formation of solid dispersions.¹¹

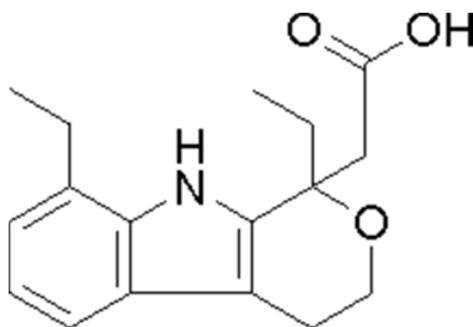


Fig: 1 structure of Allopurinol

2. Materials & Methods:

Salbutamol was Provided by SURA LABS, Dilsukhnagar, and Hyderabad. And polymers PEG 4000 , PEG 6000, polyplasdne XL, MCC purchased from Nihar traders pvt Ltd magnesium stearate, sodium hydroxide purchased from Himedia



laboratories. Potassium dihydrogenortho phosphate from Finar chemicals Ltd, Aerosil from nice chemicals

Instruments:

Weighing balance (Sartorius), tablet compression machine -multi station (Lab Press Limited, India), hardness tester(Monsanto,Mumbai,india), vernier calipers(Mutitoy,japan), roche friabilator(Labindia,mumbai,india), dissolution apparatus(Labindia,mumbai,india), UV-Visible spectrophotometer(Labindia,mumbai,india), pH meter(Labindia,mumbai,india), FT-IR Spectrophotometer(bruker,germany)

2.1 Analytical method development for Allopurinol:

a) Determination of absorption maxima

A spectrum of the working standards was obtained by scanning from 200-400nm against the reagent blank to fix absorption maxima. The λ_{max} was found to be 250nm. Hence all further investigations were carried out at the same wavelength.

b) Preparation of standard graph in pH 6.8 medium

100 mg of Allopurinol was dissolved in methanol 5 ml, volumetric flask make upto 100 ml of Phosphate buffer of pH 6.8, from this primary stock 10 ml was transferred to another volumetric flask made up to 100ml with Phosphate buffer of pH 6.8, from this secondary stock was taken separately and made up to 10 ml with Phosphate buffer of pH 6.8, to produce 10,20,30,40 and 50 $\mu\text{g/ml}$ respectively. The absorbance was measured at 250 nm by using a UV spectrophotometer.

Drug-Excipients compatibility studies:

Drug Excipients compatibility studies were carried out by mixing the drug with various excipients in different proportions was placed in a vial, and closed with rubber stopper and sealed properly.

Preformulation Studies

Pre formulation involves the application of biopharmaceutical principles to the physicochemical parameters of drug substance are characterized with the goal of designing optimum drug delivery system.

Formulation Development:

Solid dispersions were prepared by solvent evaporation method. Methanol was used as solvent. Allopurinol dose was taken as 100mg. Water soluble polymers such as PEG 4000 and PEG 6000 were selected as carriers. Drug and polymers were taken in different ratios stated in the formulation chart (Table 2). The prepared solid dispersions were passed through the sieve no 20 to get uniform sized particles. The solid dispersions were mixed with required quantities of diluent, lubricant and glidant. The blend was evaluated for precompression parameters.

Table 1: Formulation table showing various compositions

	F1	F2	F3	F4	F5	F6	F7	F8	F9
Drug	100	100	100	100	100	100	100	100	100
PEG 4000	50	100	150	200	-	-	-	-	100
PEG 6000	-	-	-	-	50	100	150	200	100
Polyplasdone XL	30	30	30	30	30	30	30	30	30
Aerosil	5	5	5	5	5	5	5	5	5
Manesium stearate	5	5	5	5	5	5	5	5	5
MCC	Q.s								

Total weight of tablets = 500 mg

The tablets were prepared by using 10 mm flat surfaced punch. The hardness of the tablets was maintained as 2.5 kg/cm².

3. Results & Discussion:

3.1: Analytical Method

a. Determination of absorption maxima

The standard curve is based on the spectrophotometry. The maximum absorption was observed at 250 nm.

b. Calibration curve

Graphs of Allopurinol were taken in phosphate buffer (pH 6.8)

Table 2: Observations for graph of Allopurinol phosphate buffer (pH 6.8)

Concentration [µg/ml]	Absorbance
0	0
10	0.198
20	0.396
30	0.601
40	0.804
50	0.998

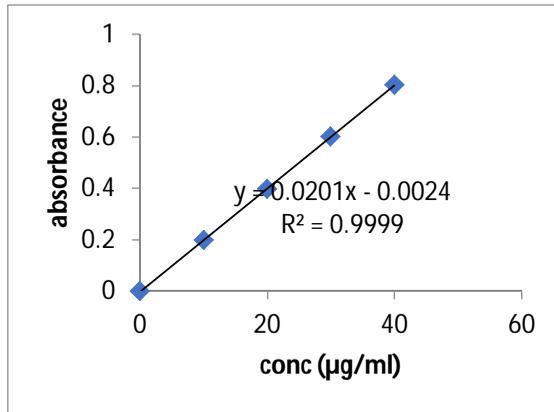


Fig No 2: Standard Curve of Allopurinol

3.2 Fourier Transform Infrared (FTIR) spectroscopy:



Figure 3: FTIR Spectrum of pure drug



Fig 4: FTIR Spectrum of optimised formulation

1.2 Preformulation parameters of powder blend:

Tablet powder blend was subjected to various pre-formulation parameters. The angle of repose values indicates that the powder blend has good flow properties.

Table 3: Pre-formulation parameters of blend

Formulation Code	Angle of repose (Θ)	Bulk density (gm/cm ³)	Tapped density (gm/cm ³)	Carr's Index (%)	Hausner's ratio
F1	25.10°	0.53	0.59	9.43	1.03
F2	25.43°	0.54	0.64	9.40	1.10
F3	25.41°	0.54	0.58	10.01	1.13
F4	26.40°	0.51	0.61	10.11	1.16
F5	27.12°	0.58	0.63	10.34	1.17
F6	25.31°	0.59	0.64	10.12	1.11
F7	26.11°	0.56	0.63	9.93	1.13
F8	26.15°	0.53	0.58	10.13	1.12
F9	26.10°	0.54	0.61	10.20	1.13

Table: 4 In vitro quality control parameters

Formulation code	Weight variation (mg)	Thickness (cm)	Hardness (Kg/cm ²)	Friability (%)	Content uniformity(%)
F1	500	4.76	2.5	0.420	99.44
F2	498	4.74	2.2	0.341	98.84
F3	490	4.71	2.6	0.363	100.09
F4	504	4.80	2.8	0.561	100.34
F5	495	4.81	2.8	0.482	99.23
F6	500	4.74	2.4	0.513	97.35
F7	504	4.76	2.5	0.412	98.94
F8	499	4.71	2.6	0.432	99.48
F9	500	4.73	2.5	0.512	100.03

3.4. In Vitro Drug Release Studies

Table 5: Dissolution data of Floating Tablets (F1-F4)

Time(MIN)	% Drug release			
	F1	F2	F3	F4
0	0	0	0	0
5	26.73	16.73	12.56	7.73
10	31.06	20.4	16.57	11.56
20	44.9	25.9	18.9	16.56
30	57.06	35.56	27.73	18.9
40	75.56	44.9	42.4	22.73
50	94.9	54.4	47.9	36.06
60		79.9	66.56	48.4

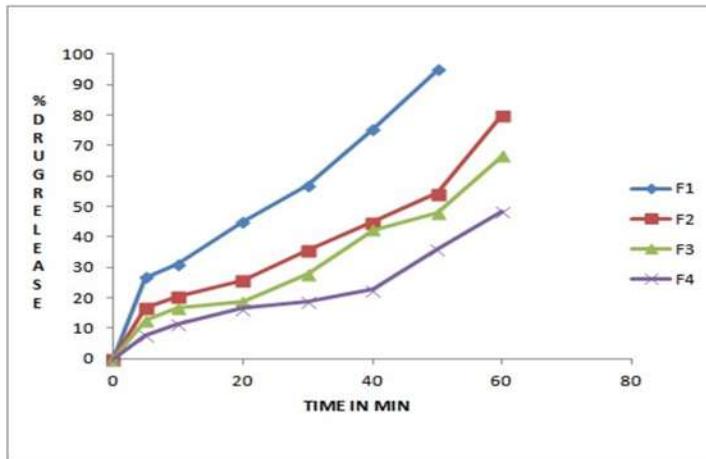


Fig 5: Invitro dissolution data for formulations F1 – F4 by using PEG 4000 Polymer

Table no 6: Dissolution data of Floating Tablets (F5-F8)

Time(MIN)	% Drug release			
	F5	F6	F7	F8
0	0	0	0	0
5	11.86	8.18	9.21	7.51
10	19.01	11.86	12.60	10.90
20	26.16	16.06	16.43	15.55
30	28.22	21.44	24.83	23.80
40	36.99	29.62	31.32	30.29
50	58.81	59.77	37.95	31.98
60	73.55	65.59	40.90	37.58

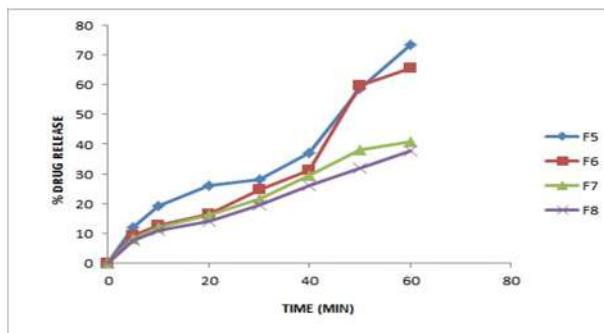


Fig 6: Invitro dissolution data for formulations F5– F8 by using PEG 4000 Polymer

Table no 7: Invitro dissolution data for formulations F9 by using PEG 4000 & 6000 Polymer.

Time(min)	% Drug release F9
0	0
5	7.51
10	10.90
20	15.55
30	23.80
40	28.29
50	34.98
60	39.58

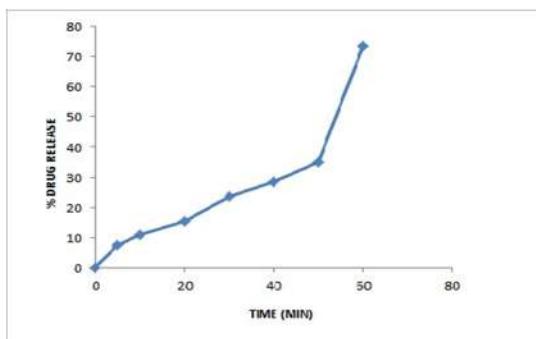


Fig: 7 Invitro dissolution data for formulations F9 by using PEG 4000 & 6000 Polymer.

3.6 Discussion:

Standard graph of Allopurinol was plotted as per the procedure in experimental method and its linearity is shown in Table and Fig. The standard graph of Allopurinol showed good linearity with R^2 of 0.999, which indicates that it obeys “Beer- Lamberts” law.

From the FTIR data it was evident that the drug and excipients doses not have any interactions. Hence they were compatible.

The precompression blend of allopurinol solid dispersions were characterized with respect to angle of repose, bulk density, tapped density, Carr’s index and Hausner’s ratio. Angle of repose was less than 28° , Carr’s index values were less than 11 for the precompression blend of all the batches



indicating good to fair flowability and compressibility. Hausner's ratio was less than 1.25 for all the batches indicating good flow properties.

The results of the weight variation, hardness, thickness, friability, and drug content of the tablets are given in Table 7. All the tablets of different batches complied with the official requirement of weight variation as their weight variation passes the limits. The hardness of the tablets ranged from 4.6 to 5 kg/cm² and the friability values were less than 0.561% indicating that the tablets were compact and hard. The thickness of the tablets ranged from 4.71-4.91cm. All the formulations satisfied the content of the drug as they contained 98-100% of Allopurinol and good uniformity in drug content was observed. Thus all the physical attributes of the prepared tablets were found to be practically within control limits.

Among all the formulations F1 formulation containing, Drug and Peg 4000 in the ratio of 1:0.5 showed good result that is 94.95 % in 50 minutes. As the concentration of polymer increases the drug release was decreased. While the formulations containing PEG 6000 showed less release. Hence from the dissolution data it was evident that F1 formulation is the better formulation. The formulation containing combination of PEG 4000 & 6000 was also not producing desired percentage drug release. The formulation is following zero order release kinetics.

Summary & Conclusion

Allopurinol belongs to class II drugs, that is, characterized by low solubility and high permeability therefore, the enhancement of its solubility and dissolution profile is expected to significantly improve its bioavailability and reduce its side effects. The standard curve of Allopurinol was obtained and good correlation was obtained with R² value of 0.999. The medium selected was pH 6.8 phosphate buffer. Allopurinol was mixed with various proportions of excipients showed no colour change at the end of two months, proving no drug-excipient interactions.

The precompression blend of allopurinol solid dispersions were characterized with respect to angle of repose, bulk density, tapped density, Carr's index and Hausner's ratio. The precompression blend of all the batches indicating good to fair flowability and compressibility.

Solid dispersions were prepared with various concentrations of carriers, the prepared solid dispersions were compressed into tablets.

The formulated tablets were evaluated for various quality control parameters. The tablets were passed all the tests.

