

DEVELOPING THE CONFLUENCE OF MANAGEMENT SKILLS AND CREATIVITY FOR THE SCHOOL HEADS

Paper ID	IJIFR/V4/ E2/ 005	Page No.	5058-5065	Subject Area	Education
Keywords	School Heads, Creativity, Management Skills, Managerial Creativity				

Challang R Marak

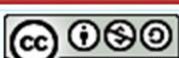
**Senior Lecturer,
District Institute of Education & Training,
Tura-Meghalaya**

Abstract

Acquiring a generalized managerial skill that is creative and constructive but not critical, proactive but not reactive, perceptual but not logical is a plausible solution for a school head as a school leader and manager. Some researchers viewed that the jobs of principals are arduous to manage due to changing school scenario in a global world nevertheless with directive to equip for competitive advantage. With the universal organizational struggle getting tougher, mere management competency or being creative, singularly often proves to be insufficient. Hence, it was pertinent to enter into the domain of 'managerial creativity', which is in fact 'finding solutions of the problems, managing physical/human/financial resources of school in creative ways furnishing a winning edge to any manager or a leader of any organization or a school. Reiterating, Turkson & Appiah (2009), that creativity add a very pertinent flavour to the practice of management by people in all forms of managerial positions and that in the absence of practical application of creativity, these managers cannot be visionary leaders. Although, from the studies reassessed, a variable 'managerial creativity' for the sample 'school heads' were left unidentified. The need to develop the scale that measures the confluence of management skills and creativity for the school heads became imperative.

I. INTRODUCTION

The role of leadership is a critical ingredient, "second only to classroom instruction among school related factors that affect student learning in school". Thus, school leadership and student outcomes have recently come to receive greater attention in research and among policy makers in United States and England (Leithwood, et.al 2004). However, in contrast to the international emphasis, literature on importance and consequences of school



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License
Copyright © IJIFR 2016

leadership in Indian context is as sparse as the attention it receives in policies and programs is a neglect (Azim Premji Foundation, 2011).

The success of school organisation whether it be at the higher secondary level, secondary level or the elementary level depends upon the effective leadership and management of the head of the institution. In the 21st century the efforts of the head of the institution has been widely recognised as one that is very crucial in bringing about Quality Education. School being as a social organisation has a collective sets of goals and objectives (Krishnamacharyulu, 2006). The school manager's management skills can bring about coordination of work among many functioning under one roof; it competently and effectively leads to achieve the organisational objectives (Kreitner, 2004). However, today, in a world full of competition, it is not usually possible to manage the school by following stereotype routines, so the head of the school should embark upon using his/her creative ability skills to manage the school. The heads of the school needs to map out and explain more fully, the richness and complexity of skilfulness, resourcefulness, ingenuity, inventiveness, originality, fluency, flexibility, and evaluative execution of managerial responsibilities. There is a need for divergent thinking abilities in the open ended tasks of the schools as leaders. Hence, leadership traits with managerial creativity is the need of the present global humanity; schools, at present should be guided and directed by leaders who uses their management skills fused with creativity to solve problems they encounter in regular processes and operations of school management.

II. JUSTIFICATION OF THE STUDY

Nonetheless, while arriving at the most common platform of empirical understanding, a few recent research studies on "managerial creativity" were initiated in India (Jain, et.al.2011; Rashid, 2012 & Wadhwani, 2014), with samples like executives, school/ college principals and secondary school/tribal teachers. Though, a self constructed Managerial Creativity Test for higher education students by Wadhwani (2014) as well as self developed/standardized Managerial Creativity Scale (MCRS) keeping in view the organizational executives by Jain.et.al (2011) found, were not presently appropriate for the sample under study. Studies in Abroad (Duze,2011; Scratchley.et.al , 2001; Turkson & Appiah, 2009; Anderson, 2006; Mathibe,2007 and Scratchley, 1998) depicted 'managerial creativity' as a quality of managers engulf with creativity for managing an organization towards growth and development. The need to develop the Managerial Creativity Scale for the Heads of Primary Schools (MCS_{HPS}) arose. Thus, Managerial Creativity is operationally defined as the confluence of components like *getting things done, developing staff, improving self* and leading towards organisational *success* through leadership, *expertise, motivation* and *creative thinking skills*.

III. SAMPLE OF THE STUDY

The sample of the present study consists of Heads of Government primary schools located in semi-urban Garo Hills Districts of Meghalaya. The proportionate stratified

random sampling technique was used to select. On the basis of different stages of test constructions and standardization, the initial sample strength for the three phases of try-out was divided as 10%, 20% and 10% of total population, for the proportional representation of Government Primary school heads from all the blocks of the districts under study.

IV. DEVELOPING THE MANAGERIAL CREATIVITY SCALE FOR THE HEADS OF PRIMARY SCHOOLS (MCS_{HPS})

4.1 Item Writing

The item writing for the 5 point Likert Managerial Creativity Scale for the Heads of Primary Schools (MCS_{HPS}) were framed in accordance to the learning domain of Bloom's Taxonomy of cognitive domain, affective domain and psychomotor domain. Through the confluence of components from *Management Skill Pyramid* of F.John Reh (2009) with the *Componential Theory of Creativity* of Teresa Amabile (1983), the items in accordance to the 20 dimensions of Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}) were shaped in forms of favourable or unfavourable statements. The items written incorporated the views of field experiences obtained through Focus Group Discussion and/or Personal interviews. This was reflected through the item statements. Efforts were made to merge in all the 7 Confluence of Components towards the shaping of the 20 multi-dimensions of Managerial Creative Scale for Heads of Primary Schools (MCS_{HPS}) by comprehensively taking into account the role of creativity in the managerial responsibilities of school heads pertaining to management, school management, leadership, school leadership and creativity as shown in Table 1.1. Items shaped depicted the dimension under the confluence of components from Management Skills Pyramid and Componential Theory of Creativity. Positive statements were initially framed, half of it was rewritten in negative form and eventually it was edited subjected to expert's comments, suggestions and criticisms. The steps followed are shown below.

4.2 Stages of Construction and Standardization

4.2.1 Stage I: Preliminary Try-out: The statements selected for the preliminary try out were 176, containing 50% of positive polarity and 50% of negative polarity. The statements were given for 20 expert opinions views for comments, suggestions and necessary modifications to be incorporated in subsequent try-outs. Based on the 20 dimensions of MCS_{HPS}, Personal Interviews (PI) and Focus Group Discussions (FDGs) with experienced Head Teachers in the field of school management also reinforced the statements. FDGs with the Sub-Divisional School Education Officers of Government of Meghalaya added much significance to the authenticity of the determining statements of the 7 confluence of components merged from Management Skills Pyramid and Componential Theory of Creativity. Out of 176 primary statements, after meticulously incorporation and/or elimination, 146 items were found suitable for the first try-out.

4.2.2 Stage II: First Try out The first tryout MCS_{HPS} was done with 146 statements, i.e 73 negative polarity items and 73 positive polarity items. This was administered to a sample of

165 randomly selected Heads of Primary Schools. MCS_{HPS} booklets with incomplete responses to a maximum of 3 items were to be eliminated from analysis.

4.2.3 Stage III: ItemAnalysis: After obtaining the total score for each respondent, the step for analysis was applied by following Kelly's method. The highest 27% and the lowest 27% is then taken out to provide the best compromise between the two desirable and inconsistent aims- (i) to make extreme group as large as possible and (ii) to make extreme group as different as possible. The scores obtained for each item in these two extreme groups were used for calculating the discriminating power of each item. The discriminating power was obtained by calculating the critical ration "t" by using the formula given by Edwards (1957).

4.2.4 Stage IV: Selection and Preparation of Final Items: Altogether 80 items having p-value of 2.75 and above were selected and the 66 items having p-value below 2.75 were rejected. The items of MCS_{HPS} were arranged in order of their discriminative value. Equal number of positive and negative items was selected encompassing every confluence of components and dimensions in a proportionate manner. The 80 items selected through item analysis were evaluated for language appropriateness by the experts and on the suggestion of experienced heads of primary schools and educationists, the statements were translated into Garo language in order to obtain true and correct reply from the respondents belonging to the two Garo Hills Districts of Meghalaya .

4.2.5 Stage V: Final Try-Out : Out of selected 80 items having p-value of 2.75 and above, only 42 selected items in consistent to the confluence of components and multi-dimensions of MCS_{HPS} were prepared after the item analysis for the final try out of the scale as shown. After compulsory preparation for the final try-out, the MCS_{HPS} was distributed amongst 82 primary school heads of the two districts of Garo Hills region of Meghalaya for establishing the parameters of validity, reliability, usability and norms of MCSHPS.

Table 1.1 Final number of items in consistent with dimensions of MCSHPS

Sl No	Confluence of Management Skills and Creativity	Dimensions of Managerial Creativity	Positive	Negative	Total
1	Get it done	1. Planning 2. Organising 3. Directing 4. Controlling	4	4	8
2	Develop staff	1. Motivation 2. Training and Coaching 3. Involvement	4	4	8
3	Improve self	1. Time Management 2. Self Management	2	2	4
4	Success	1. Vision 2. Mission 3. Ambition	3	3	6
5	Expertise	1. Hard skills 2. Soft skills	2	2	4
6	Motivation	1. Extrinsic Motivation	2	2	4

		2. Intrinsic Motivation			
7	Creative thinking skills	1. Fluency 2. Flexibility 3. Originality 4. Elaboration	4	4	8
	Total	20 Dimensions	21	21	42

4.2.6 Stage IV: Standardization of MCS_{HPS}: The vital standardization procedure through establishment of validity, reliability, usability and norms was made.

4.2.7 Establishing Validity: The validity of present scale was estimated through Face validity, Content validity and internal consistency validity.

The **face validity** of the Managerial Creativity Scale for the Heads of Primary Schools (MCS_{HPS}) was estimated in the pre-tryout of the preliminary draft stage by a series of systematic consultations of items during the process of construction. Multiple FDGs gave an impetus to the validity of the scale through their ideas of field experiences which were much in tandem with the confluence of components and dimensions for the construction of the scale. The **content validity** of the Managerial Creativity Scale for Heads of Primary schools (MCS_{HPS}) was ensured through meticulous evaluation of the items by the educationists and experts, like Sansanwal, D.N (2016) ; Nongbri, C (2015); Awasthi, K (2015); Sharma, D (2014); Madhusudan, J.V (2014); Marak , F.K (2014); Momin, N.S .C (2014)& Marak, M (2014). Ambiguous statements, vague words and double barrel statements were accordingly reworked or removed after the item evaluation stage. The **internal consistency validity** was found during the item analysis stage.

4.2.8 Establishing Reliability : In order to determine the external consistency reliability of the Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}), final 42 items were administered to 82 subjects belonging to West and South-West Districts of Garo Hills of Meghalaya. To establish predictability or stability of the scale test-retest was conducted on the scale. After a gap of 4 weeks, the same scale was administered again to the same group of respondents. The scores obtained were calculated and the reliability index was found to be at .72 and is significant at 0.01 levels of confidence, meaning that 72% of the variance in the scores are reliable and 28% is the error variance. However, in order to determine the internal consistency reliability or the coefficient alpha reliability of the scale, the 42 items were divided into 21 odd items and 21 even items, the Cronbach's Alpha in SPSS was used and reliability coefficient obtained is .835 while Cronbach's Alpha Based on Standardized Items obtained is .891 indicating that MCS_{HPS} measures variable with extremely high reliability. The reliability of the Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}) is highly reliable externally and internally.

4.2.9 Establishing Usability: The Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}) can be used for individual as well as group administration. The MCS_{HPS} during individual administration can be enhanced by an open ended personal interview and Focus Group Discussions to map out and explain more fully, the richness and complexity of

creativity in the managerial responsibilities of the school leaders with a scope shaped out for divergent thinking responses.

4.2.10 Scoring Procedure: The scoring procedure for each answer to every statement is as given in the Table 1.2. The range of scores for the Managerial Creativity Scale for Heads of Primary Schools (MCSHPS) is 42 to 210, wherein the minimum scores could be 42 (i.e 1 x 42) and maximum scores could be 210 (i.e 5x42).

Table 1.2: Scoring Procedure Managerial Creativity Scale for Heads of Primary Schools

Degree of Favourability→	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Polarity of Items↓	(S A)	(A)	(U)	(D)	(SD)
Positive Items	5	4	3	2	1
Negative Items	1	2	3	4	5

4.2.11 Establishing Norms and Interpretation: Percentile norms for the whole scale as per quartile deviation were established on the basis of raw scores made against the sex criterion. The score under each percentile are illustrated in the table 1.2. The interpretation of percentile norm is done on the basis of quartile as given in Table 1.3. A very high score above the 76th percentile is found to have High Managerial Creativity (HMC). Moderate Managerial Creativity (MMC) is scores from P₅₁ above to P₇₅. Low Managerial Creativity (LMC) is identified between percentiles P₂₆ to P₅₀. Scores between P₀₅ to P₂₅ are Very Low Managerial Creativity (VLMC).

4.2.12 Description of Managerial Creativity Level: The description of the interpretation (Table 1.4) of the various level of Managerial Creativity of the Heads of primary schools is indicative that heads of government primary schools with High Managerial Creativity levels are described as those who operationally merged in operating managerial skills with creativity in their leadership responsibilities; Moderate Managerial Creativity level scorers are those who need support through motivation, training and coaching, in hard skills & soft skills for fluency, flexibility, originality and elaboration of ideas/skills for development of Managerial Creativity Skills in their managerial positions. Low Managerial Creativity scorers are heads that needs to be sensitized, made aware and motivate about the force of creativity while getting things done, developing staff, improving self and achieving success as a leader of the school. Very Low Managerial Creativity scores are indicative of utter negligence in skills of managerial dimensions as well as creativity dimensions.

Table 1.3: Percentile Norms and Interpretation of Managerial Creativity Level

Percentile	Raw Score Of Male Head Teachers	Raw Score Of Female Head Teachers	Interpretation Of Managerial Creativity Skills Level
P ₉₅	177	175	High Managerial Creativity
P ₉₀	174	172	

P ₈₅	172	160	Moderate Managerial Creativity
P ₈₀	169	168	
P ₇₅	167	167	
P ₇₀	165	166	
P ₆₅	164	164	
P ₆₀	163	163	
P ₅₅	161	162	
P ₅₀	159	160	Low Managerial Creativity
P ₄₅	158	159	
P ₄₀	156	157	
P ₃₅	155	156	
P ₃₀	154	155	
P ₂₅	152	154	Very Low Managerial Creativity
P ₂₀	150	153	
P ₁₅	148	151	
P ₁₀	144	147	
P ₀₅	136	145	

Table 1.4: Interpretation and Description of Managerial Creativity Level

Managerial Creativity Level	Description Of The Managerial Creativity
High Managerial Creativity	Totally involved in Managerial Creativity Skills.
Moderate Managerial Creativity	Needs Support for Managerial Creativity Skills.
Low Managerial Creativity	Affirms attention for Creativity in Managerial skills.
Very Low Managerial Creativity	Negligent of skills for Managerial responsibilities.

V. DIRECTION OF ADMINISTRATION OF THE SCALE

The heads of the primary schools were contacted and Managerial Creativity Scale for Heads of Primary Schools (MCS_{HPS}) were administered either individually or in groups. Instructions were given as per as the booklet cum answer-sheet. Each of the school head were asked to answer spontaneously to the items by reading carefully and responsibly with accountability as a school manager. Alongside, on each of the dimension of the scale, Personal Interviews and Focus Group Discussions were followed to qualitatively supplement the responses obtained to understand their divergent skills of creativity in managing and leading their schools.

VI. CONCLUSION

Although the management literature has hailed managerial creativity as a necessity in current climate of rapid change and global competition, little has been done to help organisations to identify and select managers who have potential to be creative on a job more so in education in general and schools in particular. This psychological tool can help in identifying and selecting teachers into management positions in school, teacher who not



only have teaching competency but potential to take the school in new and useful directions. This scale can help in identification of managerial creativity of individual school leaders and can be used for the purpose of recruitment, promotion, training, professional development and certification of the primary school heads irrespective of gender, training , experiences and location of school.

VII. REFERENCES

- [1.] Amabile, T. (1983).The Social Psychology of Creativity. New York: Springer-Verlag.
- [2.] Anderson, P (2006), Creativity and Innovation in a Turbulent Environment. *Journal of Managerial Excellence*, 2(3), p.69.
- [3.] Azim Premji Foundation (2011). Special Issue on School Leadership. *Learning Curve*. Vol 16 (March). Pragathi Prints: Bangalore.
- [4.] Duze, C.O. (2011). Students' and teachers' participation in decision-making and impact on school work and school internal discipline in Nigeria. *African Research Review*. 5(2): 200-214.
- [5.] Edwards, A.L. (1957). Technique of Attitude Scale construction. Appleton century Crafts, Inc. Chapter. 6, 149-157.
- [6.] Jain, S., Jain R., & Dhar, U.(2011) Managerial Creativity Scale. Agra: National Psychological Corporation.
- [7.] Kreitner, R. (2004). Management (9th ed.). Boston: Houghton Mifflin.
- [8.] Krishnamacharyulu, V. (2006). School Management and Systems of Education. New Delhi: Neelkamal Publications.
- [9.] Leithwood, K., Louis, K. S., Anderson, S., & Wahlstrom, K. (2004). How Leadership Influences Student Learning: *Review of Research*. New York: Wallace Foundation.
- [10.] Mathibe, I. (2007). The Professional Development of School Principals. *South African Journal of Education*, 27, 523-540.
- [11.] Rashid, F. (2012) Managerial Creativity and Work Motivation of Secondary School Tribal Teachers In Relation To Their Occupational Self Efficacy. *Journal Of Humanities And Social Science*. 3 (6), 53-60.
- [12.] Reh, J .F (2009) The Management Skills Pyramid. Retrieved from <http://management.about.com/od/managementskills /a/ManagementSkillsPyramid.htm>
- [13.] Wadhwani. P. (2014) Managerial Creativity as a Function of Discipline of Study and Risk Taking Behaviour and their Interaction. *Journal of Management & Research*, 8 (1/4).497.
- [14.] Scratchley, L.S & Hakstian, A.R (2001) . The Measurement and Prediction of Managerial Creativity. *Creativity Research Journal*. 13, (3 & 4). 367-384.
- [15.] Scratchley, L. S. (1998): Managerial Creativity- The Development and Validation of a Typology and Predictive Model. Ph.D. (Psy.), University of British Columbia.
- [16.] Turkson, J.K. & Appiah, K. O (2009) .Managerial Creativity and Innovation: A Panacea for Organizational Change and Development. *Global Business and Economics Anthology*. 2. 117-126.

To Cite This Article

Marak, R. C. (2016): “Developing The Confluence Of Management Skills And Creativity For The School Heads”. International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5058-5065, PaperID: IJIFR/V4/E2/005.

ANALYZE THE MECHANICAL PROPERTIES OF ALUMINUM 6061 ALLOY USING FRICTION STIR WELDING

Paper ID

IJIFR/V4/ E2/ 007

Page No.

5066-5071

Subject Area

Mechanical Engineering

Keywords

Friction Stir Welding (FSW), Aluminium Alloy 6061, Tool Rotational

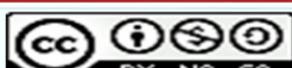
1	Kapil Singh	Associate Professor Department of Mechanical Engineering ARNI University, Himachal Pradesh(India)
2	Sushil Kumar	M.Tech. Student Department of Mechanical Engineering ARNI University, Himachal Pradesh(India)

Abstract

The present work is the analysis of the influence shown on the process parameters like (tool speed, feed rate and shoulder diameter) on the metallurgical and mechanical properties of the joints fabricated by Friction Stir Welding. Now-a-days, in many industrial applications the steels are replaced by non-ferrous alloys, in most cases by aluminum alloy. The aluminum 6061 alloy is most commonly used in aerospace and automobile industries. Friction Stir Welding (FSW) is considerably new joining process that has exhibited many benefits over traditional arc welding process including greatly reducing distortion and eliminating solidification. The FSW joints have higher tensile strength to weight ratio and finer micro structure. The samples were taken under the tool rotational speed of 1950, 3080 and 4600 rpm. The present study is done to think about the impact of input parameters on the tensile strength. The tensile quality is mostly influenced by tool speed. The parameters taken in this examination are tool rotational speed, feed rate and shoulder diameter. The greatest tensile strength is obtained at Tool Speed- 3080 rpm, Feed Rate- 20mm/min and Shoulder Diameter across 20mm.

I. INTRODUCTION

Welding is system in which we join two or more homogenous or distinctive materials with exertion of warmth and with or without use of weight. For the welding process, the most



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

essential base is heat. There are two sorts of welding i.e. conventional welding and stir welding. Here we talk about the Friction Stir Welding (FSW). The concept of FSW is simple in which A non-consumable rotating tool with a specially designed pin and shoulder is inserted into the abutting edges of sheets or plates to be joined till the shoulder contact the top surface of work piece and traversed along the line of joint to produce the weld(Fig1). The tool serves primary functions:

- heating of work piece;
- deform the material ;
- movement of deform material to produce the joint.

Aluminium is one of the most common alloys which is widely used in several application over the automotive and aircraft industries because of their light weight properties, better corrosion resistant and high strength to weight ratio.

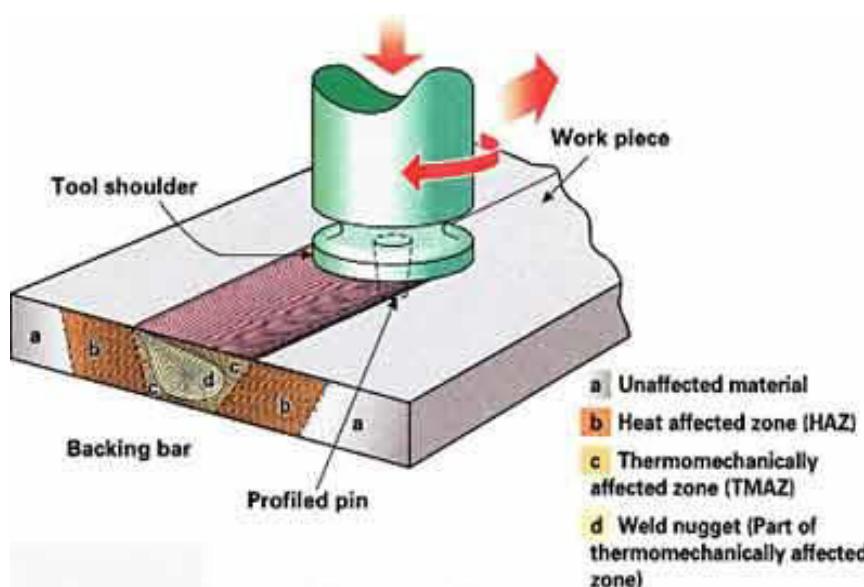


Figure 1: Friction Stir Welding

FSW have the advantages over conventional welding are:

- Strong mechanical properties
- Fine grain structure, revising power, decrease lingering hassle, pliability, and imperviousness to erosion.
- Dissimilar material can be joined.
- Guarantee 100% weld quality.

II. LITERATURE SURVEY

➤ **Jaimin B. Patel etal.(2014)**, This paper introduces the demonstration of FSW devices by substitution of hardware pin profile alongside recreation of crest temperature instigated in plate material and stream hassles produced in the same for friction welding of AA6061. Results are introduced for different temperatures of aluminum compound plate and in addition stream hassles are produced in and around the instrument pin during the welding procedure.

- **A M Khourshid et al.(2013),** In this research work, friction welding is connected with the combination of two channels, meager walled thickness variably empty glass of the gloves. The main focus of this work is studying the impact on the mechanical properties of the welding joints.
- **B.Kiran Kumar et al.(2016),** This research work is about the study of mechanical properties and micro-structure on FSW aluminum alloy. By this study we came to know that the pin diameter and shoulder diameter are increased with the increase in thickness of the plates or specimen undergoing the process of FSW.

III. EXPERIMENTAL PROCEDURE

In the welding process, we require a pivoting device with a shoulder and a stick that produces heat and encourages the stream of the diminished strong compound behind the apparatus where the welded joint structures. The Taguchi Method will be utilized to discover the three blend welding parameters. In this work three parameters will be taken and L9 orthogonal cluster will be chosen to advance parameters for quality of the welded joint. We take the different parameter to achieve the greatest tensile strength. The parameters are tool speed, feed rate and shoulder diameter. Table 1 shows the process parameters:

Table 1: Process Parameters

Level	Tool Speed(rpm)	Feed Rate(mm/min)	Shoulder Dia. (mm)
1	1950	20	17
2	3080	25	19
3	4600	30	21

Tensile Strength calculation:

$$\text{Maximum Strength} = \frac{\text{Maximum Load(KN)}}{\text{Maximum Area } (\text{mm}^2)}$$

For conversion of kgf into N/mm²: 1 kgf = 9.8 N/mm²

Elongation calculation:

$$\text{Elongation} = \frac{\text{Change in Length} * 100}{\text{Holding Length}}$$

IV. RESULTS AND DISCUSSION

We performed nine experiments in the first run and universal testing machine is used to calculate the tensile strength. The calculated tensile strength is shown in the table-2. The tensile strength is calculated for the different parameters such as tool rotation speed, feed rate and shoulder diameter.

Table 2: Tensile strength Trial 1 of the Specimens for Single Sided Joint

Speed(r.p.m)	Sample No.	Feed (mm/min.)	Shoulder Diameter(mm)	Area (mm ²)	Load (KN)	Tensile strength Trial1 (KN/mm ²)
1950	S1	20	16	150	9	0.06

	S2	25	18	150	11.25	0.074
	S3	30	20	150	18.5	0.124
3080	S4	20	18	150	20	0.133
	S5	25	20	150	23.9	0.17
	S6	30	16	150	17.7	0.118
4600	S7	20	20	150	17.20	0.116
	S8	25	16	150	7.6	0.054
	S9	30	18	150	8	0.048

Now we calculate the elongation for each nine specimen shown above at different parameters such as feed rate, transverse speed and shoulder diameters is shown in the table: 3.

Table 3: Change in Length & Elongation

Speed (r.p.m)	Sample No.	Holding length (mm)	Change in length (mm)	Elongation (%age)
1950	S1	50	5.5	12
	S2	50	7	15
	S3	50	8	17
3080	S4	50	6.5	14
	S5	50	7.5	16
	S6	50	5	11
4600	S7	50	3.5	8
	S8	50	3.5	6
	S9	50	3	7

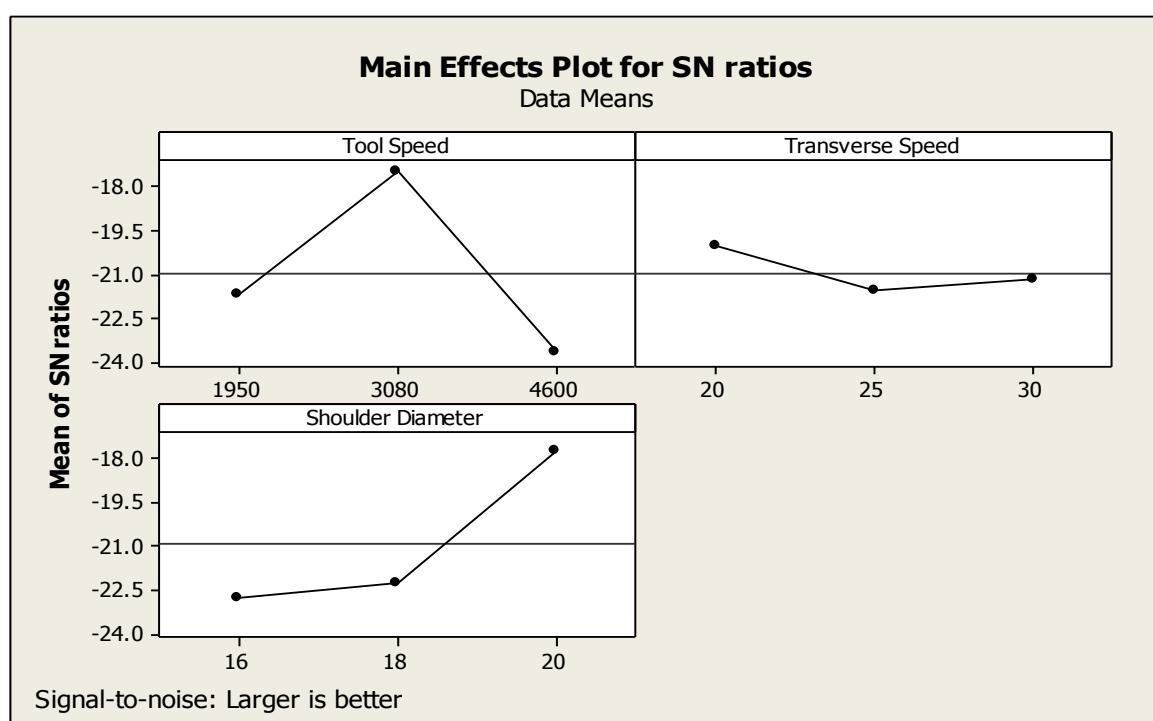


Figure 2: Effect of Welding Parameters on Tensile Strength for S/n ratio

After using all the observation as given in table 2 and table 3 means and S/N ratio are calculated and the analysis is shown by the various graph is drawn by Minitab 15 software. The S/N ratio for Tensile Strength is calculated on Minitab 15 Software using Taguchi Method. A greater S/N value corresponds to a better performance.

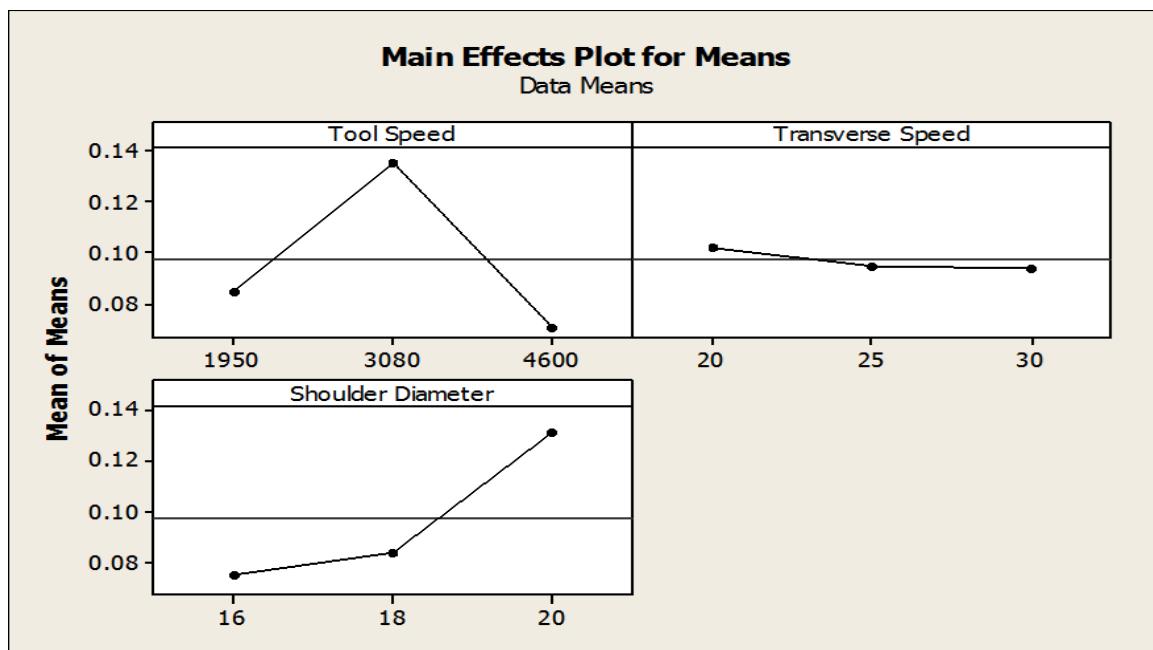


Figure 3: Effect of Welding Parameters on Tensile Strength for Means

V. DISCUSSION

Taguchi method stresses the importance of studying the response variation using the signal-to-noise (S/N) ratio, resulting in minimization of quality characteristic variation due to uncontrollable parameter. The Tensile strength was considered as the quality characteristic with the concept of "the larger-the-better".

The S/N ratio for the larger-the-better is:

$$S/N = -10 \log_{10} \left\{ \frac{1}{n} \sum \frac{1}{y^2} \right\}$$

Finally we got the optimum value of parameters of welding process for maximum tensile strength which is given in Table 4.

Table 4: Optimum Value of Parameter According to S/N Ratio

Tool Speed (rpm)	Feed Rate (mm/min)	Shoulder Diameter (mm)	Tensile strength (KN/mm ²)
3080	20	20	0.164

VI. CONCLUSION

For better welding issues, so many different traditional strategies had been utilized in this way, yet they are not vigorous and have many limitations. To solve the above issues, Taguchi system is utilized as a part of this research. The Tensile quality is mostly influenced by Tool speed and next to it shoulder distance across & feed rate likewise influence to some

degree. The Parameters considered in the examinations are upgraded to accomplish greatest Tensile Strength. The best setting of information procedure parameters for greatest tensile Strength is Tool speed-3080 rpm, feedrate-20 mm/min, and Shoulder diameter across 20 mm.

VII. REFERENCES

- [1] A. Arora(2011) "Toward ideal erosion blend welding instrument shoulder diameter" Materials and Design, Vol. 64, pages: 9–13.
- [2] A.Govind Reddy (2012) "Process Parameter Optimization for Friction Stir Welding of disparate Aluminum Alloys" International Journal of Engineering Research & Technology vol.2, ISSN: 2278-0181
- [3] A.Heidarzadeh and H. Khodaverdizadeh (2012)"Tensile conduct of friction blend welded AA 6061-T4 aluminum composite joints" Materials Science and Engineering vol. 37 page: 164– 173
- [4] Ajay Kumar Revuri(2012)" Computational Analysis Of Friction Stir Welding Tools With Various Threaded Pin Profiles" International Journal of Engineering Research & Technology vol.2, ISSN: 2278-0181
- [5] A M Khourshid (2013) "investigation and outline of grinding stir welding" International diary of mechanical designing and automated exploration India vol. 2 page: 1820– 1829
- [6] D.M. Rodrigues and A. Loureiro (2012) "Impact of friction blend welding parameters on the microstructural and mechanical properties of AA 6016" Materials Science and Engineering vol. 30 page: 1913– 1923.
- [7] Dongun Kim (2010) "friction mix welding", mix. European Journal of Mechanics A/Solids, Vol. 29, pages: 207–215
- [8] G. Çam(2008) "Mechanical properties of contact stir butt-welded Al-5086 H32 plate" Journal of Achievements in Materials and Manufacturing Engineering vol. 30 page: 135– 142
- [9] Gopi Chand (2013) "Utilization of Taguchi Technique for Friction Stir Welding of Aluminum Alloy AA6061" International Journal of Engineering Research & Technology vol.6, ISSN: 2278-0181
- [10] H.J. Liu (2009) "Malleable properties and crack areas of friction blend welded joints of 2017-T351 aluminummalloy"Journal of Materials Processing Technology vol 142, page: 691– 696
- [11] Indira Rani M and Marpu R.N (2011) "An investigation of procedure parameters of friction mix welded aa 6061 aluminum amalgam" Journal of Engineering and Applied Sciences vol. 6, pp. 1819-6508

To Cite This Article

Singh,K., Kumar,S.(2016): “Analyze The Mechanical Properties Of Aluminum 6061 Alloy Using Friction Stir Welding” International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5066-5071, PaperID: IJIFR/V4/E2/007.

A STUDY OF ICT AWARENESS, NEED AND USAGE AMONG TEACHER EDUCATORS OF B.Ed. COLLEGES OF HYDERABAD KARNATAKA REGION

Paper ID	IJIFR/V4/ E2/ 008	Page No.	5072-5081	Subject Area	Education
Keywords	ICT, Teacher Educator, B.Ed. Colleges, Professional Development, Personal Development				

1	Ratan Chavan	Research Scholar Hindi Prachar Sabha - Post Graduate Centre, Dharwad (Karnataka)
2	Dr.Vijayakumar Exambi	Professor and Research Guide, Karnataka College of Education, Bidar (Karnataka)

Abstract

Efforts are made in every country for a sound system of education which can cater the educational needs of all citizens. When the problem of quantity of education is being tackled, there is an urge for raising the quality of life, which is possible only if there is raise in the quality of education. The quality of life and the quality of education go together. Educationalists are of the opinion that the educational problems relating to the quality and quantity could be tackled by the development of an Educational Technology. Therefore, in recent years all over the world there has been a rapid development of Communication Technology in education at all levels with a purpose of extending educational facilities and upgrading instructional methodology. The present study tries to trace out the ICT awareness, use and need of the teacher educators of B.Ed. Colleges of Hyderabad Karnataka region. The result reveal that computer trained teacher educators were more aware and used more ICT resources for classroom teaching, professional development and personal development in comparison to the computer untrained teacher educators and teacher educators having personal computer were using ICT resources more for their classroom practice, professional development and personal development than that of teacher educators not possessing personal computer.

I. INTRODUCTION

We live in an age of information and technology. Widespread use of computers in all walks of life has been witnessed. There have been several major trends in emerging technologies particularly in last two decades which have increased access to instructional media with the advent of microchip technology; computers are now readily accessible on desk at reasonable cost. The electronic delivery system digitalized information storage in different forms using online servers of internet. The Internet is a global network of approximately 10-12 million hosts connected to each other. Information stored, thus, traverse international boundaries satisfying the appetite of millions of users across the world. The internet acts as a medium for personal communication; information providers as well as consumers net for business, education and recreation, and store house of all types of documents and commercial resources. It is an unparalleled resource for education.

II. OBJECTIVES OF THE STUDY

Following objectives were formulated to realize the present study which are given as follows:

- 1) To study the ICT awareness of teacher educators B.Ed. colleges of Hyderabad Karnataka region with respect to medium of instruction.
- 2) To study the ICT use of teacher educators B.Ed. colleges of Hyderabad Karnataka region with respect to computer training.
- 3) To study the ICT need of teacher educators B.Ed. colleges of Hyderabad Karnataka region with respect to possession of personal computer.

III. HYPOTHESIS

- 1) There is no significant difference between the mean ICT awareness score of science and arts teacher educators
- 2) There is no significant difference between the mean ICT use score of science and arts teacher educators.
- 3) There is no significant difference between the mean ICT need score of science and arts teacher educators group.
- 4) There is no significant difference between the mean ICT awareness score of computer trained and computer untrained teacher educators.
- 5) There is no significant difference between the mean ICT use score of computer trained teacher educators and computer untrained teacher educators.
- 6) There is no significant difference between the mean ICT need score of computer trained teacher educators and computer untrained teacher educators.
- 7) There is no significant difference between the mean ICT awareness score of teacher educators having personal computer and teacher educators not having personal computer.
- 8) There is no significant difference between the mean ICT use score of teacher educators having personal computer and teacher educators not having personal computer.

- 9) There is no significant difference between the mean ICT need score of teacher educators having personal computer and not having personal computer

IV. DEFINITION OF THE TERMS

- i) **ICT :** For the present study ICT (Information and Communication Technology) means (computers for word processing, power point, spreadsheet, CAI (Computer Assisted Instruction) and related software, internet for e-mail, chat, searching, web designing, and for giving project work, LCD projector for Power Point presentation, and T.V. presentation and OHP, Television, and Radio) meant for classroom practice, professional development and personal development of teachers of Teacher educators of B.Ed. Colleges.
- ii) **ICT AWARENESS:** It means the knowledge of teachers of secondary and higher secondary schools regarding the components of ICT like, computers for word processing, power point, spreadsheet, CAI (Computer Assisted Instruction) and related software, internet for e-mail, chat, searching, web designing, and for giving project work, LCD projector for PowerPoint presentation, and T.V. presentation and OHP, Television, and Radio. For present study ICT awareness is defined operationally as the awareness score secured by a teacher in the awareness scale prepared by the investigator.
- iii) **ICT USE:** It means the use of the ICT components of ICT like, computers for word processing, power point, spreadsheet, CAI (Computer Assisted Instruction) and related software, internet for e-mail, chat, searching, web designing, and for giving project work, LCD projector for PowerPoint presentation, and T.V. presentation and OHP, Television, and Radio by the teachers of secondary and higher secondary schools for classroom practice, professional development and for personal development. For the present study ICT is defined operationally as the score secured by a teacher in the scale prepared by the investigator.
- iv) **ICT NEED:** It means the need for skill training and ICT resources for classroom practices, professional development and for personal development of the teachers of secondary and higher secondary schools. For the present study ICT is defined operationally as the score secured by a teacher in the scale prepared by the investigator.

V. RATIONALE OF THE STUDY

ICT is one of the recent developments of the twentieth century in India. It has changed each and every system around the globe from house related systems to industrial systems. Significantly, it has influenced the educational systems in all its forms. In the educational field different types of Information and Communication media are used to impart education. Radio, T.V., Tape recorder, OHP, LCD Projector, Computer and now with advancement in these technologies has changed the scenario. Internet and advanced computers are now being used in education as an instrument of instruction. This digitization has made it

possible to design, develop, deliver and assess teaching – learning process. It increases the efficiency of the system and makes it more powerful.

The ability to use ICT effectively and appropriately is now seen as essential to allow learners to acquire and exploit information within every sphere of human activity. It can be assumed that specific forms of ICT will change with time. However, the need to be able to aware and use ICT purposefully will remain the key to full participation in an information society. The B.Ed. two year curriculums already reflect the perceived value and importance of developing ICT literacy and indeed, information literacy in all student-teachers. ICT has changed the scenario of teacher education and going to add more change in the system. It is also stated in the National Curriculum Framework for School teacher education (2000). Changes in the perception of ‘learning environment’ have been highlighted by National Curriculum Framework (2000), which seek to exploit the potential of ICT. The National Curriculum Framework has emphasized on the utilization of ICT in teacher education institutions. The success of ICT in teacher education depends on teacher educators, student-teachers and authorities in the institutions. Teacher-educators have a major role to play. Teachers can lead the journey forward.

Several studies conducted with this regards revealed that teachers are aware of the potentials of ICT in teacher education but only few teacher educators use ICT resources in their teaching due to lack of skill or unavailability of resources. So keeping in mind ICT awareness, use and need of teachers the investigator has decided to conduct a survey. Several variables may be linked with the ICT awareness, use and need of teachers like more education may lead to more awareness in ICT or English medium background may lead to be more aware in ICT. Hence investigator is interested to know the relationship of few background variables with ICT awareness, use and need of secondary and higher secondary teachers. Hyderabad Karnataka region is known as the educationally backward area but there are many B.Ed. colleges are therein this region. Whether the B.Ed. college teacher educators of this region are managed themselves according to the needed demand of ICT and computer Education. Hence the investigator has taken the proposed study to know ICT awareness, use and need of B.Ed. college teacher educators of Hyderabad Karnataka region. It will also help the investigator in term of feasibility of conducting the study. Further, keeping the time factor in mind, the investigator has decided to limit the study only to the B.Ed. college of Hyderabad Karnataka region. Even very few research studies have been conducted in this regard to know the ICT awareness, use and need in different dimensions, like, for academic development, professional development and personal development. The present study may throw some light on these matters. Hence the present study is an attempt to know the ICT awareness, use and need of B.Ed. college teacher educators.

VI. METHODOLOGY

The present study is a survey type of work where the investigator has studied the ICT awareness, use and need of the teacher educators of B.Ed. Colleges of Hyderabad Karnataka

region. Details of the research methodology followed in this present study included population, sample, tools, data collection and method of data analysis are given as follow.