Among all the formulations F1 formulation containing, Drug and Peg 4000 in the ratio of 1:0.5 showed good result that is 94.95 % in 50 minutes. As the concentration of polymer increases the drug release was decreased. While



the formulations containing PEG 6000 showed less release. Hence from the dissolution data it was evident that F1 formulation is the better formulation.

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Source: Census of India-2011. <http://www.censusindia.gov.in>

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'kpkky; dš s cuk, a vŝ 'k#vkr dš s dja' ç' k(k.k LoPNlxgh mudks crkrs gš fd xi's [kksus l s vki 'k#vkr dfj, vŝ nks xi's okys ty çn 'kpkky; gh cukÅ bl ds ihNs dŝ.k crk; k x; k gš fd i kuh ckgj uge cgrk ft l s cncwckgj uge vkrh rFkk ey dk fu"i knu çk—frd rjhd s l s gkrk gš ylxr vŝ; ; kst uk l s l Rrh gš cukuk Hkh vŝ ku gÅ bl ea xi's dh njh , oa xgjÅ 3 ehVj gŝrh gš l j t dh fdj .k s 3 ehVj rd vkrh gš vŝ ekuo ey dš Mhdā kst djus ea enn djrh gÅ xkeh.k bykclā ds fy, nks xi's okyk 'kpkky; vŝ Hkh mi; l xh bl fy, gŝ tkrk gš fd tc 2 l ky çn , d xi'k Hkj tkrk gš rŝs ml jš xi's dš fcuk fd l h ylxr ds pŝy' fd; k tk l drk gÅ , oa Hkjs gq xi's dš 6 eghus çn ml ea l s fudkys gq l fŝs ey dš tšod [kkn ds: i eaç; l x fd; k tk l drk gÅ

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- 3- tlx: drk Qs y vkuh pkfç, A
- 4- efgyk/ā dh Hkxhkhj vR; r vŝo'; d gÅ
- 5- bl l s Qs y s okyh chekfj; k l s uçl ku dh tkudkj h nuh pkfç,

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vkt ds l e; ea HkzV k f j ; k ds }kjk l j d j h ; kst uk dk [kŝy/ke çnjçl/ fd; k tkrk gÅ fcgkj ds yŝg; k LoPNrk vŝk; ku ds rgr-1 d j k M + 60 yk [k i f j o k j l ā dš 'kŝky; mi yçk djuk gÅ ft l ea l j d k j 12000 : i ; s nš gš ft l ea dē l j d k j r F k j k T ; l j d k j n k u k ā dh j k' k g ŝ r h gš t s t u r k d s [k r s ea l h e k s H k s t k t r k g Å bl ds çk o t m y l x i s k [k t k r s g Å v ŝ 'k ŝ k y ; f u e k z k u g e d j k r s g Å t s x j ç k u w h g s r F k t u ç r f u f e k H h f g l l k y ç l j f u x j u h u g e d j r s g Å t s l j d k j h r ā d k n ç i ; l x g Å l j d k j d s p k f ç , f d 'k ŝ k y ; d k f u e k z k g ŝ r gš f d u g e b l d h m p p L r j h ; t k p d j k , a r k f d H k z V k p k j i j f u ; ā . k g ŝ l d ā

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'kŝky; fuekz k ?kj dk l leku fe'ku dš ij k djus ds fy, yŝg; k LoPNrk vŝk; ku 'kq dh xÅ gÅ bl ds rgr-2 vDVçj 2019 rd l Hkh ?k j l ā ea 'kŝky; fuekz k dk dk; Z ij k djus dk yç; j [k x; k gš yfdu bl ds rgr-fuekz dh l fFkr dk Qh y p j g s r F k t s fuekz k g ŝ H h j g s g Å m u d h x q k o ū k ç g n [k j k g Å v c r d j k T ; ea 61-60 i f r " k r i f j o k j l ā ea 'k ŝ k y ; c u i k , g Å 81 y k [k 29 g t k j i f j o k j , d s g Å t s 'k ŝ k y ; f o g h u g Å 2014 l s v c r d 61 y k [k 'k ŝ k y ; k ā d k g h f u e k z k d k ; Z i w z g ŝ i k ; k g Å d j h c 58



ifr"kr ?kja ea 'kpkky; cukus ds ckn Hkh cMh l q; k ea , d h i pk; ra g8 tgka ds l Hkh ?kja ea 'kpkky; uge cu ik, ga 8456 i pk; rka ea 1215 i pk; rh , d s ga t s dks vMh, Q 1/4 kys ea 'kpk epa 1/2 cu i kA ga bl h rjg vMh, Q xko dh l q; k 6165 vlg c [Mh dh l q; k 536 ga

'kpkky; fuelzk dk; Lea jkgrkl ftyk l cl svks 99 ifr"kr ga 'k ki jk ea 97 ifr"kr vlg l hrke<h ea 87 ifr"kr ?kja ea 'kpkky; dk fuelzk gk ik; k ga tcd or8ku le; ea l hrke<h l cl svks fudy x; k ga oge nll jh rjQ l elrhij ea l cl sde 45 Qh nh 'kpkky; dk gh fuelzk gk l dk ga tcd vlg akckn ea 46 ifr"kr vlg vj j; k ea 47 ifr"kr 'kpkky; dk fuelzk gk ik; k ga jkT; ds rhu c [Mh vylsh 1/4 kxM+ kA dks oj 1/2 jh h k 1/2 vlg gl uij 1/4 elrhij 1/2 ea 'kpkky; fuelzk dh xfr l cl sekheh ga bl xfr l s vxj fuelzk gk r k jg r k s 2 vDVicj rd jkT; ka ds l Hkh , d djM+ 59 yk [k ifjokj ds ?kja ea 'kpkky; dk fuelzk dj nus dk y; i jk gkuk l Hko uge ga

fu"d"z

fcgkj t s sfodkl 'lhy jkT; ka ea l Hkh dls LoPNrk vlg LokLF; egs k djluk p p k s h Hk j k d e ga bl dk e q; dk j . k ; g Hk g s f d x e h . k { k s - d h v f e k d k k v i c k n h v k f k d l a d v } v f " k (k j c j s t x k j h d h e k j > y j g h ga t k u d k j h d s v H k o d s d k j . k , d c M h v i c k n h [k y s e a ' k p k d j r s g a v l g c h e k j ; k a d s f ' k d k j g l s t k r s g a f t l d s d k j . k x j h e y l s c k a d k s v k f k d l a d v l g u k i M r k g a l k f k g h l k f k l j d k j d k s H k h v f r f j a c t v LokLF; i j [k p l d j u k i M r k g a l e ; j g r s c h e k j ; k a d k s n j j [k u k g l o k f t l d s f y , y l s c k a d k s t k x : d d j u k l j d k j r F k l k e l f t d d k ; z r k z d k d r o ; ga

ylsg; k LoPNrk vMh; ku ds rgr-1 djM+ 60 yk [k ifjokj ds 2 vDVicj 2019 rd 'kpkky; mi y c e k d j k u s d k y ; g s f t l e a y l s c k a r F k l j d k j d h l k > n k j h l k f k & l k f k g l u k v r ; r v k o ; d ga LoPNrk ds rgr- 'kpkky; dk fuelzk y l s c k a d k n k f ; R o g a l j d k j h d k s k l s f e y u s o k y h j k f ' k d k m i ; l s x ' k p k y ; f u e l z k d j u k p k f g , u k f d f u t h L o k F z f l f) e a y x k u k p k f g , A b l l s ? k j d s e f g y k v a d s y T t k j b T t r v l g f u t r k d h l j (k k g l s h g a l j d k j d k s p k f g , f d ; l s t u k d k i w k m i ; l s x ' k p k y ; f u e l z k e a d j k ; s r F k l b l d h t l o p H k h d j k u h p k f g , A

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FORMULATION AND IN VITRO EVALUATION OF OLANZAPINE IMMEDIATE RELEASE TABLETS

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Abstract

In the present work efforts have been made to develop immediate release tablets of Olanzapine using direct compression technique involving super disintegrants like PEG 6000, Crosscarmallose sodium, HPMC 3cps. The pre compression parameters like angle of repose, bulk density, tapped density, compressibility index are within in the IP limits. The post compression parameters are acceptable and within the IP limit. In vitro drug release was satisfactory the optimized formulation F8 drug release was found to be 97.37 % at 45 min.

Key words:Olanzapine , Immediate Release Tablets.

1. Introduction:

Oral route is the most convenient and extensively used for drug administration. Oral administration is the most popular route for systemic effects due to its ease of ingestion, pain, avoidance, versatility and most importantly, patient compliance suitable for industrial production, improved stability and bioavailability. The concept of immediate release tablets emerged from the desire to provide patient with more conventional means of taking their medication when emergency treatment is required. Recently, immediate release tablets have gained prominence of being new drug delivery systems.

The oral route of administration has so far received the maximum attention with respect to research on physiological and drug constraints as well as design and testing of product, Drug delivery systems (DDS) are a strategic tool for expanding markets/indications, extending product life cycles and generating opportunities. Most immediate release tablets are intended to disintegrate in the stomach, where the pH is acidic. Several orally disintegrating tablet (ODT) technologies based on direct compression.

In pharmaceutical formulation includes any formulation in which the rate of release of drug from the formulation is at least 70% (preferably 80%) of active ingredient within 4 hours, such as within 3 hours, preferably 2 hours, more preferably within 1.5 hours, and especially within an hour (such as within 30 minutes) of administration . In Formulation of immediate release the

commonly Superdisintegrants used are Croscarmellose, sodium, Sodium Starch glycolate and Crospovidone.¹

Desired Criteria For Immediate Release Drug Delivery System

Immediate release dosage form shouldIn the case of solid dosage it should dissolve or disintegrate in the stomach within a short period.

- ✓ In the case of liquid dosage form it should be compatible with taste masking.
- ✓ Be portable without fragility concern.
- ✓ Have a pleasing mouth feel.
- ✓ It should not leave minimal or no residue in the mouth after oral administration.
- ✓ Exhibit low sensitivity to environmental condition as humidity and temperature.
- ✓ Be manufactured using conventional processing and packaging equipment at low cost.
- ✓ Rapid dissolution and absorption of drug, which may produce rapid onset of action.²

Olanzapine chemically is 2-methyl-4-(4-methylpiperazin-1-yl)-5H-thieno[3,2- c][1,5] benzodiazepine.³ The structure of Olanzapine is shown in fig 1. Olanzapine is a benzodiazepine belonging to Antipsychotics agents which was approved by the Food and Drug Administration (FDA). It is used in the treatment of schizophrenia, depressive episodes associated with bipolar disorder, acute manic episodes, and maintenance treatment in bipolar disorder. It is a relatively new drug in the market.⁴ The pharmacokinetics of Olanzapine is linear and dose proportional within the approved dosage range from 1 mg up to 20 mg. Olanzapine is well absorbed following oral administration in both fed and fasted states. Food does not affect the rate or the extent of Olanzapine absorption.⁵ The absolute bioavailability is only approximately 31.5% due to extensive hepatic metabolism.⁶

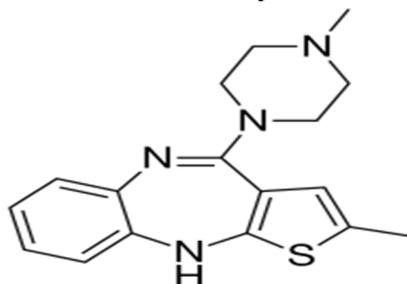


Figure: 1 structure of olanzapine

2 Materials and Methods:

Olanzapine Procured From Yarrow Chem, Mumbai. Provided by SURA LABS, Dilsukhnagar, and Hyderabad. And PEG 6000, Cross carmellose sodium, HPMC 3cps, β -cyclodextrin, Talc, Magnesium Stearate and Micro crystalline cellulose purchased from MolychempvtLtd , Mumbai

Instruments:

Ten station rotary tablet punching machine (Lab press), Electronic balance (Shimadzu), Digital vernier calipers (Remi equipments Ltd), UV/Visible-spectrophotometer (Lab India), Dissolution tester (USP) (Lab India), Digital pH meter (LabIndia), FT-IR spectrophotometer (Bruker), Roche Friabilator (Lab India).

2.1 Buffer Preparation:

Preparation of 0.2M Potassium dihydrogen orthophosphate solution:

Accurately weighed 27.218 gm of monobasic potassium dihydrogen orthophosphate was dissolved in 1000mL of distilled water and mixed.

Preparation of 0.2M sodium hydroxide solution: Accurately weighed 8 gm sodium hydroxide pellets were dissolved 10 1000ml of distilled water and mixed.

Preparation of pH 6.8 Phosphate buffer: Accurately measured 250ml of 0.2M potassium

Dihydrogen ortho phosphate and 112.5 ml 0.2M NaOH was taken into the 1000ml volumetric flask. Volume was made up to 1000ml with distilled water.

Pre formulation Studies

Pre formulation involves the application of biopharmaceutical principles to the physicochemical parameters of drug substance are characterized with the goal of designing optimum drug delivery system.

2.2 Analytical method development for olanzapine:

a) Determination of absorption maxima

A spectrum of the working standards was obtained by scanning from 200-400nm against the reagent blank to fix absorption maxima. The λ_{max} was found to be 253nm. Hence all further investigation were carried out at the same wavelength.

b) preparation of Standard graph in pH 6.8 phosphate beffer

100 mg of olanzapine was dissolved in method 5ml , volumetric flask make upto 100ml of Phosphatebeffer of pH 6.8., form primary stock 10ml was transferred to another volumetric flask made up to 100ml with Phosphate buffer of pH 6.8, from this secondary stock was taken separately and made up to 10 ml with Phosphate buffer of pH 6.8, to produce 2,4,6,8 and 10 μ g/ml respectively. The absorbance was measured at 253 nm by using a UV spectrophotometer.

2.3 Drug-Excipients compatibility studies:

Drug Excipients compatibility studies were carried out by mixing the drug with various excipients in different proportions (in 1:1 ratio were prepared to have maximum likelihood interaction between them) was placed in a vial, and closed with rubber stopper and sealed properly.

Table1: Formulation of Immediate Release tablets

Ingredients	F1	F2	F3	F4	F5	F6	F7	F8	F9
Olanzapine	10	10	10	10	10	10	10	10	10
PEG 6000	10	20	30	-	-	-	-	-	-
Cross carmellose sodium	-	-	-	10	20	30	-	-	-
HPMC 3cps	-	-	-	-	-	-	10	20	30
β -cyclodextrin	8	8	8	8	8	8	8	8	8
Talc	3	3	3	3	3	3	3	3	3
Magnesium Stearate	3	3	3	3	3	3	3	3	3
Micro crystalline cellulose	66	56	46	66	56	46	66	56	46
Total weight	100	100	100	100	100	100	100	100	100

Total weight of tablets = 100 mg

The tablets were prepared by using 6mm flat surfaced punch. The hardness of the tablets was maintained as 1.54 - 2.04 kg/cm².

2.4 Invitro Dissolution test of olanzapine tablets:

Drug release from olanzapine tablets was determined by using dissolution test United States Pharmacopoeia (USP) 24 type II (paddle). The parameters used for performing the dissolution were pH 6.8 phosphate buffer as the dissolution medium of quantity 500ml. the whole study is being carried out at a temperature of 37⁰C and at speed of 50 rpm.

5 ml aliquots of dissolution media were withdrawn each time at suitable time intervals (5, 10, 15, 20, 25 and 30 minutes.) and replaced with fresh medium. After withdrawing, samples were filtered and analyzed after appropriate dilution by UV Spectrophotometer. The concentration was calculated using standard calibration curve.

Results and Discussion

3.1 Analytical method development determination of absorption maxima:

The prepared stock solution was scanned between 200-400 nm to determine the absorption maxima. It was found to be 253nm.

Calibration curve of Olanzapine:

The standard curve of Olanzapine was obtained and good correlation was obtained with R^2 value of 0.999 , the medium selected was pH 6.8 phosphate buffer.

Table:2 Standard graph values of Olanzapine at 253 nm in pH 6.8 phosphate buffer

Concentration ($\mu\text{g/ml}$)	Absorbance
0	0
2	0.154
4	0.321
6	0.499
8	0.664
10	0.852

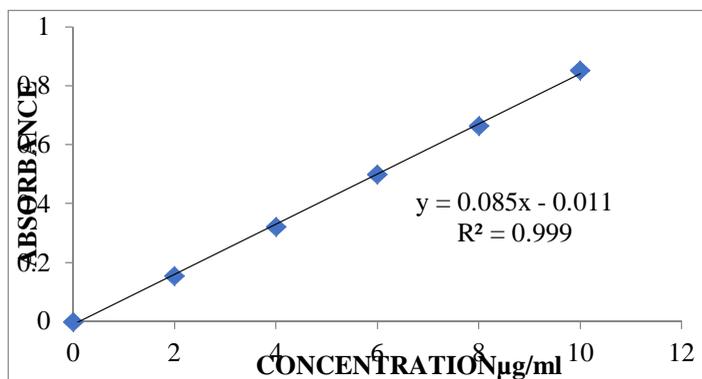


Figure 2 : Standard curve of Olanzapine

3.2 Drug-Excipient compatibility studies by FTIR studies:

Olanzapine was mixed with various proportions of excipients showed no colour change at the end of two months , providing no drug –excipient interactions.

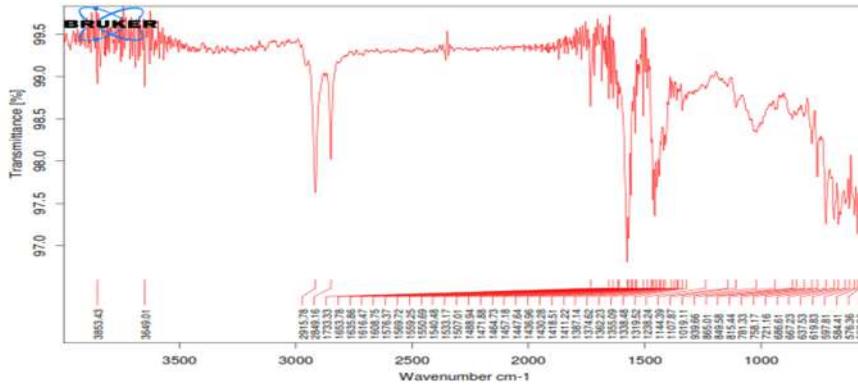


Figure 3: FTIR spectra of pure drug

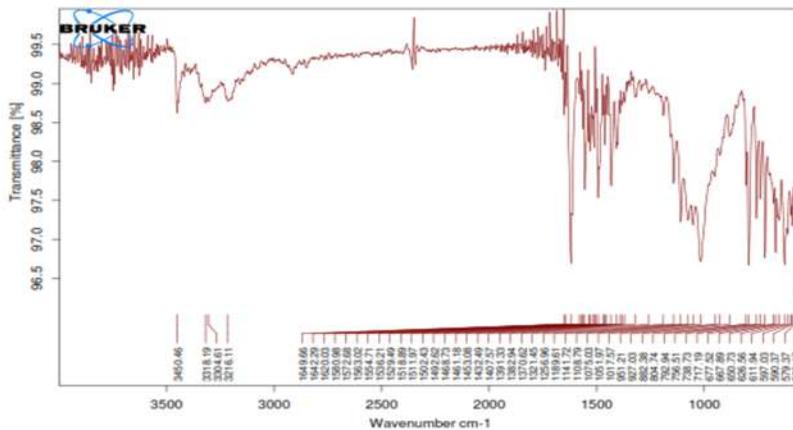


Figure 4: FTIR spectra of optimized formulation

Olanzapinewas mixed with proportions of excipients showed no colour change providing no drug-excipient interactions

Table 3: Physical properties of precompression blend

Formulation code	Angle of repose (Θ)	Bulk density (gm/cm ³)	Tapped density(gm/cm ³)	Carr's index (%)	Hausner's ratio
F1	37.6	0.3217	0.3911	17.74	1.2157
F2	36.7	0.3439	0.4244	18.96	1.2340
F3	35.5	0.3911	0.4639	15.6	1.1860
F4	36.6	0.3117	0.3836	18.7	1.2307
F5	32.5	0.5937	0.6785	12.5	1.1428
F6	28.5	0.5588	0.6064	7.84	1.08
F7	37.8	0.2977	0.3562	16.41	1.19
F8	36.5	0.4830	0.5937	18.64	1.22
F9	27.7	0.5699	0.6125	6.95	1.07



All the values represent n=3

Table 4 : Physical evaluation of Olanzapine

Formulation code	Average Weight (mg)	Thickness (cm)	Hardness (Kg/cm ²)	Friability (%)	Content uniformity(%)
F1	99.27	2.12	1.54	0.65	99.18
F2	98.34	2.05	1.85	0.72	99.57
F3	96.45	1.86	1.73	0.68	100.78
F4	97.79	1.95	2.04	0.57	99.46
F5	100.65	2.13	2.02	0.60	98.84
F6	99.72	2.24	1.93	0.58	99.75
F7	99.38	1.98	1.93	0.63	98.32
F8	98.32	1.99	1.99	0.66	99.22
F9	100.86	2.14	1.98	0.59	99.68

Table 5 : Evaluation of post compression parameters of Olanzapine Oral Disintegrating Tablets

Formulation	Disintegration time*(seconds)	Wetting time* (seconds)	Invitrodispersion time*(sec)	%Water absorption ratio*
F1	22	35	32	23.44
F2	17	22	29	39.09
F3	14	19	25	53.70
F4	44	55	33	32.89
F5	39	42	37	45.12
F6	30	38	39	58.81
F7	52	36	27	63.08
F8	11	20	23	96.64
F9	34	28	19	74.97

3.3 Invitro release studies:

Table 6 :In vitro data for formulation F1-F3.

TIME (MIN)	% DRUG RELEASE		
	F1	F2	F3
0	0	0	0



5	18.1	15.41	22.3
10	25.5	31.21	34.09
15	39.6	42.90	56.5
20	50.53	50.35	72.32
25	59.21	65.89	88.24
30	62.30	70.65	90.37
45	87.35	91.06	94.82

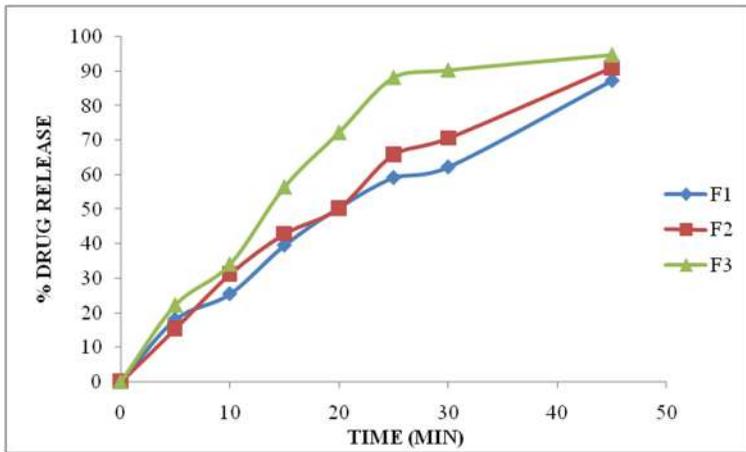


Figure 5 :In vitro dissolution data for formulation F1-F3

Table 7: In vitro dissolution data for formulations F4-F6

TIME(MIN)	% DRUG RELEASE		
	F4	F5	F6
0	0	0	0
5	11.04	20.55	21.72
10	21.71	29.80	34.15
15	40.23	42.39	50.22
20	48.42	50.09	59.98
25	56.90	64.04	70
30	61.70	69.49	74.13
45	67.56	80.30	91.58

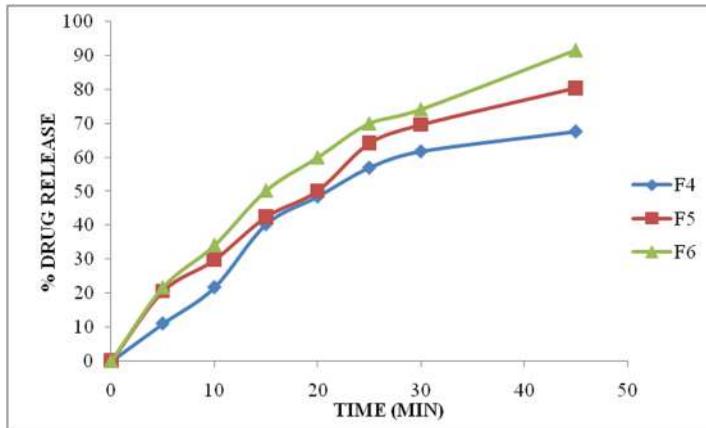


Figure 6 :In vitro dissolution data for formulations F4-F6

Table 8 :In vitro dissolution data for formulations F7-F9

TIME (MIN)	% DRUG RELEASE		
	F7	F8	F9
0	0	0	0
5	18.62	16.41	25.43
10	26.84	33.78	31.60
15	42.13	75.61	56.53
20	48.94	82.21	61.01
25	57.54	85.80	78.87
30	69.47	91.02	85.36
45	81.44	97.37	94.73

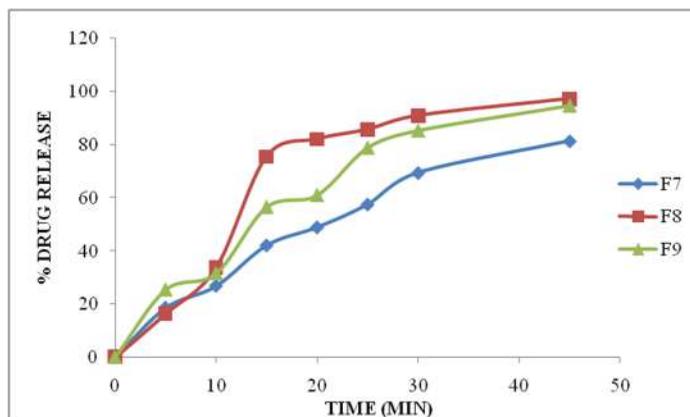


Figure 7: In vitro dissolution data for formulations F7-F9



4. DISCUSSION:

The absorption maxima of olanzapine was found to be 253 and it was obtained and good correlation was obtained with R^2 value of 0.999, the medium selected was pH 6.8 phosphate buffer.

Olanzapine was mixed with various proportions of excipients showed no colour change at the end of two months, providing no drug-excipient interactions.

The precompression blend of Olanzapine were characterized with respect to angle of repose, bulk density, tapped density, Carr's index and Hausner's ratio. Angle of repose was less than 28° , Carr's index values were less than 11 for the precompression blend of all the batches indicating good to fair floability and compressibility. Hausner's ratio was less than 1.25 for all batches indicating good flow properties.