- a) **Population:** The population for the present study comprise of all the B.Ed. college teacher educators of Hyderabad Karnataka region.
- b) **Sample:** For the present study the sample was selected randomly. The list of all the Teacher Education Institutions (TEIs) of Hyderabad Karnataka region (prepared by NCTE) was taken and using stratified random sampling method. 100 B.Ed. colleges from four different districts of Hyderabad Karnataka region were selected. Again four teachers from each college were selected randomly. These 400 teacher educators comprise the sample for the present study.
- c) **Tool for data collection:** To collect the required data according to the need of objectives, a scale on ICT awareness, use and need of B.Ed. college teacher educators was prepared by the investigator. After preparation of scale, it was given to five experts in the concern area. According to the expert's suggestions, necessary modification was done and final scale was prepared. The scale was comprised of the different components of ICT i.e. Computer (Word processing, Spreadsheet, Power Point, Access , CAI and related Software etc.), Internet (e-mail, chat, searching etc.), T.V., OHP, LCD Projector, Radio, Social Media, I-pod, Whatsapp, Play store etc. Further details of scales are given as under:
 - To know the ICT awareness of B.Ed. college Teacher educators with respect to the different components of ICT, a five point scale was taken with the extent like Maximum, Average and Minimum. With the scale the maximum ICT awareness score of a teacher could be 56.
 - To know the ICT use of B.Ed. college Teacher educators with respect to different components of ICT in three different areas like, Classroom Practice, Professional Development and Personal Development a three point scale was taken with the extent like, Great Extent, Some Extent and Less Extent. The index of ICT use by the B.Ed. college Teacher educators in the scale could be a maximum score of 160.
 - Similarly, To know the ICT need of B.Ed. college Teacher educators with respect to different components of ICT a scale was taken with two components like, skill training, availability facilities. The index of ICT need by the B.Ed. college Teacher educators using scale could be a maximum score of 36.
- d) **Data Collected:** For the present study the required data was collected from the B.Ed. college teacher educators. For this purpose the representative of investigator has personally contacted the college principals and explains the purpose of the study. After that scale was distributed among the teachers and the completed scale was collected from the respondents.

VII. DATA ANALYSIS

As it is a survey type of study, the data analysis for the present study was done quantitatively with the help of both descriptive statistics and inferential statistics. The descriptive statistical techniques like, mean, standard deviation, standard error of mean, and the inferential statistics like, t-test for independent means were used during the process of the data analysis.

1. Subject At Post Graduate Stage:

As per the Subject at Post graduate stage of the B.Ed. college teacher educators, mainly two groups of teacher educator were found, one group with science and another group with arts subject at their Post graduate stage. 77 teachers were science post graduate and 12 teachers were arts post graduate from the taken sample. The relation of subject with their Awareness, use and need for ICT were computed. Attempt had been made to see the difference among different groups of B.Ed. college teacher educators on the basis of their subject at post graduate stage in mean ICT awareness, use and need. The t-test for independent means was used for this purpose which is given in table 1.

Table – 1: Means, Standard Deviations and t- value of Groups of science and arts teacher educators

Variable	Subject	No. of T.Es	Mean	SD	t-value	Significance
Awareness	Science	200	49.6	2.49	49.05	S
	Arts	200	31.7	4.64		
Use	Science	200	148.6	8.12	27.12	S
	Arts	200	121.6	11.59		
Need	Science	200	30.9	2.73	42.21	S
	Arts	200	20.3	2.40		

From table 1, it was observed that the means of science and arts teacher educators' awareness were 49.6 and 31.7 respectively. In terms of mean, it can be analyzed that the mean score of science teacher educators was found more than that of arts teacher educators and the arts teacher educators were less aware about ICT than that of science teacher educators. The t-value of 49.05 was found not significant at both 0.05 and 0.01 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT awareness score of science and arts teacher educators' is rejected and alternative hypothesis accepted. So, it can be said that awareness of teacher educators about ICT is related with their post graduate subject.

From table-1, it was observed that the means ICT use of science and arts teacher educators were 148.6 and 121.6 respectively. In terms of mean, it can be analyzed that the mean score of science teacher educators was found more than that of arts teacher educators. The t-value of 27.12 was found not significant at both 0.01 and 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT use score of science and arts teacher educators' is rejected and alternative hypothesis accepted. So, it can be said that ICT use of B.Ed. college teacher educators, ICT is related with their post graduate subject.

From table 1, it was observed that the means ICT need of science and arts teacher educators were 30.9 and 20.3 respectively. In terms of mean, it can be analyzed that the mean score of arts teacher educators group was found less than that of science teacher educators group. The t-value of 42.21 was found not significant at 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT need score of science and arts teacher educators group' is rejected and alternative hypothesis accepted. So, it can be said that ICT need of B.Ed college teacher educators is related with their post graduate

subject. From the analysis of table 1, it can be concluded that the variable 'Post graduate subject' is related significantly with the ICT awareness, use and need of teacher educators. Science and arts teacher educators stand unequally or nearly unequal in ICT awareness, use and need.

2. Computer Training:

To find out the relation between ICT awareness, use and need of teacher educators and their Computer training, mean, SD, were used and t-test was used to see the significance difference between the means score of ICT awareness, use and need of teacher educators teaching with computer training and teacher educators teaching without computer training. For this purpose, teacher educators were classified into two groups that is computer trained teacher educators and computer untrained teacher educators on the basis of their responses in scale. Analysis of t-tests is given in table below:

Table – 2: Means, Standard Deviations and t- value of Groups of Computer trained Computer untrained teacher educators

Variable	Computer training	No. of T.E.s	Mean	SD	t-value	Significance
Awareness	Trained	200	50.0	2.45	53.21	S
	Untrained	200	31.6	4.18		
Use	Trained	200	150.4	7.72	37.11	S
	Untrained	200	122.4	8.15		
Need	Trained	200	30.7	2.18	53.45	S
	Untrained	200	19.9	2.78		

From table 2, it was observed that the means awareness about ICT of Means, Standard Deviations and t- value of Groups of teacher educators teaching with computer training and teacher educators teaching without computer training were 30.9 and 20.3 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators teaching with computer training were found more than that of the teacher educators teaching without computer training, so it can be said that teacher educators teaching with computer training were more aware about ICT resources than the teacher educators without computer training. The t-value of 42.21 was found not significant at 0.05 levels. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT awareness score of computer trained and computer untrained teacher educators' is rejected and alternative hypothesis accepted. So, it can be said that awareness of teacher educators about ICT is related with the computer training.

From table 2, it was observed that the means use about ICT of teacher educators teaching with computer training and the teacher educators teaching without computer training were 150.4 and 122.4 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators teaching with computer training were found to be using ICT resources more than that of the teacher educators teaching without computer training, so it can be said that teacher educators teaching with computer training were using ICT resources more than that the teacher educators teaching without computer training. The t-value of 37.11 was found significant at both 0.05 and 0.01 level. Hence, the working hypothesis that is 'there is

no significant difference between the mean ICT use score of computer trained teacher educators and computer untrained teacher educators' is rejected and alternative hypothesis accepted. Which indicates that the mean score of ICT use of teacher educators teaching with computer training was significantly higher than that of the teacher educators teaching without computer training? So, it can be said that use of teacher educators about ICT is related with the computer training. So, it can be said that computer training of teacher educators is related with their ICT use.

From table 2, it was observed that the means ICT need of teacher educators teaching with computer training and the teacher educators teaching without computer training were 30.7 and 19.9 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators teaching with computer training need for ICT was found to be more than that of the teacher educators teaching without computer training, so it can be said that teachers teaching with computer training ICT need was less than that the teacher educator teaching without computer training. The t-value of 53.45 was found not significant at 0.01 and 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT need score of secondary and higher secondary computer trained teacher educators and computer untrained teacher educators' is rejected and alternative hypothesis accepted. So, it can be said that need of teacher educators for ICT is related with the computer training. So, it can be said that computer training of teacher educators is related with their ICT need. From the analysis of table 2, it can be concluded that the variable 'Computer training' is related significantly with the ICT use of teacher educators. Mean score of computer trained teacher educators was higher than that of computer untrained teacher educators, which indicate that computer trained teacher educators use more ICT resources for classroom teaching, professional development and personal development in comparison to the computer untrained teacher educators, Whereas it was not found significant for the ICT awareness and need of teacher educators. So it can be said that Computer training of teacher educators is related as a variable only in case of ICT use of teacher educators whereas it was related in case of ICT awareness and need of teacher educators.

3. Possession Of Personal Computer:

To find out the relation between ICT awareness, use and need of teacher educators and their possession of personal Computer, mean, SD, were used and t-test was used to see the significance difference between the means score of ICT awareness, use and need for teacher educators having personal computer and the teacher educators not possessing personal computer. For this purpose, teacher educators were classified into two groups that is teacher educators having personal computer and the teacher educators not having personal on the basis of their responses in scale. Analysis of t-tests is given in table below:

Table – 3: Means, Standard Deviations and t- value of Groups of teacher educators having personal computer and not having personal computer

Variable	Possession of PC	No. of T.Es	Mean	SD	t-value	Significance
Awareness	Don't have PC	200	50.9	2.18	39.93	S
	Have PC	200	33.3	5.25		

Use	Don't have PC	200	150.4	8.00	26.81	S
	Have PC	200	126.3	10.03		
Need	Don't have PC	200	30.1	2.82	54.75	S
	Have PC	200	20.0	2.92		

From table 3, it was observed that the means awareness about ICT of teacher educators having personal computer and teacher educators not possessing personal computer were 21.00 and 18.37 respectively. In terms of mean, it can be analyzed that the mean score of teachers having personal computer was found more than that of the teachers not possessing personal computer, so it can be said that teacher educators having personal computer were more aware about ICT resources than the teacher educators not possessing personal computer. The t-value of 1.3140 was found not significant at 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT awareness score of teacher educators having personal computer and teacher educators not having personal computer' is retained. So, it can be said that awareness of teacher educators about ICT is not related with the possession of personal computer. From table 3, it was observed that the means ICT use of teacher educators having personal computer and the teacher educators not possessing personal computer were 31.21 and 24.29 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators having personal computer was found to be using ICT resources than that of the teacher educators not possessing personal computer, so it can be said that teacher educators having personal computer were using ICT resources more for their classroom practice, professional development and personal development than that of teacher educators not possessing personal computer. But the t-value of 1.2787 was found not significant at 0.01 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT use score of teacher educators having personal computer and teacher educators not having personal computer' is retained. So, it can be said that ICT use of teacher educators is not related with the possession of personal computer.

From table 3, it was observed that the means ICT need of teacher educators having personal computer and the teacher educators not possessing personal computer were 8.95 and 10.88 respectively. In terms of mean, it can be analyzed that the mean score of teacher educators having personal computer need for ICT was found to be less than that of the teacher educators not possessing personal computer, so it can be said that teacher educators having personal computer need for ICT was less than that of the teacher educators not possessing personal computer. But the t-value of 0.8153 was found not significant at 0.05 level. Hence, the working hypothesis that is 'there is no significant difference between the mean ICT need score of teacher educators having personal computer and teacher educators not having personal computer' is retained. So, it can be said that ICT need of teacher educators is not related with the possession of personal computer. From the analysis of table 3, it can be concluded that the variable 'Possession of Personal Computer' is not related significantly with the ICT awareness, use and need of teacher educators. Teacher educators with having personal computer and the teacher educators with not having personal computer stand equal or nearer to equal in their ICT awareness, use and need.

VIII. CONCLUSIONS

It is observed from the above findings of the research that the computer trained teacher educators aware and use more ICT resources for classroom teaching, professional development and personal development in comparison to the computer untrained teacher educators and teacher educators having personal computer were using ICT resources more for their classroom practice, professional development and personal development than that of teacher educators not possessing personal computer. It is undeniably true that the use of ICT requires training in the proper handling of ICT facilities and their optimal use. The teachers can seek such training themselves or even seek the assistance of the University to arrange for such a training programme. Thus the findings of the study also hint at the role of teachers in the effective use of ICT.

IX. REFERENCE

- [1] Altun, A. (2003). The attitudes of student teachers toward Internet. *Education and Science*, 28(127), 3-9.
- [2] Bear, G. G., Richards, H. C., & Lancaster, P. (1987). Attitudes toward computers: validation of a computer attitude scale. *Journal of Educational Computing Research*, 3(2), 207-218.
- [3] Best, J.W & Kahn, J.V. (1993). *Research in Education* (7th Ed). Needham Heights, MA: Allyn and Bacon.
- [4] Buch, M.B. 1987. Third survey of research in education. New Delhi, National Council of Educational Research and Training.
- [5] Borich, G. (2003). *Observation skills for effective teaching*. New Jersey: Merrill Prentice Hall.
- [6] Buch, M.B. 1987. Third survey of research in education. New Delhi, National Council of Educational Research and Training.
- [7] Hardy, J. V. (1998). Teacher attitudes toward and knowledge of computer technology. *Computers in the Schools*, 14 (3-4), 119-136.
- [8] Dewberry Chris. (2000) *Statistical Methods for Organizational Research Theory and Practice*, Routledge: New York.
- [9] Kem Tilak R., Esirgen Ruhi., Ed. (1998) *Information Technology Redesigning of Distance Education*, Aravali Books International. New Delhi, India.

To Cite This Article

Chavan, R., Exambi, V.(2016): “A Study Of ICT Awareness, Need And Use Among Teacher Educators Of B.Ed. Colleges Of Hyderabad Karnataka Region” International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5072-5081, PaperID: IJIFR/V4/E2/008.

DEVELOPMENT AND VALIDATION OF MATHETICS STYLE OF PROGRAMMED LEARNING MATERIAL IN ARITHMETIC FOR 10TH STANDARDD

Paper ID	IJIFR/V4/ E2/ 013	Page No.	5082-5088	Subject Area	Education
Keywords	Mathetics Style Programme, Arithmetic, Self Learning Material				

1	Nagaratna S.	Research Scholar, Department of Education, Gulbarga University, Kalaburagi
2	Prof. Hoovinbhavi B L	Dean and Chairperson , Department of Education Gulbarga University, Kalaburagi

Abstract

The aim of the study is to develop and validate the mathetics style of programmed learning material and to administer the programme (Try-out on an individual and on a small group and large group of X std CBSE students).The development of the programme consist of five steps 1) Task analysis and Data collection, 2) Prescription for developing mastery of content, 3) Characterization and lesson plan, 4) Exercise design and 5) Editing. Evaluation of the programme is the final stage in the development of a programme. The researcher followed three type of testing, i) Individual testing, ii) Small group testing and iii) Field testing of validation testing. On the basis of internal and external criteria the effectiveness of programme material is evaluated. Pearson product moment correlation technique was followed, the reliability of the material is $r = 0.6$, hence the Mathetics style of programmed learning material is reliable and valid.

I. INTRODUCTION

“Education is the most powerful weapon which you can use to change the world.” The teacher plays a prominent role in the life of the students. The modern concept of education is that the teacher should aim at the complete development of the child. For this the modern teacher is motivated by a desire to make his teaching more facile and interacting. For the complete development of the child, the main focus of teaching should be to bring out



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright©IJIFR 2016



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)

Volume - 4, Issue -2, October 2016

Continuous 38th Edition, Page No: 5082-5088

desirable changes in the behavior of the learner. These changes can bring out only by using appropriate teaching strategies.

In education, we use learning materials in various forms – print, audio, video, multimedia, web, etc. In order to help learners study these and learn in their own time and at their own pace, these materials are designed in such a way to have the teacher built in to facilitate the learning process. We call these the characteristics of self-learning materials. Everyone must be familiar with written technical reports, textbooks, chapters, academic results rather than self-instructional materials.

Self-instruction can be defined as the ability of one to cognitively plan, organize, direct, reinforce, and evaluate one's own independent learning without a teacher's prompting. There are three powerful influences behind self-instruction: First the learning and modeling of materials, the ability of verbalization, and finally, self-regulation (metacognition). The use of imagery, which is fundamental in the development of one's cognitive processing, is among the many connections that can be made through Education.

New techniques in education incredibly affect on the traditional approach of teaching learning process. Among all innovations in recent past the approach that have gain acceptance is Programmed Instruction. Programmed instruction has been considered as revolution in Educational Technology.

The term Programmed Instruction is probably derived from B.F.Skinner's (1954) "The Science of learning and art of teaching". Programmed Instruction sometimes referred to, as programmed learning is a process or techniques of teaching in a sequence of controlled steps. In most cases student work through Programmed material by themselves and at their own speed and after each step they test their comprehension by answering set question are fill-in missing terms. They are immediately shown their correct answers or given additional information.

1.1 Characteristics of Programmed Instruction Learning Material:

1. PI based learning material is Individual and only one person can learn by it at a time.
2. PI based learning material is divided into various small steps.
3. PI material is arranged into in a series of sequential step.
4. Each step is related with another step.
5. The learner should have made active response.
6. Learner get immediate feedback in PI based material.
7. Students learn by "Principle of self pacing".
8. PI material is Pre-tested and valid.
9. In PI based learning Error Rate and Fault rate is very less.
10. In PI based learning stimulus, Response and Reinforcement both are active.

1.2 There Are Three Types Of Programming.

1. Linear Programming.
2. Branching Programming.
3. Mathetics.

Nagaratna S., Prof. Hoovinbhavi B L.: Development And Validation Of Mathetics Style Of Programmed Learning Material In Arithmetic For 10th Standard



5083

1.3 Mathetics Programming:

The founder of Mathetics is Thomas F. Gilbert. "Mathetics is defined as a systematic application of reinforcement theory to the analysis and construction of complex repertoires which represent the mastery in subject matter." It is based on connectivist theory of learning. It is also termed as 'Retrogressive Chaining' or 'backward chaining'. It is a reverse chaining approach. It is based on Principle of chaining, Discrimination and Generalization. The term mathetics is being evolved from the Greek word 'Mathein' which means 'to learn'. Like other programming styles, here also learning occurs by doing some activity by the learner.

- **Mathetic and Learning Process:**

The mathematical learning system is based upon S – R analysis of behavior. Basically learning process is response centered. The child learns the last step first, then goes to the next one before it and thus to the introductory part. This procedure where the tasks are connected from the last to the first is called chaining (Elias Jijish 2009). In Retrogressive chaining demonstrated, prompted, released(DPR) approach is used, in this students are first given to demonstrated exercise (Entire procedure is demonstrated to the student. The programmer supplies the student with all the steps up to the mastery step), then prompted exercise (The programmer supplies the student with all the steps leading up to mastery step and prompt him to perform the mastery step) and finally released exercise (the programmer provides all the steps, leading up to the step that immediately precedes the last sub mastery step, prompt this step and release the student to practice the mastery step). The programmer continues in this manner, each time allowing the students to perform an additional step until he/she has worked back of the first time step in the procedure and can perform the entire task (Mangal, S.K.2002).

Retrogressive chaining can be shown by the following diagramme.

(1)	6	D	Where: D = Demonstration
(2)	5 - - 6	D P	
(3)	4 - - 5 -- 6	D P R	P = Prompt
(4)	3 - - 4 - - 5 -- 6	D P R R	R = Release
(5)	2 - - 3 - - 4 - - 5 -- 6	D P R R R	
(6) 1 - - 2 - - 3 - - 4 - - 5 - - 6	D P R R R R		
(7) 1 - - 2 - - 3 - - 4 - - 5 - - 6	D P R R R R		
(8) 1 - - 2 - - 3 - - 4 - - 5 - - 6	R R R R R R		

Programmed learning is being used not only for self instructional purpose but also as mechanism of feedback for improving teaching efficiently. Mathetics style Programme is

also best for teaching Mathematics. Thus researcher developed a programme on "Arithmetic units", which has been taken from Mathematics text book prescribed by N.C.E.R.T (National Council of Educational Research and Training) for grade X students, in English language. This programme consists of 55 frames. After the individual tryout the researcher went through small group tryout for determining whether the programme succeeds in bringing desirable change in learning. If the small group tryout reaches the standard, then the programme is ready for field testing.

II. OBJECTIVES OF THE STUDY

- 1) To develop and validate the mathematics style of programmed learning material.
- 2) To administer the programme (Try-out on an individual and on a small group and large group of X standard CBSE students).

III. SCOPE OF THE STUDY

The present study is confined to the following,

- 1) It is confined for 10th Standard students of CBSE.
- 2) Among different styles of programme instruction it is confined only mathematics style of programme instruction.
- 3) The study confined only Arithmetic units.

IV. DEVELOPMENT OF THE MATHEMATICS STYLE OF PROGRAMME

- 1) Task analysis and Data collection.
- 2) Prescription for developing mastery of content.
- 3) Characterization and lesson plan.
- 4) Exercise design and
- 5) Editing

V. EVALUATION AND VALIDATION OF A PROGRAMME

Evaluation of the programme is the final stage in the development of a programme. Evaluation of the programme in this sense refers to the testing of the programme material during its developmental process and to the strategies to improve its effectiveness. Testing of a programme is a kind of trial situation for the frames and frame sequence brought out by the programmer. There are three type of testing,

1). Individual Testing:

The purpose of individual testing is to check how far the programme produced which is essentially still only a guess about how the material should be taught is, in fact, suitable for those for whom it is written. Here researcher selected 10-12 individual students of average and below average. The student is informed that he is not being tested, but that he is in fact, helping the programmer in revising, of the programme and every effort is made to put him at his ease. On the basis of student's reactions, the researcher gathers some insight to improve and modified the frames.

2) Small Group Testing:

For the present study Descriptive survey method is applied to collect the data. In small group tryout researcher selected 15 students of X Std Kenbridge English medium School Kalaburagi (Karnataka). The researcher, before testing the programme administered pre-test to determine the extent of the student's knowledge in the subject of mathematics. After pre-test, the printed exercises were presented to the student in actual classroom situation, the title of the programme was announced and specific written instructions were read out before the students.

The students were asked to take their own time while working on the programme. Investigator had given some time to the learners to discuss the difficulties faced by them while going through the programme. Immediately after the programme, a criterion test (CT) was administered as 'posttest' on all the students of small group, in order to check the competency attained by them.

After criterion test the researcher calculated reliability of the material. The reliability of the material is $r = 0.71$, hence the material is ready for field testing.

3) Field Testing Of Validation Testing:

Field-testing is more formal than development testing. The purpose of field-testing is to assess whether the programme satisfactorily achieves its stated objectives.

There are six steps in the validation of the programme or in field testing;

- i) **Selection of the Sample:** The researcher selected 40 students of X Std. Aryan English medium school, Kalaburagi.
- ii) **Administration of Pre-Test:** After having selected the sample, generally criterion-test is administered as pre-test in order to measure the learner's knowledge of what they are about to taught.
- iii) **Administration of the Programme:** After administration of pre-test, printed copies of the programme are distributed among the students. Instructions about the working with the programme are included in the beginning of printed programme. Here researcher taken down time by each student in completion of programme.
- iv) **Administration of Posttest:** After completion of the programme, a criterion test is administered as posttest on the students.
- v) **Administration of Reaction Scale:** The reaction scale is administered after the posttest has been completed by learners.
- vi) **Analysis of the Criteria of the Programme:** Criteria of the validation of the programme are analysed after all relevant data have been collected.

These measures classified into two groups:

A) Internal Criteria:

- a) **Error Rate of the Programme:** The error rate in criterion test was calculated on the basis of the responses given by the students by using the formula

$$\text{Error rate} = \frac{\text{Total No.of errors} \times 100}{\text{Total No. of available responses in the programme} \times \text{No.of individuals}}$$

[Where Total No. of errors= 764, N= 40]

$$\text{Error rate} = \frac{764 \times 100}{837 \times 40} = 2.281$$

Table 1: Concept-Wise Error committed by the students in various exercises in percentage

Sl. No.	Units	Error in(%)	% of success
1	Real Number	2.58	97.42%
2	Arithmetic progression	1.95	98.05%
3	Probability	2.44	97.56%
4	Statistics	2.67	97.33%
5	Total	9.64	90.36%
6	Mean	2.41	97.59%

b) Density Of The Programme: Density is an independent measure of the difficulty of a programme. To find out density of a programme by using the formula

$$\text{Type/ token ratio} = \frac{\text{Total No.of Sections}}{\text{total No of responses required}}$$

Where, Total No. of sections = 215 and Total No. of responses required = 837

$$\text{Type/ token ratio} = \frac{215}{837} = 0.257 \approx 0.3$$

B) External Criteria:

The external criteria refer to learner performance after completing the programme material.

a) 90/90 Standard:

Total pretest score= 847, Total posttest score= 1739

The mean value of pre-test score is $\frac{847 \times 100}{2000} = 42\%$ [where total score is $50 \times 40 = 2000$]

And post-test score is $\frac{1739 \times 100}{2000} = 87\%$

Expected gain = $100 - 42 = 58$

Real gain = $87 - 42 = 45$

Thus, Real gain/ Expected gain is **45/58**.

b) Attitude Coefficient (Reaction Coefficient): Three point likert's reaction scale is used. Here **79%** of the students agree with all the principle and characteristics of the programme.

c) Gain Ratio: Mc-Guin and Peters (1965) suggested that best criterion of a programme effectiveness is the gain ration between amount of learned and the amount that could by possibly be learned. By using following formula we find out gain ratio;

$$\text{Gain ratio} = \frac{\text{Mean of (post-test scores-pre-test scores)}}{\text{Mean of (Full scores-pre-test scores)}}$$

Where, Mean of post test score = 1739, Mean of pre-test score = 847, Full mean score = 2000

$$\text{Gain ratio} = \frac{1739 - 847}{2000 - 847} = 892/1153 = 0.773$$



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)

Volume - 4, Issue -2, October 2016

Continuous 38th Edition, Page No: 5082-5088

- d) **Level Of Performance:** The post-test scores are used and their mean value is computed. The mean value is converted into percentage. A good programme should have 75 percent average performance.

$$2000 \rightarrow 1739$$

$$100 \rightarrow ?$$

$$100 \times 1739 / 2000 = 87\%$$

- e) **Standardization Of Validated Material:** On the basis of internal and external criteria the effectiveness of programme material is evaluated. In the administration of both pre and post test scores/results were correlated. Pearson product moment correlation technique was followed, the reliability of the material is $r = 0.6$, hence the Mathetics style of programmed learning material is reliable and valid.

VI. CONCLUSION

The Mathetics style of programme on arithmetic units was developed and validated by researcher. The programme material has been an effective instrument for making the students of Xth standard to learn arithmetic in mathematics. Mathetics style of programme material is very useful in the field of teaching Mathematics.

VII. REFERENCES

- [1] Tapaswini Aich, B. S. Wadhwa, Ruchi Manchnda and Sheetal Batra- International Journal of Recent Scientific Research ,Vol. 6, Issue, 6, pp.4579-4584, June, 2015.
- [2] Elias Jijish (2009). "Effectiveness of Mathetics on Achievement in Chemistry at Higher Secondary Level" M.Ed (Edu.), Gandhigram Rural University, Gandhigram Dindigul.
- [3] Assist. Prof. Dr. Kumari ANUPAM Department of Applied Sciences & Humanities, Faculty of Mathematics ,Baddi University of Emerging Sciences & Technology, International Journal on New Trends in Education and Their Implications ,July 2014 Volume: 5 Issue: 3 Article: 14 ISSN 1309-6249.
- [4] Ranjana Gupta, "Impact of Programmed Learning on Science Achievement of 8th Class Students"- ijird , Vol 3 Issue 8 INTERNATIONAL JOURNAL.
- [5] Mangal, S.K. (2002). "Foundation of Educational Technology", Tondan Publication, Ludhiana, 137.
- [6] Sharma R.A., programmed Instruction: An Instructional technology: International Publishing House, Meerut (U.P), 1981-1982.

To Cite This Article

Nagaratna, S., Hoovinbhavi, B. L.(2016): "Development And Validation Of Mathetics Style Of Programmed Learning Material In Arithmetic For 10th Standard" *International Journal of Informative & Futuristic Research (ISSN: 2347-1697)*, Vol. 4 No. (2), October 2016, pp. 5082-5088, PaperID: IJIFR/V4/E2/013.



Nagaratna S., Prof. Hoovinbhavi B L.: Development And Validation Of Mathetics Style Of Programmed Learning Material In Arithmetic For 10th Standard

5088

HEMICORDATE PHYLOGENETIC RECONSTRUCTION BASED ON RIBOSOMAL RNA GENES

Paper ID	IJIFR/V4/ E2/ 018	Page No.	5089-5103	Subject Area	Zoology
Keywords	Hemichordate, Ribosomal RNA Genes, Phylogeny, Trees, Clade				

Bibhuti Prasad Barik

**Assistant Professor
Post Graduate Department of Zoology,
Khallikote University, Brahmapur (India)**

Abstract

Hemichordate diversity and relationships within the group have been poorly investigated. The objectives of the current study were to infer multilocus phylogenetic relationship among hemichordates based on ribosomal RNA genes. Phylogenetic relationships were inferred showing similar species clustered together but did not form distinct clades as per their lineage and morphological similarities. It was noticed that some species appeared to be polyphyletic. Phylogenetic analyses using ribosomal RNA gene sequences could be a useful approach in understanding Hemichordate evolution. Some trees showed similar species remain clustered together with few alterations and this may be assumed by possible adaptive radiation or mutations. In future inclusion of secondary and tertiary structures of RNA as well as proteins may be useful in elucidating morphology, anatomy and evolution of this neglected phylum.

I. INTRODUCTION

Hemichordates though not well-known, are key organisms in early chordate evolutionary studies (Nomaksteinsky et al., 2009). The phylogenetic relationships within the phylum still remain undetermined (Cannon et al., 2009). Hemichordates form a small phylum comprising few hundred species and hypothesized to be the closest extant relative to Chordata and include animals called enteropneusts (acorn worms) and pterobranchs. Since the hemichordates are the closest living relatives to the chordates, they are of great concern to those studying the origins of chordate development. They possess a combination of both invertebrate and chordate characteristics. The hemichordates along with echinoderms and chordates belong to the group deuterostome branch of animal kingdom. Because of their close relationship to chordates these animals are called pre-chordates and have been pivotal



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

for understanding the evolution of chordate-like morphological and developmental features. The hemichordate notochord is a buccal diverticulum non-homologous with the chordate notochord. Hemichordates are instrumental to understanding early deuterostome and chordate evolution, yet diversity and relationships within the group have been poorly studied. Various workers have studied morphological and molecular characterization of this phylum but few studies are being conducted on their phylogenetic relationship. The objectives of the current study were to infer multilocus phylogenetic relationship among hemichordates based on ribosomal RNA genes.

II. MATERIALS AND METHODS

2.1 Retrieval Of Sequences And Taxon Sampling

The gene sequences belonging to Hemichordata were retrieved from NCBI-GenBank database (Benson et al., 2013) using a PERL script. The sequences were filter searched and were selected referring to 5.8S, 16S and 18S ribosomal RNA genes. The sequences were sorted based on gene types using Bioedit software version 7.0.5.3 (Hall, 1999).

2.2 Multiple Sequence Alignment and Phylogenetic Analysis

The retrieved gene sequences were fasta formatted and subjected to multiple sequence alignment. The sequences were aligned using CLUSTAL W (Thompson et al, 1994). For pair wise sequence alignment the gap opening penalty and extension penalty was 15 and 6.66 respectively. For multiple sequence alignment the opening penalty and gap extension penalty was 15 and 6.66 respectively. IUB DNA weight matrix with transition weight of 0.5. The negative matrix was switched off percentage was kept at 30. The aligned file was exported for phylogenetic analysis. Five different methods (ML, NJ, ME, UPGMA and MP) were adopted to perform phylogenetic analysis using MEGA 7 software (Kumar et al., 2016). All characters were equally weighted and unordered. Alignment gaps were treated as missing data. The percentage of replicate trees in which the associated taxa clustered together in the bootstrap was 500 replicates. The evolutionary distances were computed using the maximum composite Likelihood method and are in the units of the number of base substitutions per site. The branch length and consistency, retention and composites indices are shown in table 1.

Table 1: Branch length and indices of CI, RI and CI

Sl. No.	Gene	Sum of Branch Length					Consistency Index	Retention Index	Composite Index
		ML	NJ	ME	UPGMA	MP			
1	5.8S	0.866	-364	0.869	0.883	0.969	0.777	0.666	0.646
2	16S	-336	2.820	2.820	2.740	-351	0.597	0.680	0.426
3	18S	-184	1.138	1.138	1.096	0.662	0.553	0.726	0.481

ML: Maximum Likelihood, NJ: Neighbour Joining, ME: Minimum Evolution, UPGMA: Unweighted Pair Group Method with Arithmetic Mean, MP: Maximum Parsimony.

2.3 Nucleic Acid Composition

The nucleic acid composition (sequence length, nucleotide composition and molecular weight etc. were computed using Bioedit program.

III. RESULTS

3.1 Maximum Likelihood Trees

The evolutionary history was inferred by using the Maximum Likelihood method based on the Tamura-Nei model (Tamura and Nei, 1993). The trees with the highest log-likelihood are shown. Initial tree(s) for the heuristic search were obtained automatically by applying Neighbor-Joining and BioNJ algorithms to a matrix of pair wise distances estimated using the Maximum Composite Likelihood (MCL) approach, and then selecting the topology with superior log likelihood value. The tree is drawn to scale, with branch lengths measured in the number of substitutions per site. Codon positions included were 1st+2nd+3rd+Noncoding. All positions containing gaps and missing data were eliminated (Fig. 1-3).

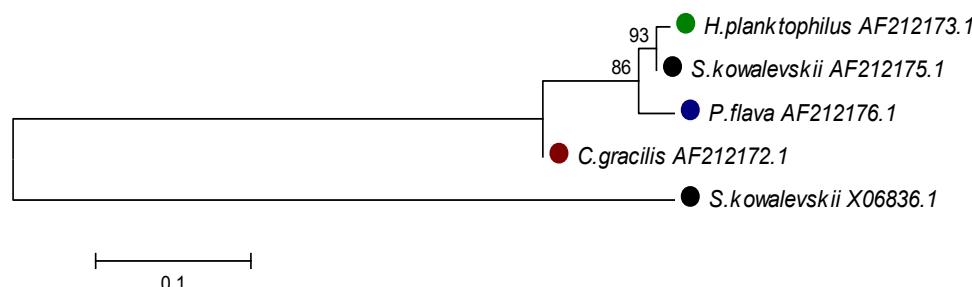


Figure 1: 5.8S rRNA based ML tree

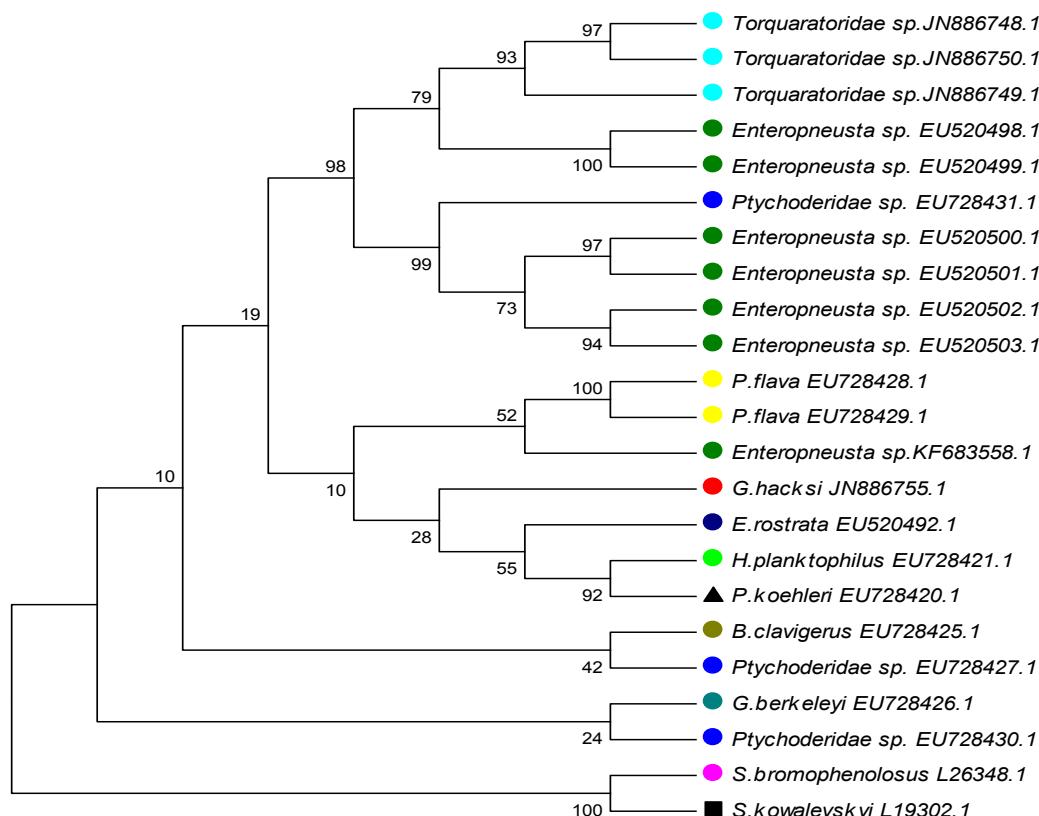


Figure 2: 16S rRNA based ML tree

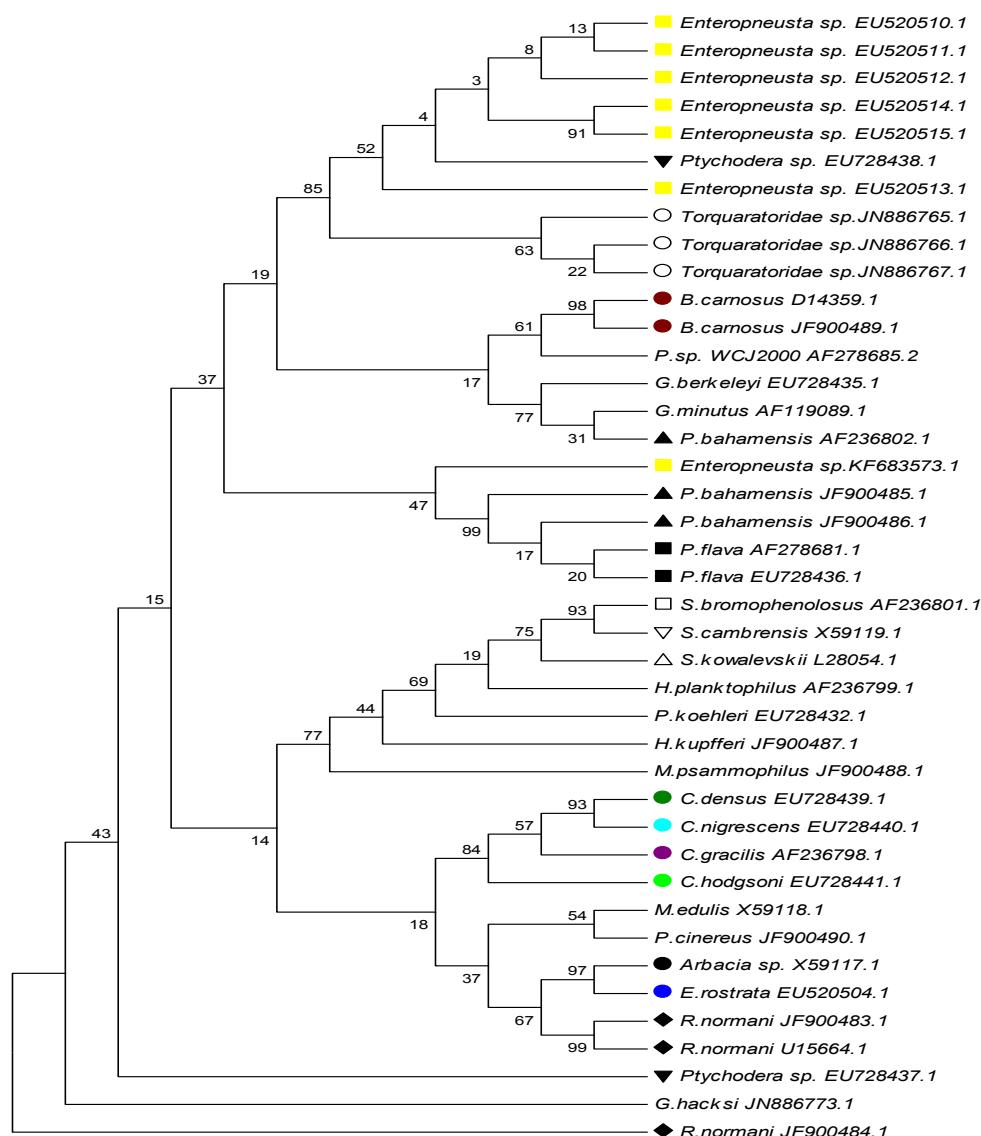


Figure 3: 18S rRNA based ML tree

3.2 Neighbor Joining Trees

The evolutionary history was inferred using the Neighbor-Joining method (Saitou and Nei, 1987). The optimal trees were drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic trees (Fig. 4-6). The evolutionary distances were computed using the Maximum Composite Likelihood method (Tamura et al., 2004) and are in the units of the number of base substitutions per site.