The results of the weight variation, hardness, thickness, friability, and drug content of tablets are given in table. All the tablets of different batches complied with the official requirement of weight variation as their weight variation passes the limit. The hardness of the tablets ranged from 1.54 - 2.04 kg/cm^2 and the friability values were < than 0.561% indicating that the tablets were compact and hard. The thickness of the tablets ranged from 1.86 - 2.24 cm. All the formulations satisfied the content of the drug as they contained 98-100% of Olanzapine and good uniformity in drug content was observed. Thus all physical attributes of the prepared tablets were found to be practically within control limits.

The drug release rate from tablets was studied using the USP type II dissolution test apparatus. The dissolution medium was 500 ml of pH 6.8 phosphate buffer at 50 rpm at a temperature of $37 \pm 0.5^\circ\text{C}$. Samples of 5 ml were collected at different time intervals up to 1 hr and has analyzed after appropriate dilution by using UV spectrophotometer at 253nm.

From In vitro drug release studies it was found to be Among all the formulations F8 formulation containing drug and HPMC showed good result that is 97.37% in 45 minutes, at the concentration of 30 mg. Hence from all the formulations it is evident that F8 formulation is the better formulation.

5. Conclusion

All formulations were found to be satisfactory when evaluated for thickness, average weight, hardness, friability, drug content uniformity, disintegration time and in vitro drug release. The in vitro drug release in optimized formulation F8 was found to be 97.37% in 45min. The optimized formulation F8 also showed satisfactory hardness, Friability, drug content, weight variation.



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లక్ష్మీవిశిష్టాద్వైతభాష్యరీత్యా ఉత్పత్త్యసంభవాధికరణవిశ్లేషణ

ఆచార్య వేదాంతం శ్రీవిష్ణుభట్టాచార్యులు

తిరుపతి.

అఖిలజగత్కారణభూతుడైన పరమాత్మ సమన్వయంతో బ్రహ్మసూత్రాలకు భాష్యం వ్రాయబడింది. చతురధ్యాయసమన్వితం ఈభాష్యం. అందు

ప్రథమాధ్యాయంలో	పరబ్రహ్మయే సర్వము అనువిచారణ
ద్వితీయాధ్యాయంలో	పరబ్రహ్మయే జగత్ జీవులకు కారణభూతము అని
తృతీయాధ్యాయంలో	పరబ్రహ్మ కర్మఫలదాత అని
చతుర్థాధ్యాయంలో	మోక్షప్రదాత పరబ్రహ్మ అని శ్రుత్యుక్తప్రమాణరీత్యా సమన్వయము

గావించబడి పురాణ ఇతిహాస సూత్రవచనముల ఆధారంగా ఆ యా సిద్ధాంతబోధన చేయబడింది.

ద్వితీయాధ్యాయంలో ద్వితీయపాదంలో ఎనిమిదవ అధికరణం ఉత్పత్త్యసంభవాధికరణం. అద్వానిని పరిశీలించుటయే ఈ వ్యాసముఖ్యోద్దేశ్యం. ఇందు నాలుగు సూత్రములు కలవు.

1. ఉత్పత్త్యసంభవాత్
2. న చ కర్మః కరణం
3. విజ్ఞానాది భావే తదప్రతిషేధః
4. విప్రతిషేధాచ్చ అనునవి. ఇందు మొదటి రెండు పూర్వపక్షం తరువాతి రెండు సిద్ధాంతము.

ఈ అధికరణం దర్శనపూర్వకముగాను పరిశీలిస్తే సాంఖ్యశాస్త్ర అచేతనప్రకృతి జగత్కారణము కాదు.

కేవలము పరమాణువులు జగత్కారణములు కావు.

క్షణికవాదము జగత్కారణములు కావు.

క్షణికవిజ్ఞానము జగత్కారణమునకు మూలము కాదు.

సర్వము శూన్యము అనువాదము అప్రమాణము.

జైనమతము అసమంజసము.

పాశుపతము నిరసనము అను విచారణచేయు సందర్భముననే పాంచరాత్రసిద్ధాంతము

విచారణచేయబడుచున్నది. ఇదియే ఉత్పత్త్యసంభవాధికరణము.

సూత్రములను పరిశీలిస్తే



1. ఉత్పత్త్యసంభవాత్ - జీవునికి ఉత్పత్తి అసంభవము (జీవోత్పత్తి అంగీకరించు పాంచరాత్రము అప్రమాణికము.)
2. న చ కర్మః కరణం- కర్మయైన జీవుని నుండి కరణం మనస్సు పుట్టుట అంటే సంకర్షణాత్ ప్రద్యుమ్న సంజ్ఞం మన ఉత్పద్యతే అని చెప్పుట, న - సంభవము కాదు. సంకర్షణుడు జీవుడు, ఆ జీవుని నుండి మనస్సు పుట్టుట అసంభవము కదా! వితస్మాత్ జాయతే ప్రాణో మనస్సర్వేంద్రియాణి చ పరమాత్మ నుండి మనస్సు ప్రాణము సర్వేంద్రియములు పుట్టుచున్నవి అని వేదము చెప్పుచున్నదిగదా! కావున పై విషయము తెలుపు పాంచరాత్రసిద్ధాంతము వేదవిరుద్ధము అప్రమాణము అని పూర్వపక్షము కాగా సిద్ధాంతమేమనగా
3. విజ్ఞానాది భావే తదప్రతిషేధః - జగత్కారణభూతుడైన వాసుదేవుడే సంకర్షణుడు, ప్రద్యుమ్నుడు, అనిరుద్ధుడు గదా! ఇచ్చట సంకర్షణాదులు పరబ్రహ్మములుగా అంగీకరించు పక్షమున పాంచరాత్రము ప్రమాణమే గదా!
4. విప్రతిషేధాచ్చ- జీవుడు ఉత్పత్తి వినాశములు లేనివాడు. సహ్యానాడి: అనన్తశ్చ పరమార్థేన నిశ్చితః (పరమసంహిత) పాంచరాత్రము జీవునకు నిత్యత్వము చెప్పబడుచున్నది. జగత్తునకు నిమిత్తము ఉపాదానములు పరమాత్ముని సంబంధించినవి అగుటచే జీవోత్పత్త్యాదులు పాంచరాత్రాభిమతములు కావు. కావున పాంచరాత్రము సర్వదా ప్రమాణమని సిద్ధాంతము.

ఇచ్చట పూర్వాపరములు నిశితముగా పరిశీలిస్తే

శంకరాచార్య అభిమతము

న వాసుదేవసంజ్ఞకాత్ పరమాత్మనః సంకర్షణ సంజ్ఞకస్య జీవన్మోత్పత్తిః సంభవతి. అనిత్యత్వాదిదోష ప్రసంగాత్. ఉత్పత్తిమత్వేహి జీవస్యానిత్యత్వాదయో దోషాః ప్రసజ్యేరన్. తతశ్చ నైవాస్య భగవత్ ప్రాప్తిర్మోక్షస్యాత్. కారణప్రాప్తా కార్యస్య ప్రవిలయ ప్రసంగాత్.....

న చ పాంచరాత్రసిద్ధాంతాభిః వాసుదేవాదిషు ఏకస్మిన్ సర్వేషు వా జ్ఞానైక్యర్యాది తారతమ్యకృతః కశ్చిద్భేదో అభ్యుపగమ్యతే.

..... చతుర్థు వేదేషు పరం శ్రేయం అలభ్య్వా శాండిల్య ఇదం శాస్త్రమధిగతవాన్ ఇత్యాది వేదనిందా దర్శనాత్ తస్మాదసంగతైషా కల్పనేతి సిద్ధమ్. (శంకరభాష్యం)

పై శంకరభాష్యసారమేమంటే జీవునకు ఉత్పత్తి మరణం కలగాలి. అది సంకర్షణాత్ జీవో జాయతే అంటే విరోధం ఏర్పడుతుంది. జీవాత్ముకు అనిత్యత్వం యుక్తం కాదు. కార్యం కారణాన్ని పొంది విలీనం కావాలి. సంకర్షణుడనే జీవుని ఉత్పత్తి వాసుదేవునినుండి జరిగిందనే సిద్ధాంతం అంగీకరింపబడదు.

జ్ఞాన ఐక్యతలు గుణాలు. ఆ గుణాలే వాసుదేవుల ఆత్మలు. అంటే ఆ గుణాలున్న గుణులు అని ప్రతిపాదించడం పరస్పరవిరుద్ధం. శాండిల్యుడు నాలుగు వేదాలు అధ్యయనం చేసినా పరమశ్రీయస్సు పొందజాలక పాంచరాత్రాగమశాస్త్రాన్ని రూపొందించాడు అని వ్యక్తం చేయడం కూడా వేదనింద అవుతుంది.

ఈ కారణాలవల్ల భాగవతుల పాంచరాత్రసిద్ధాంతం నిరాకరింబడుతున్నది అని శంకరుల అభిమతం.

రామానుజుల ఖండన

పరమకారణాత్ పరబ్రహ్మభూతాత్ వాసుదేవాత్ సంకర్షణోనామ జీవో జాయతే. సంకర్షణాత్ ప్రద్యుమ్నసంజ్ఞం మనో జాయతే. తస్మాత్ అనిరుద్ధసంజ్ఞా అహంకారో జాయతే ఇతి హి భాగవతప్రక్రియా, అత్రజీవస్యోత్పత్తిః శ్రుతివిరుద్ధా ప్రతీయతే. శ్రుతయోహి జీవస్యానాదిత్వం వదన్తి న జాయతే మ్రియతే వా విపశ్చితే ఇత్యాద్యాః. (శ్రీభాష్యం)

అనగా పరమకారణుడును పరబ్రహ్మభూతుడునగు వాసుదేవుని నుండి సంకర్షణుడను జీవుడు పుట్టుచున్నాడనియు, ఆసంకర్షణుడను జీవునినుండి ప్రద్యుమ్నమును మనస్సు పుట్టుచున్నదనియు. ఆ ప్రద్యుమ్నమునెడి మనస్సు నుండి అనిరుద్ధమును అహంకారము పుట్టుచున్నదనియు ఇట్లు భాగవతులు తమ మతమును బోధించుచున్నారు. న జాయతే మ్రియతే వా విపశ్చితే అను శ్రుతివాక్యం వలన జీవునికి జనన మరణములు లేవని చెప్పుచు అనాది అని భావించుటచే జీవునికి ఉత్పత్తిచెప్పు పాంచరాత్రము శ్రుతివిరోధము. అను పూర్వపక్షము కాగా సిద్ధాంతమేమనగా ?

తత్ర జీవమనోఽహంకారతత్త్వానాం అధిష్ఠాతారః సంకర్షణ ప్రద్యుమ్న అనిరుద్ధా ఇతి తేషామేవ జీవాది శబ్దైః అభిధానం అనిరుద్ధం యథా ఆకాశప్రాణాది శబ్దైః బ్రహ్మణోఽభిధానమ్. (శ్రీభాష్యం)

జీవతత్త్వమునకు సంకర్షణుడును, మనస్తత్త్వమునకు ప్రద్యుమ్నమును, అహంకారతత్త్వమునకు అనిరుద్ధుడును, అధిష్ఠానదేవతలు. కావున జీవుని సంకర్షణుడుగాను మనస్సును ప్రద్యుమ్నుడిగాను అహంకారమును అనిరుద్ధునిగాను వ్యవహరించుచున్నాము. ఇట్లు వ్యవహరించుటవిరుద్ధముకాదు కదా! అదెట్లనగా ఆకాశప్రాణాదిశబ్దములచే బ్రహ్మమును వ్యవహరించినట్లు ఇచ్చట కూడ తెలియతగినది.

అని పరమసంహిత పౌష్కరసంహిత సాత్త్వతసంహితాదివచనములు అనేకములు జీవుడు నిత్యుడిగా చెప్పబడుచున్నందువలన పాంచరాత్రతంత్రమున జీవునికి ఉత్పత్తి యుండెడి అంశములు నిషేధింపబడుచున్నవేగానీ ప్రతిపాదింపబడుటలేదు. కావున పాంచరాత్రము అప్రమాణమని శంకించుట తగదు. ఇదియే సిద్ధాంతము.

సుమారు 2000 సంవత్సరములకు పూర్వం శంకరాచార్యులు పాంచరాత్రసిద్ధాంతం అప్రమాణమని తమ అద్వైతభాష్యంలో వివరింపగా 1000 సంవత్సరములకు పూర్వం భగవద్రామానుజులు ఆ సిద్ధాంతాన్ని ఖండించి పాంచరాత్రం ప్రమాణమని స్థిరీకరించుచూ పాంచరాత్రము సాక్షాత్ శ్రీమన్నారాయణప్రోక్తమని చతుర్వ్యూహసిద్ధాంతం అధిష్ఠానదైవములని ఆకాశప్రాణాదిశబ్దతుల్యములే సంకర్షణాదివ్యవహారమని సమర్థించియున్నారు.



వైఖానసం - ప్రమాణం

సర్వవిధయా అపి శ్రీవైఖానసం శ్రుతివిరోధలేక కంకామాత్రస్యాపి అనాస్పదమితి. యద్యస్తి దోషకంకా ఆస్పదతా

విష్ణుం చ పురుషం సత్యమద్యతం చ యుధిష్ఠిర|

అనిరుద్ధం చ మాం ప్రాహుః వైఖానసవిదో జనః || ఇతి

మహాభారతే శ్రీవైఖానసోక్త భగవన్మూర్తీ కథయన్ భగవాన్ బాదరాయణః తద్ఘాస్త్రీ క్వచిద్దోషమాశంక్య వా పరిహారేత్. శారీరకశాస్త్రే అస్మిన్ న తథా దృశ్యతే. అతః సమస్త శ్రుతివిరోధవిదురం శ్రీవైఖానసం వైదికారాధన ప్రతిపాదకం ఐహికాముష్మిక ఫలసాధనమితి నిశ్చయతే. (లక్ష్మీవిశిష్టాద్వైతభాష్యం).

సర్వవిధముల శ్రీవైఖానసము శ్రుతివిరోధము లేకమాత్రమైనను లేక వ్యవహరించుచున్నది. ఏ భాష్యకర్త కూడా విరోధముగా ప్రస్తావించియుండలేదు. విరోధము ఉన్నదన్నచో వ్యాసుడు తన సూత్రరచనలో దోషమును చూపి ఖండనముచేయును గదా!

భారతమందలి ఆశ్వమేధికములో పంచమూర్తి ప్రస్తావనచేయుచూ దోషమును శంకించియైననూ పరిహరించలేదు. కావున సమస్తశ్రుతిసమ్మతమై వైదికారాధనప్రతిపాదకమై ఐహికాముష్మికఫలసాధన నిశ్చయాత్మకమైనది వైఖానససిద్ధాంతము.

విష్ణువుయొక్క విభూతి మహాలక్ష్మి. ఆమె ఆద్యంతరహిత అవ్యక్తరూపిణి ప్రమాణ అప్రమాణసాధారణీభూత. మాయప్రకృతి మాయి విష్ణువు. ఆప్రకృతి మాయి రెండు విధములు చేతనము అచేతనమని, చేతనము యొక్క కర్మ రెండు విధములు. ఐహికం ఆముష్మికం అని. ఐహికకర్మ భోజన-ఆచ్ఛాదన-స్నాన-గమన-ఆసన-శయనాదులు. ఆముష్మికకర్మ అహింసా దాన ధర్మపరోపకార భగవదారాధన పుణ్యపాపవిఘ్నానము.

ఆముష్మికకర్మద్వారా చేతనుడు జప-హుత-అర్చన-ధ్యానములు ఆచరించుచూ తత్తత్ ఆశ్రమధర్మానుష్ఠాన తత్పరుడై మోక్షమును పొందుచున్నాడు కూడ. మోక్షమనగా ?

నిత్యానందం అమృతరసపానవత్ సర్వదా తృప్తికరం పరమాత్మనో నిత్యనిషేవణం పరంజ్యోతిః ప్రవేశనం. (విమానార్చనాకల్పం) అని మోక్షము నిర్వచింపబడినది.

మోక్షప్రాప్తికి భక్తియే ప్రధానసాధనం.

ద్విజాతిరతంత్రితో నిత్యం గృహే దేవాయతనే వా,
భక్త్యా భగవంతం శ్రీమన్నారాయణం అర్చయేత్.
తద్విష్ణోః పరమం పదం గచ్ఛతీతి విజ్ఞాయతే.

అని శ్రీవిఖనేమునీంద్రులు స్మార్తసూత్రమునందు ఉపదేశించినారు. అట్లే ప్రపత్తి అనగా

అకారవాచ్యాయ సర్వకారణభూతాయ సర్వరక్షకాయ సర్వాత్మనే సర్వశేషిణి శ్రియః పతయ ఏవ అహం అనన్యార్థనిరుపాధిక శేషభూతః త్వచ్చరణారవిందయోః ఆత్మాత్మీయ భరం న్యస్యామి.



శ్రీమన్నారాయణాయైవ సర్వదేశ సర్వకాల సర్వావస్థోచిత సర్వవిధ కైంకర్యాణిస్సుః. (మోక్షోపాయప్రదీపికా). అని కైంకర్య సుదీర్ఘకరణాగతి భావన వైఖానసులది.

ఇట్టి వైఖానసశాస్త్రము శబ్దప్రమాణమాత్రము లేకమాత్రవిరోధరహితము, శ్రౌతిక్రియాసదృశము ఐహిక ఆముష్మిక ఫలసంధాయకము కూడా.

सप्तधा प्रान्तभूमिः प्रज्ञा - पातञ्जल योगदर्शन के विशिष्ट सन्दर्भ में

सौगत घोष

शोधच्छात्र

मानविकी एवं सामाजिकविज्ञानविभाग

राष्ट्रीयप्रौद्यौगिकीसंस्थान, राउरकेला, उडीसा ।

शोधसार

आचार्य पतञ्जलि के अनुसार योग की परिभाषा "योगश्चित्तवृत्तिनिरोधः"। अर्थात् चित्तवृत्ति निरोध की स्थिति ही योग है। आचार्य के अनुसार प्रकृति और पुरुष के संयोग का मूल कारण अविद्या है। इसी अविद्या के कारण ही बारबार हमें इस संसार चक्र में आना पडता है अर्थात् संसाररूपी दुःखों का कारण द्रष्टा और दृश्य का संयोग है, और उस संयोग का भी निमित्त अविद्या को माना गया है। द्रष्टा और दृश्य की भिन्नता की स्थिति ही मोक्ष है। इसी स्थिति को आचार्यों ने विवेकख्याति की संज्ञा प्रदान की है। द्रष्टा और दृश्य में भिन्नता के वास्तविक स्वरूप का बोध हो जाता है, अर्थात् अविद्यादि दोषों के निवृत्त हो जाने पर चित्तवृत्ति में उत्थित विकार भी शान्त हो जाता है। चित्त की प्रकृति स्वभावतया शान्त है। वृत्तियों के होने पर ही चित्त की सत्ता सिद्ध है। साधक का चित्त, वृत्तियों से रहित हो जाने पर साधक को विवेकख्याति बोध हो जाता है जिससे पुनः उस साधक की प्रज्ञा अविद्यादि क्लेशों से लिप्त नहीं होती। यही प्रज्ञा की चरम अवस्था है। आचार्य पतञ्जलि के अनुसार उपरोक्त विवेकख्याति सम्पन्न योगी की प्रज्ञा सात प्रकार की बतलायी गयी है। योग दर्शन में चतुर्व्यूह की मान्यता है – हेय, हेयोपाय, हान, हानोपाय। इन चार को ही आचार्य ने सप्तप्रज्ञाओं में प्रथम चार प्रज्ञा के रूप में स्थान दिया है।

1. परिज्ञानं हेयं नास्य पुनः परिज्ञेयमस्ति।
2. क्षीणाः हेयहेतवो न पुनरेतेषां क्षेतव्यमस्ति।
3. साक्षात्कृतं निरोधस्माधिना हानम्।
4. भावितो विवेकख्यातिरूपो हानोपाय इति।

इन्ही चार प्रज्ञाओं को आचार्य ने कार्यविमुक्ति प्रज्ञा कहा है ("एषा चतुष्टयी कार्यविमुक्तिः प्रज्ञायाः"।¹) अर्थात् इन चार प्रज्ञाओं के माध्यम से साधक अपने आप को अविद्यादि क्लेशों से मुक्त कर लेते हैं। अविद्यादि क्लेशों से मुक्त हो जाना ही, द्रष्टा और दृश्य में भेद की प्रतीति हो जाना है। अतः प्रज्ञा के यह चतुर्धा प्रकार साधक को विवेकख्याति सम्पन्न होने में सहायता करते हैं। अन्तिम तीन प्रज्ञा विवेकख्याति स्थिति की चरमावस्था है।

उपरोक्त चार प्रज्ञा के स्थित हो जाने पर बुद्धि का अधिकार समाप्त हो जाता है (चरिताधिकारा बुद्धिः²)। विवेकख्याति सम्पन्न योगी केवल सत्वादि गुणों से युक्त होता है परन्तु सत्वादि गुणों के भी विषय होने

¹ योगदर्शन व्यासभाष्य, २/२७, पृ. २५५

² योगदर्शन व्यासभाष्य, २/२७, पृ. २५५

से इन्हे अन्त में त्यागना होता है। अन्त में ये सत्वादि गुण भी अब्यक्त प्रकृति में लीन होने लगते हैं जैसे पर्वत शिखर से फिसले हुए पत्थर भूमि में लीन हो जाते हैं। (गुणा गिरिशिखरकूटच्युता इव ग्रावाणो निरवस्थानाः स्वकारणे प्रलयाभिमुखाः सह तेनास्तं गच्छन्ति। न चैषां प्रविलीनानां सति पुनरुत्पादः प्रयोजनाभावादिति।³) अन्तिम अर्थात् सप्तम प्रज्ञा में साधक गुणों के सम्बन्ध से परे हो जाता है। उस समय वह अपने स्वरूप में स्थित हो जाता है। (एतस्यामवस्थायां गुणस्म्बन्धातीतः स्वरूपमात्रज्योतिरमलः केवली पुरुष इति।⁴)

इस प्रकार आचार्य पतञ्जलि के अनुसार उपर्युक्त सात प्रकार की प्रज्ञाओं को जान लेने से पुरुष कुशल हो जाता है। प्रस्तुत शोधपत्र में इन उपर्युक्त विषयों की विशद आलोचना की गयी है।

Keywords: द्रष्टा, दृश्य, साधक, अविद्या, प्रकृति, पुरुष, चित्त, वृत्ति |

भूमिका-

“योगश्चित्तवृत्ति निरोधः”

-योगदर्शन, १/२

चित्तवृत्तियों का निरोध ही योग की पराकाष्ठा है। पातञ्जलयोग दर्शन में इसी प्रक्रिया को स्पष्ट करते हुए आचार्य पतञ्जलि ने विभिन्न उपायों पर, प्रणालियों पर, चित्तवृत्ति, समाधि चित्तभूमि, प्रज्ञास्वरूपादि अनेक विषयों पर स्वमत प्रस्तुत किया है। उनके अनुसार योग के अनुष्ठान में अभ्यास रत नैरन्तर्य सत्कारासेवित साधक⁵ जैसे जैसे निरोध वृत्ति में दृढ होते चले जाते हैं वैसे वैसे उनकी प्रज्ञा प्रान्त स्वरूपवाली हो जाती है। इन्हीं प्रान्तभूमियों को प्राप्त करते हुए साधक योग के उच्चतम मार्ग असम्प्रज्ञात समाधि⁶ को सिद्ध करते हुए केवली भाव अर्थात् आनन्दमय हो जाता है। त्रिगुणजन्य जो समस्तप्रकार के व्युत्थान साधक के चित्त में उदित होते रहते हैं, उनका स्पन्दन सम्पूर्णतया समाप्त हो जाता है। इन प्रान्तभूमियों को प्राप्त करने हेतु योगाङ्गाभ्यास⁷ बहुत जरूरी है। जिससे साधक चेतना के उस प्रकाश रूप को पहचान लेता है और अपने को द्रष्टा मानते हुए बुद्धिगत समस्त कार्य से भेद निश्चित कर लेता है। यह उत्कृष्ट स्तर वाली प्रज्ञा सात प्रकार की है जो इस प्रकार वर्णित है-

“तस्य सप्तधा प्रान्तभूमिः प्रज्ञा”

-योगदर्शन, २/२७

तस्य अर्थात् उस लब्ध विवेकख्याति युक्त योगी की (प्रान्तभूमिः) जो प्रज्ञा का विशेषण है (प्रकृष्टः उत्कृष्टः अन्तः कोटिः यासां भूमिनाम् अवस्थानाम् ताः प्रान्ताः) ऐसे उत्कृष्ट स्तर वाली प्रज्ञा (बुद्धि) सात प्रकार की होती है जबकि अन्य सामान्यजनों की बुद्धि विविधरूपा होती है। चित्त की पाँच भूमियाँ हैं क्षिप्त, मूढ, विक्षिप्त, एकाग्र एवं निरुद्ध।

³ तथैव, पृ. २५५

⁴ तथैव, पृ. २५५

⁵ स तु दीर्घकालनैरन्तर्यसत्काराऽऽसेवितो दृढभूमिः॥ - १.१४(समाधि पाद) पृ.५५

⁶ विरामप्रत्ययाभ्यासपूर्वः संस्कारशेषोज्यः॥ - १.१८ (समाधि पाद) पृ.६७

⁷ योगाङ्ग-यमनियमाऽऽनप्रणायामप्रत्याहारधारणाध्यानसमाधयोऽष्टावङ्गानि॥ - (साधनपाद २९) पृ.२६५