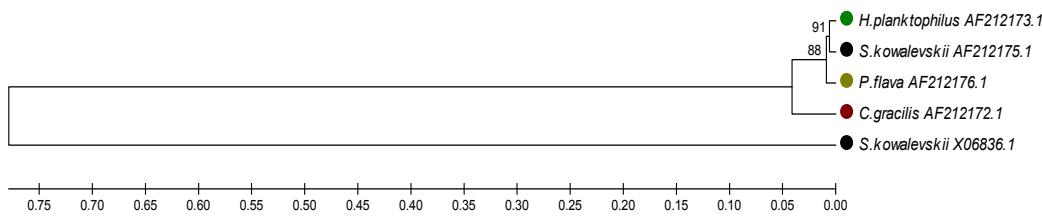


Figure 4: 5.8S rRNA based NJ tree

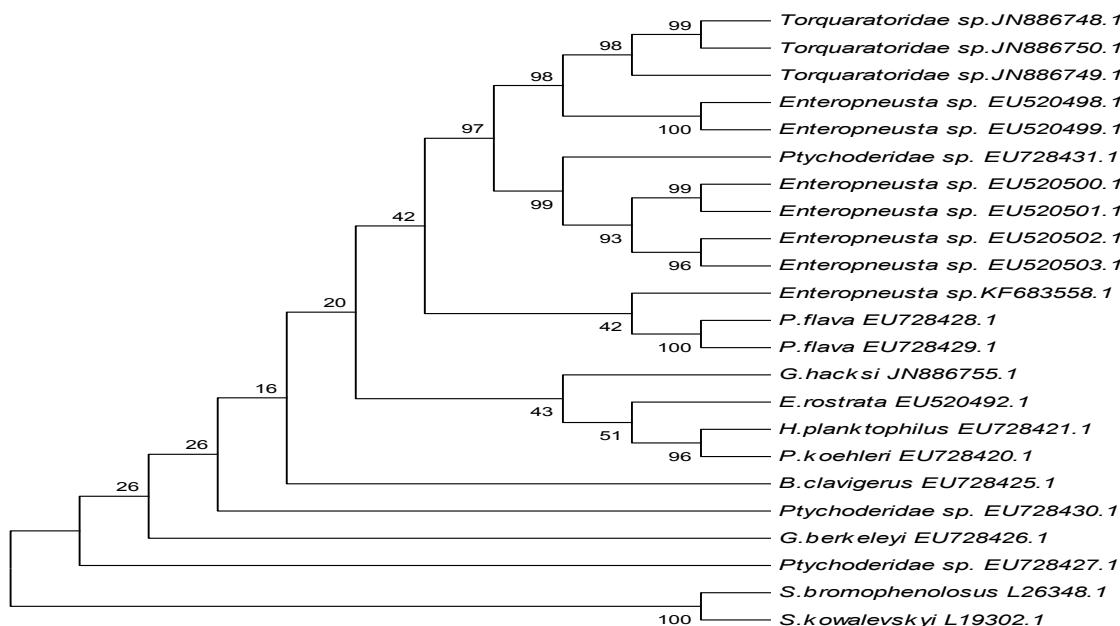


Figure 5: 16S rRNA based ML tree

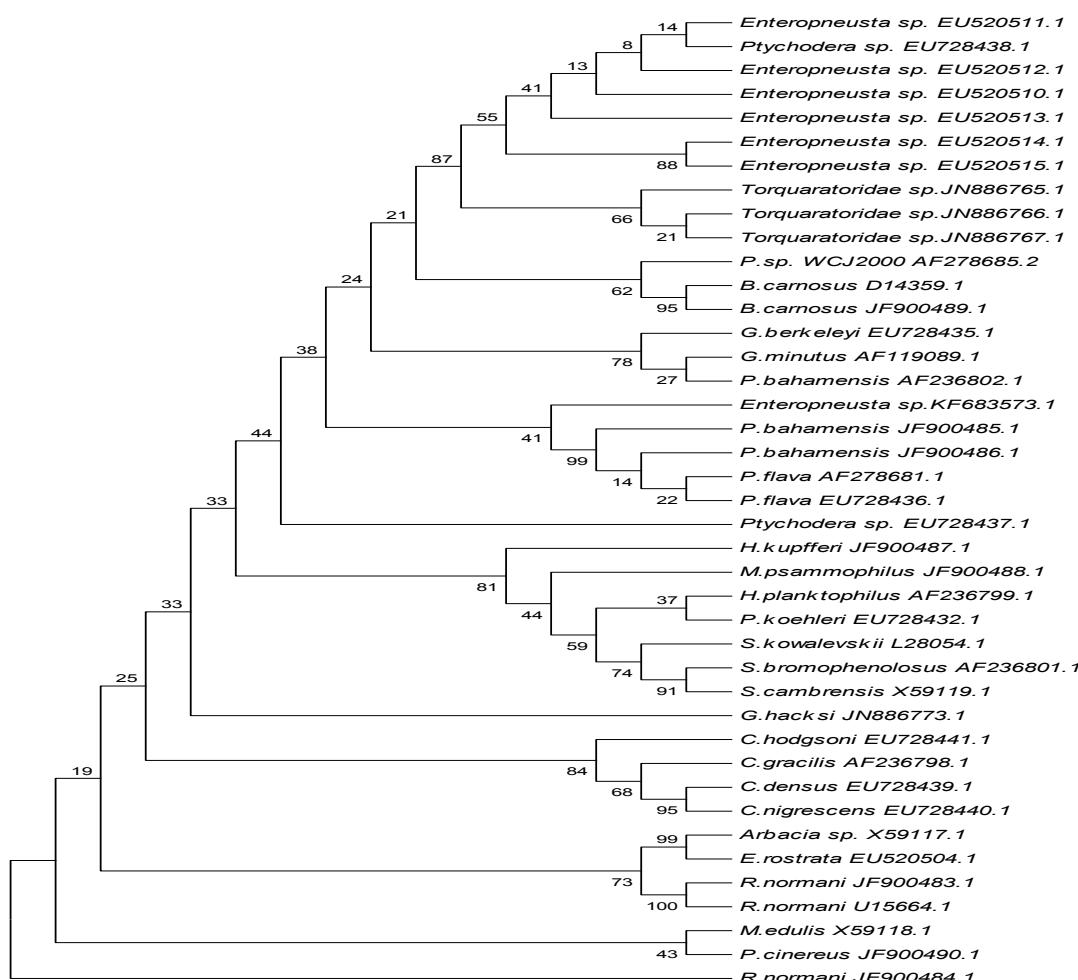


Figure 6: 18S rRNA based ML tree

3.3 Minimum Evolution Trees

The evolutionary history was inferred using the Minimum Evolution method (Rzhetsky and Nei, 1992). The trees are drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic trees (Fig. 7-9). The evolutionary distances were computed using the Maximum Composite Likelihood method (Tamura et al., 2004) and were in the units of the number of base substitutions per site. The ME trees were searched using the Close-Neighbor-Interchange (CNI) algorithm (Nei and Kumar, 2000).

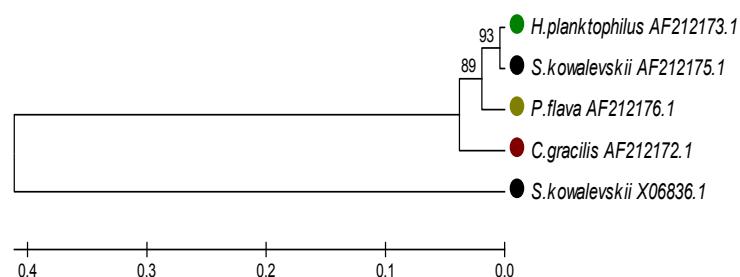


Figure 7: 5.8S rRNA based ME tree

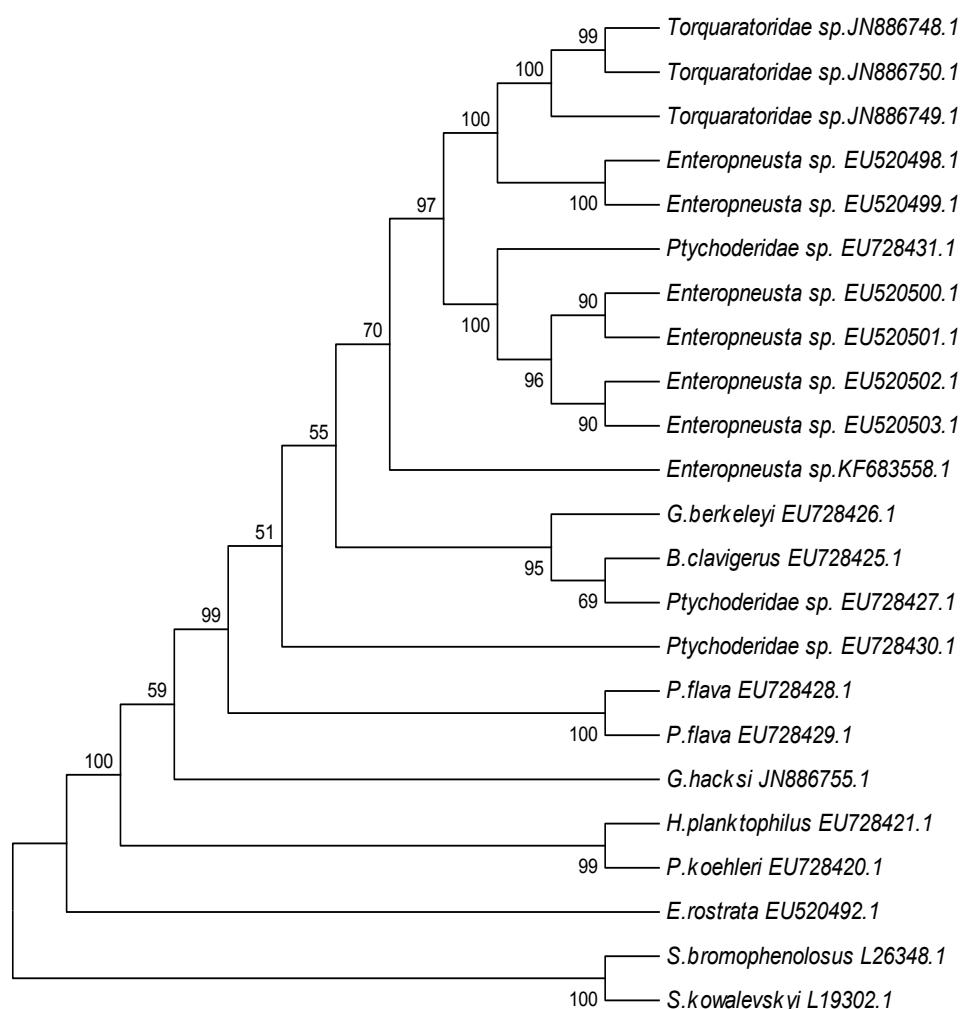


Figure 8: 16S rRNA based ME tree

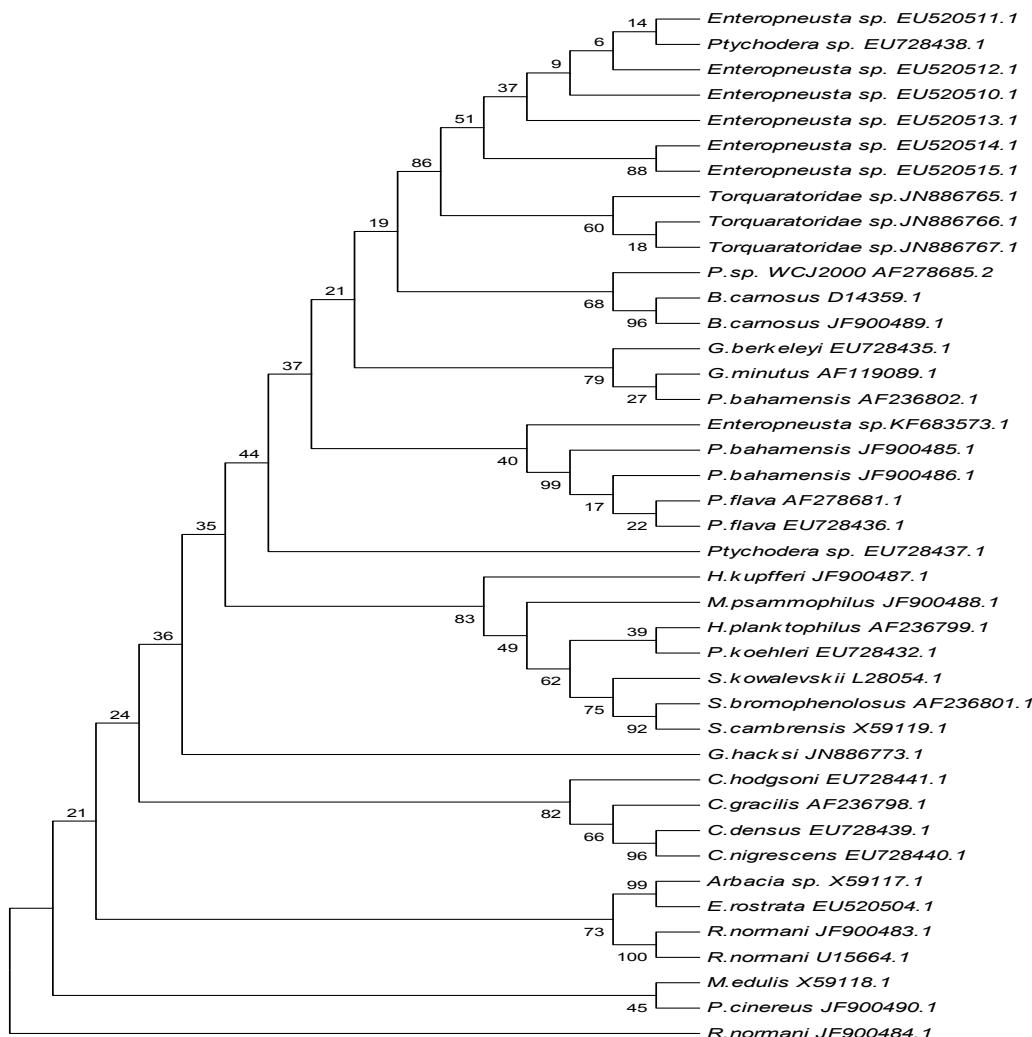


Figure 9: 18S rRNA based ME tree

3.4 UPGMA TREES

The evolutionary history was inferred using the UPGMA method (Sneath and Sokal, 1973). The optimal trees were drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic trees (Fig. 10-12). The evolutionary distances were computed using the Maximum Composite Likelihood method and were in the units of the number of base substitutions per site.

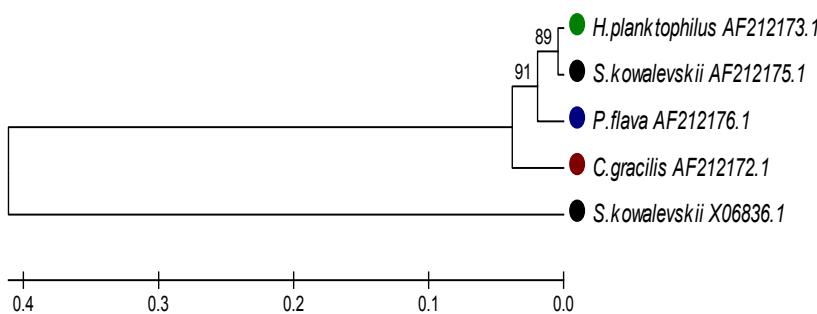


Figure 10: 5.8S rRNA based UPGMA tree

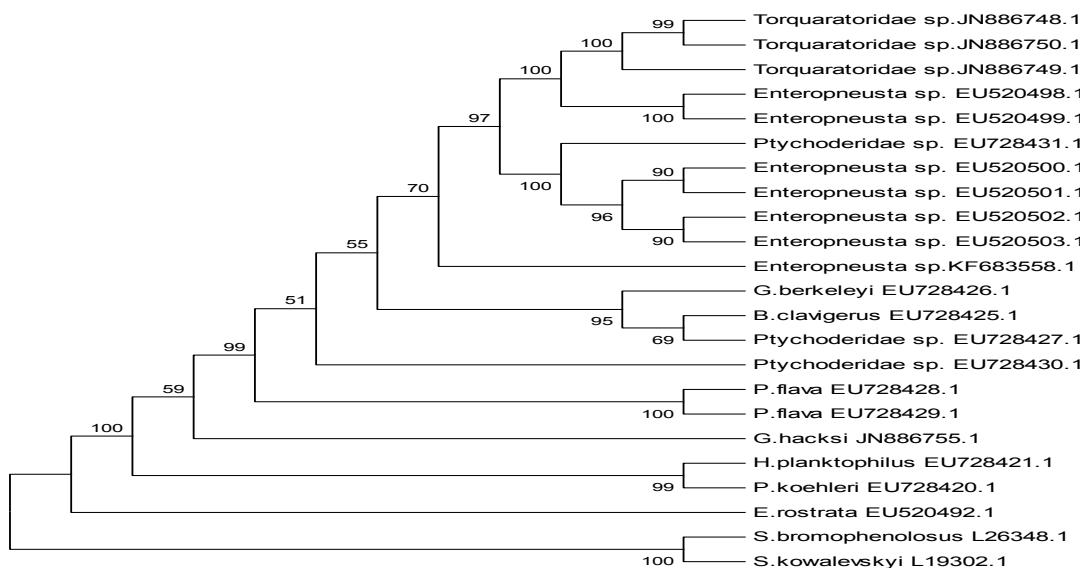


Figure 11: 16S rRNA based UPGMA tree

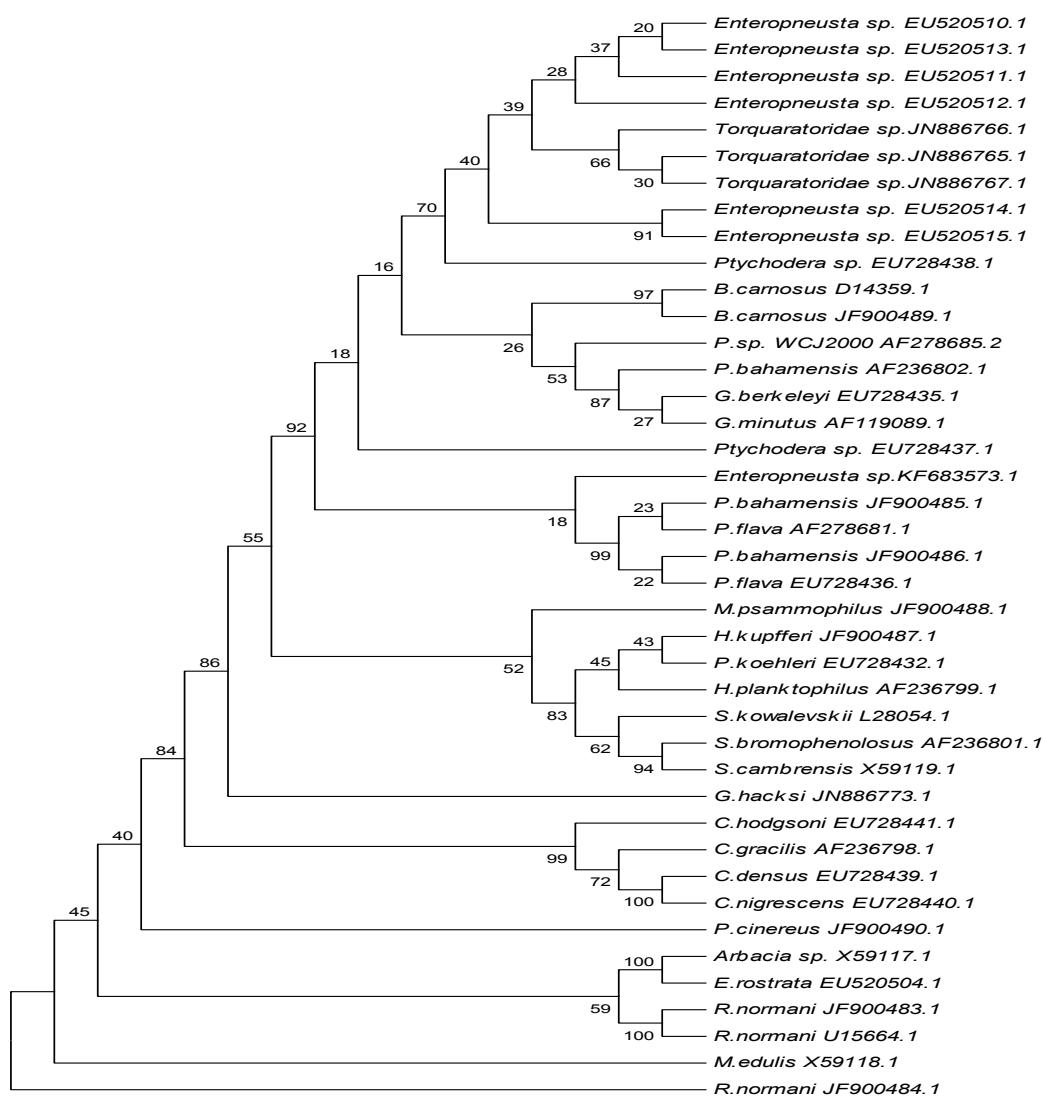


Figure 12: 18S rRNA based UPGMA tree

3.5 MP TREES

The evolutionary history was inferred using the Maximum Parsimony method (Fig. 13-15). The MP trees were obtained using the Subtree-Pruning-Regrafting (SPR) algorithm with search level 0 in which the initial trees were obtained by the random addition of sequences (10 replicates). All positions containing gaps and missing data were eliminated.

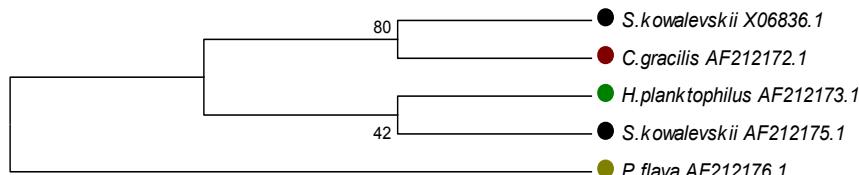


Figure 13: 5.8S rRNA based MP tree

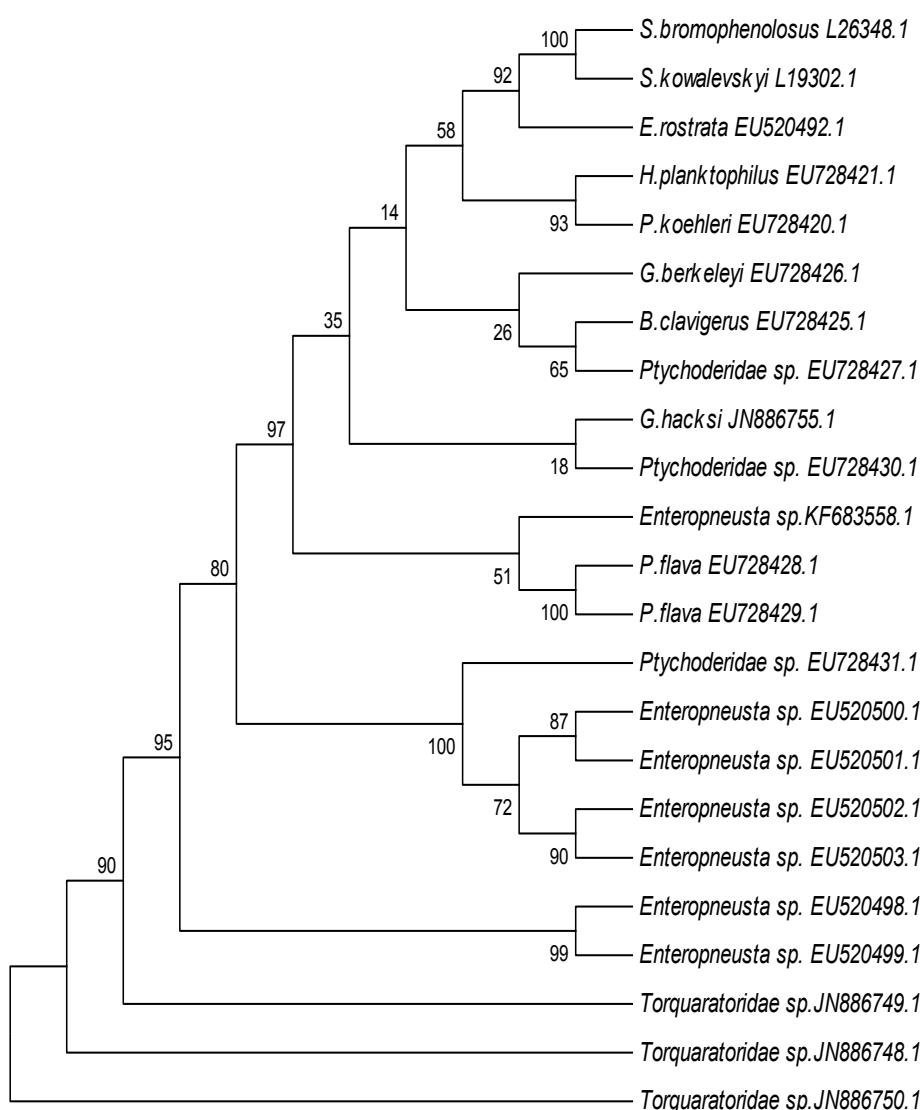


Figure 14: 16S rRNA based UPGMA tree

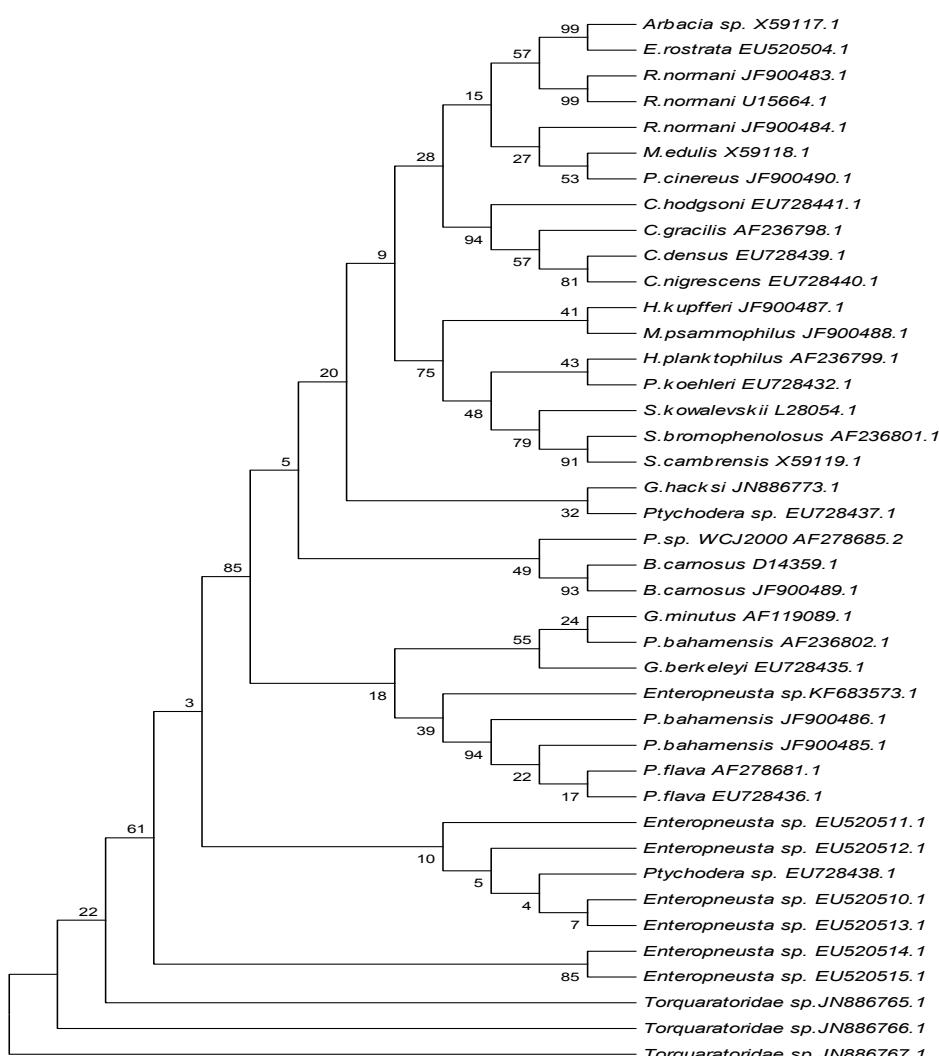


Figure 15: 18S rRNA based UPGMA tree

3.6 Nucleic Acid Composition

The computed length (base pairs), molecular weight, percentage of AU, GC, and number of adenine, uracil, guanine and cytosine were computed and given in table 2.

Table 2: Nucleic acid composition of genes of different species

Gene	Species	Length (Base pairs)	Molecular Weight (Daltons)		A+U %	G+C %	Adenine	Uracil	Guanine	Cytosine	Molecular Weight
			Single strand	Double strand							
5.8S rRNA	<i>C.gracilis</i>	4382	1334873	2675014	34.62	64.38	816	701	1514	1307	18.62(A) 29.83(C) 34.55(G) 16.00(U)
	<i>H.planktophilus</i>	4483	1362746	2734322	38.10	61.90	827	881	1481	1294	18.45(A) 28.86(C) 33.04(G) 19.65(U)
	<i>P.flava</i>	4046	1230615	2468235	37.44	62.56	807	708	1384	1147	19.95(A)

											28.35(C) 34.21(G) 17.50(U)
16S rRNA	<i>B.clavigerus</i>	591	180620	359305	49.92	49.92	163	132	133	162	27.58(A) 27.41(C) 22.50(G) 22.34(U)
	<i>E.rostrata</i>	625	189592	378809	60.96	39.04	198	183	122	122	31.68(A) 19.52(C) 19.52(G) 29.28(U)
	<i>G.berkeleyi</i>	527	160911	320399	49.91	49.91	147	116	123	140	27.89(A) 26.57(C) 23.34(G) 22.01(U)
	<i>G.hacksii</i>	498	152128	302856	49.00	51.00	134	110	117	137	26.91(A) 27.51(C) 23.49(G) 22.09(U)
	<i>H.planktophilus</i>	517	158455	314090	52.61	47.39	158	114	101	144	30.56(A) 27.85(C) 19.54(G) 22.05(U)
	<i>P.koehlerii</i>	574	175406	348767	52.09	47.91	164	135	121	154	28.57(A) 26.83(C) 21.08(G) 23.52(U)
	<i>S.bromophenolosus</i>	454	137055	275445	57.49	42.51	127	134	111	82	27.97(A) 18.06(C) 24.45(G) 29.52(U)
	<i>S.kowalevskiyi</i>	471	142024	285838	56.48	43.52	122	144	118	87	25.90(A) 18.47(C) 25.05(G) 30.57(U)
	<i>Enteropneustasps.</i>	513	156590	311490	54.58	45.42	517	123	106	127	30.60(A) 24.76(C) 20.66(G) 23.98(U)
	<i>P.flava</i>	485	148262	294944	49.07	50.93	137	101	115	132	28.25(A) 27.22(C) 23.71(G) 20.82(U)
18S rRNA	<i>Ptychoderidae.sp</i>	384	117079	233538	48.96	51.04	108	80	99	97	28.13(A) 25.26(C) 25.78(G) 20.83(U)
	<i>Torquaratoridae.sp</i>	542	165179	328973	55.90	44.10	164	139	110	129	30.26(A) 23.80(C) 20.30(G) 25.65(U)
18S rRNA	<i>Arbacia sp.</i>	505	154003	307136	48.71	51.29	138	108	128	131	27.33(A) 25.94(C) 25.35(G) 21.39(U)

	<i>C.densus</i>	1694	514515	1031910	42.74	57.26	370	354	526	444	21.84(A) 26.21(C) 31.05(G) 20.90(U)
	<i>C.gracilis</i>	1832	557262	1116734	40.01	59.44	377	356	580	509	20.58(A) 27.78(C) 31.66(G) 19.43(U)
	<i>C.hodgsoni</i>	1699	515914	1034958	42.73	57.27	370	356	530	443	21.78(A) 26.07(C) 31.19(G) 20.95(U)
	<i>C.nigrescens</i>	1695	514827	1032509	42.77	57.23	371	354	526	444	21.89(A) 26.19(C) 31.03(G) 20.88(U)
	<i>E.rostrata</i>	277	84464	168653	44.77	54.51	63	61	73	78	22.74(A) 28.16(C) 26.35(G) 22.02(U)
	<i>G.berkeleyi</i>	1653	501322	1005414	48.15	51.85	401	395	465	392	24.26(A) 23.71(C) 28.13(G) 23.90(U)
	<i>G.hacksii</i>	1730	524375	1051975	49.08	50.92	428	421	483	421	24.74(A) 23.01(C) 27.92(G) 24.34(U)
	<i>G.minutus</i>	1776	538706	1080142	48.42	51.58	433	427	494	422	24.38(A) 23.76(C) 27.82(G) 24.04(U)
	<i>H.kupfferi</i>	1808	548878	1100701	44.86	55.14	405	406	535	462	22.40(A) 25.55(C) 29.59(G) 22.46(U)
	<i>H.planktophilus</i>	1871	567869	1139108	44.68	55.32	417	419	559	476	22.29(A) 25.44(C) 29.88(G) 22.39(U)
	<i>M.edulis</i>	511	155238	310511	51.86	48.14	143	122	130	116	27.98(A) 22.70(C) 25.44(G) 23.87(U)
	<i>M.psammophilus</i>	1813	550327	1103749	44.84	55.16	407	406	539	461	22.45(A) 25.43(C) 29.73(G) 22.39(U)
	<i>P.cinereus</i>	1777	539946	1081302	46.60	53.40	425	403	499	450	23.92(A) 25.32(C) 28.08(G) 22.68(U)
	<i>P.koehleri</i>	1820	552649	1108063	44.67	55.33	408	405	539	468	22.42(A) 25.71(C) 29.62(G) 22.25(U)

<i>S.bromophenolosus</i>	1860	564364	1132243	45.22	54.78	415	426	550	469	22.31(A) 25.22(C) 29.57(G) 22.90(U)
<i>S.cambrensis</i>	534	162438	325046	45.69	54.31	125	119	149	141	23.41(A) 26.40(C) 27.90(G) 22.28(U)
<i>S.kowalevskii</i>	1818	551226	1106372	46.20	53.80	412	428	533	445	22.66(A) 24.48(C) 29.32(G) 23.54(U)
<i>Enteropneustas sp.</i>	674	204699	410033	47.63	52.37	163	158	186	167	24.18(A) 24.78(C) 27.60(G) 23.44(U)
<i>B.carnosus</i>	1696	541996	1087587	47.70	52.30	402	407	487	400	23.70(A) 23.58(C) 28.71(G) 24.00(U)
<i>P.bahamensis</i>	1713	519540	1041990	47.87	52.13	415	405	486	407	24.23(A) 23.76(C) 28.37(G) 23.64(U)
<i>P.flava</i>	1669	506339	1015463	47.03	52.97	396	389	479	405	23.73(A) 24.27(C) 28.70(G) 23.31(U)
<i>Ptychodera</i>	1615	489679	982398	47.80	52.20	390	382	462	381	24.15(A) 23.59(C) 28.61(G) 23.65(U)
<i>R.normani</i>	144	43844	87863	38.19	61.81	20	35	42	47	13.89(A) 32.64(C) 29.17(G) 24.31(U)
<i>Torquaratoridae .sp</i>	1701	515743	1034796	47.50	52.50	401	407	486	407	23.57(A) 23.93(C) 28.57(G) 23.93(U)

IV. DISCUSSION

Hemichordates consist of two subgroups, pterobranchs and acorn worms or enteropneusts. Recent phylogenetic investigations using 18S rDNA and mitochondrial codon usage (Castresana et al., 1998) suggest contradictory morphological analyses (Peterson, 1994). Molecular data, by offering a phylogenetic analysis independent of the major developmental and morphological differences between phyla, could clarify deuterostome relationships. Molecular phylogenies based on a single or a few genes often lead to apparently conflicting signals (Jeffroy et al., 2006). Shared molecular genetic characteristics could provide excellent sources of phylogenetic information, particularly if they are conserved, complex and rare and are consequently unlikely to have arisen by chance convergence (Telford et al.,

2000). However, besides the sequence itself, genome-level features have been proposed as powerful phylogenetic characters (Boore et al., 2006). There are two major classes of Hemichordata according to molecular phylogeny, the solitary Enteropneusta and the colonial Pterobranchia, but 18S rDNA analyses suggest that the Enteropneusta are paraphyletic (Cameron et al. 2000). The Pterobranchia may be a sister-group to one of the enteropneust families, the Harrimaniidae, which have direct-developing larvae (Cameron et al. 2000). In the current study 5.8S, 16S and 18S were considered to infer evolutionary relationships among Hemichordates. The trees showed similar species clustered together but did not form distinct clades as per the previous studies and morphological similarities. The result also indicated that several species appear to be polyphyletic and several unrelated species appear to share the same clade. The nucleic acid composition also supported the phylogenetic inference in terms of molecular weight, percentage of AU, GC at individual species level.

V. CONCLUSION

Identification of unknown species by means of morphology only may result in unconvincing specimen identifications resulting in to false negatives or positives. In the current study the ribosomal RNA genes were preferred to inspect comprehensive phylogeny in Hemichordates. The relative study reveals ribosomal RNA genes seem to be phylogenetically informative at the species level. Phylogenetic trees were investigated by different methods to infer evolutionary relationships. The trees showed more or less similar species clustered together but did not form distinct clades as per their lifestyles and morphological similarities. The result also indicated that several species appear to be polyphyletic and several unrelated species appear to share the same clade. But still it can be assumed here that phylogenetic analyses using ribosomal RNA genes sequences could be a productive approach in understanding Hemichordates evolution. Some trees showed similar species remain clustered together with few alterations and this may be assumed by possible adaptive radiation or mutations.

VI. REFERENCES

- [1] Benson D.A., Cavanaugh M., Clark K., Karsch-Mizrachi I., Lipman D.J., Ostell J. and Sayers E.W. (2013) GenBank. Nucleic Acids Res. 41: 36-42.
- [2] Boore J.L. (2006) :The use of genome-level characters for phylogenetic reconstruction. Trends Ecol Evol, 21:439-446.
- [3] Cameron C.B. (2005) :A phylogeny of the hemichordates based on morphological characters. Can J Zool 83(1): 196-215.
- [4] Cameron, C.B., Swalla, B.J., and Garey, J.R. 2000. Evolution of the chordate body plan: new insights from phylogenetic analysis of deuterostome phyla. Proc. Natl. Acad. Sci. U.S.A. 97(9): 4469-4474.
- [5] Cannon, J.T., Rychel, A.L., Eccleston, H., Halanych, K.L. & Swalla, B.J. (2009) Molecular phylogeny of Hemichordata, with updated status of deep-sea enteropneusts. Mol. Phylogenetic Evol. 52, 17-24.
- [6] Castresana, J., G. Feldmaier-Fuchs and S. Paabo, (1998) Codon reassignment and amino acid composition in hemichordate mit chondria. Proc. Natl. Acad. Sci. USA 95: 3703-3707.

- [7] Hall T.A. (1999). Bioedit: a user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. Nuc Acids Symp Ser 41:95-98.
- [8] Jeffroy O, Brinkmann H, Delsuc F, Philippe H (2006) Phylogenomics: the beginning of incongruence? *Trends Genet*, 22:225-231.
- [9] Kumar S., Stecher G. and Tamura K. (2016). MEGA7: Molecular Evolutionary Genetics Analysis Version 7.0 for Bigger Datasets. *Mol. Biol. Evol.* 33(7):1870-1874.
- [10] Nei M. and Kumar S. (2000). Molecular Evolution and Phylogenetics. Oxford University Press, New York.
- [11] Nomaksteinsky, M., Rottinger, E., Dufour, H., Chettouh, Z., Lowe, C. J., Martindale, M. & Brunet, J. (2009) Centralization of the deuterostome nervous system predates chordates. *Curr. Biol.* 19: 1264-1269.
- [12] Peterson, K. J. (1994). Understanding chordate origins: testing hypotheses of homologous structures between chordates and enteropneusts. *Am. Zool.* 34, Addendum, 10AA.
- [13] Rzhetsky A. and Nei M. (1992). A simple method for estimating and testing minimum evolution trees. *Molecular Biology and Evolution* 9: 945-967.
- [14] Saitou N. and Nei M. (1987). The neighbor-joining method: A new method for reconstructing phylogenetic trees. *Molecular Biology and Evolution* 4: 406-425.
- [15] Sneath P.H.A. and Sokal R.R. (1973). *Numerical Taxonomy*. Freeman, San Francisco.
- [16] Tamura K. and Nei M. (1993). Estimation of the number of nucleotide substitutions in the control region of mitochondrial DNA in humans and chimpanzees. *Molecular Biology and Evolution* 10: 512-526.
- [17] Tamura K., Nei M. and Kumar S. (2004). Prospects for inferring very large phylogenies by using the neighbor-joining method. *Proceedings of the National Academy of Sciences (USA)* 101:11030-11035.
- [18] Thompson, J.D., Higgins, D.G. and Gibson, T.J. (1994) CLUSTAL W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice, *Nucl. Acids Res.*, 22, 4673-4680.

To Cite This Article

Barik, P.B. (2016): “Hemichordate Phylogenetic Reconstruction Based On Ribosomal RNA Genes” International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5089-5103, Paper ID: IJIFR/V4/E2/018.

EFFECT OF CHLOR-ALKALI SOLID WASTE EFFLUENT ON CALORIC CONTENT IN GRAIN OF A LITTLE MILLET CROP

Paper ID	IJIFR/V4/ E2/ 021	Page No.	5104-5108	Subject Area	Botany
Keywords	Chlor-Alkali Factory, Solid Waste Effluent, Little Millet, Caloric Content, Grain				

Kamal L. Barik

**Assistant Professor,
Department of Botany, North Orissa
University, Baripada, Mayurbhanj (Odisha)**

Abstract

The little millet (*Panicum sumatrense Rath ex. Roem and Schult*) crop variety SS. 81-1, exposed to chlor-alkali solid waste effluent @ 100 gm⁻² (treatment - 1), 200 gm⁻² (treatment - 2), 300 gm⁻² (treatment - 3) and 400 gm⁻² (treatment - 4) was studied in vivo at the Agriculture Research Station, Ankuspur in the District of Ganjam, Odisha at an interval of 15 days starting from 30 days after sowing (DAS) till harvest of the crop following the ICAR technology proposed by Seetharam (1994) with little modification depending upon the soil condition and climate of the locality. The method and formula as proposed by Leith (1975) were employed for the determination of caloric value of the material. Caloric content of grain in control and various treatments were determined. Very little or no increase in caloric value was observed from control to treatment - 1, 2 and then to treatment-3. Treatment-4 showed less caloric content than that of treatment -3. The caloric value of grain in control and all treatments showed high order of variation ($p \leq 0.001$). However, the ANOVA test for caloric values in the control, treatments - 1, 2 and 3 in grain did not show significant variation.

I. INTRODUCTION

The degradation of environment due to industrial waste threatens the survival of living beings. Literature available revealed mostly the adverse effects of chlor-alkali solid waste on algae (Mishra et al. 1985, 1986), on fish (Shaw et al. 1985) and on rice (Nanda et al. 1993, 1994, 1996, Behera et al. 1995). So far as the little millet crop is concerned, some work has been done by Indian Council of Agricultural Research (ICAR, 1992-93, 1993-94,



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016



1994-95, 1995-96 and 1996-97) under All India Coordinated Small Millet Improvement Project associated with various cooperative agencies for the development of crop productivity. However, no work has been done on the effect of chlor-alkali solid waste effluent on the caloric content of little millet crop. Therefore, in this investigation an attempt has been made to study the caloric content in grain of a little millet crop exposed to various concentration of chlor-alkali solid waste effluent.

II. STUDY SITE AND ENVIRONMENT

The experiment was conducted at the Agriculture Research Station (a Research farm of Orissa University of Agriculture and Technology, Bhubanswar, Odisha), Ankuspur ($19^{\circ}46'N$; $94^{\circ}21'E$) situated at a distance of about 25 km from the Bay of Bengal Coast, Odisha. The climate of the experimental site was monsoonal with three distinct seasons i.e. rainy (July to October), winter (November to February) and summer (March to June). Out of 863.65mm of rain recorded during the experimental year, a maximum of 28.8 per cent was observed in June. The mean minimum and mean maximum atmospheric temperature recorded during the year were found to be normal. The mean minimum temperature ranged from $15.4^{\circ}C$ (December) to $26.13^{\circ}C$ (May) whereas mean maximum showed a range of $27.6^{\circ}C$ (December) to $37.81^{\circ}C$ (May).

The soil was found to be sandy (75%) and acidic ($pH = 6.58$) in nature. The phosphorus and potassium contents of the soil were high (i.e., 9.0 and 46.6 ppm respectively) whereas the amount of organic carbon (%) was very low (0.35%). The solid waste of chlor-alkali factory (M/s. Jayashree Chemicals) applied in the field soil was found to be alkaline ($pH=8.06$). Textural analysis showed almost nil of sand, silt and clay. The waste soil exhibited a medium range of phosphorus and potassium contents. The organic carbon (%) of the waste was of very low order (Barik, 2016).

III. MATERIALS AND METHODS

Twenty-five beds were prepared following the usual agricultural practice. Solid waste collected from the chlor-alkali factory was applied at the concentration of 100 g m^{-2} , 200 g m^{-2} , 300 g m^{-2} and 400 g m^{-2} and marked as treatment -1, 2, 3 and 4 respectively. The soil was mixed thoroughly in each bed and leveled. Five beds for each concentration and the control were maintained. ICAR technology proposed by Seetharam (1994) was employed for cropping with little modification depending upon the soil condition and climate of the locality. The sampling was made at an interval of 15 days starting with a 30 days period after sowing till the harvest of the crop.

The harvested plant samples i.e. fodder and grain were dried and powdered in a Willy Mill separately. These fine powdered materials (about 1g) were pressed to form pellets. Five replicates were taken from each control and treatment exposed to various concentration of solid waste effluent. The caloric value of the material was determined by igniting these pellets in a "Toshniwal" make Bomb Calorimeter following the method and formula given by Leith (1975).

$$V = \frac{W (\Delta t - \Delta c)}{G}$$

Where,

V = Calorific value of the biological material

W = Water value of the instrument

t = Corrected temperature difference reading at the Beckmann thermometer before and after burning

c = Correction value for the ignition wire

G = Sample dry weight.

IV. RESULTS

Caloric content of grain in control, treatments - 1, 2, 3 and 4 are presented in Table -1. Very little or no increase in caloric value was observed from control to treatments - 1, treatment - 2 and then to treatment - 3. Treatment - 4 showed less caloric content than that of treatment - 3, even the value was found to be less than that observed in the control. The trend of caloric content i.e. control < treatment - 1 < treatment - 2 < treatment - 3 was most probably due to the influence of solid waste. The decrease in caloric content in treatment - 4, was perhaps, due to the adverse effect of solid waste. The concentration of solid waste applied in treatment - 4 might have been higher than the tolerance limit of the crop.

V. DISCUSSION

Compared to rice (Parijat and Mashuri varieties), the caloric content of present study showed greater variation (Table -2). The caloric value of grain exhibited higher value than that of Mashuri and less compared to Parijat of rice. ANOVA test (Table -3) relating to grain in the control and 4 treatments showed high amount of differences (0.001p). However, the ANOVA test for control, treatments - 1, 2 and 3 caloric values of grain did not show significant variation. The results, thus, revealed that the solid waste in treatment - 4 might be higher than the crop tolerance limit. Besides, the soil characteristics, soil amendment practices with modern improved technology, precipitation, atmospheric temperature and relative humidity do play vital role in variation of caloric content in grain.

Table – 1. Caloric values (Cal g⁻¹ dry wt.) in grain of a little millet crop (*P. sumatrense*) in control and various treatments exposed to chlor-alkali solid waste at harvest (values are in mean ± SD, n = 5 each)

Variable	Grain
Control	4280.287 ± 1.959
Treatment - 1	4280.843 ± 2.209
Treatment - 2	4281.429 ± 2.245
Treatment - 3	4281.685 ± 2.035
Treatment - 4	4146.370 ± 4.890

Table – 2: Caloric value in grain of some crop ecosystem at harvest

Sources	Crop	Variety	Grain
Patnaik(1982)	Rice	Parijat	a 4992.63
			b 5580.00
	Mashuri	a	3452.63
		b	3348.00
This study	Little millet	SS. 81-1	4280.29
			d 4280.84
			e 4281.43
			f 4281.68
			g 4146.37

a = without fertilizer, b = with fertilizer, c = control, d = treatment – 1, e = treatment – 2, f = treatment – 3 and g = treatment – 4 (treatment – 1,2,3, and 4 are exposed to chlor-alkali solid waste).

Table – 3: Variance analysis of caloric value in grain of a little millet crop (*P. sumatrense*) showing the variance ratio (F), the least significant differences (LSD) and the significant level (p) in control and various treatments exposed to chlor-alkali solid waste effluent.

Compartment	Contrl with treatment – 1,2,3 and 4 (n = 25)	Contrl with treatment – 1,2 and 3 (n = 20)
Grain	F = 2300.342 *** LSD = 3.766	F = 0.363 (NS)

*** ≤ 0.001, NS = Not Significant

VI. CONCLUSION

In this investigation the caloric value in grain of little millet crop showed very little fluctuation following the trend, control < treatment-1 < treatment-2 < treatment-3 > treatment-4. The rain fall at the early stage of growth could perhaps have diluted the waste soil concentration as a result of which an increasing trend in caloric value was obtained from control to treatment-1, treatment-2 and then to treatment-3. Treatment-4 showed less caloric content compared to treatment-3. This might be due to the influence of waste soil concentration in soil. It revealed that the chlor-alkali solid waste effluent applied in treatment-4 might be higher than the tolerance limit of the crop. However, this concentration of chlor-alkali solid waste applied in the field would vary from place to place and also from crop to crop because of climatic variation of the place and also the genetic setup of the crop. Soil quality and the soil amendment practices with modern improved technology also play vital role in detoxification of the waste soil concentration applied in the field.

VII. ACKNOWLEDGEMENTS

The author gratefully acknowledges the financial assistance extended by University Grants Commission (U.G.C.), New Delhi. Thanks are due, to Prof. B.N. Misra (Retd.), Prof. M.K. Misra (Retd.), and Prof. A.K. Panigrahi (Retd), Department of Botany, Berhampur

University, Berhampur, Odisha for their co-operation throughout the progress of this investigation. The author is also indebted to Dr. R.C. Misra (Sr. Breeder and Officer in-charge), Dr. H.K. Mohapatra (Entomologist), Dr. S. Panda (Pathologist), Dr. B.K. Jena (Agronomist) and Mr. S.N. Biswal (Field Asst.) of Agriculture Research Station, Ankuspur for providing necessary help throughout the cropping.

VIII. REFERENCES

- [1] K.L. Barik, "Effect of chlor-alkali solid waste effluent on the fodder and grain yield of a little millet crop". The Global J. Environ. Sci. and Research, Vol. 3, No. 1 (2016), pp. 85-88.
- [2] M., Behera, B. Padhy, and B. Patra, "Effect of industrial effluent on seed germination and seedling growth of rice (*Oryza sativa L.*)". Neo Botanica, Vol. 3, No. 1&2, (1995), pp. 7-12.
- [3] ICAR, "All India coordinated small millet improvement project". Annual Report, Indian Council of Agricultural Research and Cooperating Agencies, Bangalore (1992-93).
- [4] ICAR, "All India coordinated small millet improvement project". Annual Report, Indian Council of Agricultural Research and Cooperating Agencies, Bangalore (1993-94).
- [5] ICAR, "All India coordinated small millet improvement project". Annual Report, Indian Council of Agricultural Research and Cooperating Agencies, Bangalore (1994-95).
- [6] ICAR, "All India coordinated small millet improvement project". Annual Report, Indian Council of Agricultural Research and Cooperating Agencies, Bangalore (1995-96).
- [7] ICAR, "All India coordinated small millet improvement project". Annual Report, Indian Council of Agricultural Research and Cooperating Agencies, Bangalore (1996-97).
- [8] H. Leith, "The measurement of caloric values". pp.119-129, In Ecological studies. 14, Primary Productivity of the Biosphere, H. Leith and R.H. Whittaker (eds.), Springer Verlag, New York (1975).
- [9] B.B. Mishra, D.R. Nanda, and B.N. Misra, "Reclamation with blue-green algae; Mercury uptake by algae cultured in solid waste of a chlor-alkali factory and its effect on growth and pigmentation", J. Environ. Biol., Vol. 6, No. 4 (1985), pp. 223-231.
- [10] B.B. Mishra, D.R. Nanda, and B.N. Misra, "Reclamation with blue-green algae; Changes in free amino acid content of algae exposed to solid waste of a Chlor - alkali factory". Microb. Lett., Vol. 33 (1986), pp. 139-142.
- [11] D.R. Nanda, B.B. Mishra, and B.N. Misra, "Effect of solid waste from a Chlor-alkali factory on rice plants; Mercury accumulation and changes in biochemical variables". J. Environ. Studies, Vol. 45 (1993), pp. 23-28.
- [12] D.R. Nanda, B.B. Mishra, and B.N. Misra, "Changes in bio- chemical variables of a Crop plant exposed to saturated solid waste extract from a Chlor-alkali factory". Mendel, Vol. 11, No. 3 & 4 (1994), pp. 151-152.
- [13] D.R. Nanda, B.B. Mishra, and B.N. Misra, "Effect of solid waste from a Chlor-alkali factory on accumulation of mercury and changes in biomass of rice roots". Oryza., Vol. 33 (1996), pp 51-54.
- [14] H.B. Patnaik, "Primary Production and growth analysis in a crop plant", Ph.D. Thesis, Berhampur University, Berhampur, Orissa (1982).
- [15] A .Seetharam, "Technology for increasing finger millet and other small millets production in India", Project Coordination Cell, All India Coordinated Small Millet Improvement Project, Indian Council of Agricultural Research, GKVK Campus, Bangalore (1994).
- [16] B.P. Shaw, A. Sahu, and A.K. Panigrahi, "Residual mercury concentration in brain, liver and muscle of contaminated fish collected from an estuary near a caustic-chlorine industry". Curr. Sci., Vol. 54 , No. 16 (1985), pp. 810-812.

To Cite This Article

Barik, L. K. (2016): "Effect Of Chlor-Alkali Solid Waste Effluent On Caloric Content In Grain Of A Little Millet Crop" International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5104-5108, Paper ID: IJIFR/V4/E2/021.

ENHANCED SIGMA-DELTA MODULATOR FOR WEARABLE WIRELESS RECEIVERS

Paper ID	IJIFR/V4/ E2/ 016	Page No.	5109-5115	Subject Area	Elect. & Comm. Engineering
Keywords	Modulator, Quantizer, OSR, Wireless Body Area Network , WiMAX				

1st	S.Sumathi	Assistant Professor, Department of Elect. & Comm. Engineering, Velammal Engineering College, Chennai
2nd	Dr. R. Dhaya	
3rd	V.Ragul	M.Tech. Student Department of Elect. & Comm. Engineering, Velammal Engineering College, Chennai
4th	Dr.R.Kanthavel	Professor & Head Department of Elect. & Comm. Engineering, Velammal Engineering College, Chennai

Abstract

The demand for new bio instruments requiring higher capacities, data rates and different operating modes have motivated the development of new generation multi-standard wireless transceivers. In multi-standard design, sigma-delta based ADC is one of the most fashionable choices. A reconfigurable cascade sigma delta modulator has been presented on the system level. The modulator was based on single-bit quantizers and utilized feed-forward path to increase the dynamic range. The double-sampling technique was adopted to improve the over-sampling ratio (OSR) over a wide bandwidth range. The loop order and OSR were reconfigurable to meet the requirements of a wide range of standards. The modulator performance were modeled and analyzed in MATLAB/ SIMULINK for Global System for Mobile Communications (GSM) / Bluetooth / Wireless Body Area Network (WBAN) communication standards. The proposed modulator fulfills the performance requirements of biological devices.

I. INTRODUCTION

In the modern world, people are interested in using 4G wireless network. 4G is described as MAGIC — Mobile multimedia, anytime anywhere, Global mobility support, integrated



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016



wireless solution, and customized personal service. In telephony, 4G is the fourth generation of cellular wireless standards. It is a successor to 3G and 2G families of standards. A 4G system is expected to provide a comprehensive and secure all-IP based solution where facilities such as ultra-broadband (giga-bit speed such as 100+ MiB/s) Internet access, IP telephony, gaming services, and streamed multimedia may be provided to users.

In this paper, the design approach of a multi-mode sigma delta modulator for 4G mobile standard was proposed .A sigma delta modulator was presented to meet the requirements of GSM/ Bluetooth /GPS /WBAN communication standards. The topology was based on 2-1-1 cascade sigma delta modulator with feed-forward paths. The double-sampling technique was employed to improve the OSR and the resolution of quantizers. The topology improves the order programmability and decreases the circuit's complexity.

II. DELTA MODULATOR

Delta modulation (DM) is an analog-to-digital and digital-to-analog signal conversion technique used for transmission of voice information where quality is not of primary importance. DM is the simplest form of differential pulse-code modulation (DPCM) where the difference between successive samples is encoded into n-bit data streams. In delta modulation, the transmitted data is reduced to a 1-bit data stream.

To achieve high signal-to-noise ratio, delta modulation must use oversampling techniques, that is, the analog signal is sampled at a rate several times higher than the Nyquist rate. Derived forms of delta modulation are continuously variable slope delta modulation, delta-sigma modulation, and differential modulation. The Differential Pulse Code Modulation is the super set of DM.

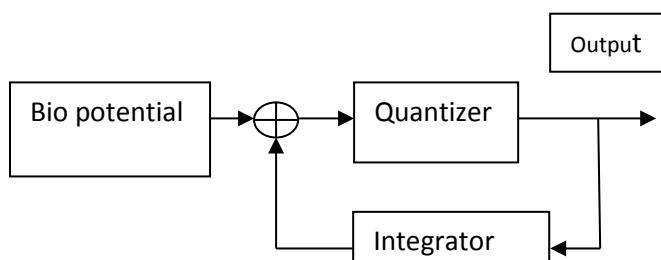


Figure 1: Delta Modulator

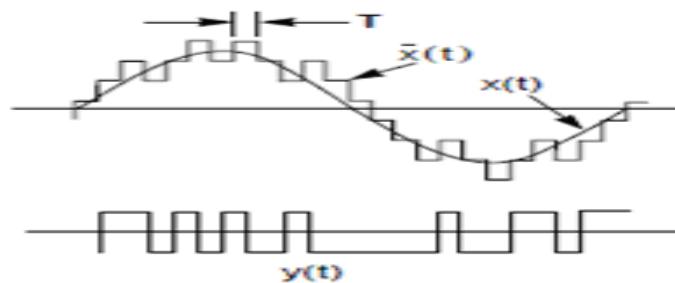


Figure 2: Modulated Signal

The predicted signal is smoothed with a low pass filter. Delta modulators, furthermore, exhibit slope overload for rapidly rising input signals, and their performance is thus dependent on the frequency of the input signal. the spectrum of quantization noise of the prediction error is flat and the noise level is set by the 1-bit comparator. The signal-to-noise ratio can be enhanced by decimation processes.



Figure 3: Demodulator

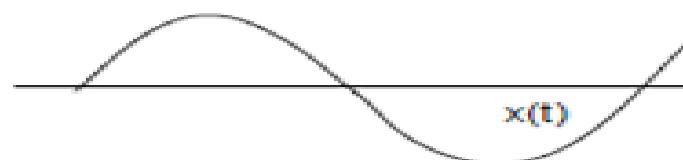


Figure 4: Demodulated Signal

In delta modulation there is no restriction on the amplitude of the signal waveform, because the number of levels is not fixed. On the other hand, there is a limitation on the slope of the signal waveform which must be observed if slope overload is to be avoided. However, if the signal waveform changes slowly, there is nominally no limit to the signal power which may be transmitted.

III. SIGMA-DELTA MODULATOR

Sigma-delta modulation (SDM) was developed in 1960s to overcome the limitations of delta modulation. Sigma-delta systems quantize the delta (difference) between the current signal and the sigma (sum) of the previous difference. An integrator is placed at the input to the quantizer; signal amplitude is constant with increasing frequency; thus SDM is also known as pulse density modulation (PDM). Like PCM, SDM quantizes the signal directly, and not its derivative as in DM. Thus the maximum quantizer range is determined by the maximum signal amplitude and is not dependent on signal spectrum.

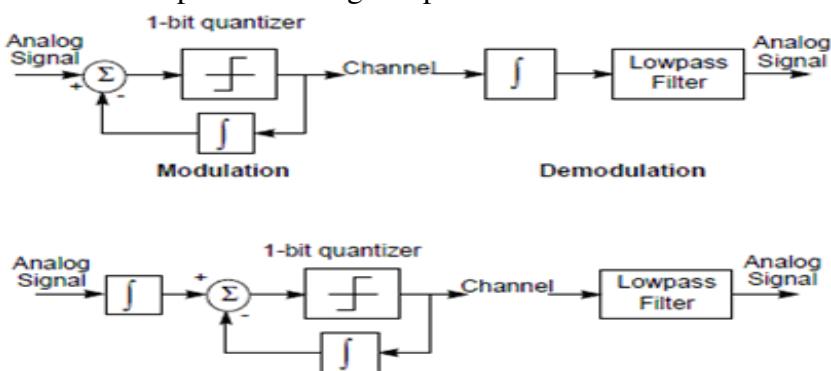


Figure 5: Sigma Delta Modulator

A first-order (single integration) sigma-delta modulation encoder is shown in Figure.5; the input to the quantizer is the integral of the difference between the input and the quantized output. The difference between the input signal and the output signal approaches zero; the average value of the clocked output tracks the input. There is little dc error in the output signal; the frequency spectrum of the quantizing error rises with increasing frequency (6 dB/octave). The integrator forms a low pass filter on the difference signal thus providing low frequency feedback around the quantizer. This feedback results in a reduction of quantization noise at low (in-band) frequencies. Unlike PCM and DM, the noise is not white, but shaped by a first-order high pass characteristic.

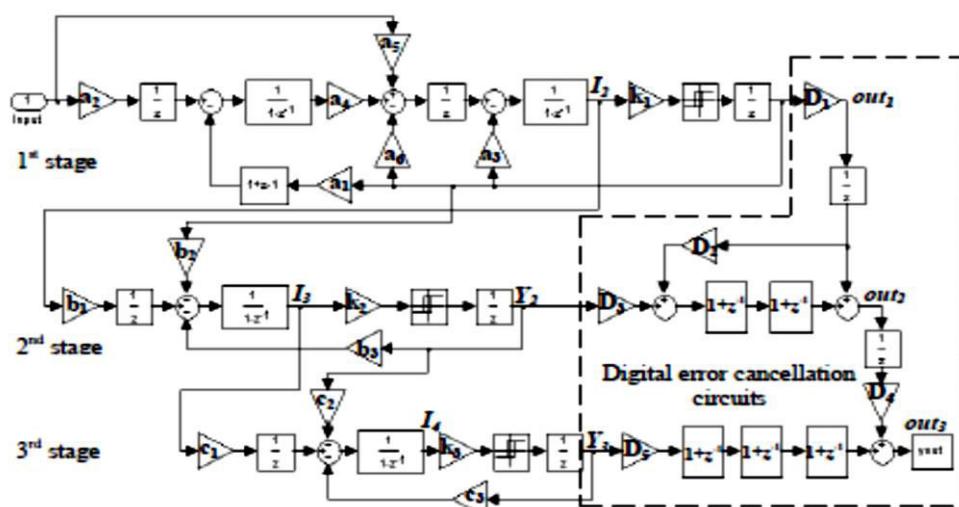


Figure 6: Proposed Multimode Sigma Delta Modulator

IV. PROPOSED MODULAR TOPOLOGY

4.1 GSM Mode:

GSM (Global System for Mobile Communications) is the most popular standard for mobile telephony systems in the world. The GSM Association, its promoting industry trade organization of mobile phone carrier. This ubiquity means that subscribers can use their phones throughout the world, enabled by international roaming arrangements between mobile network operators. GSM differs from its predecessor technologies in that both signaling and speech channels are digital. This also facilitates the wide-spread implementation of data communication applications into the system

4.2 Bluetooth Mode:

Bluetooth is an open wireless technology standard for exchanging data over short distances (using short wavelength radio transmissions) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security. It was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization. Today Bluetooth is managed by the Bluetooth Special Interest Group. Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each) in the range

2402-2480 MHz. This range is in the globally unlicensed Industrial, Scientific and Medical (ISM) 2.4 GHz short-range radio frequency band.

4.3 GPS and WCDMA mode

GPS is considered a dual-use technology, meaning it has significant military and civilian applications. GPS has become a widely used and useful tool for commerce, scientific uses, tracking and surveillance. GPS's accurate timing facilitates everyday activities such as banking, mobile phone operations, and even the control of power grids. Farmers, surveyors, geologists and countless others perform their work more efficiently, safely, economically, and accurately.

WCDMA air interface, referred also as UMTS terrestrial radio access (UTRA), developed by the third-generation partnership project (3GPP). WCDMA has two modes characterized by the duplex method: FDD (frequency division duplex) and TDD (time division duplex), for operating with paired and unpaired bands, respectively. For the channel coding three options are supported: convolutional coding, turbo coding, or no channel coding. Channel coding selection is indicated by upper layers. Bit interleaving is used to randomize transmission errors. The modulation scheme is QPSK.

The output of the second quantizer is given by:

$$Y_2(z) = \frac{B}{D_1} z^{-3} V_{in}(z) + B z^{-2} (1 - z^{-1})^2 Q_1(z) - \frac{2a_6 b_1}{b_3} z^{-2} Q_1(z) + z^{-1} (1 - z^{-1}) Q_2(z)$$

$$B = \frac{2a_6 b_1}{b_3} - \frac{b_2}{b_3},$$

Where, $Q_2(z)$ is the quantization error of the 2nd stage.

The output of the 2nd stage is:

$$out_2(z) = STF_2(z) V_{in}(z) + p_2(z) Q_2(z)$$

$$\text{Where } STF_2(z) = \frac{2a_6 b_1 D_3}{b_3 D_1} z^{-3}$$

$$p_2(z) = D_3 z^{-1} (1 - z^{-1})^3$$

The output of 2nd stage can be reduced as $2a_6 b_1 D_3 = b_3 D_1$, $D_2 = -D_3 B / D_1$ are satisfied.

$$out_2(z) = z^{-3} V_{in}(z) + D_3 z^{-1} (1 - z^{-1})^3 Q_2(z)$$

In the conventional cascade modulator structure, there is no the D2 branch. Introducing D2 branch can improve the freedom of b1 and b2 effectively, which enhances the modulator's performance.

4.4 WLAN and WiMAX mode

WLAN: IEEE 802.11 is a set of standards carrying out wireless local area network (WLAN) computer communication in the 2.4, 3.6 and 5 GHz frequency bands. They are created and maintained by the IEEE LAN/MAN Standards Committee (IEEE 802). The base current version of the standard is IEEE 802.11-2007. The 802.11 family includes over-the-air modulation techniques that use the same basic protocol. The most popular are those defined by the 802.11b and 802.11g protocols, which are amendments to the original

standard. The segment of the radio frequency spectrum used by 802.11 varies between countries.

WiMAX (Worldwide Interoperability for Microwave Access) is a telecommunications protocol that provides fixed and fully mobile Internet access. The current WiMAX revision provides up to 40 Mbit/s with the IEEE 802.16m update expected to offer up to 1 Gbit/s fixed speeds. The name "WiMAX" was created by the WiMAX Forum, which was formed in June 2001 to promote conformity and interoperability of the standard. The forum describes WiMAX as "a standards-based technology enabling the delivery of last mile wireless broadband access as an alternative to cable and DSL".

The output of the 3rd quantizer can be denoted as:

$$Y_3(z) = STF_3(z)V_{in}(z) + p_3(z)Q_1(z) + p_4(z)Q_2(z) + p_5(z)Q_3(z)$$

Where $Q_3(z)$ is the quantization error of the 3rd stage.

$$STF_3(z) = \frac{B(b_3c_1 - c_2)}{c_3D_1} z^{-4}$$

$$p_3(z) = \frac{B}{c_3} (-c_2 + b_3c_1)z^{-3}(1-z^{-1})^2 + \frac{2a_6b_1}{c_3} (\frac{c_2}{b_3} - c_1)z^{-3}$$

$$p_4(z) = -\frac{c_2}{c_3} z^{-2} + \frac{c_2 - c_1b_3}{c_3} z^{-3}$$

$$p_5(z) = z^{-1}(1-z^{-1})$$

Under the conditions $c_2 = c_1b_3$, formula can be simplified as:

$$Y_3(z) = -\frac{c_2}{c_3} z^{-2} Q_2(z) + z^{-1}(1-z^{-1}) Q_3(z)$$

The output of the 3rd stage can be expressed as:

$$out_3(z) = \frac{2a_6b_1D_4D_5}{b_3D_1} z^{-4} V_{in}(z) + D_5 z^{-1}(1-z^{-1})^4 Q_3(z)$$

where $D_4 = \frac{c_2}{c_3}$, $D_5 = D_3$.

V. ANALYTICAL RESULT

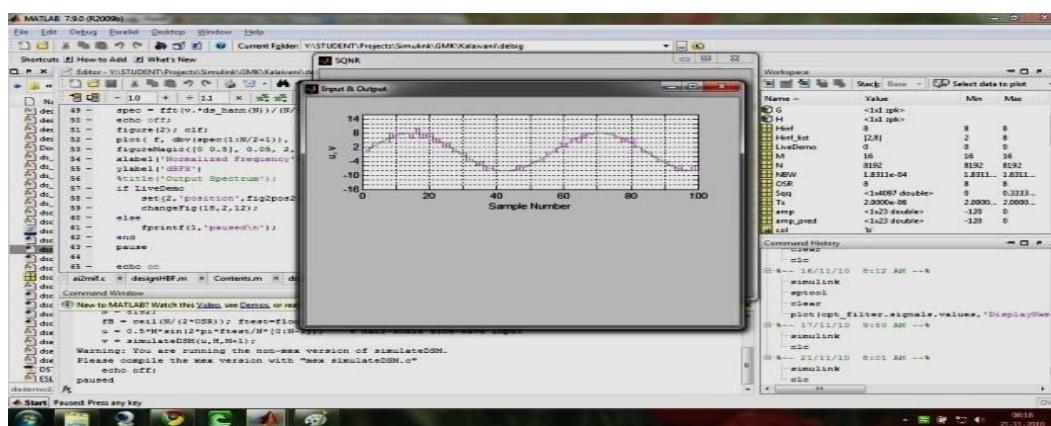


Figure 8: Sigma Delta Modulator output

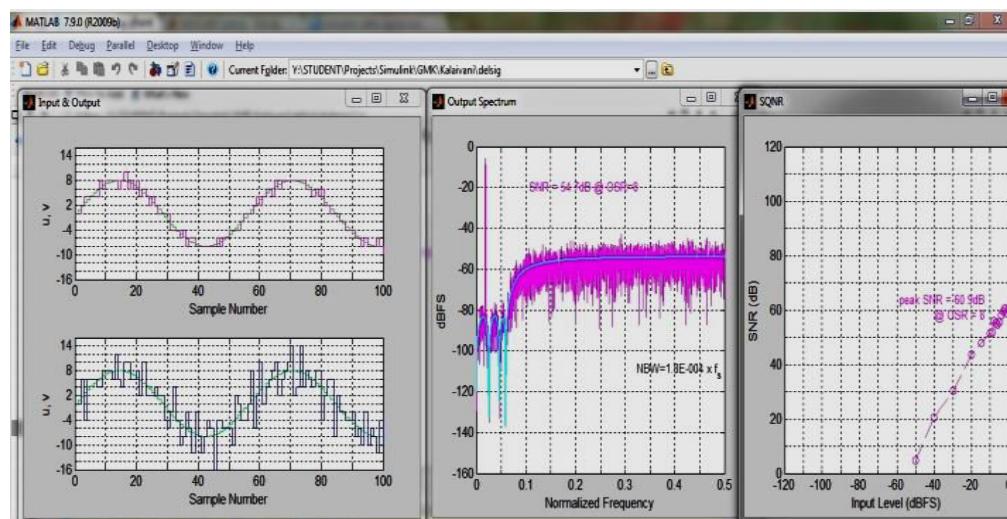


Figure 9: Sigma Delta Modulator Output

VI. CONCLUSION AND FUTURE WORK

The design approach of a multi-mode sigma delta modulator for 4G mobile terminals is proposed on the system level. The reconfigurable modulator adopts a cascade 2-1-1 double-sampling single-bit topology with a feed-forward path. The topology improves the order programmability and decreases the circuit's complexity. The non-ideality analysis validates the efficiency of the proposed topology and the feasibility of the circuit realization. The simulation results meet the requirements of 4G mobile communication standards.

VII. REFERENCES

- [1] Ling Zhang. System and Circuit Design Techniques for WLAN Enabled Multi-Standard Receiver [D]. Doctor's Thesis. Columbus: The Ohio State University, 2005.
- [2] A.Silva, Guilherme, R.F.Neves et. al. Designing Reconfigurable Multi-Standard Analog Baseband Front End for 4G Mobile Terminals: System Level Design [J/OL]. 2007, http://www.co.it.pt/conftele2007/assets/papers/electronics/paper_39.pdf.
- [3] Georges Gielen, Erwin Goris. Reconfigurable Front End Architectures and AD Converters for Flexible Wireless Transceivers for 4G Radios [C]. IEEE 7th CAS Symposium on Emerging Technologies: Circuits and Systems for 4G Mobile Wireless Communications,2005: 13-18
- [4] Ana Rusu, Delia Rodriguez de Llera Gonzalez, Mohammed Ismail. Reconfigurable ADCs Enable Smart Radios for 4G Wireless Connectivity [J]. IEEE Circuits & Devices Magazine, 2006, 22(3): 6-11.
- [5] Andrea Xotta, Andrea Gerosa, Andrea Neviani. A Programmable Order Sigma Delta Converter for a Multi Standard Wireless Receiver [J/OL]. <http://primo.ismb.it/firb/docs/multiSD.pdf>.
- [6] Sigdel, R.Schreier. SD Toolbox [DB/OL]. 2002, <http://www.Mathworks.com/matlabcentral/fileexchange>

To Cite This Article

Sumathi, S., Dhaya, R., Ragul, V., Kanthavel, R. (2016): "Enhanced Sigma-Delta Modulator for Wearable Wireless Receivers" International Journal of Informative & Futuristic Research (IJIFR) (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5109-5115, Paper ID: IJIFR/V4/E2/016.

EFFECTS OF EDUCATING THE ADOLESCENT GIRLS IN THE RURAL SCHOOLS ABOUT ANAEMIA THROUGH AUDIO-VISUAL AIDS

Paper ID	IJIFR/V4/ E2/ 019	Page No.	5116-5123	Subject Area	Education
Keywords	Teaching –Learning Process, Teaching Anaemia, Communication, Audio-Visual Aids				

1 st	Dr.K.R.Rajendran	Graduate Assistant, Government Higher Secondary School, Malaipatti-Tamilnadu
2 nd	A.Selvaraj	Ph.D Research scholar, Dravidian University, Kuppam (A.P)
3 rd	Dr.S.Rjaguru	Associate Professor, SRKVidyalaya College Of Education, Coimbatore-Tamilnadu
4 th	G.Kalaiselvi	Assistant Professor, Sri Ramana College Of Education, Aruppukottai

Abstract

the study emphasises the importance of teaching –learning process through Audio-visual aids in teaching anaemia and the importance, need to undergo treatment, medicines to the girls who have reached the adolescence. Teaching is generally known as a communication between two or more persons who influence by their ideas and learn something in the process of interaction (Philip Barker 1985). Here the investigators put forth their efforts to find out the effects of teaching anaemia through audio-visual aids rather than mere teaching by conventional method.” A teacher can no more teaches unless someone learns than a seller can sell unless someone buys (Dewey1972). Actually teaching narrowly means the art of instruction in the educational institutions. It is a direct interaction between the teacher and the learners. Collectively teaching is a multiple capability of administering and executing the various techniques of being understood an idea or a concept by others.



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)

Volume - 4, Issue -2, October 2016

Continuous 38th Edition, Page No: 5116-5123

I. INTRODUCTION

Education is a term derived from two latin words “edu” and “carae” which mean “To bring up”. Dictionary of behavioural science says ”Education is a progressive change of a person affecting knowledge, attitude and behaviour as a result of formal instruction and study” John Dewey beautifully described, “Education is a constant organising or reorganising of experiences”. Generally the educators felt that education is a way of development of desirable habits, skills and attitudes which create a person to be a better citizen of a nation. Education is a process by which a human being develops and enhances himself/herself from inexplicable imagination and inherent folly to enthralling and enlightening intelligence and wisdom. Diver correctly quoted, “Education is concerned with transmitting something that is worthwhile.”

Life is actually involved with constant and continuous modification of experiences. Here the humans` personal ideas, changes, attitudes and skills have to meet alteration. Education is the process of helping the child to adjust to the revolving spheroid. The aim of education mainly emphasises on the psycho-physical growth and development of the individual.

II. VARIOUS INSTRUCTIONAL STRATEGIES

Considering India in rural areas, two educational methodologies are well known in schooling.i.e; (i) conventional teaching methodology viz; lecturing, chalk and talk method and (ii) Assisted instruction with audiovisual aids viz; projector, smart class room, CC TV etc.In conventional methodology the educationists feel that the teachers are usually not sure about that students psychological effect of receiving or feeling difficult in understanding the concept which is being taught. Any device that is helpful to hear and see known as audio-visual aids. By teaching audio-visual the learning is facilitated, sensed and understood effectively. This has been felt by the students usually it is felt that the 2D/3D teaching aids are highly useful in teaching-learning process. Teaching Aids help to stimulate, motivate and classify the facts, concepts which are being educated. Nowadays we can simply understand that an outstanding development in the field education especially in science is due to the increased use of audio-visual aids. Educational technology is also widely applied in the process of ‘Teaching-Learning’.

(i) Need of audio-visual aids

For communicating an idea, experience on technology the teacher uses audio-visual aids as they help to communicate the concept effectively and efficiently. The visual or the screen along with the sound, make the listeners mentally free and stimulate with a situation nearest to the reality and readily gets that idea exactly. Audiovisual aids motivate highly the children.

(ii) Importance of audio-visual aids

The audio-visual aids help to make out the meaning of spoken words clear as the ideas on information put across through more than one sense.



Dr.K.R.Rajendran, A.Selvaraj, Dr.S.R Jaguru, G.Kalaiselvi:: Effects Of Educating The Adolescent Girls In The Rural Schools About Anaemia Through Audio-Visual Aids

5117

III. STATEMENT OF THE STUDY

To understand the value on the utilisation of the audio-visual aids in teaching anaemia, treatment and medical care regarding to the adolescent girls rather than the conventional teaching the investigators have taken up this task of exhibiting the “ Effects of educating the adolescent girls in rural schools about anaemia through audio-visual aids”. It focuses the valuable effects in understanding anaemia and on treatment with regard to that by the rural adolescent girls.

(i) Anaemia

Anaemia is the most common in all the groups of adolescence girls to the tune of 20-25% irrespective of the social class. Angular stomatitis and glossitis are more common in poor classes because of the poor quality of food items. It is common in poor class since the intake food is poor mainly due to the non reliability of healthy food. In higher classes personal likes, dislikes and food taboos lead to anaemic. Supplementation of iron to mothers to be is the rational way to combat anaemia. Red blood cells or RBCS are formed in the body's bone marrow and act like boats ferrying oxygen throughout the rivers of the blood stream. The various anaemia may be classified in the following simplified fashion (i)anaemia caused by blood loss, (ii) anaemia caused by excessive destruction of erythrocytes, (iii) anaemia due to impaired production of erythrocytes. Anaemia is widespread more among females than males and higher among infants, children and adults. According to the National Institute of Nutrition (1991), anaemia is found mostly common in all the groups of adolescent girls to the tune of 25% irrespective of social class.

IV. OBJECTIVES OF THE STUDY

- i) To find out the effectiveness of audiovisual aids assisted teaching anaemia to the 9 or 10th standard studying girls.
- ii) To compare the effectiveness of teaching through audio-visual aids and that of conventional methodology on the achievement in teaching anaemia to the adolescent girls.
- iii) To find out the difference in the post-test between the control group and the experimental group

V. HYPOTHESES OF THE STUDY

- i.) There is no significant difference among the rural adolescent girls in learning about anaemia through the traditional methodology and through audio-visual aids.
- ii.) There is no significant difference between the pre-test and post-test of the controlled group
- iii.) There is no significant difference between the pre-test and post-test of the experimental group.
- iv.) There is no significant difference between the performance of the control group in the pre-test and post-test of the control group.

VI. METHODOLOGY

This study is an experiment. It is based on the pre-test, post-test groups design. Five units of anaemia and the food items (schedule) to rectify it were taught to the control group through conventional technology and the experimental group through audio-visual aids assisted methodology for the control group consisting of 40 girls and the experimental group 40 girls are selected for the study.

6.1 Sample

For this research work the selected sample is of two groups of adolescent girls in rural schools who are studying 9/10th standard bifurcated as control group and experimental group.

6.2 Tools used for the study

The present study needs Hb (Haemoglobin) level test, a pre-test and post-test to evaluate the students. These tests were structured and validated against a sample of adolescent girls studying 9/10th standard before.

The following tests were structured and validated by the investigators for the present study.

- Haemoglobin level test
- Pre test for five units (unit wise)
- Post test for five units (unit wise)

6.3 Administering the tests/Data Gathering Procedure

The present study is an experiment. It is based on the Pre-test, Post-test equivalent group design. Five units of anaemia and the food schedule to rectify it were taught to control group through conventional (oral) method and to the experimental group through Audio-visual assisted learning. First of all the investigators conducted the haemoglobin test and according to the Hb level, the students were in the ascending order, then they were divided into control and experimental groups alternatively. By teaching the five units one by one for one hour Pre-test and post test was conducted. The time schedule for each test was 30 minutes. Thus for 5 units both control and experimental groups underwent the test (Pre-test and Post test).

6.4 Statistical techniques adopted

In this study, the investigators calculated the mean and standard deviation to understand the distribution of the different test scores. He used differential statistics 't' test for studying the differences between the means of the groups considered for the study.

VII. STATISTICAL ANALYSIS AND INTERPRETATION

Pre-Test Performance

After administering the pre-test the mean scores and the standard deviations of the control and experimental groups were calculated. Applying the 't' test to calculate the significant difference between the control and experiment groups.

Table 1: 't' test to calculate the significant difference between the control and experiment groups

S.No.	Unit	N	Types of GP	Mean	S.D	't' value
-------	------	---	-------------	------	-----	-----------

1	I	40	EXP	1.05	0.98	0.14 @
		40	CONT	1.08	0.83	
2	II	40	EXP	1.31	1.17	2.19 **
		40	CONT	1.73	0.84	
3	III	40	EXP	1.31	0.96	0.13@
		40	CONT	1.29	1.11	
4	IV	40	EXP	1.16	0.92	2.08**
		40	CONT	1.54	0.97	
5	V	40	EXP	1.15	1.08	0.67 @
		40	CONT	1.29	0.98	

** denotes significant difference at 0.01 level.

@ denotes no significance at 0.01 level.

It is evident that there is no significant difference between the mean achievement scores of the pre-test of the two groups in units I, III and V whereas there is significant difference in units II and IV and it is also noted that the controlled group has shown better performance than the experimental group.

Here the null hypothesis "there will not be significant difference between the pre-test scores of the control and experimental groups is partly accepted.

Table-2: Experimental vs Control group-Post test

S.No.	Unit	N	Types of GP	Mean	S.D	't' value
1	I	40	EXP	8.65	0.68	24.14 **
		40	CONT	4.60	0.80	
2	II	40	EXP	8.71	0.61	32.79 **
		40	CONT	4.53	0.68	
3	III	40	EXP	8.93	0.76	33.07**
		40	CONT	4.53	0.61	
4	IV	40	EXP	8.73	0.72	25.40**
		40	CONT	4.28	0.77	
5	V	40	EXP	8.75	0.78	27.34**
		40	CONT	4.79	0.68	

** denotes significance at 0.01 level.

From the table it is understood that there is significant difference between Control group and experimental group in the mean scores in unit test at 0.01 level. It reveals that the difference falls in favour of the experimental group and it can be seen that the experimental group scores better than the control group in the post test.

Table-3: Pre-test VS Post-test(Control group)

S.No.	Unit	N	Test	Mean	S.D	't' value
1	I	40	Pre	1.05	0.83	17.41**
		40	Post	4.58	0.78	
2	II	40	Pre	1.71	0.84	14.99 **
		40	Post	4.53	0.68	
3	III	40	Pre	1.31	1.11	18.20 **
		40	Post	4.52	0.61	
4	IV	40	Pre	1.56	0.92	14.39**

		40	Post	4.28	0.67	
5	V	40	Pre	1.25	1.02	17.72 **
		40	Post	4.72	0.63	

** denotes significance at 0.01 level.

From this table it is understood that there is significant difference between the pre-test and post-test scores of the control group. Here also the post-test scores show a better record than the pre-test. Here also the hypothesis “there will be no significant difference between the pre-test and post-test of the control group” is rejected.

Table-4: Pre-test VS Post-test(experimental group)

S.No.	Unit	N	Tests	Mean	S.D	't' value
1	I	40	Pre	1.05	0.99	47.70**
		40	Post	8.65	0.66	
2	II	40	Pre	1.30	1.16	35.55 **
		40	Post	8.70	0.61	
3	III	40	Pre	1.28	0.96	42.27**
		40	Post	8.93	0.73	
4	IV	40	Pre	1.15	0.92	43.29**
		40	Post	8.73	0.72	
5	V	40	Pre	1.13	1.07	36.77**
		40	Post	8.83	0.55	

** denotes significant difference at 0.01 level.

This table also inferred that there is a significant difference between the Pre-test and post test scores of the experimental group. The Post test scores are here also higher than the Pre-test scores. So that the null hypothesis “There will not be a significant difference between the Pre-test and Post test of the experimental group.

Table-5 Experimental vs Control (Haemoglobin)

S.No.	N	Variables	Mean	S.D	't' value
1	40	EXP	54.08	6.23	2.88 @
2	40	CONT	53.70	6.27	

@ denotes no significant difference at 0.01 level.

Here we realize that there is no significant difference between the experimental group and the control group in the pre-test examining haemoglobin level.

Table-6: Experimental vs Control (Haemoglobin)

S.No.	N	Variables	Mean	S.D	't' value
1	40	EXP	53.88	6.29	37.37 **level.
2	40	CONT	66.20	5.07	

** denotes significant difference at 0.01

Here we understand that there is significant difference between the experimental group and control group in the post-test examining haemoglobin level. Here the null hypothesis “There will be no significant difference between the control group and the experimental group in the post test” is rejected.

VIII. FINDINGS

There are significant differences in the post test performance scores between the control and the experiment groups. This strongly favours the activity based teaching. The audio-visual aids assisted teaching-learning process is more effective than the conventional method of teaching in health education to the adolescent girls in the rural schools.

It comes to understand that the post test scores show better results than the pre-test scores ie; the girls understood the concept of health education and anaemia only receiving the instructions, elaborations through audio-visual aids. The education through audio-visual aids about the causes of anaemia and the precautions to be taken to prevent it received a highly positive effect among the students. When the adolescent girls were taught with pictures about it and audio-visual aids, they received better visualisation and ideas on the ways to prevent anaemia.

IX. RECOMMENDATIONS

- 1) Since audio-visual education has proved its effectiveness in teaching health education (especially on Anaemia) the adolescent girls should be motivated to follow the medical tips given to prevent anaemia.
- 2) Every school has to provide a period per week for health education through Audio-Visual aids.
- 3) The students should have developed a complete knowledge on vitamins and vitamin deficiencies.

X. CONCLUSION

Nowadays it is gradually proved in many fields that the innovative techniques and the technological innovations make many things easier and easily reachable to the public. Many studies have also proved that the teaching-learning process is more valuable and easier when it is through Audio-Visual aids, Smart class room, CCTV etc.

From this research it is well understood that the health education through Audio-Visual aids yielded better results than through conventional (chalk and talk) method ,logy for the adolescent people it is of vital importance to provide health education in all the schools for any diseases viz; heart attacks, diabetics,anaemia etc; National policy on education gives much importance to women's literacy. So that this kind of health education to the women has to be imported in regular intervals through Audio-visual aids.