1. क्षिप्त भूमि- “रजसा विषयेष्वेव वृत्तिमत्⁸” - रजोगुणाद्रेक से विषयों में व्यापृत रहने वाली भूमि।
2. मूढ भूमि- “तमसा निद्रावृत्तिमत्⁹” - तमोगुणाद्रेक के कारण मूर्च्छादि व्यापारवान् चित्त की भूमि मूढ भूमि है।
3. विक्षिप्त भूमि- “क्षिप्तादविशिष्टं विक्षिप्तं। सत्त्वाधिक्येन समादधदपि चित्तं रजोमात्रयाऽन्तराऽन्तरविषयान्तरवृत्तिमद्¹⁰” - अर्थात् सत्त्वगुणाधिक्य के कारण आंशिक काल के लिए समाधि लगने पर भी रजोगुणाद्रेक से चित्त पुनः विषयों की ओर आकृष्ट हो जाता है।
4. एकाग्रभूमि- “एकस्मिन्नेव विषयेऽग्रं शिखा यस्य चित्तदीपस्येत्येकाग्रं, विशुद्धसत्त्वतयैकस्मिन्नेव विषये वक्ष्यमाणावधीकृतकालपर्यन्तमचञ्चलं निवातस्थदीपवत्¹¹”- अर्थात् सात्विक वृत्ति के प्रभाव से चित्त एक ही विषयों में निरन्तर लगा रहता है।
5. निरुद्ध भूमि- “निरुद्धं च निरुद्धसकलवृत्तिकं संस्कारमात्रशेषमित्यर्थः¹²”- चित्त की राजसिक तथा तामसिक वृत्तियों के साथ साथ सात्विक वृत्ति का भी परित्याग करना पड़ता है इस निरुद्ध भूमि में केवल संस्कारमात्र अवशेष रहता है।

इन पाँच भूमियों में से क्षिप्त तथा मूढ भूमियों में क्रमशः रजोगुण तथा तमोगुण की अधिकता के कारण ये उत्कृष्ट प्रज्ञा नहीं मानी जाती। आचार्य के अनुसार विक्षिप्त भूमि को छोड़कर शेष चार भूमियों में समाधि सम्भव है। चित्त का किसी भी विषय में एक क्षण के लिए भी ठहरना समाधि है। चित्त का किसी विषय में स्थिर हुए बिना हमें उस विषय का ज्ञान नहीं हो सकता। इसलिए चित्त की हर स्थिति में समाधि है परन्तु सभी समाधि योग नहीं है। (योग शब्द 'युज्' समाधौ धातु में 'घञ्' प्रत्यय लगाकर बना है।) “योगः समाधि, स च सार्वभौम चित्तस्य धर्मः¹³”। समाधि में ज्ञान समग्र होता है।

- विवेकख्याति प्राप्ति की विधि-

योगदर्शन में अन्तःकरण सामान्य जो चित्त रूप से वर्णित है वह तीन प्रकार का बताया गया है- “चित्तं हि प्रख्याप्रवृत्तिस्थितिशीलत्वात् त्रिगुणम्¹⁴” अर्थात् चित्त प्रख्या (ज्ञान, प्रकाश स्वरूप), प्रवृत्ति (क्रिया स्वरूप), और स्थिति (क्रिया राहित्य एवं प्रकाश राहित्य एवं गतिशून्यता) तीन प्रकार बताया गया है। इन तीनों प्रकृतियों का आधार तीन गुण हैं (सत्त्व, रजस्, तमस्)।

⁸ योग वार्तिक, पृ., ८

⁹ तथैव, पृ. ८

¹⁰ तथैव, पृ. ८

¹¹ तथैव, पृ. ८

¹² तथैव, पृ. ८

¹³ व्यास भाष्य, पृ. १

¹⁴ व्यास भाष्य, पृ. ९

सत्व गुण प्रधान चित्त- “प्रख्यारूपं हि चित्तसत्त्वं रजस्तमोभ्यां संसृष्टमैश्वर्यविषयप्रियं भवति”¹⁵ अर्थात् प्रकाशशील चित्त सत्वगुण प्रधान होता है परन्तु रजस् और तमोगुण के सम्पर्क के कारण इस प्रकार चित्त को ऐश्वर्य और विषय प्रिय लगते हैं।

रजोगुण प्रधान चित्त- “तदेव प्रक्षीणमोहावरणं सर्वतः प्रद्योतमानमनुविद्धं रजोमात्रया धर्मज्ञानवैराग्यैश्वर्योपगं भवति”¹⁶ अर्थात् मोह के आवरण से रहित जब चित्त सब ओर से प्रकाशमान रजोगुण से व्याप्त होता है, तब चित्त में धर्म ज्ञान वैराग्य और ऐश्वर्य की प्राप्ति होती है।

तमोगुण प्रधान चित्त- “तदेव तमसाऽनुविद्धमधर्माज्ञानावैराग्यानैश्वर्योपगं भवति”¹⁷। जब वही चित्त तमोगुण से आच्छादित रहता है तो उसकी प्रवृत्ति अधर्म, अज्ञान, अवैराग्य और अनैश्वर्य की प्राप्ति में होती है।

विवेकयुक्त चित्त- “तदेव रजोलेशमलापेतं स्वरूपप्रतिष्ठं सत्वपुरुषान्यताख्यातिमात्रं धर्ममेधध्यानोपगं भवति। तत्परं प्रसंख्यानमित्याचक्षते ध्यायिनः”¹⁸। अर्थात् जब चित्त रजो गुण के मल से रहित एवं अपने स्वरूप में प्रतिष्ठित हो जाता है, तब साधक को धर्ममेधध्यान विशुद्ध आत्मस्वरूप को उपलब्ध कराने वाली समाधि प्राप्त होती है। इसी धर्ममेध को योगीजन परप्रसंख्यान कहते हैं। इसी को विवेकख्याति भी कहते हैं।

अर्थात् बुद्धि/चित्त जब रजोगुण तथा तमोगुण से रहित शुद्ध सत्व गुण का आश्रय लेकर स्वरूप में प्रतिष्ठित हो जाता है, वही विवेकख्याति है। “तद्धर्ममेधाख्यं ध्यानं परमं प्रसंख्यानं तत्त्वज्ञानं विवेकख्यातेरेव पराकष्टेति योगिनो वदन्तीत्यर्थः”¹⁹।

सप्तविधि प्रज्ञा- इस प्रकार लब्धविवेकख्याति योगी की प्रान्तभूमि (उत्कृष्टप्रकार की प्रज्ञा) सातप्रकार की होती है। “निर्विप्लवविवेकख्यातिनिष्ठामापन्नस्य सप्तप्रकारैव प्रज्ञा विवेकिनो भवति”²⁰।

१) “परिज्ञातं हेयं नास्य पुनः परिज्ञेयमस्ति” -

दुःखमयत्व का सम्पूर्ण ज्ञान हो जाना समस्त प्रकार के दुःखों से परिचित चित्त ही प्रथम प्रकार की प्रज्ञा है। पुण्य तथा अपुण्य कर्मों के संग्रह कर्माशय रूप है। इन्हीं कर्मों से प्राप्त जन्म आयु भोग पाप पुण्य के हेतु होने से जीवन सुख दुःखात्मक है।

“ते ह्लादपरितापफलाः पुण्यापुण्यहेतुत्वात्”

-योगदर्शन, २.१४

सांख्य में तीन प्रकार का दुःख बताया गया है- आध्यात्मिक, आधिभौतिक तथा आधिदैविक। आचार्य पतञ्जलि ने सम्पूर्ण संसार को विवेकी जनों के लिए दुःखमय माना है।

¹⁵ योगदर्शन, १/२ व्यासभाष्य, पृ. ९

¹⁶ तथैव

¹⁷ तथैव

¹⁸ तथैव

¹⁹ योग वार्तिक, पृ. १४-१५

²⁰ तत्त्ववैशारदी, पृ. २३७

“परिणामतापसंस्कारदुःखैर्गुणवृत्त्यविरोधाच्च दुःखमेव सर्वं विवेकिनः”

-योगदर्शन, २/१५

परिणाम दुःख, ताप दुःख, और संस्कार दुःख तथा गुणवृत्तियों (सत्व, रजस्, तमस्) में परस्पर विरोध होने से विवेकी पुरुष के लिए सबकुछ दुःख स्वरूप ही है। परिणाम दुःख से अभिप्राय केवल दुःख के परिणामों से बचना नहीं है अपितु सुख की आसक्ति का भी त्याग करना जरूरी है क्योंकि सुखभोग भी परिणाम में दुःखस्वरूप ही है। चेतन और अचेतन का समूह यह संसार है। व्यक्ति को इन दोनों से ही दुःख का अनुभव होता है। लोग सुख के साधनों की प्राप्ति हेतु शरीर मन और वाक्य से चेष्टा करते हैं। इसी हेतु दूसरे को पीडा देते हैं या अनुग्रह करते हैं। इसप्रकार परानुग्रह अथवा परपीडा द्वारा धर्म अधर्म का संचय करते हैं और यही कर्माशय दुःखरूप में प्रकट होता है। यही तापदुःख है।

इसप्रकार इन सुख दुःखों आदि अनुभवों का प्रभाव जो हमारे चित्त पर पडता है, यह संचित होकर स्मृति के द्वारा अनुकूल और प्रतिकूल परिस्थिति में सुख और दुःख के रूप में क्रमशः जाग्रत हो जाता है। संस्कारों के वशीभूत वासनाजन्य इन्ही दुःखों को संस्कार दुःख कहते हैं और इन समस्तप्रकार के दुःखों का कारण है त्रिगुणों में विरोध- **“गुणवृत्तिविरोधाच्च दुःखमेव सर्वं विवेकिनः। प्रख्याप्रवृत्तिस्थितिरुपा बुद्धिगुणाः परस्परानुग्रहतन्त्रीभूत्वा शान्तं घोरं मूढं वा प्रत्ययं त्रिगुणमेवारभन्ते”**²¹। अर्थात् इन गुणों के कार्यों में भी स्थिरता का अभाव है। कभी सत्व गुण की प्रधानता है तो कभी रज गुण की तो कभी तम गुण की। इस चलायमान स्थिति के कारण चित्त हमेशा परिवर्तित होता रहता है। इसीलिए विवेकी पुरुष ने संसार को दुःख रूप माना है।

दुःख का कारण –

“द्रष्टृदृश्ययोः संयोगो हेयहेतुः”।

-योगदर्शन, २.१७

आचार्य पतञ्जलि के अनुसार द्रष्टा और दृश्य का संयोग ही हेय का कारण है। द्रष्टा अर्थात् बुद्धि का प्रतिसंवेदन करनेवाला पुरुष (**“द्रष्टा बुद्धेः प्रतिसंवेदी पुरुषः”**²²) और दृश्य बुद्धि पर आरुढ सभी धर्म (**“दृश्या बुद्धिसत्वोपारुढा सर्वे धर्माः”**²³) इन द्रष्टृ शक्ति और दर्शन शक्ति का अनादि तथा पुरुष के प्रयोजन के लिए हुआ संयोग हेय का हेतु है। दुःख का कारण द्रष्टा और दृश्य में संयोग को माना गया है और इस संयोग का भी हेतु अविद्या अथवा अज्ञान को माना है।

“तस्य हेतुरविद्या”

-योगदर्शन, २.२४

अर्थात् इस अविद्या मिथ्या ज्ञान की वासना से ग्रसित बुद्धि विवेकख्यातिरूप कार्य को सिद्ध नहीं कर पाती। अतः दुःख की जड़ अविद्या ही है।

²¹योगदर्शन, २/१५, व्यास भाष्य पृ. २००

²² योगदर्शन, २/१७, व्यास भाष्य पृ. २१२

²³ तथैव, पृ. २१२

२) “क्षीणाः हेयहेतवो न पुनरेतेषां क्षेतव्यमस्ति”²⁴ - हेय अर्थात् दुःख क्या है यह प्रथम प्रज्ञा में साधक को ज्ञात हो जाता है तदनन्तर उस हेय का हेतु जो द्रष्टा और दृश्य का संयोग है वह भी साधक जान लेता है। इसप्रकार दुःख तथा दुःखों का कारण जान लेने पर साधक द्वितीय प्रज्ञा में इस दुःख के कारण का निवारण कैसे हो इसका समाधान करते हैं। आचार्य कहते हैं- “तत्संयोगहेतुविवर्जनात् स्यादयमात्यान्तिको दुःखप्रतीकारः”²⁵ अर्थात् द्रष्टा और दृश्य के संयोग के कारण का त्याग करने से सर्वदा के लिए दुःख का नाश हो जाता है। लोक में भी ऐसा देखा जाता है कि दुःख के हेतु के प्रतिकार से त्याज्य दुःख का भी प्रतीकार हो जाता है।

अर्थात् साधक को प्रथम दुःख के हेतु अर्थात् संयोग को त्यागना है तदुपरान्त उस संयोग के भी हेतु अर्थात् अविद्या को त्यागना होता है। संयोग का विवर्जन तभी संभव है जब साधक भेद्य भेदक और परिहार को जान ले। यथा –

पैर के तलुओं का काँट से विध्र जाना दुःख है (भेद्य)। काँटा उस दुःख का कारण (भेतृत्वम)। काँट को पैर से निकाल देना परिहार (परिहार)²⁶ है। इसीतरह शुद्ध अपरिणामी द्रष्टा का दृश्य रूप में प्रतिभवेदन दुःख है। द्रष्टा और दृश्य का संयोग दुःख का कारण है। संयोग का विवर्जन परिहार है। इसप्रकार संयोग का त्याग तथा उस संयोग का हेतु अविद्या है उसका भी परिहार करना है। द्रष्टा और दृश्य का संयोग दुःख (भेद्य) है। संयोग का कारण अविद्या (भेतृत्वम) है। विवेकख्याति से अविद्या की निवृत्ति (परिहार) हो जाती है।