XI. REFERENCES

- [1] Benjamin B.W,(1973), *Dictionary of Behavioural sciences*, The MacMillan Press, Newyork
- [2] Chauhan, S.S(1979); *Innovation Teaching-learning process*, Vikas publishing House pvt ltd, New Delhi
- [3] Singh V.K, Nayak A.K(2002); *Human nutrition*, New age International Pvt Ltd. Publishers, New Delhi
- [4] Rajalakshmi.s.(2008), *Teaching Anaemia through audio-visual aids-An Experiment* unpublished M.Phil thesis, M.K University

To Cite This Article

Rajendran, K.R., Selvaraj, A., Rjaguru, S., Kalaiselvi, G., (2016): "Effects Of Educating The Adolescent Girls In The Rural Schools About Anaemia Through Audio-Visual Aids" *International Journal of Informative & Futuristic Research* (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5116-5123, Paper ID: IJIFR/V4/E2/019.

EFFECT OF SCIENTIFIC TEMPER, CRITICAL THINKING AND SELECTED BACKGROUND VARIABLES ON PERSONALITY OF TEACHER EDUCATORS

Paper ID	IJIFR/V4/ E2/ 020	Page No.	5124-5132	Subject Area	Education
Keywords	Personality, Critical Thinking, Scientific Temper, Effect				

1 st	Shilpa.S.G	Ph.D. Research scholar, Dept. of Studies and Research in Education Gulbarga University, Kalaburagi- Karnataka
2 nd	Dr. Surekha Ksheerasagar	Professor Dept. of Studies and Research in Education Gulbarga University, Kalaburagi- Karnataka

Abstract

the study emphasises the importance of teaching –learning process through Audio-visual aids in teaching anaemia and the importance, need to undergo treatment, medicines to the girls who have reached the adolescence. Teaching is generally known as a communication between two or more persons who influence by their ideas and learn something in the process of interaction (Philip Barker 1985). Here the investigators put forth their efforts to find out the effects of teaching anaemia through audio-visual aids rather than mere teaching by conventional method.” A teacher can no more teaches unless someone learns than a seller can sell unless someone buys (Dewey1972). Actually teaching narrowly means the art of instruction in the educational institutions. It is a direct interaction between the teacher and the learners. Collectively teaching is a multiple capability of administering and executing the various techniques of being understood an idea or a concept by others.

I. INTRODUCTION

Psychologically, personality is all that a person is. It is the totality of his being and includes his physical, mental, emotional and temperamental make-up. His experience, perception, memory, imagination, instincts, habits, thoughts and sentiments constitute his personality. A child tends to exhibit a variety of characteristics in his relations with others, to the extent that there is unity of response he is displaying in his personality.



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright©IJIFR 2016

Teacher has a role as an instructor, as a scholar, as a pedagogue, as a trainer, as an educator, as stimulator and as a guide for the students. It is an established fact that teacher's qualities, personality, character help the pupils to become good human beings thereby, contribute in building a knowledgeable and coherent society. The personality of a teacher plays vital role in teaching-learning process. Many factors effects on personality of teacher among them Scientific Temper, critical thinking, interest, job satisfaction, good mental health. In this study I mainly analyzed the effects of the factors Scientific Temper, Critical Thinking on Personality of Teacher Educators of TEIs.

1.1 Definitions of the key terms used:

a) Personality:

Personality refers to individual differences in characteristic patterns of thinking, feeling and behaving. The study of personality focuses on two broad areas: One is understanding individual differences in particular personality characteristics, such as sociability or irritability. The other understands how the various parts of a person come together as a whole. In the present study I analyzed the personality of Teacher educators of TEIs and the factors effecting on

b) Critical thinking:

We can say that critical thinking to be purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteria or contextual considerations upon which that judgment is based. Critical thinking is essential as a tool of inquiry. As such, critical thinking is a liberating force in education and a powerful resource in one's personal and civic life. Critical thinking is "the reasoned judgment of information and ideas. In the present study I analysed the effect of critical thinking on personality of Teacher educators of TEIs.

c) Scientific temper:

Scientific Temper describes an attitude which involves the application of logic and the avoidance of bias and preconceived notions. Discussion, argument and analysis are vital parts of scientific temper. Scientific temper influence on the Teacher educator towards their personality because it is an attitude, way of living which would involve objective observation, rational analysis and healthy skepticism and also other attributes like honesty, truthfulness, humility, positive approach to failure are some of the essential universal human values.

d) Teacher educators:

In this study, teacher educators refer to the teachers who are teaching in Government, Government Aided and Self-financed teacher education institutions/Colleges.

II. OBJECTIVES OF THE STUDY

Keeping the above said theoretical background in view the present study was taken up to study the personality dimensions of the teacher educators of TEIs of Hyderabad Karnataka Region with the following objectives.

1. To see the relationship and difference if any, between the personality and the selected

background variables.

2. To see the relationship and difference if any, between the personality and the critical thinking.
3. To see the relationship and difference if any, between the personality and the scientific temper.

III. HYPOTHESIS

1. H_01 : There is no significant difference between male and female teacher educators in their personality.
2. H_02 : There is no significant difference between rural and urban TEI's Teacher educators in their personality.
3. H_03 : There is no significant difference between Science and arts teacher educators in their personality.
4. H_04 : There is no significant difference between more and less experienced teacher educators in their personality.
5. H_05 : There is significant difference between Scientific Temper and personality of teacher educators.
6. H_06 : There is significant difference between critical thinking and personality of teacher educators.
7. H_07 : There is no significant difference among Scientific Temper, Critical Thinking and Personality variables of teacher educators working in teacher education institutions.
8. H_08 : There is no significant relationship among Scientific Temper, Critical Thinking and Personality variables of teacher educators working in teacher education institutions.

IV. METHODOLOGY

4.1. Population:

All the Teacher Education Institutions (B.Ed. Colleges) i.e. Government, Government aided and Self-financed institutions/colleges existing in the Hyderabad Karnataka region (Bidar, Gulbarga, Yadgir, Raichur, Koppal, and Bellary districts) constituted the population of the present study.

4.2. Sample:

The sample of the study comprised of 1000 teacher educators drawn from Government and Self-financed teacher education institutions of Hyderabad Karnataka region. A list of B. Ed. Colleges (Government/ Government Aided and Self-financed institutions) was obtained from the National Council for Teacher Education, S.R.C., Bangalore. All the Government and Government Aided colleges were included in the sample whereas the data from Self-financed colleges was collected from those colleges which were situated in the same district where the Government/Government Aided Colleges are situated. Thus, a sample of 1000 teacher educators constituted the final sample of the study. The sample from all the colleges was collected randomly in such a way that each district was given equal representation. All these colleges were affiliated to the

Gulbarga University, Gulbarga or Karnataka State Woman's University, Bijapur or Sri Krishnadevaraya University, Bellary.

4.3. Tools Used:

- i) **General Information:** Relating to (a) Teacher educators gender, b) Subject, c) locality of college and d) experience information.
- ii) **Personality:** Wide ranges of personality that relate to teacher educators were measured by using the Differential Personality Inventory (DPI) developed by Aashish Kumar Singh and Arun Kumar Singh was used for this purpose.
- iii) **Scientific Temper:** To measure the Scientific Temper, Scientific Temper Scale developed by Dr. Smt. Leela Pradhan (2012) was used.
- iv) **Critical Thinking:** To measure the Critical Thinking Inventory developed by Porgio and Rani, (2010) was used.

4.4. Procedure for data collection:

The Teacher educators were asked to be free and frank while giving responses clearly. All four scales were administered to the randomly selected sample of 1000 Teacher educators of TEI in six districts. The personal data of the teacher educators including their gender, locality of the college, type of college, status of college, nature of college, district and subject they are dealing, also collected.

4.5. Analysis of Data:

The data thus obtained was scored and analyzed in the following manner.

- i.) The personality measures were arranged in mean distribution across gender, experience, locale and subject teacher educators dealing and discussed. Comparing each age and gender means with that of the test manual's description of their corresponding standard means for each gender, experience, locale and subject teacher educators dealing.
- ii.) Simple linear correlations and F value were computed in order to understand the relationship and difference of the selected personal social variables with the teacher educator's personality.

V. RESULTS AND DISCUSSION

5.1: Analysis of personality and selected background variables of teacher educators working in teacher Education institutions.

Table – 1: Means, SD and ‘t’ ratio of Personality and selected background variables of teacher educators working in teacher Education institutions

Background Variables	Gender	N	Mean	S.D	Calculated ‘t’ value	Remarks
Gender (a)	Male	500	122.1	16.2	338.36	Significant
	Female	500	66.8	16.21		
Experience (b)	More exp	500	103.5	31.01	2.905	Significant
	Less exp	500	94.0	32.06		
Place of TEI (c)	Urban	500	101.4	31.22	92.47	Significant

	Rural	500	87.5	31.4		
Subject (d)	Science	500	108.3	28.99	177.27	Significant
	Arts	500	80.5	28.83		

It is inferred from the above table that the calculated 't' value 338.36 is more than the table value (1.96 and 2.576) for df 998, at 0.05 and 0.01 level of significance. There is significant difference between male and female teacher educators in their personality. Hence the null hypothesis H_01 , is rejected and alternative hypothesis was accepted i.e. there is significant difference between male and female teacher educators in their personality. It means there is positive effect of gender on personality of teacher educators. Sugirtham (2009) made an attempt to assess personality, the results indicated that study says that Male dominate over the female in personality dimensions index, however, the level of significance is only at five percent.

It is inferred from the above table that the calculated 't' value 2.905 is more than the table value (1.96 and 2.576) for df 998, at 0.05 and 0.01 level of significance. There is significant difference between more and less experienced teacher educators in their personality. Hence the null hypothesis H_02 , is rejected and alternative hypothesis was accepted i.e. there is significant difference between more and less experienced teacher educators in their personality. It means there is positive effect of experience on personality of teacher educators. Ozel (2007) focused on the effect of Turkish geography teacher's personality on his teaching experiences. There was a significant difference with respect to the fact that teachers make students feel that they can always give them reinforcement, according to the length of service variance, a significant difference was determined .

It is inferred from the above table that the calculated 't' value 92.47 is more than the table value (1.96 and 2.576) for df 998, at 0.05 and 0.01 level of significance. There is significant difference between rural and urban TEI's Teacher educators in their personality. Hence the null hypothesis H_03 , is rejected and alternative hypothesis was accepted i.e. there is significant difference between rural and urban TEI's Teacher educators in their personality. It means there is positive effect of Locality of TEI on personality of teacher educators. Sowmyah and Ningamma (2010) found that there was no significant difference in the means of rural & urban personality.

It is inferred from the above table that the calculated 't' value 177.27 is more than the table value (1.96 and 2.576) for df 998, at 0.05 and 0.01 level of significance. There is significant difference between science and arts teacher educators in their personality. Hence the null hypothesis H_04 , is rejected and alternative hypothesis was accepted i.e. there is significant difference between science and arts teacher educators in their personality. It means there is positive effect of teaching subject of teacher educators on personality. Khanna (1985) examined personality patterns of effective high school teachers he found that the effective teachers in the faculties of arts and science possess relatively different traits of personality.This data has been shown graphically as follows:

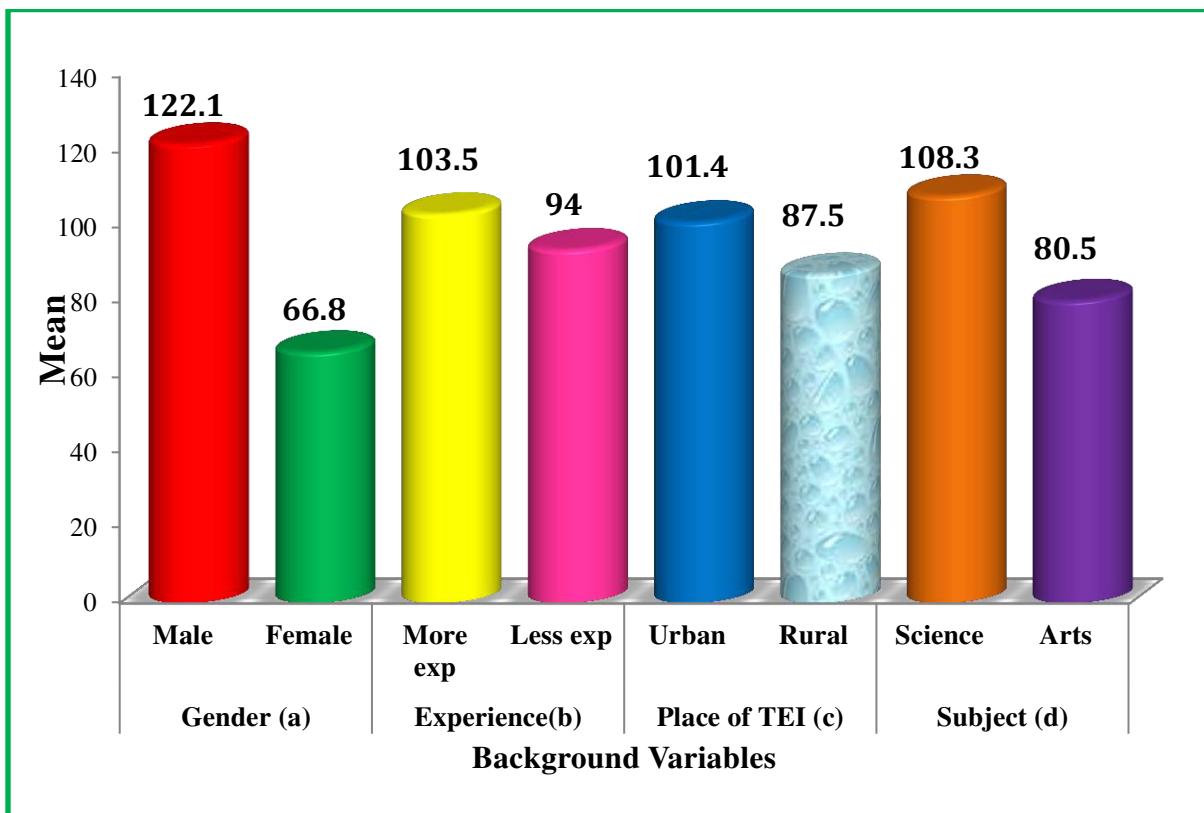


Figure 1: Effect Of Scientific Temper, Critical Thinking And Selected Background Variables On Personality Of Teacher Educators

5.2 Analysis of personality and critical thinking and scientific temper of teacher educators working in teacher Education institutions.

Table -2: Means, SD, 't' and 'r' ratio of Personality, critical thinking and scientific temper of teacher educators working in teacher Education institutions (N=1000)

Relationship	Gender	Mean	S.D	Calculated 't' value	Calculated 't' value	Remarks
A	Scientific Temper	65.1	11.54	44.68	0.985(**)	Significant
	Personality	94.4	32.06			
B	Critical Thinking	19.3	57.95	114.8	0.982(**)	Significant
	Personality	94.4	32.06			

It is inferred from the table-2 (A), that the calculated 't' 44.68 value is more than the table value (1.96) for df 998, at 5% level of significance in the personality. Hence the respective null hypothesis H_0 is rejected i.e. There is significant difference between Scientific Temper and personality.

The table-2 (A), also shows that the value of co-efficient of correlation between Scientific Temper and Personality development is 0.985. It represents a strong degree of positive

relationship between two variables which is an indicative of positive correlation between the above two variables. Therefore, the null hypothesis, "There is no significant relationship between the Scientific Temper and Personality of teacher educators working in private teacher education institutions." stands rejected. Thus, we can interpret that there is strong positive correlation between Scientific Temper and Personality of the teacher educators working in teacher education institutions. On the basis of the above interpretations it is concluded that scientific temper and Critical thinking are correlated with each other. Change in the level of scientific temper is directly proportional to Personality. Hence we can say that there is positive effect of scientific temper on Personality of teacher educator.

It is inferred from the table-2 (B), that the calculated 't' 114.8 value is more than the table value (1.96) for df 998, at 5% level of significance. Hence the respective null hypothesis H_06 is rejected i.e. There is significant difference between Critical Thinking and personality. The above table-2 (B), shows that the value of co-efficient of correlation between Critical Thinking and Personality development is 0.985. It represents a strong degree of positive relationship between two variables which is an indicative of positive correlation between the above two variables. Therefore, the null hypothesis, "There is no significant relationship between the Critical Thinking and Personality of teacher educators working in private teacher education institutions." stands rejected. Thus, we can interpret that there is strong positive correlation between Critical Thinking and Personality of the teacher educators working in teacher education institutions.

On the basis of the above interpretations it is concluded that Critical Thinking and personality are correlated with each other. Change in the level of Critical Thinking is directly proportional to Personality. Hence we can say that there is positive effect of Critical Thinking on Personality of teacher educator.

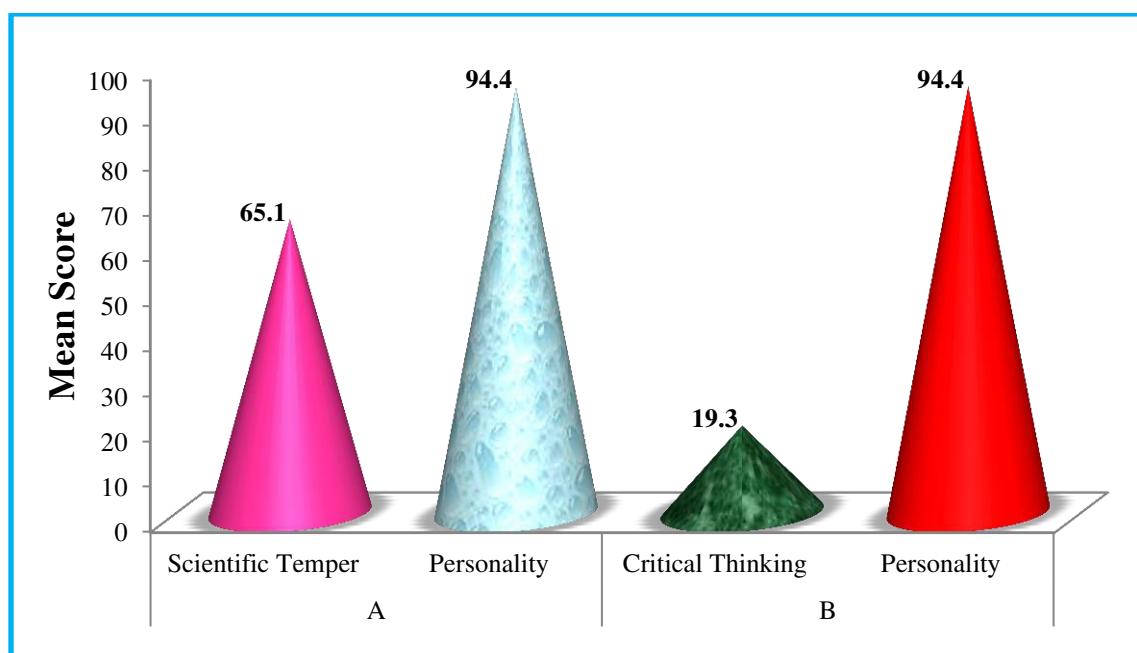


Figure 2: Means of Personality, critical thinking and scientific temper of teacher educators

VI. MULTIPLE CORRELATION

Table – 3: Multiple correlations among Scientific Temper, Professional Development, Critical Thinking and Personality of teacher educators working in teacher education institutions (N = 1000)

Variable	Scientific Temper	Critical Thinking	Personality	Multiple correlation	Calculated 'F' value	Remarks at 5% level
Scientific Temper	1	0.987(**)	0.985(**)	0.982	2604.21	Sing
Critical Thinking	0.987(**)	1	0.982(**)			
Personality	0.985(**)	0.982(**)	1			

(At both 0.05 and 0.05 level of significance, the table value of 'F' is 2604.21, S - Significant)

It is inferred from the above table that the calculated 'F' value is greater than the table value (2.61) at both 0.05 and 0.05 level of significance. Hence the null hypothesis H_0 is rejected. It shows that there is significant influence three variable one on another variable of teacher educators working in teacher education institutes of Hyderabad Karnataka region and also shows that there is significant relationship ($r= 982$) three variable one on another variable of teacher educators working in teacher education institutes of Hyderabad Karnataka region. Therefore we can say there is positive effect of scientific temper and critical thinking on personality of teacher educators.

VII. CONCLUSION

From this study it can be concluded that, there is significant difference between male and female teacher educators in their personality. It means there is positive effect of gender on personality of teacher educators.

- There is significant difference between more and less experienced teacher educators in their personality. It means there is positive effect of experience on personality of teacher educators.
- There is significant difference between rural and urban TEI's Teacher educators in their personality. It means there is positive effect of Locality of TEI on personality of teacher educators.
- There is significant difference between science and arts teacher educators in their personality. It means there is positive effect of teaching subject of teacher educators on personality.

We can interpret that there is significant difference between Scientific Temper and personality and there is strong positive correlation between Scientific Temper and Personality of the teacher educators working in teacher education institutions.

On the basis of the above interpretations it is concluded that scientific temper and Critical thinking are correlated with each other. Change in the level of scientific temper is directly proportional to Personality. Hence we can say that there is positive effect of scientific temper on Personality of teacher educator.



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)

Volume - 4, Issue -2, October 2016

Continuous 38th Edition, Page No: 5124-5132

VIII. REFERENCES

- [1] Feldman, R. S. (2004). Understanding Psychology (6th ed.). New Delhi: Tata McGraw-Hill Publishing Company Ltd., 303.
- [2] Evens et al. (2014). The development of critical thinking in professional and academic bachelor programmes. Higher Education Studies, 4 (2), 42-51. doi:10.5539/hes.v4n2p42.
- [3] Best, W. J. & Khan, J. (1992). Research in Education. New Delhi: Prentice Hall of India Pvt. Ltd., 401.
- [4] Aggarwal, Y. P. (2000). Statistical Methods: Concepts, Application and Computation. New Delhi: Sterling Publishes Pvt. Ltd., 215-242.
- [5] Allport G.W. (1933): The Study of Personality by the Experimental Method Character & Peers. 1, P. 259-264.
- [6] Beder I.E. (1935): A Study in Integration of Personalities by Prediction and Matching. Syracuse, N.Y.: Syracuse University Library.
- [7] Govinda R.: Scientific Temper, Education in Values, a Source Book, NCERT P. 58-63.
- [8] Gupta Sen M. (2002): Creating Thinking Fingers for Nation Building, Journal of Indian Education, NCERT P. 30-45
- [9] Kapil H.K.: Elements of Statistics, in Social Sciences, Vinod Pustak Mandir, Agra P. 400-440.
- [10] Kothari C.R. (2003): Research Methodology, Methods & Techniques, Wishwa Prakashan. P. 68-115.
- [11] Ennis & Millman, J., (1985), Cornel Critical Thinking Test, Mid West Publications, Public Grove.

To Cite This Article

Shilpa, S.G. , Ksheerasagar, S. (2016): "Effect Of Scientific Temper, Critical Thinking And Selected Background Variables On Personality Of Teacher Educators" *International Journal of Informative & Futuristic Research (ISSN: 2347-1697)*, Vol. 4 No. (2), October 2016, pp. 5124-5132, Paper ID: IJIFR/V4/E2/020.



Shilpa.S.G.,Dr. Surekha Ksheerasagar :: Effect Of Scientific Temper, Critical Thinking And Selected Background Variables On Personality Of Teacher Educators

5132

CROP DIVERSIFICATION IN RELATION TO TIME AND SPACE: A STUDY FROM MALDA DISTRICT

Paper ID	IJIFR/V4/ E2/ 023	Page No.	5133-5142	Subject Area	Geography
Keywords	Crop Diversification, Agricultural Development, Crop Diversification Index, Cropping Pattern				

1 st	Dr. Shamsul Haque Siddiqui	Professor and Chairperson, Department of Geography, A.M.U, Aligarh- Uttar Pradesh
2 nd	Hasibur Rahaman	Ph.D. Research Scholar Department of Geography, A.M.U, Aligarh- Uttar Pradesh

Abstract

Crop Diversification is one of the important dimensions of agricultural development which understood as the multiple cropping systems with an addition, replacement or substitution of more crops to the existing farmland. Growing multiple crops pays wider scope and opportunities in socio-economic transformation than crop specialization in extensive farming. District like Malda, primarily dominated by agriculture with multiple cropping patterns and patch of specialization found have limited space. Study of crop diversification also helps to know the cropping pattern, crop concentration and crop variation of a region. An attempt has been made to show crop diversification in light of spatial pattern along with temporal changes. Spatial changes noticed in due course of fast changing physical, institutional, and infrastructural factors are studied for the period 2004-05 and 2014-2015. The study has employed Singh's (1976) technique to find out crop diversification index. The block level analysis of said index determines the level and extends of diversification. Analysis finds shifts in diversification index, cropping patterns and number of crops grown over there.

I. INTRODUCTION

Productivity, specialization and diversification are the three dimensions to understand the level of agricultural development in any geographical region of the globe. Crop diversification is understood as opposite of crop specialization with an areal strength between

crops in any region (Husain, 1996). Diversification at the cropping level often face a problem about its meaning and scope, whether it is replacement, addition or pluriactivity (Fuller, 1990), mixed farming (Shucksmith, 1989) or shift away from monoculture (Newby, 1988). A plethora of terms have emerged alongside diversification to describe agricultural activity in developed and developing countries. This is an agricultural practice in which farmer harvest varieties of crops instead one .This is the stage at which many developing countries are currently lying (Petit and Bargouti, 1993). As far as, the condition of crop diversification is concern; it is done when the farm has more than one enterprise and may produce and sell crops at different times of year (Metcalf, 1969). Although, variations and expansions in the level of cropping pattern are the result of long time standing. At spatiotemporal level unconformity in crop diversification is recorded across the continents of the globe. Crop diversification of geographical area is dully affected by physical, social and economic factors along with technological, geographical and institutional structure of that region (Todkari, 2012). Therefore, exiting conceptual difference in its long standing analysis arouse diversity of opinions.

Crop diversification patterns have great relevance in the agricultural land use studies, and are an important component of the crop geography of a region (Ratnaparkhi 2012). Crop diversification has emerged as an important alternative to attain the objectives of output growth, employment generation and natural resources sustainability in the developing countries. The recent experience in Asia, particularly southeast Asia, Middle East and North Africa indicates that policy makers and planners are increasingly focusing on crop diversification to promote agricultural development (Petit and Barghouti, 1972). Crops are generally grown in combinations (Weaver, 1954) therefore; it reduces risks unexpected to come from natural calamities or vagaries in weather. Moreover, rich farmers prefer specialization, the poor and substitute farmers are interested in diversification of crops (Barlett, 1991; Kimhi and Bollman, 1999). For commodities, which are imported and exported, there will be price risk emanating from exchange rate variability. Such variability of commodity price leads to variability in farm income, which has a positive effect on off-farm work participation (Mishra and Goodwin, 1997). It generates more income and opportunities of works on regular basis. Increase in intensity of cultivation and in yields per unit area are the only available options to meet future food needs to feed an ever increasing population (Gunasena, 2000). Opportunities of better diet preserve good nutrition thereby, farmer too leads healthy life. Crop rotation enriches soil fertility and thus, sustainability of farm land remains good.

II. SYNOPTIC VIEW OF STUDY AREA

The Malda district of West Bengal chose for the study to assess the impact of growing consumerism at farm level for a decade (2004-05 to 2014-15). The study area lies between latitudinal and longitudinal figures of $24^{\circ} 40'20''$ N to $25^{\circ}32'08''$ N and $87^{\circ}45'50''$ E to $88^{\circ}28'10''$ E respectively. The district is surrounded by Bangladesh and Dakhsin Dinajpur in East, Santhal Parganas of Jharkhand in West, Uttar Dinajpur in North and Murshidabad in the South. This region is made up of the ancient alluvial humps which are remnants of old

riverine floodplains and remained unaffected subsequently by inundation and renewed silting. The district has 15 blocks with English Bazar as an administrative centre.

Total geographical area of the district is 3733 sq. km. According to National Agricultural Research Project-2015 (NARP) the district has two main agro-climatic zones, i.e. old alluvial zone and new alluvial zone. The net sown area is 260000 hectares and gross cropped area is 474700 hectares. The cropping intensity increasingly rose up to 182.57% (NARP, 2014-15). The district has high potentiality of intense crop diversification since crop intensity is increasing.

The old and new alluvial soils are very much helpful for the production of cereals especially along river channels and area having irrigation facilities. Lowland area supports rice and jute cultivation while high land having dominance of diverse crops. During summer, along with rice vegetables are grown and in winter wheat, maize, pulses, oilseeds and varieties of vegetables gets farm land. The pace of population bomb impinged intuitional and infrastructural expansion. Each administrative unit have institutional base for famers.

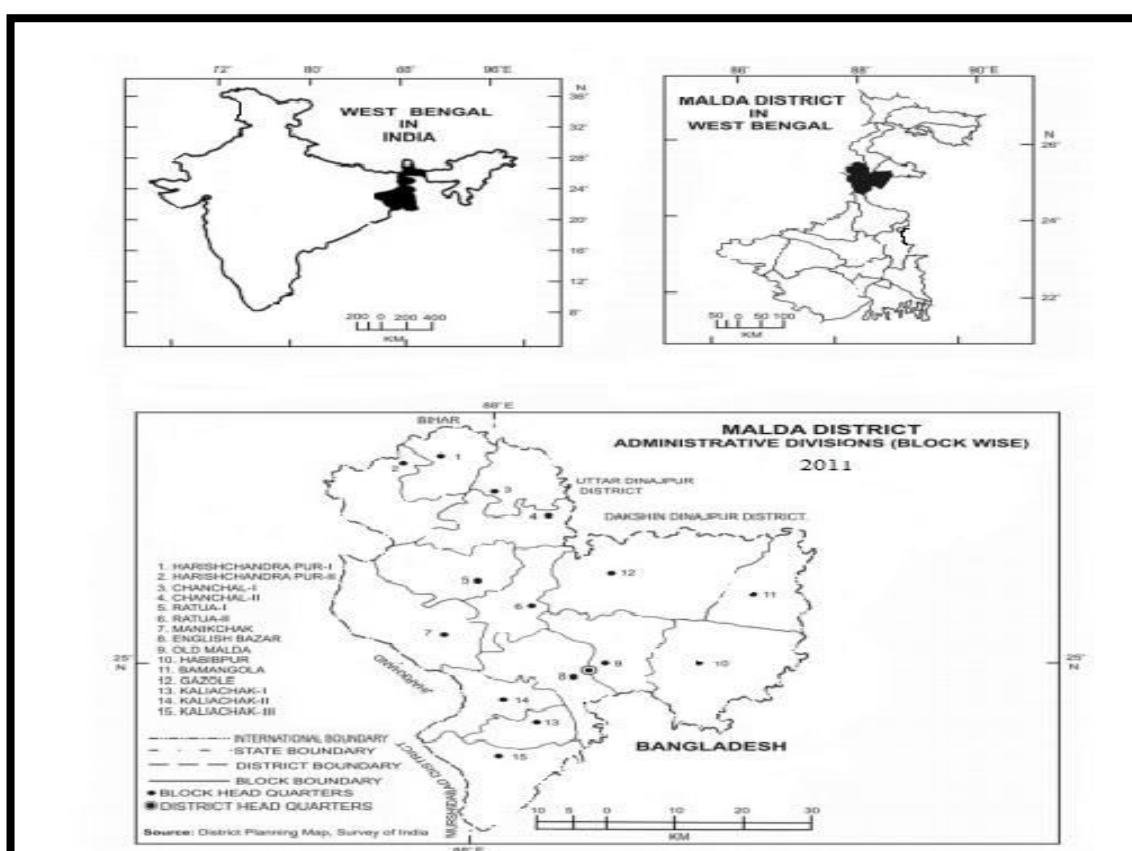


Figure -1: Administrative Division of Malda District

III. OBJECTIVES OF THE STUDY

- To have a comparative study of cropping pattern viz-a-viz crop diversification for the cropping year 2004-05 and 2014-2015 of Malda District.
- To assess the spatio-temporal variation and changes of crop diversification in the study area.

- iii.) To formulate study based and specific suggestions for implementing the viable crop diversification.

IV. DATABASE AND METHODOLOGY

The work based on secondary sources of data obtained from the Statistical Handbook of Malda District of 2005 for the year 2004-05 and, Directorate of agriculture –Malda District, Government of West Bengal for the year of 2014-15. Quantitative technique is used to process the data. The major crops which dominate district agricultural production took for the study. Therefore, author has purposively used the statistical technique of Jasbir Singh (1976) for delineating crop diversification regions. The study includes those crops which have a share of 5% and above to the total harvested area.

$$\text{Index of Crop Diversification (ICD)} = \frac{\text{Percentage of area under 'n' crop}}{\text{Number of 'n' crop}}$$

Where, 'n' crops are those crops which individually occupy five percent and above to the total cultivated land. The ICD value for different blocks (2004-05 and 2014-15) has categorized into three classes, based on arbitrary chosen class interval, viz. i) high, ii) medium, and iii) low. By use GIS technique a choropleth map has been drawn succeeded by class division.

V. RESULTS AND DISCUSSION

5.1 Cropping Pattern in Malda District from 2004-05 and 2014-15

The index of diversification is inversely related to diversification (Singh, 1976). High index mean specialization and lower index show diversification. An attempt has been made to show the changes of crop diversification at block level for the periods of 2004-05 and 2014-2015 (Table-3). Analyses show that where some areas significant change is observed, some show few change; and others own negative change. The environmental limit of physical attributes, such as soil and climate constrains for diverse agro products. Jasbir Singh technique has identified three classes of crop diversification because large margin of data variation in the study area. Farmers grow numerous crops in the field rather than single crops. Rice is the main primary crop, and is seen in every combination of diversifications in the blocks of Malda.

Table-1: Cropping Pattern in Malda District from 2004-05 and 2014-15

Sl. No.	Block	Cropping Pattern		Number Occupied Above 5%	Crop and 5% above
		2004-05	2014-15		
		2004-05	2014-15		
1	Harishchandrapur-I	R,J,W,O,PL	R,J,W,O,PL	5	5
2	Harishchandrapur-II	R,J,W,O,PL	R,O,W,J,PL	5	5
3	Chanchal-I	R,O,W,PL,J	R,J,PL,W	5	4
4	Chanchal-II	R,O,W,PL,J	R,O,J,W	5	4
5	Ratua-I	W, R,J,O,PL,MIS.	W,R,J,O,PL	6	5

6	Ratua-II	R,W,O,PL,J,MIS.	R,O,J,W,PL	6	5
7	Gazole	R,O,W	R,O,P,PL	3	5
8	Bamongola	R,O,W	R,O,P	3	3
9	Habibpur	R,O	R,O	2	2
10	Old Malda	R,W,O	R,O,P,W	3	4
11	English Bazar	W,R,PL,MIS.,O	W,R,PL	5	3
12	Manikchak	W,PL,J,R,O	W,PL,J,R	5	4
13	Kaliachak-I	W,J,R,O,MIS.,	W,J,O,R	5	4
14	Kaliachak-II	PL,MIS.,W,R,J	S,O,R,W,J,M	5	6
15	Kaliachak-III	W,PL,R,MIS.,J,O	W,PL,J,O,R	6	5
District		R,W,O,J,PL	R,W,O,J,PL	5	5

Source: Directorate of Agriculture, Malda, Govt. of W.B

Note: - R- Rice, W- Wheat, M- Maize, J- Jute, O- Oilseeds, P- Potato, S- Sugarcane, PL- Pluses, MIS. – Miscellaneous, N.B: Miscellaneous crops- Tori, Linseed, Lentil, Rai, Gram, Barley and Til.

5.2 High Crops Diversity (ICD : <25)

Thirteen out of fifteen blocks have experienced high ICD value cover more than eighty per cent of total crop area of the district with reference year of 2004-05. In these blocks six to three crops are grown. Ratua-I with crop diversification index 14.17 cover significant area of wheat, rice, jute, oilseeds, pulses and miscellaneous crops (table- 1). Data found 5540 hectares of land for aman cultivation of total gross cropped area in 2004-05. Kaliachak-II having highest diversity of crops with carrying ICD of 5.74 and also cultivates five crops combination viz, pulses, miscellaneous, wheat, rice, jute. Ratua-II (19.07) and Kaliachak-III (14.27) are witness six crops combination having 5% and more area among total crop land. Mentioned three blocks having six crops combination are dominated by paddy (aman) and followed by wheat and pulses. The blocks like English Bazar (7.89), Manikchak (8.47) and Kaliachak-I (9.26) recorded five crops combination and, mostly cultivated by wheat, rice, and pulses. Harishchandrapur-I (19.00), Harishchandrapur-II (16.11), Chanchal-I (22.06), Chanchal-II (16.44) grew five crops with lower diversity index because of larger areal expansion. The crop diversification index of Bamongola with ICD value 18.73 produced only three crops having 5% and more area.

In 2014-15, six blocks of Malda have experienced high crop diversity (Table-3). The crop diversification index of 20.62 recognized Kaliachak-III which represent high diversity index for 2014-15 with five crop combination, viz., wheat, pulses, jute, oilseeds and rice. Harishchandrapur-I, (ICD-20.66, Harishchandrapur-II(ICD-20.96), Ratua-II (ICD-21.05), Gazole (ICD-21.25), and Ratua-I(ICD-21.30) maintained five crops combination and, again rice is a dominant crop.

Table-2: Crop Diversification Index at Block level, Malda (2004-05 and 2014-15)

Sl. No.	Blocks	Index of Crop Diversification		Change in ICD
		2004-05	2014-15	
1	Harishchandrapur-I	19.00	20.66	0.44
2	Harishchandrapur-II	16.11	20.96	4.85
3	Chanchal-I	22.06	25.63	3.57
4	Chanchal-II	16.44	25.72	9.28

5	Ratua-I	14.17	21.30	7.13
6	Ratua-II	19.07	21.05	1.98
7	Gazole	25.24	21.25	-3.99
8	Bamongola	18.73	35.75	17.02
9	Habibpur	40.80	50.82	10.02
10	Old Malda	17.80	30.56	12.76
11	English Bazar	7.89	35.05	27.17
12	Manikchak	8.47	27.38	18.91
13	Kaliachak-I	9.26	26.16	16.9
14	Kaliachak-II	5.74	27.51	21.77
15	Kaliachak-III	14.27	20.62	6.35
	District	15.02	21.19	6.17

Source: Calculated by authors

5.3 Medium Crop Diversification (ICD: 25-35)

Gazole, lone block has been categorized in medium crop diversification with an ICD value of 25.24 and harvest three important crops. Rice, wheat and oilseeds are major crops covering an area of five per cent and more. For the cropping year of 2014-15 major shift has been recorded in medium category where, six blocks newly added to said category (Table-3). Chanchal-I reveals four crops combination with least ICD index of 25.63 among medium category of diversification while, Old Malda shows high ICD value of 30.05 in same category with similar number of crops. Kaliachak-II (ICD-27.51 has an exceptional diversification and having six crops combinations with sugarcane as a dominant crop followed by oilseeds, rice, wheat, jute and maize. Three blocks, i.e., Chanchal-II (25.72), Kaliachak-I (ICD-26.16) and Chanchal-II (ICD-25.72) are having four crops combination with rice as dominant crop.

Table-3: Levels of Crop Diversification in the Blocks of Malda (2004-05 and 2014-15)

Levels of Diversification	2004-05		2014-15	
	Block	ICD	Block	ICD
High <25	Kaliachak-II	5.74	Kaliachak-III	20.62
	English Bazar	7.89		
	Manikchak	8.47		20.66
	Kaliachak-I	9.26		
	Ratua-I	14.17	Harishchandrapur-II	20.96
	Kaliachak-III	14.27		
	Harishchandrapur-II	16.11		
	Chanchal-II	16.44		
	Old Malda	17.80	Ratua-II	21.05
	Harishchandrapur-I	19.00		
	Bamongola	18.73	Gazole	21.25
	Ratua-II	19.07		
	Chanchal-I	22.06		
Medium 25-35	Gazole	25.24	Ratua-I	21.30
			Chanchal-I	25.63
			Chanchal-II	25.72

			Kaliachak-I	26.16
			Manikchak	27.38
			Kaliachak-II	27.51
			Old Malda	30.56
Low >35	Habibpur	40.80	Bamongola	35.75
			English Bazar	35.05
			Habibpur	50.82

Source: Compiled by authors.

5.4 Low Crop Diversification (ICD : >35)

In 2004-05 again only one block listed under high category of diversification. Rice and wheat have grown in Habibpur with an ICD value of 40.80. From total geographical area of 39607 hectares, 16805 hectares devoted for cultivation of crops and, only two crops reached the level of five per cent and more area. Three blocks witness low crop diversity covering 28485, in 207185.3 hectares total cultivated area (table-4) of the district with reference 2014-15. Bamongola with ICD value 35.75 cultivating three crops, i.e., rice, oilseeds, and potato covers crop land on half of the total geographical area (Table-4). Habibpur has two major crops; rice and oilseeds and is found to have least crop diversification index. English Bazar has shown stagnation by sticking to three cereal crops i.e. wheat, rice, and pulses from five crops combination in 2004-05. Data reveals 13895 hectares of total crop land in Old Malda, 937 hectares is devoted for Potato cultivation and 1128 hectares for oilseeds, dominated by mustard.

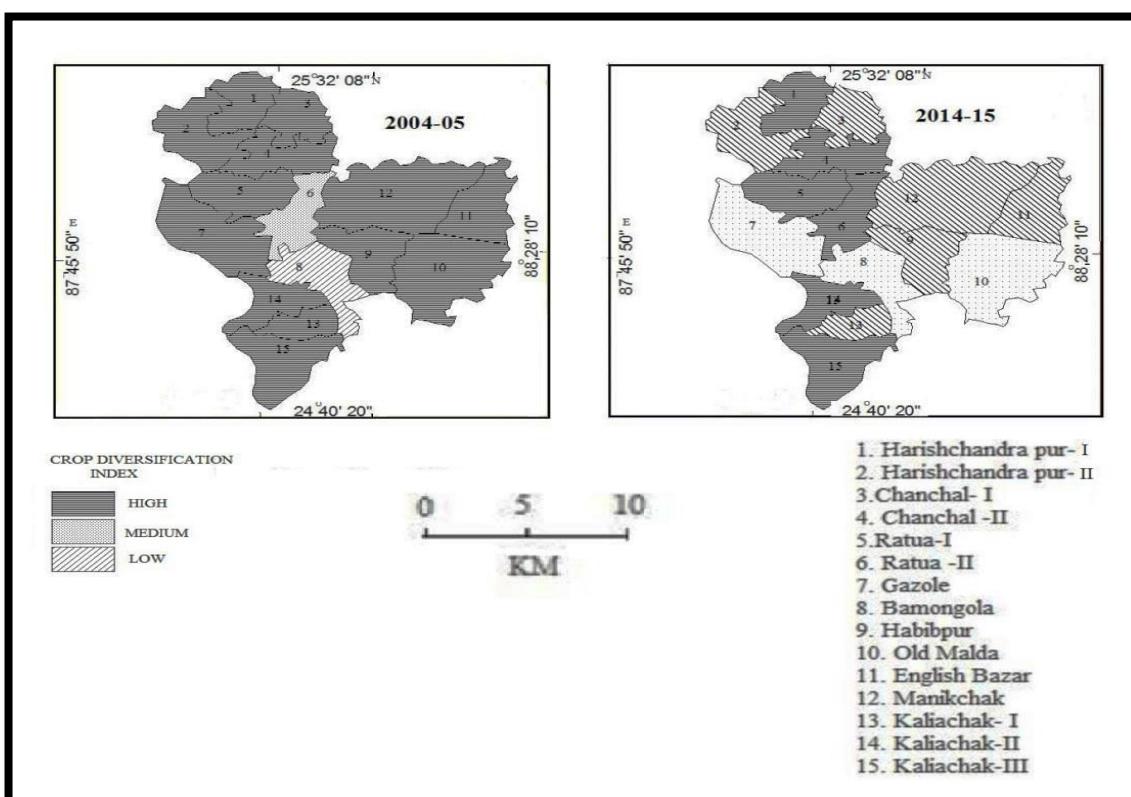


Figure 2: Crop Diversification Regions in the Malda District (2004-05 and 2014-15)

5.5 Review of Crop Diversification Pattern in the Malda District

Result shows wide variation at both; spatial and temporal level in the block. Modernizations in agriculture along with proper infrastructural facilities have added charm to diversification. Cropping pattern and crop combination for the year of 2004-05 varies from two to six crops and crop diversification ranges from 5.74 to 40.80 on same cropping year. Eleven blocks recorded five crop combinations in 2004-05 and nine blocks for 2014-15. This indicates increase in gross cropped area with mild tends toward specialization. Rice dominated as first ranking crop for nine blocks while wheat rank top for five blocks in 2004-05 and 2014-15 respectively. Pulses find one block in 2004-05 and replaced by sugarcane in 2014-15. Both the season cropping pattern at district is same but changed notice in gross cropped area. English Bazar and Gazol record maximum shift in number crops from five to three and vice versa. Thirteen blocks get high ICD value in 2004-05 but it reduces at six in 2014-15. Bamongola and English Bazar come down from high ICD into low ICD group. Gazole which was in the medium crop diversification category in 2004-05 has changed into precede category. In 2004-05, Habibpur placed in low ICD category, remain same class for 2014-15. This happen causes flood of 2011. Here risk factor overlooked by farmer presumably lacking in institutional or infrastructural attainment. Moreover, the gap in ICD values from lower diversification 40.80 in 2004-05 to 50.82 in 2014-15 is not as much high in higher diversification, while at high diversification it is 5.74 to 20.62.

Diversification in cropping pattern in malda shows positive scope and opportunities especially, in high value crops like, potato, pulses, and oilseeds production. It is a positive sign from the farmers who are taking interest in crop diversification (Pingali and Rosegrant, 1995). Taking care of growing consumerism in a diversified food sector in the district like malda already projected a significance stage in agriculture development. A report presented in the Global Convention Food - World India 2005, organized by FICCI, the Chief Minister of West Bengal, Mr. Buddhadeb Bhattacharjee said Frito Lays of Pepsi and Dabur (in pineapple processing) are already in the state and countries like France, Italy and Japan have been taking interest in entering the food sector in west Bengal. To cope up with prevailing health problems like, malnutrition and maladjustment crop priority has been assigned to develop agriculture in our country (Vidya, 1985). To adopt more sustainable way in crop diversification, attention can be trace from the United Nations Food and Agriculture Organization (FAO) to promote crop diversification among small farmers.

VI. CONCLUSION

Changes gross cropped area in the study year adds new flavor to ICD value and cropping pattern as well. In light of growing population expected land use shall be more complex and diversified. Diversifying nature of crops, especially those occupied less than five per cent area is more complex as shown in data source book. Blocks with favorable climate of physical in general and infrastructural in particular have entertained multiple cropping slots. Food for consumption left out diversifying nature of agriculture and commercial faming

seems important. Thereby, more blocks add in medium and low index categories. Pattern tells more scope of diversification and thus, it is necessary for food, income and livelihood and sustains use of land. Crop diversification is economically viable and therefore, intensive and well care investment to be made for institutional and infrastructural facilities. Strategy from government and private institution should be accessible to the farmers on demand. On this regard, establishment of crop diversification centre would necessary step.

VII. REFERENCES

- [1] Bhatia, S. S. (1965). Patterns of crop concentration and diversification in India. *Economic Geography*, 41(1), 39
- [2] Directorate of Agriculture, Malda, Govt. of West Bengal, 2014-15.
- [3] District Statistical Handbook, 2005. Malda, Published from Bureau of Applied Economics & Statistics, Govt. of West Bengal.
- [4] Fuller, A. M. (1990). From part-time farming to pluriactivity: A decade of change in rural Europe. *Journal of Rural Studies*, 6(4), 361–373.
- [5] GU, T., & SJ, A. (2012). Agriculture Productivity In Solapur District Of Maharashtra: A Geographical Analysis. *International Journal of Agriculture Sciences*, 4(2), 186–189.
- [6] Gunasena H.P.M. (2000) Intensification of crop diversification in Asia Pacific Regions. Report of the Expert Consultation on Crop Diversification in the Asia-Pacific Region. FAO Corporate Document Repository. Produced by-Regional Office of Asia and Pacific RAP Publication. Bangkok, Thailand.
- [7] Husain. M. (1996). *Systematic Agricultural Geography*, Rawat Publications, New Delhi.
- [8] Kimhi, A. (1994). Participation Of Farm Owners In Farm And Off-Farm Work Including The Option Of Full-Time Off-Farm Work. *Journal of Agricultural Economics*, 45(2), 232–239.
- [9] Mishra, A. K., & Goodwin, B. K. (1997). Farm income variability and the supply of off-farm labor. *American Journal of Agricultural Economics*, 79(3), 880–887.
- [10] Newby, H. (1983). The sociology of agriculture: Toward a new rural sociology. *Annual Review of Sociology*, 9(1), 67–81
- [11] Pal S. (2008) Spatio-Temporal Change of Crop Diversification in Murshidabad District, West Bengal. *Geographical Review of India*, 70 (2), pp 188-195.
- [12] Pingali, P. L., & Rosegrant, M. W. (1995). Agricultural commercialization and diversification: Processes and policies. *Food Policy*, 20(3), 171–185.
- [13] Ratnaparkhi M. (2012) Crop Diversification Patterns in East Vidarbha in Maharashtra. *Golden Research Thoughts*, Vol.1, Issue-9, pp.1-4.
- [14] Siddiqui, S. H. (2010), Changing Land use Pattern and Cropping Intensity: A Case study of Dadri Block, Gautam Buddh Nagar, Regional Symbiosis, Kanpur, *The Geographer*, Aligarh, Vol.18, pp.53-66.
- [15] Singh J. and Dhillon S.S. (Ed) (1976). *Agricultural Geography*, Tata Mc Graw Hill Publishing Company Ltd., New Delhi.
- [16] Shucksmith, D. M., & Smith, R. (1991). Farm Household Strategies And Pluriactivity In Upland Scotland. *Journal of Agricultural Economics*, 42(3), 340–353.
- [17] Todkari G.R. (2012) Spatio-Temporal Analysis of Crop Diversification in Solapur District. *Golden Research Thoughts*, Vol.1, Issue-8., pp 1-4.

To Cite This Article

Siddiqui, H.S., Rahaman, H. (2016): “Crop diversification in relation to time and space : A study from Malda district” *International Journal of Informative & Futuristic Research (ISSN: 2347-1697)*, Vol. 4 No. (2), October 2016, pp. 5133 - 5142, Paper ID: IJIFR/V4/E2/023.

ABOUT AUTHORS



1st . Prof. Shamsul Haque Siddiqui was born on 20th January 1955 in Bihar. Presently he acts as chairperson at department of Geography in Aligarh Muslim University. He has thirty years of teaching and twenty years of research experience.



2nd. Hasibur Rahaman was born on 20th October 1989 in Malda district of West Bengal. Pursued schooling from home and joined A.M.U, Aligarh in 2009 for graduation and post graduation (Geography). His research interest lies in agricultural geography. He is receiving Junior Research Fellowship (JRF) from 14th January 2015.

COLORING OF INTERVAL VALUED FUZZY GRAPH USING ALPHA CUT

Paper ID IJIFR/V4/ E2/ 022 **Page No.** 5143-5148 **Subject Area** Mathematics

Subject Classification AMC 2010 : 20M17, 20M15

Keywords Chromatic Number, Chromatic Index, Total Chromatic Number, Interval Valued Fuzzy Set, Alpha Cut

1st	N.Naga Maruthi Kumari	Assistant Professor Department of Mathematics, REVA University, Kattigene Halli, Bangalore-Karnatka
2nd	Dr. R. Chandra Sekhar	Professor Department of Mathematics, T. John College, Bangalore-Karnatka

Abstract

In this paper, we discuss the interval valued fuzzy chromatic number, chromatic index, Total chromatic number as fuzzy numbers through the alpha cuts of the interval valued fuzzy graphs, which are the crisp graphs. Some applications will explain these concepts.

I. INTRODUCTION

To deal with the uncertainty, the concept of Fuzzy Theory was applied to Graph theory and hence interval valued fuzzy graph theory. The notion of fuzzy set was introduced by Zadeh In 1965 which is characterized by a membership function that defines a grade of membership in [0,1]. Kaufmann (1973) introduced the first definition of Fuzzy Graph, which is based on Zadeh's fuzzy relations (1971). According to M.Blue, B.Bush and J.Puckett, there are 5 types of graph Fuzzyness. They are

1. A collection of fuzzy graphs, where fuzziness is on each member of the fuzzy graphs.
2. A collection of vertices and edges, where the edge set is fuzzy
3. A collection of vertices, and edges, where the vertex set is fuzzy
4. A collection of vertices and edges, where the vertex set and edge set both are crisp but the edges have fuzzy weights.
5. A collection of vertices and edges, but the edges have fuzzy heads and fuzzy tails.

The total coloring conjecture and the total coloring were independently introduced by Behzad and Vizing between 1964 and 1968.



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright ©IJIFR 2016

Kilakos and Reed proved that the fractional chromatic number of the graph G is at most $\Delta(G)+2$ where Δ is maximum vertex degree of the graph.

In this paper we consider the Interval valued fuzzy graphs with fuzzy interval valued vertex set and fuzzy interval valued edge set. Coloring of graphs is a most important concept in which we partition the vertex (edge) set of any associated graph so that adjacent vertices (edges) receive different colors. In other words coloring problem is considered as grouping the items of interest as few groups as possible so that incompatible items are in different groups. Generally for a given graph $G=(V,E)$, a coloring function is a mapping : $V \rightarrow N$ such that $(x) \neq (y)$ where x and y are adjacent vertices in G (incompatible vertices) but if we use only k colors to color a graph we define a k -coloring

$k : V \rightarrow \{1,2,\dots,k\}$. A graph is k -colorable if it admits a k - coloring. The chromatic number $\chi(G)$, of a graph G is the minimum number of colors 'k' for which G is k - colorable. Fuzzy graph coloring is one of the most important problems of fuzzy graph theory; it is mainly studied in combinatorial optimization like traffic light control, exam scheduling, register allocation etc.

Definition 1: "A fuzzy set A defined on a non empty set X is the family

$A = \{(x, \mu_A(x)) / x \in X\}$ where $\mu_A : X \rightarrow I$ is the membership function."

In classical fuzzy set theory the set I is usually defined on the interval $[0,1]$ such that

$\mu_A(x) = 0$ if x does not belong to A

$\mu_A(x) = 1$ if x strictly belongs to A and any intermediate value represents the degree in which x could belong to A .

The set I could be discrete set of the form $I = \{0,1,\dots,k\}$ where $\mu_A(x) < \mu_A(x')$ indicates that the degree of membership of x to A is lower than the degree of membership of x' "

Definition 2 : "Fuzzy graphs with crisp vertices and fuzzy edges

The graph $\hat{G} = (V, \hat{E})$ is a fuzzy graph where V is the vertex set and the fuzzy edge set is characterized by the matrix $\mu = [\mu_{ij}]$ $i,j \in V$, $\mu_{ij} = \mu_{\hat{E}}(\{i,j\})$ for every $i,j \in V$ such that $i \neq j$ and $\mu_{\hat{E}} : V \times V \rightarrow I$ is the membership function. Each element $\mu_{ij} \in I$ represents the intensity level of the edge $\{i,j\}$ for any $i,j \in V$ with $i \neq j$. The fuzzy graph can also denoted by $\hat{G} = (V, \mu)$ "

Definition 3: Fuzzy vertex coloring:

"A fuzzy set A defined on X can be characterized from its family of α -cuts

$A_\alpha = \{x \in X / \mu_A(x) \geq \alpha\}$ $\alpha \in I$. This family of sets is monotone, i.e., for $\alpha, \beta \in I$, $\alpha \leq \beta$

we have $A_\alpha \supseteq A_\beta$ On the other hand, given a finite monotone family $\{A_\alpha / \alpha \in I\}$, a fuzzy set can be defined from the membership function .

$\mu_A(x) = \sup \{P_\alpha / x \in A_\alpha\}$ for every $x \in X$.

Let $\{G_\alpha = (V, E_\alpha) / \alpha \in I\}$ be the family of α -cuts of \hat{G} , where the α -cut of a fuzzy graph is the crisp graph $G_\alpha = (V, E_\alpha)$ with $E_\alpha = \{\{i,j\} / i,j \in V, \mu_{ij} \geq \alpha\}$."

Definition 4 : "Chromatic Number : For a fuzzy graph $\hat{G} = (V, \mu)$, its chromatic number is the fuzzy number $\chi(\hat{G}) = \{x, v(x) / x \in X\}$, where $X = \{1, \dots, |V|\}$, $v(x) = \sup \{\alpha \in I / x \in A_\alpha\}$ $x \in X$ and $A_\alpha = \{1, \dots, \chi_\alpha\} \alpha \in I$ ".

The chromatic number of a fuzzy graph is a normalized fuzzy number whose modal value is associated with the empty edge-set graph. It can be interpreted that for lower values of α

there are many incompatible edges between the vertices so that more colors are needed in order to consider the incompatibilities; on the other hand, for higher values of α there are fewer incompatible edges and less colors are needed. The fuzzy coloring problem consists of determining the chromatic number of a fuzzy graph and an associated coloring function. For any level α , the minimum number of colors needed to color the crisp graph G_α will be computed. In this way the fuzzy chromatic number is defined as fuzzy number through its α -cuts”

Definition 5: “The interval-valued fuzzy set A in V is defined by

$$A = \{(x, [\mu_A^-(x), \mu_A^+(x)]): x \in V\},$$

where $\mu_A^-(x)$ and $\mu_A^+(x)$ are fuzzy subsets of V such that $\mu_A^-(x) \leq \mu_A^+(x)$ for all $x \in V$.”

For any two interval-valued sets $A = [\mu_A^-(x), \mu_A^+(x)]$ and $B = [\mu_B^-(x), \mu_B^+(x)]$ in V we define:

- $A \cup B = \{(x, \max(\mu_A^-(x), \mu_B^-(x)), \max(\mu_A^+(x), \mu_B^+(x))): x \in V\},$
- $A \cap B = \{(x, \min(\mu_A^-(x), \mu_B^-(x)), \min(\mu_A^+(x), \mu_B^+(x))): x \in V\}.$

“Interval-valued fuzzy relation B on a set E of the graph $G^* = (V, E)$, is such that

$$\mu_B^-(xy) \leq \min(\mu_A^-(x), \mu_A^-(y))$$

$$\mu_B^+(xy) \leq \min(\mu_A^+(x), \mu_A^+(y)) \text{ for all } xy \in E.$$

Definition 6: α - cut of an Interval-valued fuzzy graph:

“For $\alpha = (a,b) \in I$, $G_\alpha = (A_\alpha, B_\alpha)$ where $A_\alpha = \{x \in V; a \leq \mu_A^-(x) \leq b\}$ and $B_\alpha = \{xy \in E; a \leq \mu_B^-(xy) \leq b\}$ ”

Example 1:

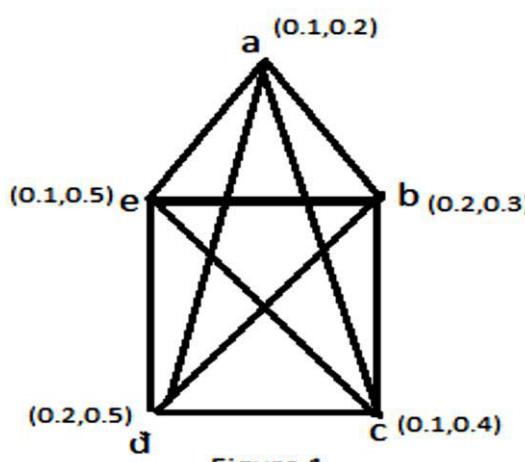


Figure 1

The memberships of the edges of the above graph are given below:

$$\mu(ab) = (0.1, 0.2), \mu(bc) = (0.1, 0.3), \mu(cd) = (0.1, 0.4), \mu(de) = (0.1, 0.5),$$

$$\mu(ea) = (0.1, 0.2), \mu(ad) = (0.1, 0.2), \mu(ac) = (0.1, 0.2), \mu(ce) = (0.1, 0.4), \mu(eb) = (0.1, 0.3),$$

$$\mu(bd) = (0.2, 0.3)$$

If $\alpha = (0.1, 0.2)$ then the fuzzy graph is just like the figure 1, then the chromatic number with respect to α is $\chi(\alpha) = 5$

If $\alpha = (0.1, 0.3)$, then the fuzzy graph is given by figure 2 and the chromatic number is $\chi(\alpha) = 4$

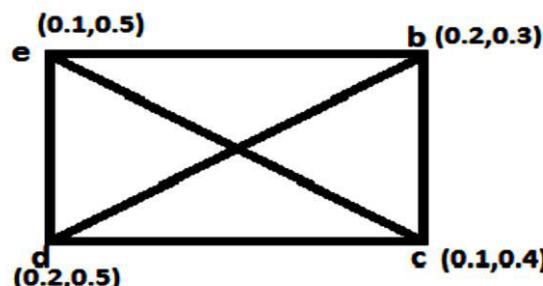


Figure 2

If $\alpha = (0.1, 0.4)$, then the fuzzy graph is given by figure 3 and the chromatic number is $\chi(\alpha) = 3$

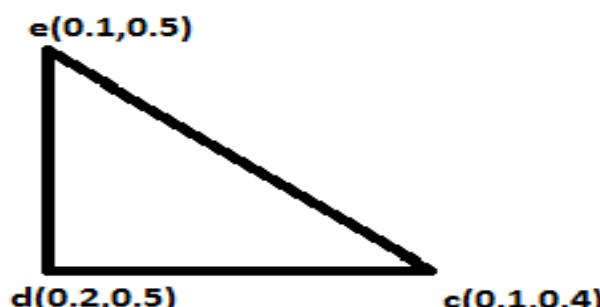


Figure 3

If $\alpha = (0.1, 0.5)$, then the fuzzy graph is given by figure 4 and the chromatic number is $\chi(\alpha) = 2$



figure 4

If $\alpha = (0.2, 0.7)$, then the fuzzy graph does not contain any vertices and edges. Hence the chromatic number is 0. Hence the interval valued fuzzy chromatic number is given by $\chi(G) = \{\alpha, \chi(G_\alpha)\} = \text{The set of ordered pairs consisting of } \alpha \text{ (the interval)} \text{ and the corresponding chromatic number of the graph} = \{((0.1, 0.2), 5), ((0.1, 0.3), 4), ((0.1, 0.4), 3), ((0.1, 0.5), 2), ((0.2, 0.7), 0)\}$

II. RESULT:

For lower values of the length of the interval α , there are many incompatible edges between the vertices so that more colors are needed in order to consider the incompatibilities. On the other hand, for higher values of the length of the interval α , there are fewer incompatible



edges and less colors are needed. The fuzzy coloring problem consists of determining the chromatic number of a fuzzy graph and an associated coloring function. Hence as the length of ' α ' increases, the chromatic number decreases.

Definition 7: "Total coloring: Total coloring of a graph is a kind of graph coloring on the vertices and edges of a graph, in the sense that no adjacent edges and no edge and its end vertices are assigned the same color."

"Fuzzy Total coloring: If $\{G_\alpha = (V, E_\alpha) / \alpha \in I\}$ be the family of α -cuts of G , where the α -cut of a fuzzy graph is the crisp graph $G_\alpha = (V, E_\alpha)$ with $E_\alpha = \{(i, j) : i, j \in V, \mu_{ij} \geq \alpha\}$ "

"The total chromatic number $\chi''(G)$ is the least number of colors needed in any Total coloring of the graph G and is at most $\Delta + 2$, where Δ is the max vertex degree."

Total chromatic number properties:

- 1) $\chi''(G) \geq \Delta + 1$
- 2) $\chi''(G) \leq \Delta(G) + 10^{26}$ (According to MOLLOY < REED in 1998)"

The total chromatic number of the graph given in example -1 by considering different α -cuts in the interval $(0,1)$ is given the following table

Table 1: Total chromatic number of the graph

α	Width of α	E_α	X_T	Colors (C_i) of vertices and edges															
				a	b	c	d	e	a	a	a	a	b	b	b	b	c	c	e
(0.1, 0.2)	0.1	ab,ac,ad,ae,bc,b d,be,cd,ce,de,	7	C 1	C 2	C 3	C 4	C 5	C 3	C 2	C 5	C 4	C 1	C 6	C 7	C 7	C 6	C 1	
(0.1, 0.3)	0.2	bc,bd,be,cd,ce, de	7	C 1	C 2	C 3	C 4	C 5	0	0	0	0	C 4	C 3	C 1	C 2	C 6	C 7	
(0.1, 0.4)	0.3	Cd,ce,de	3	C 3	C 3	C 3	C 4	C 5	0	0	0	0	0	0	0	C 5	C 4	C 3	
(0.1, 0.5)	0.4	de	3	C 4	C 4	C 4	C 4	C 5	0	0	0	0	0	0	0	0	0	C 3	
(0.2, 0.7)	0.5	\emptyset	1	C 4	C 4	C 4	C 4	C 4	0	0	0	0	0	0	0	0	0	0	

Since $\Delta=4$ for the given graph the interval valued fuzzy total chromatic number of \hat{G} is given by

$$X^T = \{((0.1, 0.2), 7), ((0.1, 0.3), 7), ((0.1, 0.4), 3), ((0.1, 0.5), 3), ((0.2, 0.7), 1)\}$$

Conclusion : In this paper we defined the fuzzy chromatic number, fuzzy total chromatic number and interval valued fuzzy total chromatic number as interval valued fuzzy numbers through the α - cuts of the interval valued fuzzy graph which are crisp graphs. We can also de-fuzzify this number using any of methods available if we want these numbers in crisp form.

III. REFERENCES

- [1] A. Nagoorgani, K. Radha, Isomorphism on fuzzy graphs, International J. Computational Math. Sci. 2 (2008) 190-196.
- [2] A. Perchant, I. Bloch, Fuzzy morphisms between graphs, Fuzzy Sets Syst. 128 (2002) 149-168.

- [3] A. Rosenfeld, Fuzzy graphs, Fuzzy Sets and their Applications (L.A.Zadeh, K.S.Fu, M.Shimura, Eds.), Academic Press,New York, (1975) 77-95.
- [4] F. Harary, Graph Theory, 3rd Edition, Addison-Wesley,Reading, MA, 1972.
- [5] I.B. Turksen, Interval valued fuzzy sets based on normal forms, Fuzzy Sets Syst. 20 (1986) 191-210.
- [6] J. Hongmei, W. Lianhua, Interval-valued fuzzy subsemigroups and subgroups associated by intervalvalued suzzy graphs, 2009. WRI Global Congress on Intelligent Systems, 2009, 484-487.
- [7] J.M. Mendel, Uncertain rule-based fuzzy logic systems:Introduction and new directions, Prentice-Hall, Upper Saddle River, New Jersey, 2001.
- [8] J.M. Mendel, X. Gang, Fast computation of centroids for constant-width Interval-valued fuzzy sets, Fuzzy Information Processing Society, NAFIPS (2006)621-626.
- [9] J.N. Mordeson, C.S. Peng, Operations on fuzzy graphs, Information Sci. 79 (1994) 159-170.
- [10] J.N. Mordeson, Fuzzy line graphs, Pattern Recognition Letter 14 (1993) 381-384.
- [11] J.N. Mordeson, P.S. Nair, Fuzzy graphs and fuzzy hypergraphs, Physica Verlag, Heidelberg 1998; Second Edition 2001.
- [12] K.P. Huber, M.R. Berthold, Application of fuzzy graphs for metamodeling, Proceedings of the 2002 IEEE Conference, 640-644
- [13] K.R. Bhutani, A. Battou, On M-strong fuzzy graphs, Information Sci. 155 (2003) 103-109.
- [14] K.R. Bhutani, A. Rosenfeld, Strong arcs in fuzzy graphs, Information Sci. 152 (2003) 319-322.
- [15] K.R. Bhutani, On automorphism of fuzzy graphs, Pattern Recognition Letter 9 (1989) 159-162.
- [16] K.T. Atanassov, Intuitionistic fuzzy sets: Theory and applications, Studies in fuzziness and soft computing, Heidelberg, New York, Physica-Verl., 1999.
- [17] L.A. Zadeh, Fuzzy sets, Information Control 8 (1965) 338-353.
- [18] L.A. Zadeh, Similarity relations and fuzzy orderings, Information Sci. 3 (1971) 177-200.
- [19] L.A. Zadeh, The concept of a linguistic and application to approximate reasoning I, Information Sci. 8 (1975) 199-249
- [20] M. Akram, K.H. Dar, Generalized fuzzy K-algebras VDM Verlag, 2010, pp.288, ISBN 978-3-639-27095-2.
- [21] M.B. Gorzalczany, An interval-valued fuzzy inference method some basic properties, Fuzzy Sets Syst. 31 (1989) 243-251.
- [22] M.K. Roy, R. Biswas, I-V fuzzy relations and Sanchezs approach for medical diagnosis, Fuzzy Sets Syst. 47 (1992) 35-38.
- [23] M.S. Sunitha, A. Vijayakumar, Complement of a fuzzy graph, Indian J. Pure Appl. Math. 33 (2002) 1451-1464.
- [24] P. Bhattacharya, Some remarks on fuzzy graphs, Pattern Recognition Letter 6 (1987) 297-302.
- [25] S. Mathew, M.S. Sunitha, Node connectivity and arc connectivity of a fuzzy graph, Information Sciences, 180(4)(2010) 519-531.

To Cite This Article

Kumari, M.N.N., Sekhar, C.R. (2016):“Coloring Of Interval Valued Fuzzy Graph Using Alpha Cut” International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5143 -5148, Paper ID: IJIFR/V4/E2/022.



IMPROVED ANTIFILARIAL EFFICACY OF AZITHROMYCIN BY ACACIASIDES ON MICROFILARIA OF *D. IMMITIS* IN VIVO

Paper ID	IJIFR/V4/ E2/ 024	Page No.	5149-5158	Subject Area	ZOOLOGY
----------	-------------------	----------	-----------	--------------	---------

Keywords	Lymphatic Filariasis, Azithromycin, Saponins, <i>Wolbachia</i>
----------	--

1st	Dr. Sutapa Datta	Assistant Professor P.G. Department of Zoology Bethune College, Kolkata-West Bengal
2nd	Dr. Sudipta Maitra	Associate Professor Department of Zoology, Visva-Bharati University , West Bengal
3rd	Dr. S.P. Sinha Babu	Professor Department of Zoology, Visva-Bharati University , West Bengal

Abstract

*Lymphatic filariasis is a major cause of clinical morbidity. Lymphatic filariasis is a major public health problem throughout the tropics and subtropics. The prevalence of infection is increasing worldwide with more than 120 million people infected with lymphatic filarial worm. The drugs used for lymphatic filariasis are diethylcarbamazine (DEC), ivermectin and albendazole. None of these is effective in killing the long-lived adult worms and the treatments are therefore aimed at reducing transmission and pathology. In the present study a 40-day treatment of azithromycin at 10 mg/kg body weight/day resulted in a maximum 70% reduction in mf count compared to untreated control on 40 day post-treatment. However, the *Wolbachia* population was not reduced significantly as evident from the PCR using *Wolbachia* 16S rRNA primers. But a 40-day regimen of azithromycin at 10 mg/kg body weight/day followed by a 7-day regimen of acaciasides at the same dose reduced the mf count (90% clearance) at a faster rate on 45 day post-treatment with no effect on *Wolbachia* population.*



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

I. INTRODUCTION

Lymphatic filariasis is a major tropical disease and one of the major common causes of clinical morbidity and global disability. Approximately 40% of the world's 120 million cases of lymphatic filariasis occur in sub-Saharan Africa (approximately 46–51 million cases) (Michael and Bundy, 1997; Zagaria and Savioli, 2002; Fenwick, *et al.*, 2005; Global alliance, 2005; Molyneux, *et al.*, 2005; Global alliance, 2009), with an estimated 382–394 million people at risk of infection, including 176 million children (Ottesen, 2006; WHO, 2008). India contributes about 40% of the total global burden and accounts for about 50% of the people at the risk of infection. Of the people exposed to the risk of infection, individuals with microfilaraemia, suffering from lymphoedema and hydrocele cases in the globe; India alone accounts for 39.0, 37.9, 46.4 and 48.1%, respectively (Michael *et al.*, 1996). Present day antimicrofilarial or macrofilaricidal treatment regimens do have certain well documented limitations. The first line choice of drugs are diethylcarbamazine (DEC), ivermectin and albendazole. Diethylcarbamazine and ivermectin are effective at killing microfilariae but are associated with systemic and inflammatory adverse reactions. Albendazole increases the efficacy of DEC and ivermectin and is used in combination with either of the drugs as the basis of long-term intervention programme. Thus, the present day requirement for filarial chemotherapy is a cheap, non-toxic and novel antifilarial drug with long term antimicrofilarial or macrofilaricidal activity. Ivermectin has been used as standard antifilarial drug for comparing the results.

A recent breakthrough in the filarial research is the discovery that *Wolbachia* plays an important role in the biology of filarial nematodes (Taylor and Hoerauf, 1999). The discovery of *Wolbachia* has fostered a new initiative in the development of suitable antifilarial drugs. One potential target is to use anti-rickettsial antibiotics to deplete *Wolbachia* endosymbionts that exist in the lateral cords of adult female and microfilaria of most filarial nematodes including *D. immitis*, *Litomosoides sigmodontis*, *O. volvulus*, *W. bancrofti* and *B. malayi* (Bandi *et al.*, 1999; Taylor *et al.*, 1999). In recent years, studies have linked tetracycline treatment of filaria infected animals with reduced worm burdens and decreased level of microfilaremia. This has been demonstrated in animal models with *L. sigmodontis*, *D. immitis* and recently confirmed in patients with *O. volvulus* (Hoerauf *et al.*, 1999; 2000b; Taylor *et al.*, 1999; 2000b). We have earlier reported that tetracycline at 10mg/kg/day for 40 days followed by 7 day treatment with acaciasides at 10mg/kg/day causes total depletion (100%) in mf count in the blood of treated dogs on day 75 post-treatment and this was maintained even 120 days after the last dose (Datta *et al.*, 2009).

The antifilarial activity of two triterpenoid saponins acaciaside A and acaciaside B, originally isolated from the funicles of *A. auriculiformis* were observed earlier (Mahato *et al.*, 1992). The saponins were found effective against both microfilaria and the adult worm of *S. cervi* in rats (Ghosh *et al.*, 1993). An ethanol extract obtained from the funicles of the plant proved effective against both microfilaria and the adult worm of *D. immitis* in dogs (Chakraborty *et al.*, 1995). The crude ethanol extract at the effective dose did not show any apparent toxicity in the treated dogs in terms of lethargy, food intake and change in body



temperature; however serological tests revealed some mild transient effects in liver function (Sarkar, 1997). Recently we have reported absence of *Wolbachia* in *S. cervi* collected from local abattoirs (Datta *et al.*, 2007). Since this cattle parasite does not harbour *Wolbachia*, it is likely that the filaricidal activity of saponins may be mediated through a different target altogether. These two saponins are known to interact with the membrane, thus inflicting membrane damage (Sinha Babu *et al.*, 1997). Our findings on the mechanism of action of saponins further revealed that super oxide anion is probably involved in the expression of membrane damaging effect of saponins (Nandi *et al.*, 2004). In the present study, the mixture of acaciaside A and acaciaside B was used for testing its effects on the antifilarial efficacy of azithromycin and to study the effect of azithromycin and acaciasides and their combination on *D. immitis* *in vivo*. Our primary aim is to assess the impact of azithromycin on *Wolbachia* loads within microfilaria and of the combination of azithromycin + acaciasides on microfilaria level over the observation period.

II. MATERIALS AND METHODS

2.1 Preparation of Acaciaside A and Acaciaside B

Acaciaside A and B are triterpenoid saponins originally isolated from the funicles of *Acacia auriculiformis* were respectively defined to be 3-O-[β -D-glucopyranosyl (1 \rightarrow 6){ α -L-arabinopyranosyl (1 \rightarrow 2)}- β -D-glucopyranosyl]-21-O-((6'S)-2'-trans-2',6'-dimethyl-6'-O- β -D-glucopyranosyl-2',7'-octadienoyl) acacic acid 28-O- α -L-rhamnopyranosyl (1 \rightarrow 6)[β -D-xylopyranosyl (1 \rightarrow 2)]- β -D-glucopyranoside (**1**) and 3-O-[β -D-glucopyranosyl (1 \rightarrow 6){ α -L-arabinopyranosyl (1 \rightarrow 2)}- β -D-glucopyranosyl]-21-O-[(6'S)-2'-trans-2',6'-dimethyl-6'-O- β -D-xylopyranosyl (1 \rightarrow 2)- β -D-glucopyranosyl]-2',7'-octadienoyl] acacic acid 28-O- α -L-rhamnopyranosyl (1 \rightarrow 6)[β -D-xylopyranosyl (1 \rightarrow 2)]- β -D-glucopyranoside (**2**). The structural details were elucidated by a combination of fast-atom-bombardment mass spectrometry, 1 H-, and 13 C NMR spectroscopy, and some chemical transformations (Mahato *et al.* 1992; Fig. 1). The mixture of acaciaside A and acaciaside B, which is water soluble, was used for testing its effects on *D. immitis* in dogs.

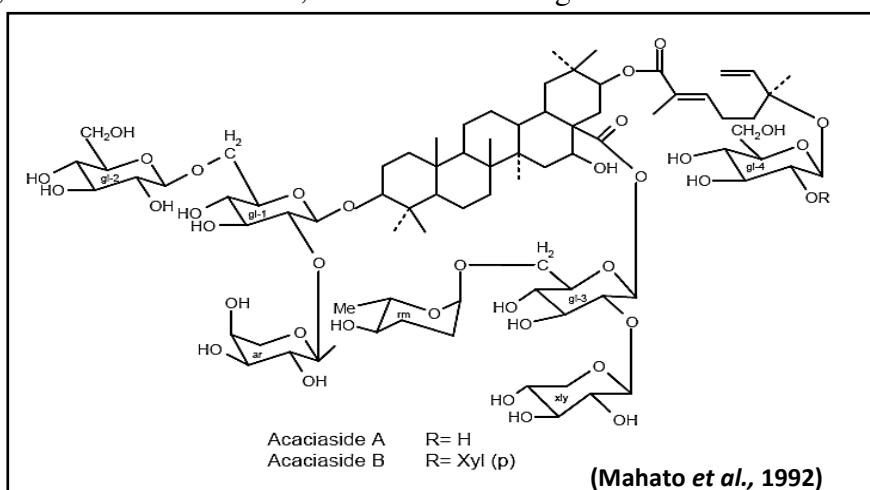


Figure 1: Chemical structure of acaciasides A and acaciasides B

2.2 Drugs used for the experiment:

Azithromycin was obtained from Alembic Limited. The antibiotics were given orally. Ivermectin was obtained from Ochoa Laboratoy Limited and injected subcutaneously in a single shot.

2.3 Experimental animal and study design

Fifteen stray dogs (9 males and 6 females) naturally infected with *D. immitis* were used in the present experiment. Blood samples from all the dogs were collected every week for a period of ten weeks and mf density per 0.25 ml of blood was determined in each sample. Six mf dogs (males) were administered orally with azithromycin at 10 mg/kg/day for 40 days. Three male azithromycin treated (for 40 days) dogs were given saponins of *A. auriculiformis* at 10mg/kg/day orally for 7 consecutive days and the other three received the placebo. Among the remaining nine mf dogs, three females received no treatment, three males were treated orally with acaciasides at 10mg/kg/day for 7days (day 41- day 47) only and three females were given ivermectin at 2 mg/ kg body weight (single subcutaneous injection).

2.4 Collection of microfilaria from blood

Animal trials were duly approved by the institutional animal ethics committee of the University. Blood samples were obtained separately from each dog with the help of 5ml heparinised disposable syringe. Blood was drawn on day 15, 30, 40 and 47 from the commencement of treatment. Additional samples were taken at quarterly intervals up to day 75 and last sampling was done at 120 day post-treatment. From all the experimental dogs, 5 ml of blood was taken in heparinised tubes and immediately diluted (1:1) with pre-chilled PBS (0.01 M phosphate buffer, 0.15 M sodium chloride, pH 7.4) and was filtered through a 5 μ m filter membrane (Millipore, USA). Microfilariae were separated as per standard protocol (Datta *et al.*, 2009).

2.5 Extraction of DNA and PCR

Total genomic DNA was extracted from *D. immitis* microfilariae, collected from blood drawn from naturally infected stray dogs following the method by Smith and Rajan (2000), with slight modifications. The mf pellet was resuspended in 500 μ l of lysis buffer, pH 8.0 containing 20 mM Tris-HCl, 50 mM EDTA, 0.5% SDS, 100 mM NaCl, 1%(v/v) β -mercaptoethanol and proteinase-K 0.1 mg/ ml. Then the mixture was incubated at 55°C for 3 h. To inactivate proteinase-K, samples were heated at 95°C for 10 min. After phenol-chloroform-isoamyl alcohol (25:24:1) extraction and ethanol precipitation, the pellet was washed with cold ethanol (70%) and then resuspended in sterile 25 μ l 10 mM TE buffer (pH 8.0). Total genomic DNA was also extracted from adult worms of *S. cervi* collected from the peritoneal cavity of freshly slaughtered cows at local abattoirs (Kashipur, Birbhum), washed briefly with modified Ringers medium at 37°C and stored immediately in 1 ml of TEN buffer (100 mM Tris, 5 mM EDTA, 200 mM sodium chloride, pH 7.5) at -20°C. Finally DNA was isolated as described above. In both treated and untreated dogs PCR was



performed to check DNA integrity and to assay for the presence of *Wolbachia* in *D. immitis*. PCR was performed in 50 μ l of reaction mixture having 1 \times PCR buffer containing (NH₄)₂SO₄, 2 mM dNTP mix, 2 mM MgCl₂, 20 ng/ml each of forward and reverse primers and 1.5 units *Taq* polymerase (Fermentas). PCR products were visualized by running 5 μ l of reaction mixture in 1% agarose (SRL, India) gel followed by staining with ethidium bromide (SRL, India). To confirm filarial DNA, 28S rRNA primers (BD1A-F and BD1A-R) were used (Smith and Rajan, 2000). Presence and integrity of *Wolbachia* DNA was confirmed by using *Wolbachia* 16S rRNA primers FIL-5 and FIL-6 (Smith *et al.*, 2000). Annealing was done at 51°C for all three sets of primers. As negative control, sterile distilled water or DNA extracted from *Setaria cervi*, which does not have *Wolbachia* endosymbionts (Datta *et al.*, 2007) was used.

Table 1: Primer sequences

Filaria 28S rRNA primers	
BD1A-F	5'-ATGAAAGGCCTTGATATATAG-3'
BD1A-R	5'-GCAAGCCATGCAAGCGTTGAG-3'
Wolbachia 16S rRNA primers	
FIL-5	5'-TGAGGAAGATAATGACGG-3'
FIL-6	5'-CCTCTATCCTCTTCAACC-3'

2.6 Side effects of drugs

Following treatment with the test drugs the animals were kept under observation and their body weight, food intake and movement was recorded at regular intervals. The treated animals did not show any toxic effects in terms of change in body weight, food intake and movement. Serological tests were applied to pariah dogs naturally infected with *D. immitis* before and after azithromycin, acaciasides and their combination treatment. The same serological tests were performed for control dogs. Blood was analysed before and after treatment with respect to the following parameters: SGOT, SGPT and % haemoglobin.

III. RESULTS

3.1 Parasitological findings

The mf count per 0.25ml of blood did not vary appreciably during the 10 week period of observation before the commencement of treatment (data not shown). Treatment with azithromycin or azithromycin + acaciasides or acaciasides alone at the effective dose levels did not produce any apparent side effects in the treated dogs in terms of lethargy, food intake and serological tests including SGPT SGOT and % Hb (data not shown). The percent occurrence of mf/ 0.25ml of blood following treatment with azithromycin or azithromycin + acaciasides or acaciasides alone in comparison to placebo at various time intervals are shown in Figure 2.

Treatment of microfilaremic adult dogs (body weight range 8-12 kg) with azithromycin at 10 mg/kg/day for 40 days resulted in 54% ($P < 0.05$, one way ANOVA) and 57% ($P <$

0.05, one way ANOVA) reduction in mf count on day 15 and 30, respectively, and the maximum reduction in mf count (70%, $P < 0.01$) was achieved on 40 day treatment (Fig. 18). However, treatment with azithromycin (10 mg/kg/day for 40 days) followed by acaciasides (10 mg/kg/day for 7 days) resulted in 90% clearance of mf at a faster rate on 45 day post-treatment (Fig.2).

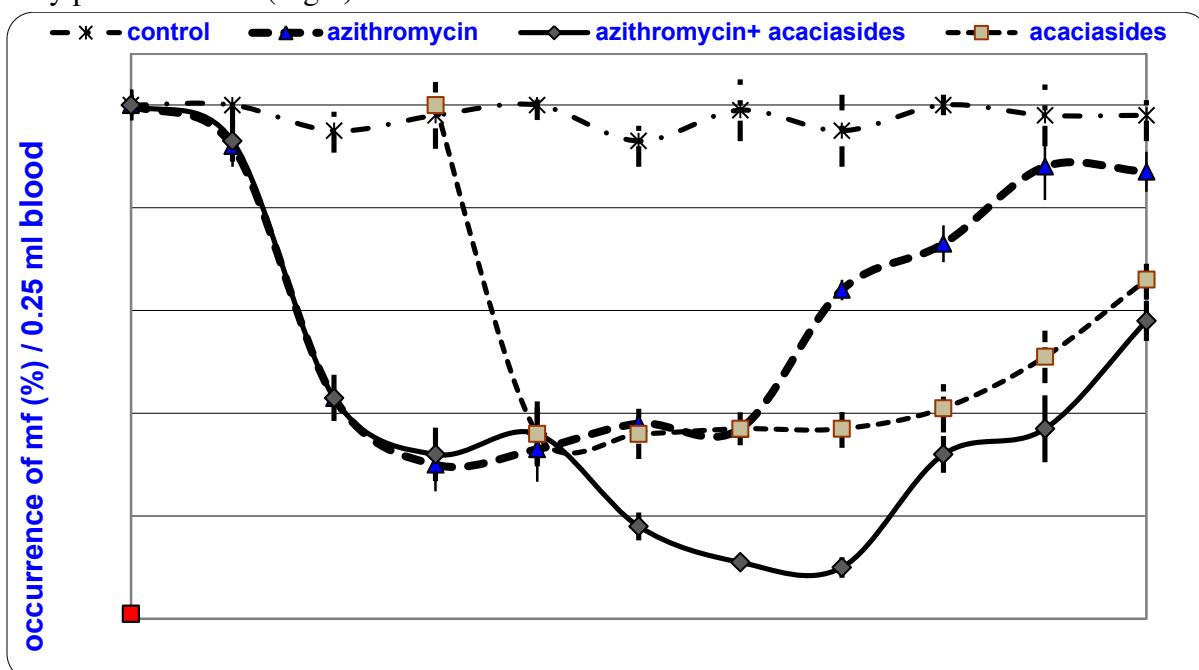


Figure 2: Percentage of microfilaria (*D. immitis*) per 0.25 ml of blood in control and treated dogs. Three dogs were kept as control and three were treated orally with azithromycin (40 days, at 10 mg/kg/day) followed by 7-day placebo treatment. Another three were treated orally with azithromycin (40 days, at 10 mg/kg/day) followed by 7-day acaciasides (10 mg/kg/day) treatment. The remaining three were treated orally with acaciasides (7 days, at 10 mg/kg/day). Each bar represents the mean \pm S.D. Data were analysed by one way ANOVA. There was a significant difference between control and treated groups and among the treated groups ($P < 0.05$). Treatment period is 0d to 47d. Post-treatment period is 15d to 120d.