योगवार्तिक में कहा गया है कि-“ततश्च हेयहेतवोऽविद्याकामकर्मादयो विवेकसाक्षात्कारेण ममक्षीणाः इत्यर्थः”²⁷ अर्थात् विवेकख्याति के द्वारा सारे अविद्यादि संस्कार दग्धबीज हो जाते हैं। अर्थात् द्वितीय प्रज्ञा में वह अविद्यादि संस्कार सम्पूर्णतया क्षीण कर दिया जाता है।

३) “साक्षात्कृतं निरोधसमाधिना हानम्”²⁸-

तृतीय प्रज्ञा में साधक निरोध समाधि के द्वारा समस्त प्रकार के दुःखों से मोक्ष का अनुभव कर लेते हैं। मोक्ष हान की परिभाषा –“बुद्धिनिवृत्तिरेव मोक्षः”²⁹ बुद्धि की निवृत्ति ही मोक्ष है।

“तदभावात् संयोगाभावो हानं तद् दृशेः कैवल्यम्”

-योगदर्शन, २.२५

²⁴योगदर्शन, २/२७, व्यास भाष्य पृ. २५५

²⁵ योगदर्शन, २/१७, व्यासभाष्य, पृ. २१३

²⁶ पादतलस्य भेद्यता, कण्टकस्य भेतृत्वं, परिहारः कण्टकस्य पादानधिष्ठानं पादत्राणव्यवहितेन वाऽधिष्ठानम्। तथैव, पृ. २१३

²⁷ योगवार्तिक, पृ. २३८

²⁸योगभाष्य, २/२७, व्यास भाष्य, पृ. २५५

²⁹ योगदर्शन, २/२४, व्यास भाष्य, पृ. २४७

अर्थात् दुःख का निमित्त द्रष्टा और दृश्य का संयोग और उस संयोग का भी निमित्त अविद्या है, जब अविद्या का नाश हो जाता है तो संयोग का नाश हो जाता है और जब संयोग का नाश हो जाता है तो दुःख का नाश हो जाता है, यह दुःख का नाश ही मोक्ष है।

अर्थात् साधक जब विवेकख्याति प्रज्ञा अर्थात् स्वरूप में स्थित हो जाता है एवं सत्व गुण का अधिकारी बन जाता है तब उसमें अविद्यादि जनित किसी प्रकार का क्लेश अथवा कर्माशयों की वासना नहीं रहती उस मूल अविद्या के नष्ट हो जाने पर अपरिणामी पुरुष और प्रकृति का संयोग भी समाप्त हो जाता है यही स्थिति मोक्ष है।

आचार्य के अनुसार निरोध समाधि से मोक्ष का साक्षात्कार सम्भव है। चित्त की एकाग्र भूमि में रजस् और तमस् वृत्तियों का पूर्णतया निरोध हो जाने पर केवल सात्विक वृत्ति उदित रहती है। फलतः साधक को समस्त वस्तुओं का वास्तविक निर्भान्त तथा सामग्रिक ज्ञान होता है, इसीलिए इस समाधि को सम्प्रज्ञात समाधि कहते हैं। (सम्यक् प्रज्ञायतेऽस्मिन्निति सम्प्रज्ञात समाधिः) इसी समाधि के सिद्ध होने से साधक को प्रकृति और पुरुष इन दो अन्तिम तत्वों का विविक्तज्ञान भी हो जाता है। यही विवेकख्याति है।

इस सम्प्रज्ञात समाधि से आगे साधक जब असम्प्रज्ञात समाधि की ओर अग्रसर होता है तब साधक को विवेकख्याति सम्पन्न बुद्धि अर्थात् सात्विक वृत्ति का भी निरोध करना होता है जिससे केवल निरोध संस्कार ही शेष रहता है। इस प्रकार के चित्त में किसी प्रकार की व्युत्थान सम्भव नहीं है। इन निरोधात्मक संस्कारों को ही अवशिष्ट रखने वाले पूर्ण वृत्ति निरोध को असम्प्रज्ञात समाधि कहते हैं। इस समाधि में बुद्धिकृत ज्ञान विलकुल नहीं रहता। इसी असम्प्रज्ञात समाधि को निरोध समाधि भी कहते हैं। आचार्य का कहने का अभिप्राय यह है कि इसी निरोध समाधि से मोक्ष का अनुभव तत्काल सिद्ध हो जाता है।

४) "भावितो विवेकख्यातिरूपो हानोपाय इति"³⁰ - अर्थात् विवेकख्याति रूप मोक्षोपाय सिद्ध कर लिया गया है। योगसूत्र में भी वर्णित है कि-

"विवेकख्यातिरविप्लवा हानोपायः"

-योगदर्शन, २.२६

अर्थात् मिथ्याज्ञान रहित विवेकख्याति हान का उपाय है एवं "सत्वपुरुषान्यताप्रत्ययो विवेकख्यातिः"³¹ अर्थात् बुद्धि और पुरुष की भिन्नता का बोध विवेकख्याति है। सात्विक बुद्धि के उदित हो जाने पर मिथ्याज्ञान जब दग्धबीज हो जाता है तब बुद्धि के विवेकज्ञान की धारा निर्मल बनी रहती है। इस प्रकार व्यक्ताव्यक्त विज्ञान रूप यह विवेकख्याति ही कैवल्य का अमोघ उपाय है जिसे चतुर्थ प्रज्ञा के उदित हो जाने पर साधक सिद्ध कर लेते हैं। "विप्लवो मिथ्याज्ञानं तद्गहिता विवेकख्यातिः"³²

"एषा चतुष्टयी कार्यविमुक्तिः प्रज्ञायाः चित्त विमुक्तिस्तु त्रयी"³³ योगदर्शन में जो चतुर्व्यूह की मान्यता है वह यही चार (क) हेय (ख) हेयहेतु (ग) हान (घ) हानोपाय इन चार कार्यों को सम्पन्न कर लेने से अन्य कोई

³⁰ योगदर्शन, २/२७, व्यास भाष्य, पृ. २५५

³¹ योगदर्शन, २/२६, व्यास भाष्य, पृ. २५३

³² तत्त्ववैशारदी, पृ. २३७

³³ योगदर्शन, २/२७, व्यास भाष्य, पृ. २५५

करणीय कार्य शेष नहीं रहता। इसीलिए इन चारों को कार्यविमुक्ति प्रज्ञा कहा गया है। चेष्टा द्वारा यह विमुक्ति होती है और साधन कार्य यही पर समाप्त हो जाता है। "कार्यान्तरेण विमुक्तिः प्रज्ञया इत्यर्थः"³⁴

अवशिष्ट तीन प्रकार की प्रान्तभूमि चित्तविमुक्ति प्रज्ञा है। कार्यविमुक्ति हो जाने पर यह प्रज्ञा स्वतः उदित होती है। यही ज्ञान की पराकाष्ठा है प्रज्ञा की प्रान्त अवस्था है। इसके बाद कैवल्य है। ये तीन प्रान्त प्रज्ञाएँ अप्रलिखित हैं-

५) "चरिताधिकारा बुद्धिः"³⁵ - उपरिवर्णित स्तरों तक बुद्धि के भोगापवर्ग रूप समस्त प्रयोजन सिद्ध हो चुके हैं। जिससे बुद्धि द्वारा और कोई प्रयोजन न रहने पर बुद्धि कृतकृत्य हो चुकी है। बुद्धि का अन्तिम कार्य यही है कि वह अपने स्वरूप में स्थित हो जाए, विवेकख्याति से भेद ज्ञान स्पष्ट हो जाए जो चतुर्थ प्रज्ञा तक साधक को सम्पन्न हो जाता है। साधक को विवेकख्याति बोध हो जाता है। तदुपरान्त इस पञ्चम प्रज्ञा में बुद्धि (चरित अधिकारा) अर्थात् समाप्त अधिकार वाली हो जाती है।

६) "गुणा गिरिशिखरकूटच्यूता इव ग्रावाणो निरवस्थानाः स्वकारणे प्रलयाभिमुखाः सह तेनास्तं गच्छन्ति। न चैषां प्रविलीनानां सति पुनरुत्सादःप्रयोजनाभावादिति"³⁶ अर्थात् साधक की जो विवेकख्याति प्रज्ञा सत्त्वादि गुणों से युक्त होकर चित्त को स्थित कर स्वरूप में प्रतिष्ठित हो चुकी थी। अन्तिम में साधक को उस सत्त्व गुण का भी त्याग करना पड़ता है, क्योंकि गुण होने के कारण उसका भी विषय होते है। जब सत्त्वादि गुणों का भी निरोध हो जाता है तो बुद्धि का स्पन्दन समाप्त हो जाता है वह साम्यावस्था में आ जाती है, (क्योंकि तीनों गुणों की विषमावस्था ही व्युत्थान में हेतु है) फिर से उदित नहीं होगी यही षष्ठ प्रज्ञा है। इसी को एक उदाहरण से स्पष्ट किया गया है- यथा पर्वत चूडा से बृहत् उपलखण्ड नीचे गिरने पर पुनः अपने स्थान में नहीं लौटता उसीप्रकार गुणसमूह भी अव्यक्त प्रकृति में लीन होने के उपरान्त पुनः उदित नहीं होते। नित्य मुक्त होने के लिए योगी का पथ प्रशस्त हो जाता है। (यहाँ गुण से अभिप्राय सुख दुःख मोह रूप बुद्धि का गुण मौलिक त्रिगुण नहीं) यही द्वितीय प्रकार की चित्त विमुक्ति प्रज्ञा है।

७) "एतस्यामवस्थायां गुणसम्बन्धातीतः स्वरूपमात्रज्योतिरमलः केवली पुरुष इति"³⁷

पूर्वाक्त छः भूमिकाओं का अभ्यास हो जाने पर और भेद न दिखाई देने पर जो आत्मभाव में अविचलित स्थिति हो जाती है इसी अन्तिम प्रज्ञा में साधक गुणों के सम्बन्धों से रहित स्वप्रकाश निर्मल केवली एकाकी द्रष्टा मात्र चित्तवृत्ति की प्रतीति से रहित अनुभव करता है। यही कैवल्य विषयक सर्वोत्तम प्रज्ञा है परन्तु कैवल्य नहीं है। इन सात प्रान्तभूमि प्रज्ञाओं से अवगत हो जाने पर साधक को कुशल कहा जाता है। "एतां ससविधां प्रान्तभूमिप्रज्ञामनुपश्यन् पुरुषः कुशल इत्याख्यायते"³⁸ यही जीवन्मुक्ति की अवस्था है अर्थात् जीवनकाल में ही जो दुःख संपर्क क्लेशादि से निःस्पृह है एवं गुणों के सम्पर्क से सर्वथा रहित है।

³⁴ तत्त्ववैशारदी, पृ. २५९

³⁵ योगदर्शन, २/२७, व्यास भाष्य, पृ. २५५

³⁶ तथैव, पृ. २५५

³⁷ तथैव, पृ. २५५

³⁸ तथैव, पृ. २५५



उपसंहार -

व्यक्त जगत् में चित्त से बढकर शक्तिशाली कोई पदार्थ नहीं है। चित्त ही जगत् की सृष्टि करता है, चित्त ही सभीप्रकार सुख दुःख के उत्पादक है और चित्त ही वासना रहित हो जाने पर ब्रह्म हो जाता है। चित्त जब इन जागतिक मलिन वासनाओं से सम्पृक्त होकर आत्मस्वरूप का विस्मरण होने से कर्तृत्वपन का निश्चय कर लेता है यहीं से समस्त प्रपञ्च का विस्तार होने लगता है। ब्रह्म की चेतन शक्ति से ही प्रकृति चेतनवत् दिखाई पडती है। कोई भी दर्शनों का अन्तिम उद्देश्य इन जागतिक प्रपञ्च से मुक्त होना है। बुद्धि को इन मलिन वासनाओं से असम्पृक्त होकर परम सत् की ओर आगे बढना है। ऐसा ही योगदर्शन में भी बताया गया है। जहाँ साधक प्रथम बुद्धि के कार्यों से स्वयं को विमुक्त कर लेता है पुनः जब बुद्धि का समस्त अधिकार समाप्त हो जाता है तब बुद्धि इन जागतिक प्रपञ्च से स्वरूप में अर्थात् आत्मा में प्रतिष्ठित हो जाती है जिससे साधक स्वयं प्रकाश आनन्दस्वरूप होकर जीवन्मुक्त स्थिति में विराजमान होता है। इस कार्य को कैसे सम्पादित करना है यही योगदर्शन में बुद्धि के सप्त सोपानो के माध्यम से स्पष्ट किया गया है कि प्रथम दुःख को जानना है तदनन्तर दुःख के उपायो को, पुनः मोक्ष को और मोक्ष के उपाय को भी जानना है - इन चार कार्यों को प्रथम चार प्रज्ञा से सफल करते हुए साधक प्रज्ञा की चरम अवस्था जहाँ विवेकख्याति के सदा उदित रहने से द्रष्टा और दृश्य के भेद ज्ञान में कुशल हो जाते है, पहुँच जाता है। यही चित्त विमुक्ति है।

सन्दर्भ ग्रन्थ -

1. डॉ सुरेशचन्द्र श्रीवास्तव, पातञ्जलयोगदर्शनम् व्यासभाष्य-संवलितम् तच्च योगसिद्धि-हिन्दीव्याख्योपेतम्, चौखम्बा सुभारती प्रकाशन, २०१२
2. श्रीमत स्वामी हरिहरानन्द आरण्य, पातञ्जल योगदर्शन व्यासभाष्य, हिन्दी अनुवाद तथा सुविशद व्याख्या, मोतीलाल बनारसीदास, नवम् पुनर्मुद्रण दिल्ली, २०१७
3. प्रो. ज्ञानप्रकाश शास्त्री, महर्षि पतञ्जलिकृत योगसूत्र (महर्षि-व्यासकृत-योगसूत्रभाष्य और आचार्य रजनीश के विचारों के आलोक में), परिमल पब्लिकेशन्स दिल्ली, प्रथम संस्करण २०१६