In dogs treated with acaciasides only for seven days, the mf count was reduced by more than 64% ($P < 0.05$) on day 7 (the last day of treatment), thereafter, the mf density increased gradually to 34% reduction level on day 120 post-treatment (Fig. 2). In dogs treated with single dose ivermectin at 2 mg/kg body weight the mf population in blood disappeared totally as observed on day 15 post-treatment.

3.2 PCR of microfilaria samples

PCR amplification of *D. immitis* mf DNA using filaria specific primers, from both pre-treated (0 day, lane 2; Fig. 3) and azithromycin treated (sampling on 30 and 45 days) dogs yielded distinctive bands at 150 bp (lanes 3 and 4; Fig. 3). A comparison between pre-treated and treated dogs reveals that there was a trace of filarial specific amplified product in both treated dogs on 45 day post-treatment but the band intensity was higher in

azithromycin treated dogs (lane 4; Fig. 3) than azithromycin + acaciasides treated dogs (lane 5; Fig. 3).

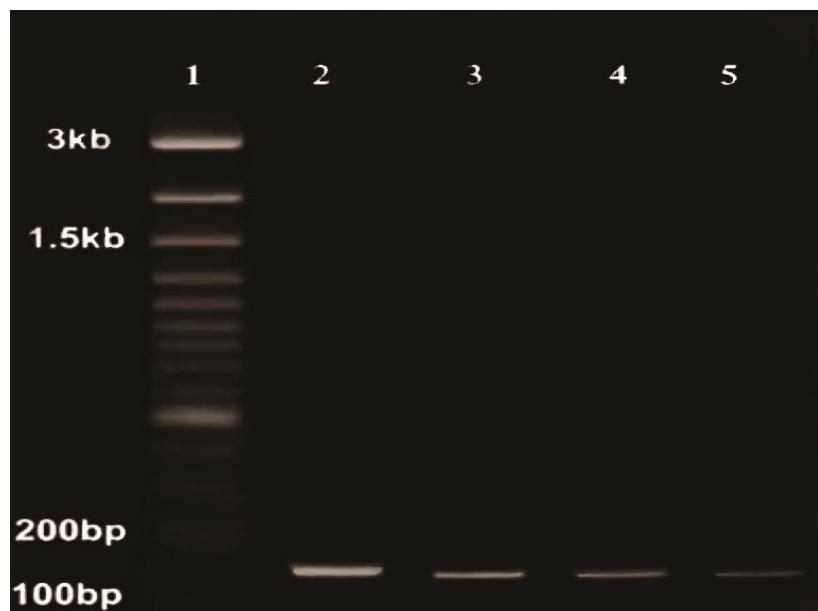


Fig. 3: PCR of mf of *D. immitis* total genomic DNA using primers (BD1A-F and BD1A-R) specific for filarial 28S rRNA before (lane 2) and after azithromycin treatment (sampling as on 30 day treatment and 45 day post-treatment; lanes 3, 4 respectively). Lane 5 is 45 day post-treatment with the azithromycin+acaciasides and yielded products of 150 bp. Electrophoretic migration pattern of DNA ladder (lane 1) is shown.

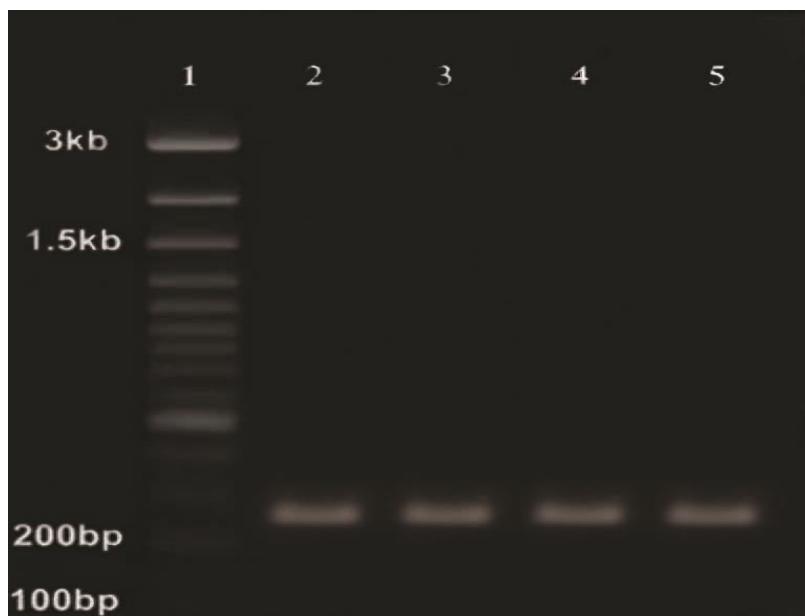


Fig. 4: PCR of mf of *D. immitis* total genomic DNA using primers (FIL-5 and FIL-6) specific for *Wolbachia* 16S rRNA before (lane 2) and after azithromycin treatment (sampling as on 30 day treatment and 45 day post-treatment; lanes 3, 4 respectively). Lane 5 is 45 day post-treatment with the azithromycin+acaciasides. Presence of a distinct band of approximately 207 bp size confirms the presence of *Wolbachia* in all the lanes. Migration pattern of DNA ladder (lane1) is shown at extreme left.

The template DNA prepared from a calculated number of 300-1200 mf was used to determine the presence of *Wolbachia* by PCR. The data obtained were normalized against filarial 28s rRNA gene. The *Wolbachia* 16S rRNA primers produced amplified product at 207 bp after 35 cycles of amplification (Fig. 4). No depletion was found in *Wolbachia* population on day 30 (lane 3, Fig. 4) and 45 day post-treatment compared to 0 day samples (lane 2; Fig. 4) from both azithromycin (lane 4; Fig. 4) and azithromycin + acaciasides (lane 5; Fig. 4) treated groups.

IV. DISCUSSION

The principal of anti-wolbachial chemotherapy of filariasis relies on either depletion or a significant reduction of the *Wolbachia* endobacteria in the adult worms leading to sterility and eventually death of female worms (Debrah *et al.*, 2006; 2007; Hoerauf *et al.*, 2007). The ability to provide riboflavin, flavin adenine dinucleotide, heme and nucleotides is likely to be *Wolbachia*'s principal contribution to the mutualistic relationship, whereas the host nematode likely supplies amino acids required for *Wolbachia* growth (Foster *et al.*, 2005). The lack of nucleotide synthesis would particularly affect cell division during oogenesis and embryogenesis, and this is the first parasitological feature that can be observed after *Wolbachia* depletion (Hoerauf *et al.*, 2003a).

It is safe to administer azithromycin to the children indicating the rationale for including azithromycin in the anti-wolbachial chemotherapy. Treatment of onchocerciasis patients with a 5-day course of rifampicin or azithromycin or both did not cause depletion of *Wolbachia*, reduction of microfilariae in the skin or degeneration of adult worms even after 9 months of treatment indicating that a short term course with these antibiotics will not clear *Wolbachia* (Richards *et al.*, 2007). A 6-week regimen of azithromycin at 250 mg/day significantly reduced the worm's burden in onchocerciasis patients but there was no change in the *Wolbachia* population in the treated worms (Hoerauf *et al.*, 2008). In the present study a 40-day treatment of azithromycin at 10 mg/kg body weight/day resulted in a maximum 70% reduction in mf count compared to untreated control on 40 day post-treatment. However, the *Wolbachia* population was not reduced significantly as evident from the PCR using *Wolbachia* 16S rRNA primers. But a 40-day regimen of azithromycin at 10 mg/kg body weight/day followed by a 7-day regimen of acaciasides at the same dose reduced the mf count (90% clearance) at a faster rate on 45 day post-treatment with no effect on *Wolbachia* population.

V. CONCLUSION

A 40-day treatment of azithromycin at 10 mg/kg body weight/day resulted in a maximum 70% reduction in mf count on 40 day post-treatment but *Wolbachia* population was not reduced as shown from PCR . But the combination of azithromycin and acaciasides have a significant effect on mf count with less effect on *Wolbachia* indicating that azithromycin has effect on a minority of worms and the reduction of *Wolbachia* is not enough to play any role on the parasites. Present study supports that saponins are good as

microfilaricide. But further work need to be done increasing the dose of saponins and duration of treatment regimen to decrease the load of *Wolbachia*.

VI. ACKNOWLEDGEMENT

We are thankful to the Head, Department of Zoology, Visva-Bharati University for providing necessary laboratory facilities. The gel documentation was carried out through the courtesy of Prof. Shelley Bhattacharya, Department of Zoology, Visva-Bharati University. We are thankful to Dr. B.C. Pal, IICB, Kolkata for isolation and identification of Acaciasides A and B.

VII. REFERENCES

- [1] Rao, R.U., Endosymbiotic *Wolbachia* of parasitic filarial nematodes as drug targets. Indian J. Med. Res. 122: 199-204, (2005).
- [2] Bandi, C., McCall, J.W., Genchi, C., Corona, S., Venco, L., Sacchi, L., Effects of tetracycline on the filarial worms *Brugia pahangi* and *Dirofilaria immitis* and their bacterial endosymbionts *Wolbachia*. Int. J. Parasitol. 29, 357–364,(1999).
- [3] Taylor, M.J., Bilo, K., Cross, H.F., Archer, J.P., Underwood, A.P., 16S rDNA phylogeny and ultrastructural characterisation of *Wolbachia* intracellular bacteria of the filarial nematodes, *Brugia malayi*, *B. pahangi*, and *Wuchereria bancrofti*. Exp. Parasitol. 91: 356–361(1999).
- [4] Hoerauf, A., Nissen-Pahle, K., Schmetz, C., Henkle-Duhrsen, K., Blaxter, M.L., Büttner, D.W., Gallin, M.Y., Al-Qaoud, K.M., Lucius, R., Fleischer, B., Tetracycline therapy targets intracellular bacteria in the filarial nematode *Litomosoides sigmodontis* and results in filarial infertility. J. Clin. Invest. 103:11–17,(1999).
- [5] Hoerauf, A., Volkmann, L., Paehle, K., Schmetz, C., Autenrieth, I., Büttner, D.W., Fleischer, B., Targeting of *Wolbachia* in *Litomosoides sigmodontis*: comparison of tetracycline with chloramphenicol, macrolides and ciprofloxacin. Trop. Med. Int. Health 5:275-279, (2000b).
- [6] Taylor, M.J., Bandi, C., Hoerauf, A.M., Lazzins, J., *Wolbachia* bacteria of filarial nematodes: a target for control? Parasitol. Today 16: 179–180, (2000b).
- [7] Datta, S., Maitra, S., Gayen, P., Sinha Babu, S.P., Improved efficacy of tetracycline by acaciasides on *Dirofilaria immitis*. Parasitol. Res. 105: 697-702, (2009).
- [8] Mahato, S.B., Pal, B.C., Nandy, A.K., Structure elucidation of acylated triterpenoid bisglycosides from *Acacia auriculiformis* Cunn. Tetrahedron 48:7–6728, (1992).
- [9] Ghosh, M., Sinha Babu, S.P., Sukul, N.C., Mahato, S.B., Antifilarial effect of two triterpenoid saponins isolated from *Acacia auriculiformis*. Indian J. Exp. Biol. 31:604–606, (1993).
- [10] Chakraborty, T., Sinha Babu, S.P., Sukul, N.C., Antifilarial activity of a plant *Acacia auriculiformis*. Trop. Med. 37:35–37, (1995).
- [11] Sarkar, P., A study of filaricidal potential of seven plant substances and their side reactions. Ph.D Thesis, Visva-Bharati University, Santiniketan, West Bengal, India , (1997).
- [12] Datta, S., Maitra, S., Gayen, P., Sinha Babu, S.P., Absence of symbiotic *Wolbachia* endobacteria in *Setaria cervi* from Birbhum, West Bengal, India. Cur. Sci. 93: 22–23,(2007).
- [13] Sinha Babu, S.P., Sarkar, D., Ghosh, N.K., Saha, A., Sukul, N.C., Bhattacharya, S., Enhancement of membrane damage by saponins isolated from *Acacia auriculiformis*. Japanese J. Pharmacol. 75:451–454, (1997).
- [14] Nandi. B., Roy, S., Bhattacharya, S., Sinha Babu, S.P., Free radicals mediated membrane damage by the saponins acaciaside A and acaciaside B. Phyto. Res. 18:191–194, (2004).
- [15] Smith, H.L., Rajan, T.V., Tetracycline inhibits development of the infective-stage larva of filarial nematodes *in vitro*, Exp. Parasitol. 95: 265–270, (2000).
- [16] Debrah, A.Y., Mand, S., Specht, S., Marfo-Debrekyei, Y., Batsa, L., Pfarr, K., Larbi, J., Lawson, B., Taylor, M., Adjei, O., Hoerauf, A., Doxycycline reduces plasma VEGF-C/sVEGFR-3 and improves pathology in lymphatic filariasis. PLOS Pathogens 2(9):e92,(2006).

- [17] Debrah, A.Y., Mand, S., Marfo-Debrekyei, Y., Batsa, L., Pfarr, K., Büttner, M., Adjei, O., Büttner, D., Hoerauf, A., Macrofilaricidal effect of 4 weeks of treatment with doxycycline on *Wuchereria bancrofti*. *Trop. Med. Int. Health.* 12: 1433–1441, (2007).
- [18] Hoerauf, A., Specht, S., Büttner, M., Pfarr, K., Mand, S., Fimmers, R., Marfo-Debrekyei, Y., Konadu, P., Debrah, A.Y., Bandi, C., Brattig, N., Albers, A., Larbi, J., Batsa, L., Adjei, O., Büttner, D.W., *Wolbachia* endobacteria depletion by doxycycline as antifilarial therapy has macrofilaricidal activity in onchocerciasis: a randomized placebo-controlled study. *Med. Microbiol. Immunol.* doi: 10.1007/s00430-007-0062-1, (2007).
- [19] Foster, J., Ganatra, M., Kamal, I., Ware, J., Makarova, K., Ivanova, N., Bhattacharyya, A., Kapatral, V., Kumar, S., Posfai, J., Vincze, T., Ingram, J., Moran, L., Lapidus, A., Omelchenko, M., Kyrpides, N., Ghedin, E., Wang, S., Goltsman, E., Joukov, V., Ostrovskaya, O., Tsukerman, K., Mazur, M., Comb, D., Koonin, E., Slatko, B., The *Wolbachia* genome of *Brugia malayi*: endosymbiont evolution within a human pathogenic nematode. *PLoS Biol.* 3: 599-613, (2005).
- [20] Hoerauf, A., Mand, Volkmann, L., Büttner, M., Marfo-Debrekyei, Y., Taylor, M., Adjei, O., Büttner, D.W., Doxycycline in the treatment of human onchocerciasis: kinetics of *Wolbachia* endobacteria reduction and inhibition of embryogenesis in female *Onchocerca* worms. *Microbes Infect.* 5: 261–273, (2003a).
- [21] Richards, F.O., Amann, J., Arana, B., Punkosdy, G., Klein, R., Blanco, C., Lopez, B., Mendoza, C., Dominguez, A., Guarner, J., Maguire, J.H., Eberhard, M., No depletion of *Wolbachia* from *Onchocerca volvulus* after a short course of rifampin and/or azithromycin. *Am. J. Trop. Med. Hyg.* 77: 878-882 (2007).
- [22] Hoerauf, A., Debrekyei, Y.M., Büttner, M., Debrah A.Y., Konadu, P., Mand S., Adjei O., Büttner, D. W., Effects of 6-week azithromycin treatment on the *Wolbachia* endobacteria of *Onchocerca volvulus*. *Parasitol. Res.* 103:279–286, (2008).

To Cite This Article

Datta, S., Maitra, S., Babu, S.P.S. (2016) :“ Improved Antifilarial Efficacy Of Azithromycin By Acaciasides On Microfilaria Of D. Immitis In Vivo”
International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5149-5158, Paper ID: IJIFR/V4/E2/024.



ANTHROPOMETRIC MEASUREMENTS AND PHYSICAL FITNESS OF BOYS ENGAGED IN GYMNASTICS

Paper ID	IJIFR/V4/ E2/ 026	Page No.	5159-5165	Subject Area	Food Science & Nutrition
Keywords	Standing Height, Body Weight, BMI, Flexibility, Physical Fitness, Anthropometric Measurements				

1st Priyanka Deshpande | 2nd Prajakta Nande

Assistant Professor

Post Graduate Teaching Department of Home Science,
Rashtrasant Tukadoji Maharaj Nagpur University,
Jyotiba Phule Educational Campus, Amravati Road,
Nagpur- Maharashtra

Abstract

The study aims to assess anthropometric measurements and physical fitness of boys engaged in gymnastics. The subjects selected were from the age group 10- 12 years and 13-15 years. Under anthropometric measurements, standing height & body weight were measured. Body mass index (BMI) was derived. Flexibility was tested by conducting sit and reach test to assess physical fitness of the gymnasts. Significant difference at both 5% & 1% levels ($p<0.01$) was found between mean height of subjects from both the age groups 10-12 years & 13-15 years and the standards for age. Body weight of boys from the age group 10-12 years was 7.11% excess than the standard whereas a deficit of 8.15% was observed in boys from the age group 13-15 years. With reference to BMI, a significant difference was found ($z= 8.97, p<0.01$) for the age group 10-12 years whereas among gymnasts from age group 13-15 years, insignificant difference was found ($z=1.68, p>0.05$). 61% boys (10-12 years) and 62% boys (13-15 years) graded "excellent" for flexibility.

I. INTRODUCTION

The science of measuring size, shape and proportions of human body is known as anthropometry. Standing height, body weight, BMI, body circumferences like head circumference, neck circumference, chest circumference, elbow width, arm length, hip to waist ratio etc. are some of the anthropometric measurements which are widely used in the



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

field of sports to assess physical dimensions of players. Anthropometry is not only a tool to monitor growth of children and general health condition of an adult but it has a vital role in an athlete's performance as well. Height, weight, arm length, BMI etc. have definite advantage in many games. (A. Thirumagal, Challenges of Academic Library Management in Developing Countries)

In each sport, certain body standards are required for excellence. Thus, it becomes a crucial factor in selection process of players. (Khasawneh Aman, 2015). A player or an athlete will surely perform well in the sport if his anthropometry matches with the required standards for the sport.

In gymnastics along with skills like flexibility and strength, specific body size and low level of body fat is important. This sport demands lot of body lifting and body rotation (Anthropometry and Gymnastics). So, a small stature and less of body fat is beneficial to perform these acts freely, accurately and gracefully (Fitness Testing for Gymnastics). Low body weight helps the gymnast to achieve a high strength- to- weight ratio (Are You a Born Gymnast?). The small stature of a gymnast gives him / her lower center of gravity, which is especially important for balancing skills (Morris Ivy, 2015).

Assessment of body composition becomes necessary in order to monitor and improve performance of a gymnast. Body mass index (BMI) has traditionally been used to measure body composition. BMI can be considered to provide the most useful, albeit crude, population level measure of obesity. Once the BMI is calculated the person is categorised as underweight, normal weight, overweight, or obese based on that value (Body Mass Index (BMI), Nande Prajakta, 2015). Thus, in sports where performance of the player fully depends on weight management, calculation of BMI becomes a necessity.

Like any other sport, physical fitness is of upmost importance in Gymnastics as well. Specific components of fitness for a gymnast include body composition, flexibility, muscular strength, muscular endurance and cardiorespiratory endurance (Allen S.).

Gymnast has to be flexible enough to perform acts like splits and backbends. Flexibility is the ability to move or bend joints in a wide and complete range of motion with ease and without injury. It may also be an asset to improving coordination and balance (T. Marice Huggins, 2014). Flexibility of a gymnast can be tested from time to time and can be improved by working on it (Howard J, 2005). Sit and Reach test is one of the test for the assessment of flexibility. It measures the flexibility of the lower back and hamstring muscles (Sit and Reach Test, Jonathan K. et.al.).

Present study was undertaken to assess anthropometric measurements and physical fitness of boys engaged in gymnastics.

II. METHODOLOGY

Assessment of the gymnasts in terms of anthropometric measurements and physical fitness was the aim of this research. For this study, boys (10-12 and 13-15 years of age) engaged in gymnastics were purposively selected as sample population. 200 male gymnasts from various gymnastic clubs from Nagpur, Mumbai and Pune cities of Maharashtra were

selected for the assessment. Injury free subjects who were practicing gymnastics regularly and have participated in competitive events were chosen.

Anthropometric Measurements: Considering the importance of body stature for excellence in the sport, anthropometric measurements like standing height and body weight of the gymnasts were recorded. The values of height and weight were recorded in cm and kg, respectively. An elastic measuring tape was used to measure height of the subjects whereas digital weighing machine was used to record body weight. BMI was calculated using the formula: Weight (kg) ÷ Height (meter)².

Physical Fitness: Sit and reach test was conducted to monitor the development of the gymnast's lower back and hamstring flexibility. Gymnasts were instructed to sit on the floor with shoes removed, feet flat against the table, and legs straight. In this position, gymnasts tried to reach forward and push the fingers along the table as far as possible. The distance from the finger tips to the edge of the table was measured and recorded as the score of that gymnast. The same procedure was repeated thrice and the longest distance measured was considered for analysis.

Statistical Analysis: Data was gathered, compiled and classified on the basis of age group. Mean, standard deviation, range & percentage were calculated. Data was then compared with reference values of respective age group using z test. Difference was tested at both 5% & 1% levels of significance.

III. RESULTS AND DISCUSSION

Anthropometric measurements like height, weight and BMI of gymnasts are represented in Table 1. Mean height of boys from the groups 10-12 years & 13-15 years was recorded as 140.25cm and 157.43cm, respectively. Boys from both age groups showed significantly shorter height than the standards for age ($z=7.46$ & $z=6.39$ males for age groups 10-12 & 13-15, respectively, $p<0.01$). The % deficit was calculated as -3.48% and -2.88%, respectively for 10-12 years & 13-15 years. Older boys were found to be significantly taller than younger boys ($z=17.2$, $p<0.01$). **Erlandson, M. C. et al. (2008)** reported that gymnasts were significantly shorter than tennis players and swimmers at all chronological ages during adolescence. For the present study, height showed significantly positive correlation with body weight ($r= 0.5668$ & 0.4471 , respectively for 10-12 & 13-15 years, $p<0.01$).

Mean values of body weights of gymnasts from age groups 10-12 years and 13-15 years were 26.74 kg and 43.72 kg, respectively. In comparison with the standards for age, younger gymnasts (10-12 years) were found to be significantly heavier ($z=3.73$, % excess: +7.11) & older gymnasts (13-15 years) were found to be significantly lighter ($z=5.13$, % deficit: -8.15). Greater variation was found in the body weights within the groups. The observed range for body weight was 25.00 - 52.00 kg for 10-12 years of boys and 35.00- 64.00 kg for 13-15 years of boys (Table 1).

BMI was calculated and gymnasts were categorised accordingly. Mean BMI values of boys aged 10-12 years & 13-15 years were 18.63 kg/m^2 and 17.63 kg/m^2 , respectively. Between age group difference was found to be significant at 5% level ($0.01 < p < 0.05$). Gymnasts from



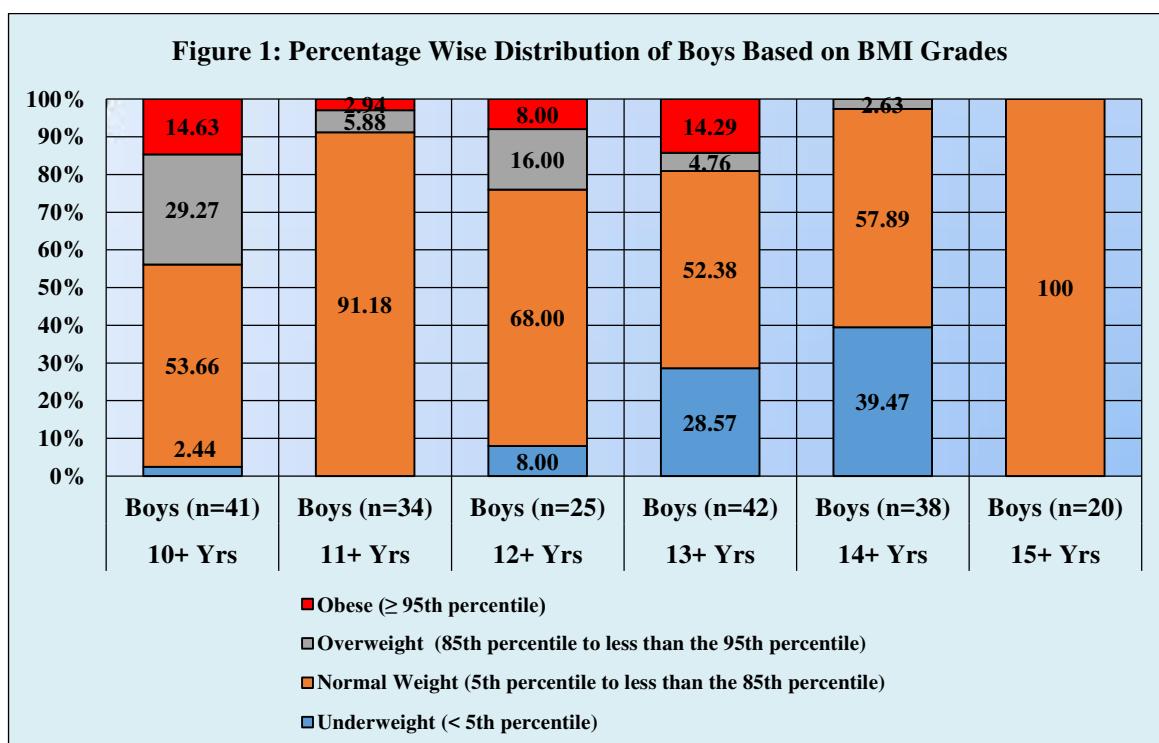
age group 13-15 years possessed lower mean BMI than gymnasts from age group 10-12 years ($z=2.57$) which could be attributed to larger increment in height of older subjects. Younger group of gymnasts showed significantly greater mean value of BMI than the standard for age ($z=8.97$, $p<0.01$) with %excess calculated as 15. In contrast, older age group of gymnasts showed lower mean BMI value than the standard for age, however, the difference was insignificant ($z=1.68$, $p>0.05$). % deficit for this age group was recorded as 2.59 (Table 1). BMI showed direct relationship with body weight among boys aged 10-12 & 13-15 years ($r=0.8430$ & 0.8419 , respectively, $p>0.05$).

Table 1: Data on Height, Weight & BMI (Body Mass Index) of Subjects

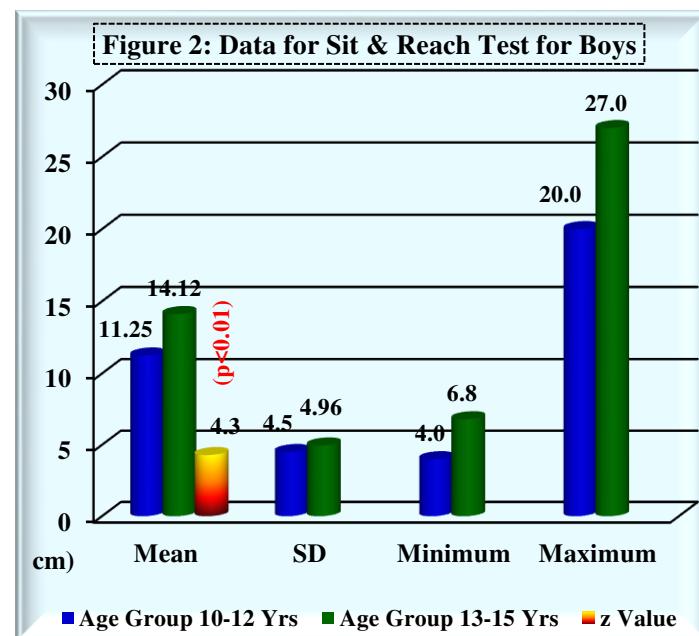
Sr. No.	PARAMETERS	10-12 Yrs (n=100)	13-15 Yrs (n=100)	z Values#
HEIGHT (cm)				
I	M±SD	140.25±6.77	157.43±7.31	17.2*
II	Range	129.00-161.00	146.00-174.00	
III	Standard	145.30	162.10	
IV	z Values§	7.46*	6.39*	
V	%Deficit	-3.48	-2.88	
WEIGHT (kg)				
i	M±SD	36.74±6.55	43.72±7.56	6.98*
ii	Range	25.00-52.00	35.00-64.00	
iii	Standard	34.30	47.60	
iv	z Values§	3.73*	5.13*	
v	%Excess/Deficit	+7.11	-8.15	
BMI (kg/m²)				
i	M±SD	18.63±2.71	17.63±2.79	2.57**
ii	Range	14.13-27.71	13.55-26.64	
iii	Standard	16.2	18.1	
iv	z Values§	8.97*	1.68	
v	%Excess/Deficit	+15.00	-2.59	

- z values are for between group comparison (i.e. comparison between age groups 10-12 yrs & 13-15 yrs); § - z values are for comparison between data of subjects & standards; * - Significant at both 5 % and 1% levels ($p<0.01$); ** - Significant at 5 % level but insignificant at 1 % level ($0.01<p<0.05$); Values without any mark indicate insignificant difference at both 5% & 1% levels ($p>0.05$).

Percentage wise distribution of subjects based on BMI grades is shown in Fig.1. Majority of the subjects were categorised as normal weight (5th percentile to less than the 85th percentile). All the boys (100%) from 15 years of age were categorised under “normal weight” followed by boys of 11+ years of age (91.18%). None of the boys were “underweight” in the age group 11+ years. 29. 27% boys aged 10+ & 16% boys aged 12+ were “overweight” for their BMI. Very few gymnasts from 10+, 11+, 12+ & 13+ were categorised as “obese” which could be due to growing age weight gain.



Sit & reach test was conducted to assess physical fitness in terms of flexibility of gymnasts. The results of this test are presented in Fig. 2. Mean of the distance reached by boys 10-12 years and 13-15 years were 11.25 cm & 14.12 cm, respectively. Between age group comparison revealed significant difference ($z=4.3$, $p<0.01$). Age correlated positively with age ($r=0.0900$ & 0.0921 , respectively for age groups 10-12 & 13-15 years, $p>0.05$). Minimum & maximum distance reached by male gymnasts of 10-12 years of age was 4.0 cm and 20.0 cm, respectively whereas in the age group 13-15 years, minimum & maximum distance reached was 6.8 cm and 27.0 cm, respectively. Heavier the body weight lower was the flexibility of gymnasts. Here, results of flexibility correlated negatively with weight & BMI among younger gymnasts ($r=-0.1583$ & -0.1963 , respectively, $p>0.05$). However, weight & BMI showed positive correlation with the performance of sit & reach test among boys from age group 13-15 years ($r=0.3886$ & 0.4838 , respectively, $p<0.01$), hence, showed positive effect of longer engagement in this game.



Percentagewise distribution (Fig.3) showed majority of boys from both the age groups had excellent flexibility (61% from age group 10-12 years and 62% from 13-15 years of age). None of the subjects from 13-15 years group were categorised for “below average” or “poor flexibility”. Thus, it can be said that 13-15 years of boys demonstrated superior flexibility when compared to 10-12 years of boys which showed regular effect of engagement in the game of gymnastics.

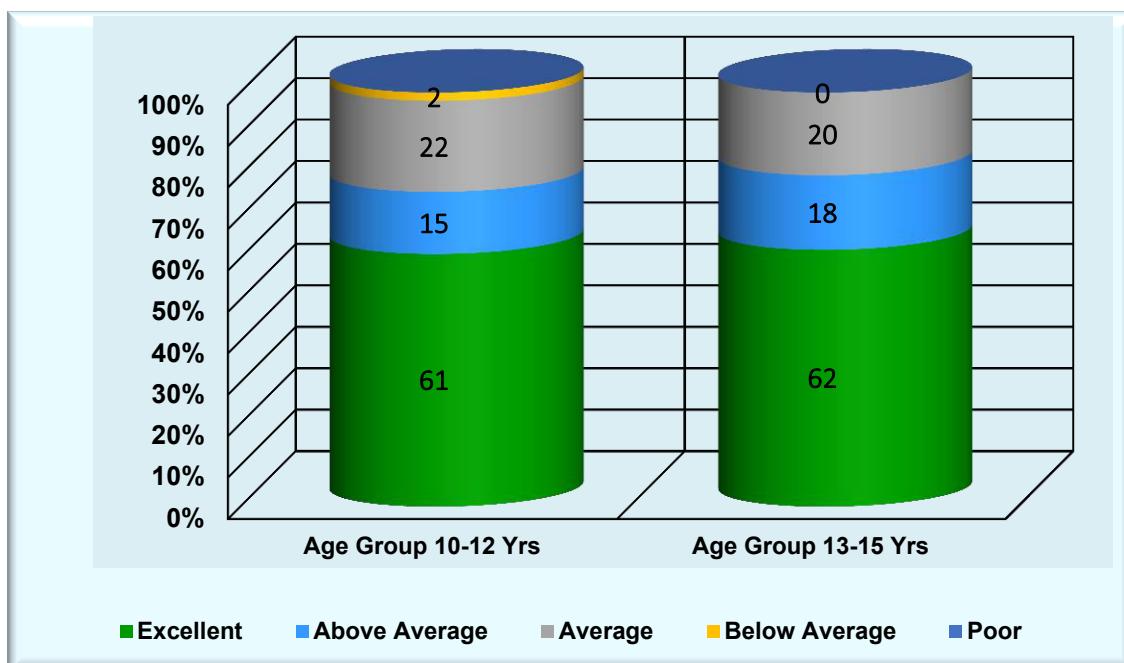


Figure 3: Percentage Wise Distribution of Boys Based on Performance Assessment for Distance Reached

IV. CONCLUSION

From the results of the study, it can be said that there found positive effect of regular engagement in the sports of gymnastics as majority of subjects demonstrated excellent results for sit & reach test. Height is genetically inherited & also, height & weight are influenced by nutritional intake. Subjects can achieve new heights in this game which can be coupled with regular appropriate training& sound nutrition.

V. REFERENCES

- [1] A, Thirumagal, “Research Publications in Anthropometric Measurements of Sports”, 285, <http://www.irma-international.org/viewtitle/77987>
- [2] Allen S, “Five Components of Fitness in Gymnastics”, Demand Media. Cited from <http://healthyliving.azcentral.com>
- [3] “Anthropometry and Gymnastics”, <http://www.topendsports.com/sport/gymnastics/anthropometry.htm>
- [4] “Are You a Born Gymnast, Academy Where the Stars Show You How”, http://news.bbc.co.uk/sportacademy/hi/sa/newsid_3577000/3577460.stm
- [5] “Body Mass Index (BMI)”, <http://www.topendsports.com/testing/tests/BMI.htm>
- [6] “Challenges of Academic Library Management in Developing Countries”, <http://www.igi-global.com/chaptser/research-publications-anthropometric-measurements-sports/77987>



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)

Volume - 4, Issue -2, October 2016

Continuous 38th Edition, Page No: 5159-5165

- [7] Erlandson, M. C. Sherar, L. B. Mirwald, R. L. Maffulli. N. and A. D. G. Baxter-Jones, "Growth and Maturation of Adolescent Female Gymnasts, Swimmers, and Tennis Players" *Medicine and Science in Sports and Exercise*, 2008, 40(1):34-42. Cited from ukpmc.ac.uk & www.ncbi.nlm.nih.gov.
- [8] "Fitness Testing for Gymnastics", <http://www.topendsports.com/sport/gymnastics/testing.htm>
- [9] Howard J, "The Importance of Flexibility for Gymnastics", 2005, <http://ezinearticles.com/?The-Importance-of-Flexibility-for-Gymnastics&id=88520>
- [10] https://en.wikipedia.org/wiki/Body_mass_index
- [11] Jonathan K. Ehrman , Paul Gordon, Paul Visich, Steven keteyian, "Clinical Exercise Physiology", Human Kinetics, second edition, pg.no.128
- [12] Khasawneh Aman, "Anthropometric Measurements and Their Relation to Static and Dynamic Balance among Junior Tennis Players", Sport Science 8 (2015) Suppl 1: 87-91, <http://www.sposci.com/PDFS/BR08S1/SVEE/04%20CL%2016%20AK.pdf>
- [13] Morris Ivy, "Does Gymnastics Delay Your Growth"? 2015 <http://www.livestrong.com/article/533098-does-gymnastics-delay-your-growth/>
- [14] Nande P.J, Vali S.A, "Fitness Evaluation Tests For Competitive Sports", Himalaya Publishing House, 2010 (1), 81, 153, 154, 156.
- [15] Nande Prajakta, "Body Composition of Young Females (20-25 years) by Bioelectrical Impedance: Relationship with Body Mass Index", International Journal of Arts, Humanities and Management Studies, Volume 01, No.6, 2015
- [16] "Sit and Reach Test", <http://www.topendsports.com/testing/tests/sit-and-reach-presidents.htm>
- [17] T. Marcie Huggins, "5 Components of Fitness in Gymnastics", 2014,<http://www.livestrong.com/article/497802-5-components-of-fitness-in-gymnastics/>

To Cite This Article

Deshpande, P., Nande, P. (2016) :" Anthropometric Measurements And Physical Fitness Of Boys Engaged In Gymnastics" *International Journal of Informative & Futuristic Research* (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5159-5165, Paper ID: IJIFR/V4/E2/026.



Priyanka Deshpande and Prajakta Nande:: Anthropometric Measurements And Physical Fitness Of Boys Engaged In Gymnastics

5165

COMMODITY MARKET ANALYSIS WITH SPECIAL REFERENCE TO GOLD

Paper ID	IJIFR/V4/ E2/ 014	Page No.	5166-5175	Subject Area	Financial Analysis
Keywords	Risk, Diversified Portfolio, Margin, Safety, Commodity Market				

1st	Michelle Jenita Pinto	Student MFA -II Department of M.Com. Financial Analysis Jyoti Nivas College Autonomous, PG Centre, Bangalore-Karnatka
2nd	Delphina Jovita	Head of Department Department of M.Com. Financial Analysis Jyoti Nivas College Autonomous,PG Centre, Bangalore-Karnatka
3rd	Dr. B. Percy Bose	

Abstract

The commodities markets are one of the fastest growing areas in the investment world. A commodity market is an exchange for buying and selling of commodities for future delivery. Commodity trading in India started much before it started in many other countries. However, years of foreign rule, draughts and periods of scarcity and government policies, caused the commodity trading in India to diminish. Commodity trading was however restarted in India recently, but a lot more developments and initiatives needs to be taken in this avenue. Investing on commodities offers protection against risk, diversified portfolio, trading on lower margin and safety. The study focuses on understanding the concepts and mechanism of commodity trading with special reference to Gold. It also aims to analyze the factors that influence the prices of gold and analyze the gold trend in the commodity market.

I. INTRODUCTION

Commodity markets are markets where raw or primary products are exchanged. These raw commodities are traded on regulated commodities exchanges, in which they are bought and sold in standardized contracts. The commodities market consists of the trading of forward contracts or futures contracts; forward contracts are contractual agreements to buy/sell any commodity bet there in two entities; futures contracts are market agreements to buy/sell very specific commodities bet there in two entities over a recognized commodities



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

exchange. It is a physical virtual market place for buying and selling of raw or primary products. For investors' purposes there are currently about 50 major commodity markets worldwide that facilitate investment trade in nearly 100 primary commodities. Commodities are split into two types: hard and soft commodities. Hard commodities are typically natural resources that must be mined or extracted (gold, rubber, oil, etc.), whereas soft commodities are agricultural products or livestock (corn, wheat, coffee, sugar, soybeans, pork, etc.)

1.1 GOLD

Gold is a natural resource available all over the world but not in abundant. In science it has atomic number 79 and symbolized as AU. It is highly Precious metal and is invested in coins, jewels, bars, certificates, accounts etc. It is attracted by all the human beings as source of prestigious thing or the source of investment to make maximum returns. In India gold has become very prestigious metal from the ancient days itself, it stands for its unique property and it is treated as asset and core wealth by the people According to the investors owning gold is very much safe because all over the globe gold is same there is no difference in production and people think it will help in difficult situation as there is high liquidity power. Investing in gold is safe because it doesn't include the crop rotation fluctuation in the market. All over the world gold is accepted and traded as a commodity.

1.2 FEATURES OF GOLD

- It can be source of investment
- It is treated as safe haven
- It is an asset diversifier
- It has high liquidity power
- It acts as an insurance

1.3 GOLD AS AN INVESTMENT AVENUE

Investing in gold is booming from the past two decades. The investors will invest in this to protect themselves from the political, economical, inflation, social disaster. However it is subjected to risk in the market especially in futures contracts and derivatives. Even the government will invest in this product to secure from the inflation and gold has become more like currency rather than commodity.

1.4 INVESTMENT SOURCES

1. Gold Bars
2. Gold Coins
3. Gold Exchange –Traded Products(ETPs)
4. Gold Certificates
5. Gold Accounts
6. Gold Mining companies
7. Derivatives

1.5 FACTORS AFFECTING GOLD PRICE

The major factors impacting the gold price can be summarized as under:

- Demand for the product

- Inflation rate
- Value of dollar
- Gold reserve
- Monetary policy
- Speculation in the market
- Supply of the product
- Growth in demand for exchange traded paper backed products

II. REVIEW OF LITERATURE

Technical analysts argue that their methods take advantage of market psychology as illustrated by the quotation from Pring (1991) above. In particular, technical textbooks such as Murphy (1986) and Pring (1991) outline three principles that guide the behavior of technical analysts. The first is that market action (prices and transactions volume) "discounts" everything. In other words, an asset's price history incorporates all relevant information, so there is no need to forecast or research asset "fundamentals." Indeed, technical purists don't even look at fundamentals, except through the prism of prices, which reflect fundamentals before those variables are fully observable.