शुक्लयजुर्वेदीय मेधासूक्तस्य प्रकृतिपाठानाम् विवेचनम्

Pankaj Kumar Sharma

भारतीयानां वेदा एव सर्वस्वम्। सनातनधर्मकर्मसंस्कृतिश्च
वेदानुसारं प्रवहति तथा च समस्तधर्माणाम् मूलमपि वेदा इति।

मनुनोक्तम्-“वेदोऽखिलो धर्ममूलम्”¹।

“विद् ज्ञाने” इति धातोः घञ् प्रत्यय कृते वेदशब्दस्य
निष्पत्तिर्भवति। भारतीयपरम्परायाः आचार-विचार-धर्मकर्मादि
सम्यगवज्ञानार्थं वेदाध्ययनाध्यापनश्च अत्यावश्यकं अस्ति।

उक्तञ्च पतञ्जलिना-

“ब्राह्मणेननिष्कारणोधर्मःषडङ्गोवेदोऽध्येयोज्ञेयश्च”²इति।

वेदेषु मुख्यतया समस्तज्ञानविज्ञानराशिः प्रकृतिपाठेषु समुपलभ्यते।
प्रकृतिपाठेषु संहितापाठः, पदपाठः, क्रमपाठश्च समायान्ति।

कातीयचरणव्यूहेऽस्मिन् प्रकृतिपाठान् “स्थानानि” इत्युक्तम्।

उक्तञ्च-

“तत्र ऋग्वेदस्याष्टौ स्थानानि भवन्ति। प्रकृतिनाम संहिता-ब्राह्मणम्,
पदपाठः, क्रमपाठः इमानि चत्वारि प्रकृतिभूतानि”³।

¹ मनुस्मृतिः 2.6

² आचार्यमहाभाष्ये 1.1.1

मया शोधपत्रेऽस्मिन् मेधासूक्तं गृहीतम्। एतत्सूक्तं शुक्लयजुर्वेदीय
माध्यन्दिनसंहितायाः द्वात्रिंशत्तमोऽध्यायादुद्धृतः।

मेधासूक्तस्य वैशिष्ट्यम्प्रयोजनञ्च-

वैदिकगुरुकुलेषु समस्तविद्यार्थीनां मेधाशक्तिवर्द्धनार्थं तथा
वैदिकवाङ्मयेऽस्मिन् प्रतिपादितनानाविधगूढविषयाणाञ्च
सम्यगवगमनार्थं मेधासूक्तस्य पारायणमनुष्ठानम्पाठञ्च भवति।
एतेनसूक्तमाध्यमेनावश्यं सर्वेषाम् मेधाशक्तेः वृद्धिर्भवति।

प्रकृतिपाठेषुसंहितापाठः-

संहितालक्षणम्- “वर्णानां एकप्राणयोगः संहिता”⁴॥ वैदिकवर्णानां
एकश्वासमाध्यमेन उच्चारणं यत्र भवति सा संहिता इति कथयति।

अन्यशास्त्रेषु संहिता लक्षणानि तावत्-

“परः सन्निकर्षः संहिता”⁵।

“संहिता पदप्रकृतिः”⁶।

“पदान्तान्पदादिभिः संदधदेतियत्साकालाव्यवायेन”⁷।

“गुरुक्रमेणाध्येतव्यः ससन्धिः सावसानकः।

³ कातीयचरणव्यूहः

⁴ शुक्लयजुःप्रातिशाख्यम् 1.158

⁵ सिद्धान्तकौमुदी

⁶ ऋग्वेदप्रातिशाख्यम्

⁷ ऋग्वेदप्रातिशाख्यम्



त्रिस्वरोऽपरिवर्त्यश्च पाठ आद्यस्तुसंहिता” ॥

प्रकृति पाठेषु सर्वप्रथमः संहिता पाठः समायाति।

॥प्रकृतिपाठेषु मेधासूक्तस्य संहितामन्त्राः॥

हरिं ÷ ॐ स दं स॒स्पति॑म॒द्भुत॑मि॒प्रियमिन्द्र॑स्य॒काम्य॑म् ॥

स॒नि॒म्मे॒धाम॑यासिष॒ष्ठ॒स्वाहा॑ ॥ १ ॥

याम्मे॒धान्दे॒वग॑णा॒पित॑रंश्चो॒पास॑ते ॥

तया॒माम॑द्यमे॒धया॑ग्नेमे॒धावि॑नङ्कुरु॒स्वाहा॑ ॥ २ ॥

मे॒धाम्मे॒ध्वरु॑णोददातुमे॒धाम॑ग्निं॒प्रजा॑पति ॥

मे॒धामिन्द्र॑श्चवा॒युश्च॑मे॒धान्धा॑ताददातु॒स्वाहा॑ ॥ ३ ॥

इ॒दम्मे॒ब्रह्म॑चक्ष॒त्रञ्चो॒भेश्रिय॑मश्रुताम् ॥

मरि॑दे॒वाद॑धतुश्रियंमुत्त॒मान्त॑स्यै॒ते॒स्वाहा॑ ॥ ४ ॥

॥इतिसंहितापाठः॥

॥प्रकृतिपाठेषु पदपाठः॥

वैदिकमन्त्रेषु प्रतिपादितनानाविधगूढविषयाणामर्थप्रयोजनञ्च
सम्यक्तयावज्ञानाय मन्त्रद्रष्टृभिः महर्षिभिः पदपाठानामविष्कारः
कृतः।

पदलक्षणम्- “अर्थः पदम्⁸” ॥

अर्थवाचकशब्दाः अर्थवाचीशब्दसमुदायश्च पदपाठः इत्युच्यते।

“सुसिद्धन्तं पदम्”⁹ ॥

“पदविच्छेदोऽसंहितः”¹⁰

“पदपाठे संहितायाः पदानि समधीयते।

विच्छिद्य सन्धिं, तस्मात्तु स्वर-वर्णविपर्ययः॥

दृश्यते तस्य विज्ञानं कार्यं स्यात् पार्षदादिभिः।

न तत्र सम्प्रदायाद्धि विशेष इति नोच्यते”¹¹ ॥

पदप्रकारा-

कातीयप्रातिशाख्यग्रन्थे चतुष्प्रकाराः पदपाठाः इत्युक्ताः॥

⁸ शुक्लयजुःप्रातिशाख्यम्

⁹ सिद्धान्त कौमुदी

¹⁰ शुक्लयजुःप्रातिशाख्यम्

¹¹ कात्यायनीयशुक्लयजुःप्रातिशाख्य ज्योत्स्नावृत्तिःपृष्ठ 313



“क्रियावाचकमाख्यातमुपसर्गोविशेषकृत्।

सत्वाभिधायकं नाम निपातः पादपूरणः”¹² ॥

यथा-

पाहि इति आख्यातपदम्।

परां इति उपसर्गः।

वा, च, उत इति निपाताः।

सविता इति नामपदम्।

॥प्रकृतिपाठेषु मेधासूक्तस्य पदमन्त्राः॥

सदंसः। पतिम्। अद्भुतम्। प्रियम्। इन्द्रस्याकाम्यम्।

सनिम्। मेधाम्। अयासिषम्। स्वाहा ॥१॥

याम्। मेधाम्। देवगुणाऽइतिदेव गुणाः। पितरं३। च।

उपासंतऽइत्युप आसंते॥

तया। माम्। अद्या मेधया। अग्ने मेधाविनम्। कुरु।

स्वाहा॥२॥

मेधाम्। मे। वरुणः। ददातु। मेधाम्। अग्निः३।

प्रजापतिरितिप्रजा पतिः॥

¹² शुक्लयजुःप्रतिशाख्यम् 8.56



मे॒धाम्। इन्द्रं॑। च। वा॒युः॑। च। मे॒धाम्। धा॒ता। द॒दा॒तु।
स्वाहा॑॥३॥

इ॒दम्। मे। ब्र॒ह्म। च। क्ष॒त्रम्। च। उ॒भेऽइत्यु॑भे।
श्रि॒यम्। अ॒श्रुता॑म्॥

म॒रि॒यै। दे॒वाः॑। द॒ध॒तु। श्रि॒यम्। उ॒त्त॑मा॒मित्यु॑त् त॒माम्। त॒स्यै। ते।
स्वाहा॑ ॥४॥

॥इतिपदपाठः॥

॥प्रकृतिपाठेषु क्रमपाठः॥

वैदिकमन्त्राणां सुरक्षार्थं, मन्त्रेषु स्वरवर्णाद्यपरिवर्तनार्थं, मन्त्रद्रष्टारैः
यथावन्मन्त्रदृष्टम् तद्वत्स्थितिरुपतार्थं, प्राचीनैर्मन्त्ररक्षकैर्महर्षिभिः
क्रमपाठस्य प्रवचनं कृतम्। क्रमपाठमाध्यमेन संहितामन्त्राणां
यथावद्रूपता भवति। एतदेव क्रमपाठस्य प्रयोजनम्।

क्रमलक्षणम्-

“द्वे द्वे पदे सन्दधात्युत्तरेणोत्तरमावसानादपृक्तवर्जम्”¹³॥

“क्रमेणपदद्वयपाठः”

¹³ वा. प्रातिशाख्यम् 4.183



“पदपाठे पठितयोर्द्वयोः सामान्यतः परम्।

ससन्धिः पदयोः पाठः क्रमपाठस्तु कथ्यते॥

क्वचित् तत्रापि त्रयाणां चतुर्णां वा ससन्धिकः।

पाठो विधीयते सोऽपि प्रातिशाख्यानुसारतः”¹⁴॥

अपृक्तपदं त्यक्त्वा द्वे द्वे पदे संहिते उच्चार्य,तयोर्मध्ये उत्तरेण तदुत्तरम् अवसानपर्यन्तं द्वे द्वे पदे संहिताया उच्चारयति स क्रमः भवति।क्रमपाठे अपि द्विक्रमः,त्रिक्रमः,चतुष्क्रमभेदाश्च सन्ति।

यथा –उप॑त्वा।

त्रिक्रमः-म॒हीमू॑षु।

चतुष्क्रमः-ऊ॒र्द्ध॑ऽऊ॒षूणः॑

प्रकृतिपाठेषुक्रमपाठमन्त्राः-

सद॑स॒स्पति॑म्। पति॑मद्भु॒तम्। अद्भु॑तमि॒प्रिय॑म्। प्रि॒यमिन्द्र॑स्य।

इन्द्र॑स्य॒काम्य॑म्। काम्य॑मि॒ति॒काम्य॑म्॥

स॒निम्मे॑धाम्। मे॒धाम॑यासिषम्। अ॒या॒सि॒ष॒ऽस्वाहा॑।

स्वाहे॑ति॒स्वाहा॑ ॥१॥

¹⁴ कात्यायनीयशुक्लयजुःप्रातिशाख्य ज्योत्स्नावृत्तिःपृ ३ 313



याम्मेधाम्। मेधान्देवगुणाः। देवगुणाःपितरं३। देवगुणाऽइतिदेव
गुणाः। पितरंश्च। चोपासंते। उपासंतुऽइत्युपु आसंते॥

तयामाम्। मामद्य। अद्यमेधया। मेधयाग्ने। अग्नेमेधाविनम्।
मेधाविनङ्कुरु। कुरुस्वाहा। स्वाहेतिस्वाहा ॥२॥

मेधाम्मे। मेघरुणः। वरुणोददातु। ददातुमेधाम्। मेधामग्निः।
अग्निःप्रजापतिः। प्रजापतिरितिप्रजा पतिः॥

मेधामिन्द्रं३। इन्द्रंश्च। च्वायुः। वायुश्च। चमेधाम्। मेधान्धाता।
धाताददातु। ददातुमे। मेस्वाहा। स्वाहेतिस्वाहा ॥३॥

इदम्मे। मेब्रह्म। ब्रह्मच। चक्षत्रम्। क्षत्रञ्चोभे। उभेश्रियम्।
उभेऽइत्युभे। श्रियमश्रुताम्। अश्रुतामित्यश्रुताम्॥

मर्यिदेवाः। देवादधतु। दधतुश्रियम्। श्रियमुत्तमाम्।
उत्तमान्तस्यै। उत्तमामित्युत् तमाम्। तस्यैते। तेस्वाहा।
स्वाहेतिस्वाहा ॥४॥

॥इति प्रकृतिपाठेषु क्रमपाठः॥

॥शम्॥



सन्दर्भग्रन्थसूची-

1. शुक्लयजुर्वेदीयसंहिता
2. शुक्लयजुर्वेदीयपदपाठः लेखकः युधिष्ठिरमीमांसकः
3. वाजसनेयिप्रातिशाख्यम्
4. वेदशाखापर्यायलोचनम् लेखकः श्रीकिशोरमिश्रः
5. ऋग्वेदप्रातिशाख्यम् लेखकः डा. वीरेन्द्रवर्मा
6. कात्यायनीयशुक्लयजुःप्रातिशाख्य ज्योत्स्नावृतिः 1989