Commodity markets are asset markets where market players buy for use and sell for gain. Commodity markets are complex because many factors play a role in relation to their costs. Such factors include the weather, inventories, supply, demand, and technology (Baffes, 2013). Over the recent decade, commodity markets have often been in the spotlight due to a high amount of volatility in the markets, but as mentioned the interest is not new. Ludwell Moore (1921) examined the existence of cycles through history, and did find some evidence of cycles. However, he did not find anything that could predict either the length or depth of those cycles in commodity markets. As other following studies have shown, commodity markets have been volatile and appearing to be random. Nevertheless, that has not prevented the popularization of technical analysis tools that are thought to be able to predict future movements in commodity prices (Bundgaard, 2013), which is what any procurement function would like to be able to do as argued above. Consequently, this paper aims at helping companies at least understand whether they can use technical analysis as a reliable predictor of future movements or if commodity markets truly do behave in a random fashion. It is relatively easy to highlight situations where arbitrage cannot be traded away in commodity markets. First of all, national policies and regulations may create such high transaction costs for certain commodities (Zapoleon, 1931; Caine, 1958). There may not be any open market where a commodity is traded. If the commodity is not traded, it is obviously impossible to trade away arbitrage opportunities. Nevertheless, there are commodities which are somewhat freely and openly traded across the globe (Baffes & Haniotis, 2010; Baffes, 2013). By choosing those commodities, and avoiding commodities that are prone to non-random shocks, e.g. oil and its dependence on OPEC policies, it can plausibly be considered that arbitrage opportunities should be traded away in the market data.

III. RESEARCH METHODOLOGY

3.1 STATEMENT OF THE PROBLEM

When investing for a long and a short term there may be differences in fundamental analysis and technical analysis. Because calculation of fundamental analysis in commodity market is difficult this depends upon the supply and demand for the resources. The highlight of the study is to appropriate use of technical analysis in order to facilitate the investors in decision making.

3.2 NEED FOR THE STUDY

Commodity markets are where raw or primary products are exchanged. Commodity market is of two types i.e., Hard (Non-Agricultural) and Soft (Agricultural) commodities here Hard commodities are typically Nonagricultural or natural resources (Gold, Silver, Copper, Natural Gas) and Soft Commodities are the agricultural commodities(Coffee, Corn, Wheat, Sugar). The problem faced by the participants in the market is to predict the price movement of the commodity and to take the right decision when to entry and exit the market to make a maximum profit. As Gold Commodities are more sensitive in the market, their price prediction is rigorous job. Thus, there is a need to study the present scenario of the performance of the non-agricultural commodities in Indian stock market.

3.3 OBJECTIVES OF THE STUDY

- To study and analyze the commodity market of selected non-agricultural product i.e., Gold
- To study the price volatility among commodity market of selected non-agricultural product i.e., Gold
- To identify the co-relationship between Gold price and Dollar exchange rate.

3.4 SCOPE OF THE STUDY

- Studying the commodity price movements in the market.
- Analysis of the relationship of gold with the exchange rates.
- Helps in buying and selling strategy by recognizing the trend reversals in a formerly stage.
- To help investors in decision making.

3.5 METHODOLOGY ADOPTED

Research methodology stands a way to systematically resolve the research problem. It is a scientific way of studying how research is done scientifically approved by the researcher in reviewing research problem alongside with the reason behind study. It is essential for the researcher to distinguish not only the research methods and procedures but also the methodology.

➤ Sample size

The sample consists of one commodity – from MCX market, on the basis of the research objectives. This study is mainly based on the Gold prices in Indian commodity market.

➤ Data Collection

The research is purely based on secondary data.

- Secondary Data

Secondary data was collected by referring to following sources:

Alpha Commodities Private Ltd Online publication, BSE websites, Text books & Research Journals

- **Study Period**

The study includes a period of 5 years covering from 2011-2015.

- **Source of Data**

The main source of data is collected through websites of BSE, MCX to obtain the historical prices. Also the other relevant data required for the purpose of the study was gathered from the various websites, publications, magazines and reports prepared by research scholars.

- **Statistical tools and indicators used**

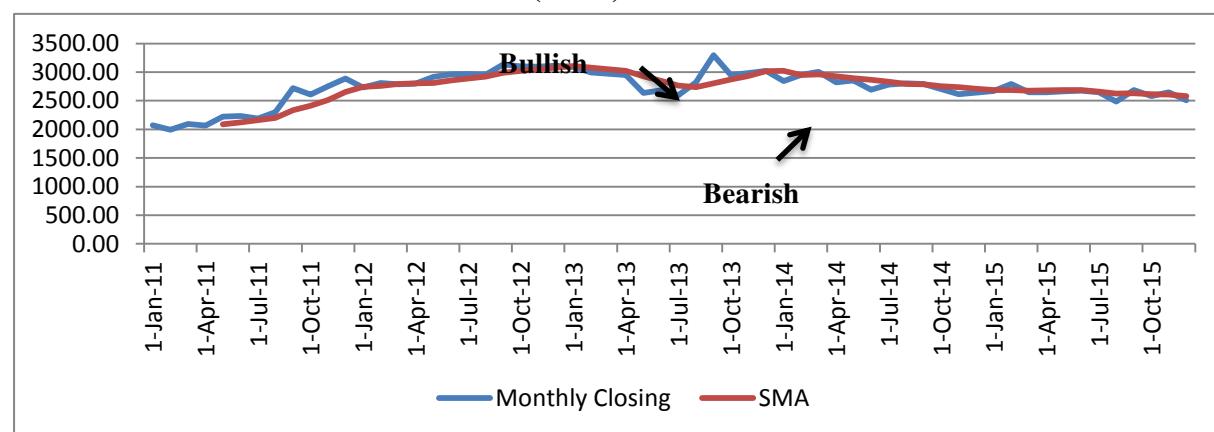
- Simple Moving Averages
- Moving Average Convergence Divergence
- Bollinger Band Width
- Relative Strength Index
- Correlation

3.6 LIMITATIONS OF THE STUDY

- Study is confined only to the commodity market in Indian context.
- The study of this analysis was mainly based on historical data.
- The study is considered a period of five years (20011-2015).

IV. DATA ANALYSIS AND INTERPRETATION

4.1: SIMPLE MOVING AVERAGES (SMA)



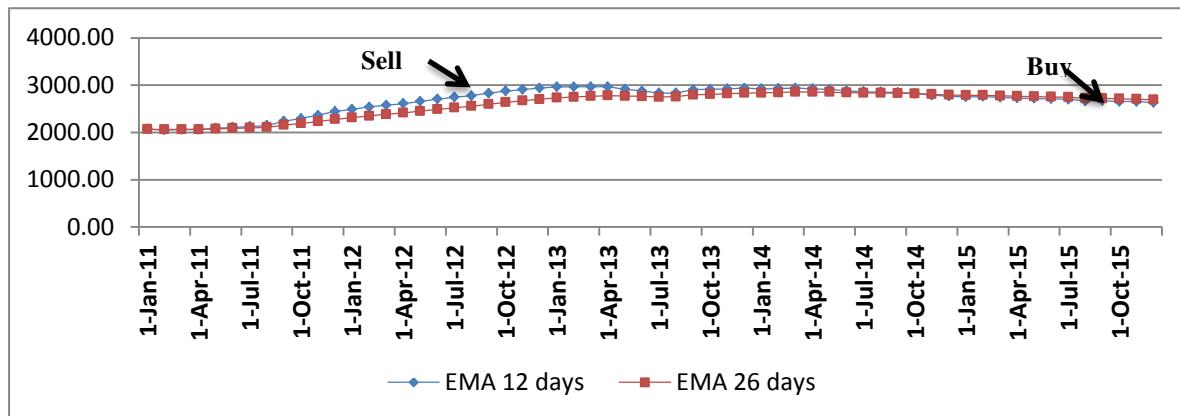
Graph 1: Simple Moving Averages

Interpretation:

The SMA is plotted using last 5 years data of gold. Here 5 months moving average has been taken to construct the Simple Moving Averages. The 5 years chart of Simple Moving Averages shows that on many occasions monthly moving average line cuts the 5 months Simple Moving Averages line from top to bottom which signals bearish market and it is right time to go out of the market and some time the monthly moving average line cuts the 5 months Simple Moving Averages line from bottom to top which signals bullish market and

it is right time to invest in the market. For example, in December 2015 the Simple Moving Averages and monthly moving averages are closely equal hence it is not a buying signal to the investors.

4.2: MOVING AVERAGE CONVERGENCE DIVERGENCE (MACD)

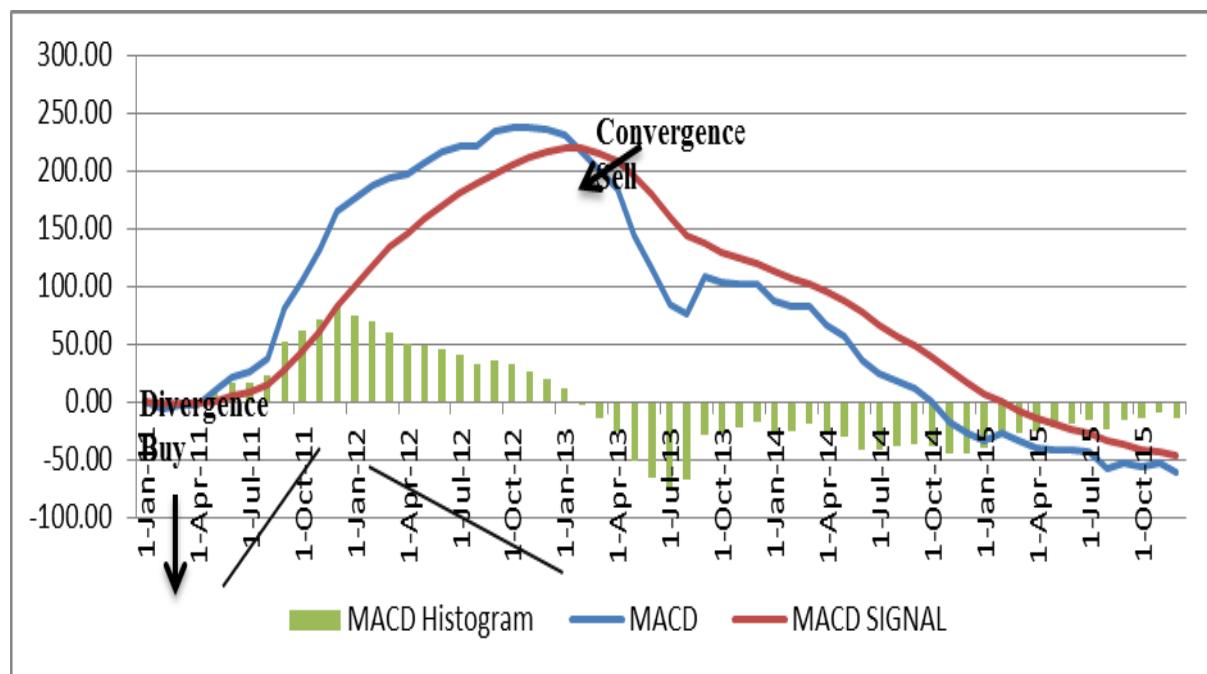


Graph 2: Moving Average Convergence Divergence (MACD)

Interpretation:

The Moving Average Convergence Divergence is plotted using last 5years data of gold. Here, MACD is calculated through Exponential moving average (EMA) 12 and EMA 26 period. If EMA 26 line is above the EMA 12 line then it is bearish signal vice versa if the EMA 12 line is above the EMA 26 line then it is bullish market signal. The average closing price of EMA 12 in December 2015 is 2632 which is less than the EMA 26 in December 2015, 2692 thus it is advisable to buy the commodity in the market.

4.3: MOVING AVERAGE CONVERGENCE DIVERGENCE HISTOGRAM



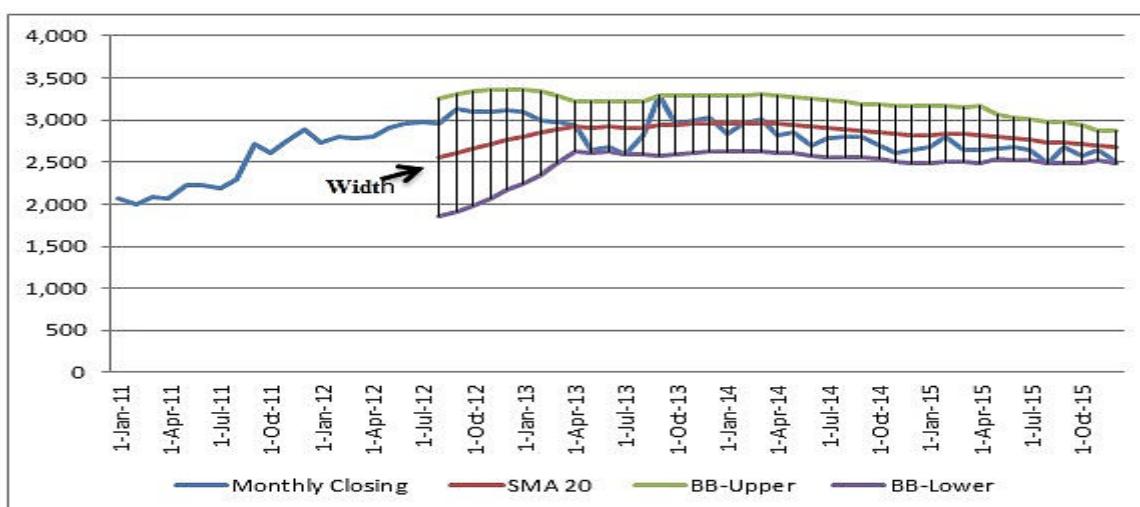
Graph 3: Moving Average Convergence Divergence Histogram

Interpretation:

The histogram is calculated to identify the Convergence and Divergence. If the MACD Histogram is shrinking in height then it leads to the Convergence then it is potential sell signal and if the MACD Histogram is increasing in height then it leads to the Divergence then it is potential Buy signal to the investors. If the MACD crosses the MACD Signal then it is advisable to buy the commodity or if the MACD signal crosses the MACD line then it is advisable to sell the commodity. In the year April 2011 the market is in divergence hence it is to be bought and in the year April 2012 the market is turning to convergence hence it is to be sold in the market.

4.4: RELATIVE STRENGTH INDEX (RSI)**Graph 4: Relative Strength Index****Interpretation:**

The RSI graph shows the overbought and oversold areas. The RSI values from 30 and below indicates a good opportunity to buy the commodity and the RSI values from 70 and above indicates a good opportunity to sell the commodity. But as it is clear in above graph in the year 2015 there is no signal to buy or to sell thus it is recommended to hold the commodity still for a long term.

4.5: BOLLINGER BAND WIDTH (BBW)**Graph 5: BOLLINGER BAND WIDTH**

Interpretation:

The width between Upper and Lower band refers to the volatility of the prices of the commodity, the higher the width the greater the volatility in this time it is advisable to sell the commodity and when there is low volatility the investor either buy or retain the commodity. . If the closing prices touch the Upper Bollinger Band then the commodity is overbought and if the prices touch the lower Bollinger Band then the commodity is over sold in the market. It is advisable to buy the commodity when the stocks prices hits the lower band and to sell when the prices hits the upper band.

4.6: CORRELATION BETWEEN GOLD AND DOLLARS EXCHANGE RATE

H0: There is no significant relationship between gold price and dollar exchange rate.

H1: There is significant relationship between gold price and dollar exchange rate.

Table 1: Correlation between Gold and Dollars Exchange Rate

	Gold	Dollars
Pearson Correlation	1	-.838**
Sig. (2-tailed)		.000
N	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

From the above table it is found that the correlation value is 0.000 that is below 0.05. So, it is significant, hence reject null hypothesis (H0) and accept alternative hypothesis (H1).

Inference

As the correlation value is -0.838 it indicates that the inverse relationship exist between the gold price and dollar exchange rate in India. That shows there inverse effect among variables where if the dollar price increases then the gold price will decrease and if dollar price decreases then the gold price will increase.

V. SUMMARY OF FINDINGS

- Analyzing the commodity market helped to find out the gold price volatility.
- Technical analysis was more helpful in decision making about the commodity market and reduced the errors in forecasting. The various tools in technical analysis were complicated but it has given the realistic results.
- The performance of gold in the year 2015 was in bearish. It has been fluctuating from Rs.3298 to Rs.2509 by the end of the year.
- The overall performance of gold indicates the low returns for short term investment and the high returns for long term investments.
- SMA shows the price fluctuations in the market. The gold price is too sensitive in the market.
- MACD shows the relationship between the MACD histogram and the MACD signal line which helps in taking decisions regarding the entry period and exit period.

- Bollinger band is helpful to analyze the market when they are over bought and over sold in the market and it is also helpful to analyze the price volatility of the gold prices which are dependent on their band width.
- According to Relative Strength Index when it is above 70 it is advised to sell the commodity and if it is below 30 it is usually recommended to buy the commodity.
- The gold and dollar exchange rate share the inverse relationship where if dollar increases the prices of gold decreases and if the dollar price decreases then gold prices increases in the market.

VI. SUGGESTIONS

- Gold is a precious metal; its value cannot not be diminished in a shorter time. But even then there are some investment rules:
- Before investing, an investor should have clear and adequate knowledge of stock market so that they can earn maximum returns.
- The commodity i.e., gold is a very complex financial instrument. Thus the traders must analyze the trend of the market.
- Investing for short term gains in current scenario will not be helpful as both commodity markets are in bearish market, the investor can go for long term investment to maximize the returns.
- The traders should not enter into the market in bullish period they need to wait till the bearish market ends and then they need to invest when market gives positive signal to buy the commodity.
- Investors should not buy in bulk volume because of high price fluctuations. If the investors invest in one shot then they cannot buy when the prices goes down. So it is advisable to buy in small quantities.

VII. CONCLUSION

The analysis emphasized on the commodity market which gave a real time experience in this field and thereby the study could reflect positive from the investor's perspective. The last five years price movements of gold shows that the investors are satisfied by the reasonable returns from commodity market. Investors can make substantial returns only if investments are made in disciplined manner. The blind investments have always let too many blunders; an investor should always analyze the market by using the analytical tools for investments purpose. Investors can succeed in their investment only when they are able to select the right commodity at right time. The investors should closely watch the situation like market price, economy, returns and risk associated with the commodity before taking the decision to invest. Thus, by utilizing the investment opportunities available in the commodity market will help in maximizing the returns. Finally, as per the present trend and the analysis it can be concluded that, in commodity market there is high possibility of getting good returns, therefore it can be suggested that the investors can invest in gold market without any hesitation.



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)

Volume - 4, Issue -2, October 2016

Continuous 38th Edition, Page No: 5166-5175

VIII. REFERENCES

- [1] Punithavathy Pandiyan-2013, Security Analysis and Portfolio Management, Himalayan Publishing House 13th edition.
- [2] S.C. Gupta-2014, Fundamentals of Statistics, Himalayan Publishing House 7th edition.
- [3] Murphy, John J., 1986, Technical Analysis of the Futures Markets (New York Institute of Finance, Prentice-Hall, New York, NY).
- [4] Moore, H. L., 1921. Generating Cycles of Products and Prices. *The Quarterly Journal of Economics*, 35(2), pp. 215-239.
- [5] Baffes, J., 2013. Global Economic Prospects: Commodity Market Outlook, Washington D.C.: The World Bank Development Prospects Group.
- [6] Pring, Martin J., 1991, Technical Analysis Explained (McGraw-Hill, New York, NY).
- [7] Bundgaard, T., 2013. Commodity Risk Management III - Technical Analysis, Copenhagen: Kairos Commodities.
- [8] <http://www.alphacommodities.co.in/>
- [9] <http://www.mcxindia.com/>
- [10] <http://www.nseindia.com/>
- [11] <http://www.investopedia.com/articles/technical/052201.asp>
- [12] <http://money.rediff.com/bse>
- [13] <https://en.wikipedia.org/wiki/Gold>

To Cite This Article

Pinto, J. M., Jovita, D., Bose, P.B. (2016) :“ Commodity Market Analysis With Special Reference To Gold” *International Journal of Informative & Futuristic Research (IJIFR)* (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5166-5175, Paper ID: IJIFR/V4/E2/014.



**Michelle Jenita Pinto, Delphina Jovita, Dr. B. Percy Bose ::
Commodity Market Analysis With Special Reference To Gold**

5175

HEDGING THE RISK OF FUTURES – A COMPARITIVE STUDY IN IT AND FMCG SECTOR

Paper ID	IJIFR/V4/ E2/ 015	Page No.	5176-5183	Subject Area	Financial Analysis
Keywords	Risk, Hedging, Beta, Sensitivity, Index				

1 st	Chaitra Karanth	Student MFA -II Department of M.Com. Financial Analysis Jyoti Nivas College Autonomous, PG Centre, Bangalore-Karnatka
2 nd	Varsha Rajasekaran	
3 rd	Dr.Jahnavi M	Assistant Professor Department of M.Com. Financial Analysis Jyoti Nivas College Autonomous,PG Centre, Bangalore-Karnatka

Abstract

Many of the participants in futures markets are hedgers. This risk might relate to fluctuations in the price of oil, a foreign exchange rate, the level of the stock market, or some other variable. A perfect hedge is one that completely eliminates the risk. For the most part, therefore, a study of hedging using futures contracts is a study of the ways in which hedges can be constructed so that they perform as close to perfect as possible. This comparative study is on hedging the risk of futures in IT Sector (Infosys, TCS, Wipro, Tech Mahindra and HCL Technologies) and FMCG sector (Hindustan Uniliver, Pidilite Limited, Godrej, Dabur, Britannia). Data of each company has been analysed with the help of Beta which reflects the sensitivity of the movement of scrip relative to the movement of the index.

I. INTRODUCTION

A derivative instrument, broadly, is a financial contract whose payoff structure is determined by the value of an underlying commodity, security, interest rate, share price index, exchange rate, oil price, and the like. Derivatives are specialized contracts which are employed for a variety of purposes including reduction of funding costs by borrowers, enhancing the yield on assets, modifying the payment structure of assets to correspond to



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

the investor's market view, etc. However, the most important use of derivatives is in transferring market risk, called hedging, which a protection against losses is resulting from unforeseen price or volatility changes.

A future contract is a standardized contract between two parties commits to sell, and the other to buy, a stipulated quantity (and quantity, where applicable) of a commodity, currency, security, index or some other specified item at an agreed price on a given date in the future. Hedging is the prime reason for development of future contracts. Stock index futures can be effectively used for hedging purposes. They can be used while taking a long or short position on a stock and for portfolio hedging against unfavourable price movements.

A short hedge is a hedge that involves a short position in futures contract. It is appropriate when the hedger already owns an asset and expects to sell it at some time in the future.

Hedges that involve taking a long position in a futures contract are known as long hedges. A long hedge is appropriate when a company knows it will have to purchase a certain asset in the future and wants to lock in a price now.

II. REVIEW OF LITERATURE

In the Indian context, Naik and Jain (2002) examine prices from the older regional exchanges, and show that information flows from the futures market to the spot markets. Kumar et al. (2008) analysed the hedging properties of the Indian commodity futures using data for both agricultural and non-agricultural commodities for the period from 2004 to 2008. They find that the effectiveness of the futures contracts to hedge risk was low. They also find that hedging effectiveness is lower for non-agricultural commodity futures compared to agricultural commodity futures.

Hedging in the spot market is particularly useful in case of any long-term requirement for which the prices have to be confirmed to quote a sale price but to avoid buying the physical commodity immediately to prevent blocking of funds and incurring large holding costs (Tomek and Peterson, 2001). Switzer and El-Khoury (2007) investigate the efficiency of the New York Mercantile Exchange (NYMEX) Division light sweet crude oil futures contract market for the recent periods of extreme conditional volatility. Crude oil futures contract prices are found to be unbiased predictors of future spot prices. Both futures and spot prices exhibit asymmetric volatility characteristics. Hedging performance is improved when asymmetries are accounted for.

In financial parlance, risk is any variation from an expected outcome. So, for an investor, risk includes an outcome when one may not receive the expected return (Stein, 1961). Traditionally, hedging has been motivated by the desire to reduce risk by taking a position opposite to the exposure. The quest for better hedge has been the motive for sophisticated risk management and hedging techniques. Derivatives are used as a tool to transfer risk, i.e., for hedgers (Bodla and Jindal, 2006) and, therefore, they are extensively used as hedging instruments worldwide, including emerging markets like Malaysian, Italian and Portuguese equity markets. However, hedging one's stock position through futures and options is still the road less travelled in India. Even when it is done, the techniques used have been too

naïve and primitive. Lack of suitable hedging models for the Indian market is a challenge to the risk management system of participants and regulators. It is also a deterrent for attaining greater market depth, and may severely affect the stability of Indian markets. Further, availability of high frequency data in the recent past will help validate such models empirically.

III. STUDY DESIGN

3.1 STATEMENT OF PROBLEM

- To what extent the existing futures contract are suitable for hedging?
- What is the extent of risk involved in FMCG and IT sector?

3.2 NEED FOR THE STUDY

Stock index futures contracts can be used to manage investment exposure and control the risk related to movements in equity market in a well-diversified portfolio of stocks through the use of hedging strategies, thus the study is based on hedging the risk of futures in IT sector and FMCG sector, which would in turn enable the investors in the futures market to be aware of the risk involved in these sectors and mitigate the same.

3.3 OBJECTIVES OF THE STUDY

- To analyse the hedging effectiveness of futures market.
- To examine the market efficiency of futures market.
- To hedge the risk involved in the future market.

3.4 SCOPE

The study is confined to FMCG and IT sector. The study uses hedge ratio model. The study is done in order to minimize the risk involved in futures market. Further the study could explore the relationship between future returns and volume of trade.

IV. RESEARCH METHODOLOGY

4.1 TYPE OF RESEARCH

The study is based on the analytical research method.

4.2 TYPE OF DATA COLLECTION

Data required for hedging the risk of futures study is secondary data which are collected from various resources from official website of NSE, Wikipedia and textbooks to collect information.

4.3 SAMPLE USED IN THE STUDY

The sample used for the study are FMCG Future price and Index price of Hindustan Uniliver, Pidilite Limited, Godrej, Dabur, Britannia. Samples of IT sector Future price and Index price are Infosys, TCS, Wipro, Tech Mahindra and HCL Technologies, for the period of 1 month that is 25th July 2016 to 19th August 2016.

4.4 LIMITATIONS OF THE STUDY

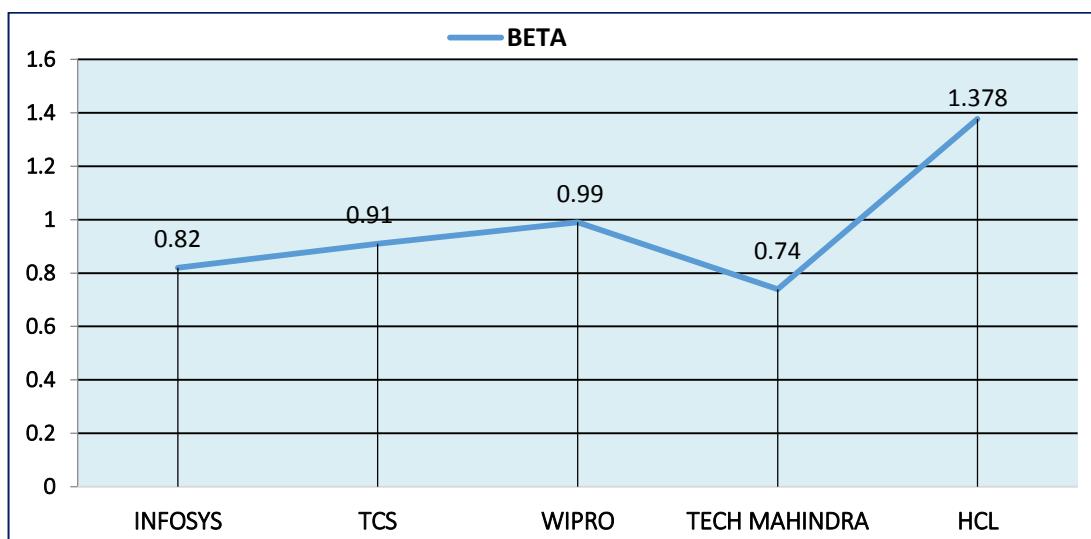
The analysis is limited to 1month that is 25 July 2016 to 19th August 2016. It would have been better if the analysis is based on various hedge ratio models.

V. DATA ANALYSIS & INTERPRETATIONS

5.1 IT SECTOR

Table 1: The Value Of Beta And Alpha

COMPANY	BETA	ALPHA	REGRESSION
INFOSYS	0.82	0.12	$Y=0.12+0.82X$
TCS	0.91	-0.01	$Y=-0.01+0.91X$
WIPRO	0.99	0.26	$Y=0.26+0.99X$
TECH MAHINDRA	0.74	0.34	$Y=0.34+0.74X$
HCL	1.38	2.48	$Y=2.48+1.38X$
PORTFOLIO	0.97	0.64	$Y=0.64+0.97X$



Graph 1: Chart Showing The Changes In Beta Value Of IT Sector

INTERPRETATION:

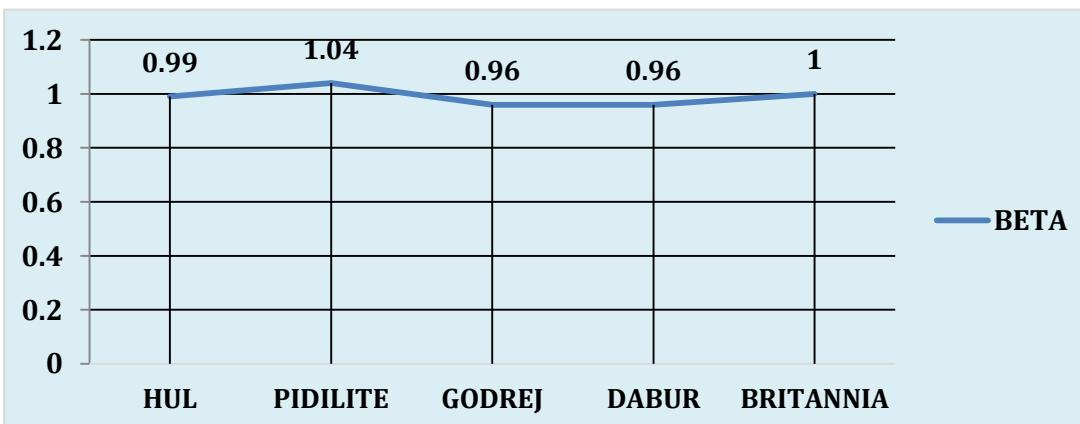
- The systematic risk of Infosys is 0.82, the stock and the market move in the same direction; however, the stock is relatively less risky. A move of 1% in the market influences the stock to move up by 0.82%. In order to hedge the risk, for an instance of 100 contracts, 82 contracts must be hedged. The unsystematic risk of INFOSYS is 0.12. The regression of the company is $Y= 0.12+0.82X$, for instance if the investor gets a return of 2% in the market then the investor would earn a return of 1.76% in the futures market.
- The systematic risk of TCS is 0.91, the stock and the market move in the same direction; however, the stock is relatively less risky. A move of 1% in the market influences the stock to move up by 0.91%. In order to hedge the risk of TCS, for an instance of 100 contracts 91 contracts must be hedged. The regression of the company is $Y= -0.01+0.91X$, for instance if the investor gets a return of 2% in the market then the investor would earn a return of 1.81% in the futures market.

- The systematic risk of WIPRO is 0.99 which is very close to the standard condition of $\beta=1$, which moves according to the market. A move of 1% in the market influences the stock to move up by 0.99%. In order to hedge the risk, for an instance of 100 contracts, 99 contracts must be hedged. The unsystematic risk of WIPRO is 0.26. The regression of the company is $Y=0.26+0.99X$, for instance if the investor gets 2% returns in the market then the investor would earn a return of 2.24% in the futures market.
- The systematic risk of TECH MAHINDRA is 0.74, which is relatively less risky. A move of 1% in the market influences the stock to move up by 0.74%. In order to hedge the risk, for an instance of 100 contracts, 74 contracts must be hedged. The unsystematic risk of TECH MAHINDRA is 0.34. The regression of the company is $Y=0.34+0.74X$, for instance if the investor gets 2% returns in the market then the investor would earn a return of 1.4 %in the futures market.
- The systematic risk of HCL is 1.38 it means the stock moves in the same direction as the markets; however, the stock tends to move 38% more than the market. In order to reduce the risk of HCL, for an instance of 100 contracts 138 contracts must be hedged. The unsystematic risk of HCL is 2.48. The regression of the company is $Y=2.48+1.38X$, for instance if the investor gets 2% returns in the market then the investor would earn a return of 5.24% in the futures market

5.2 FMCG SECTOR

Table 2: Value Of Beta And Alpha

COMPANY	BETA	ALPHA	REGRESSION
HUL	0.99	0.02	$Y=0.02+0.99X$
PIDILITE	1.04	0.02	$Y=0.02+1.04X$
GODREJ	0.96	0.01	$Y=0.01+0.96X$
DABUR	0.96	0.02	$Y=0.02+0.96X$
BRITANNIA	1	-0.01	$Y=-0.01+X$
PORTFOLIO	0.99	0.06	$Y=0.06+0.99X$



Graph 2: The Changes In Beta Of FMCG Sector

The systematic risk of HUL is 0.99 which is very close to the standard condition of $\beta=1$, which moves according to the market. A move of 1% in the market influences the stock to move up by 0.99%. In order to hedge the risk, for an instance of 100 contracts, 99 contracts must be hedged. The unsystematic risk of HUL is 0.02. The regression of the company is $Y=0.02+0.99X$, for instance if the investor gets 2% returns in the market then the investor would earn a return of 2 % in the futures market.

- The systematic risk of PIDILITE is 1.04 it means the stock moves in the same direction as the markets; however, the stock tends to move 40% more than the market. In order to hedge the risk, for an instance of 100 contracts, 104 contracts must be hedged. The unsystematic risk of PIDILITE is 0.02. The regression of the company is $Y=0.02+1.04X$, for instance if the investor gets 2% returns in the market then the investor would earn a return of 2.1% in the futures market.
- The systematic risk of GODREJ is 0.96 it means the stock and the market move in the same direction; however, the stock is relatively less risky. A move of 1% in the market influences the stock to move up by 0.96%. In order to hedge the risk, for an instance of 100 contracts, the investor has to hedge 96 contracts. The unsystematic risk of GODREJ is 0.01. The regression of the company is $Y=0.01+0.96X$, for instance if the investor gets 2% returns in the market then the investor would earn a return of 1.93% in the futures market.
- The systematic risk of DABUR is 0.96 it means a move of 1% in the market influences the stock to move up by 0.96%. In order to hedge the risk, for an instance of 100 contracts, the investor has to hedge 96 contracts. The unsystematic risk of the company is 0.02. The regression equation of the company is $Y=0.02+0.96X$, for an instance if the investor gets 2% returns in the market then the investor would earn a return of 1.94% in the future market.
- The systematic risk of BRITANNIA is 1 that means it moving according to the market, 1% in the market influences the stock to move up by 1%. In order to hedge the risk, for an instance of 100 contracts, the investor has to hedge 100 contracts. The unsystematic risk of the company is -0.01. The regression equation of the company is $y=-0.01+X$ for an instance if the investor gets 2% return in the market then the investor would earn a return of 1.99% in the future market

Table 3: Comparison Of Beta In IT And FMCG Sector With The Help Of t-Test

PARTICULARS	BETA(IT)	BETA(FMCG)
Mean	0.968333	0.99
Variance	0.049497	0.00088
Observations	6	6
Hypothesis Mean	0	
Degrees of freedom	5	
t stat	-0.23646	
P(T<=t)	0.822459	
T critical two-tail	2.570582	

H0: There is no significant difference in the beta value of IT and FMCG sector

H1: There is significant difference in the beta value of IT and FMCG sector.

The calculated value= -0.23646 and the critical value =2.570582.

Since, the calculated value is less than the critical value we accept the null hypothesis that is H0 and we infer that there is no significant difference between the beta values of IT and FMCG sector.

VI. FINDINGS

- The risk involved in IT sector is moderate, except HUL which is highly risky,since the beta is greater than 1.
- In the FMCG sector the risk is more towards PIDILITE and BRITANNIA companies, since their beta value is much higher than the standard norm which is 1.
- In order to mitigate the risk, the investor has to hedge only 97 contracts against 100 contracts in IT sector,whereas in FMCG sector the investor has to hedge 99contracts over 100 contracts, thus IT sector would be optimal to reduce the risk.
- After calculating t-test, we infer that the portfolio beta has no significant difference between the IT and FMCG sector.

VII. SUGGESTIONS

- If the investor is a risk taker and wants a higher return, then it is optimal to invest in FMCG sector rather than investing in IT sector and in turn hedge the risk involved in the futures market.
- The investor of futures market has to hedge the risk involved in HCL, HUL, PIDILITE companies where the systematic risk is relatively high.

VIII. CONCLUSION

This study enables the investors to analyse the risk involved and the volume of contracts to be hedged in the IT and FMCG sector. It facilitates the investors to have an optimal portfolio, considering the systematic and unsystematic risk prevailing in these sectors. The analysis shows that there is high risk involved in HUL, HCL, PIDILITE companies which equally give high returns. Since, there is no significant difference in beta of IT and FMCG sector, the investor has to analyse the individual performance of the companies in these sectors.

IX. REFERENCES

1. Naik G, Jain SK (2002). "Indian agricultural commodity futures markets." Economic and Political Weekly, 37(30).
2. Kumar B, Singh P, Pandey A (2008). "Hedging effectiveness of constant and time varying hedge ratio in Indian stock and commodity futures markets." Technical report, IIM, Ahmedabad, WP No.2008-06-01.
3. Tomek WG, Peterson HH (2001). "Risk Management in Agricultural Markets: A Review." Journal of Futures Markets, 21(10), 953–985.



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)

Volume - 4, Issue -2, October 2016

Continuous 38th Edition, Page No: 5176-5183

4. Switzer LN, El-Khoury M (2007). "Extreme volatility, speculative efficiency, and the hedging effectiveness of the oil futures markets." *The Journal of Futures Markets*, 27(1), 61–84.
5. Stein, J.L. 1961. "The Simultaneous Determination of Spot and Futures Prices." *The American Economic Review* 51(5): 1012–1025.
6. Bodla, B.S., and Jindal, K. 2006. "Impact of Financial Derivatives on Underlying Stock Market: A Survey of the Existing Literature." *The ICFAI Journal of Derivatives Market* 3(2): 50– 66

To Cite This Article

Karanth,C., Rajasekaran,V., Jahnvi, M. (2016) :“ Hedging The Risk Of Futures – A Comparative Study In IT And FMCG Sector” *International Journal of Informative & Futuristic Research (ISSN: 2347-1697)*, Vol. 4 No. (2), October 2016, pp. 5176-5183, Paper ID: IJIFR/V4/E2/015.



Chaitra Karanth, Varsha Rajasekaran, Dr.Jahnvi M :: Hedging The Risk Of Futures – A Comparative Study In IT And FMCG Sector

5183

A STUDY ON HONNALLI TALUKA SECONDARY SCHOOL STUDENTS' ENVIRONMENTAL AWARENESS AND PRACTICES

Paper ID	IJIFR/V4/ E2/ 011	Page No.	5184-5190	Subject Area	Education
Keywords	Secondary School Students, Environmental Awareness & Environmental Practices				

1 st	Sunanda H.	Research Scholar Department of Education and Research in Education, Karnatka State Open University, Mysore
2 nd	Dr. N. Laxmi	Head of the Department Department of Education and Research in Education, Karnatka State Open University, Mysore

Abstract

Today, the environmental problems are matter of great concerns. The very survival of man depends on the solution of these problems. Education can play a vital role in this direction. Awareness and practices are essentials for action. It is education, which makes man aware, conscious of and knowledge about environment and environmental problems. The present study was intended to investigate the environmental awareness and practices among Secondary school students.

I. INTRODUCTION

The students, on whom the present study is conducted, might have been exposed to a variety of environmental related concepts, besides their exposure to mass media. Therefore, they might have acquired some level of environmental knowledge during their student hood. The present study therefore makes an attempt to estimate the level of awareness and practices. Environmental awareness is defined as factual information (for knowledge) possessed by a student about environmental issues, facts and events in the content areas of ecological concepts, pollution, wildlife, natural resources population and persons organization involved in the environmental movement. The environmental awareness test (EAT) which assesses the student's awareness (Knowledge) in area of ecology concepts, pollution, wild life, natural resources, population and person's organizations involved in the environmental movement. Environmental practice is defined as the day today practices of an individual as related to the conservation and preservation of his/her immediate environment in a



particular situations or give social group and individuals as an opportunity. So as to be actively involved at all levels in working towards the solution of environment problems.

II. RESEARCH DESIGN

2.1 STATEMENT OF THE PROBLEM:

The problem for the present study is entitled, "A study on environmental awareness and practices among Secondary school students of Honnalli taluka".

2.2 OBJECTIVES OF THE STUDY:

1. To study the level of environmental awareness of Secondary school students of Honnalli taluka.
2. To study the level of environmental practices of Secondary school students of Honnalli taluka.
3. To study the significance of the difference in respect of Secondary school students' environmental awareness if any between the subsamples with regard to
 - a. Gender
 - b. Location of the school
 - c. Subject group
 - d. Type of management
4. To study the significance of the difference in respect of Secondary school students' environmental practices if any between the subsamples with regard to
 - a. Gender
 - b. Location of the school
 - c. Subject group
 - d. Type of management
5. To study the significant relationship if any between environmental awareness and environmental practices of Secondary school students.

2.3 HYPOTHESES OF THE STUDY:

1. The level of environmental awareness of Secondary school students of Honnalli taluka is low.
2. The level of environmental practices of Secondary school students of Honnalli taluka is low.
3. There is no significant difference in the environmental awareness of Secondary school students of Honnalli taluka between the following subsamples
 - a. Gender
 - b. Location of the school
 - c. Subject group
 - d. Type of management
4. There is no significant difference in the involvement environmental movements of secondary students of Honnalli taluka between the following subsamples
 - a. Gender

- b. Location of the school
 - c. Type of School
 - d. Type of management
5. There is no significant relationship between environmental awareness and environmental practices of Secondary school students of Honnalli taluka.

III. RESEARCH METHODOLOGY

Normative Survey Method has been used in the study.

3.1 Tools used

1. Environmental practice test for Secondary school students was constructed and validated by the investigator.
2. Environmental Awareness Scale constructed and validated by Dr. S. Kulasekara Perumal Pillai.

3.2 Sample

Using random selection, 1000 Secondary school students from Honnalli taluka of Karnataka were selected for the present study.

3.3 Statistical Technique Used

Descriptive analysis, Differential analysis and Correlation analysis were used in the present study to test the hypotheses and interpret the data.

IV. STATISTICAL ANALYSIS AND INTERPRETATION OF DATA

4.1 Descriptive Analysis

4.1.1 Comparison of Environmental Awareness and Environmental practices

Table-1: Mean and Standard Deviation of Environmental Awareness and Environmental practices Scores of the Entire

Variables	N	Mean	SD
Environmental awareness	1000	63.51	6.31
Environmental practices	1000	65.61	5.91

It could be observed from Table-1 that Mean and standard deviation values of Secondary school students environmental awareness of the entire sample is found to be 63.51 and 6.31 respectively. The Mean value of the entire sample is higher than the mid value 48. Therefore, it is found that the Secondary school students have high environmental awareness. The hypothesis no.1 is rejected. The calculated Mean and standard deviation values of Secondary school students' environmental practices of the entire sample are found to be 65.61 and 5.91 respectively. The Mean value of the entire sample is higher than the mid value 50.11. Therefore, it is found that the Secondary school students of Honnalli taluka have higher level of environmental practices. The hypothesis no. 2 is rejected.

4.2 Differential Analysis:

4.2.1 Significance Difference in the Sub-samples (Gender and Location) of Secondary

school Students' Environmental Awareness and Environmental practices:

Table-2: Significance Difference in the Sub-samples of Secondary School Students' Environmental Awareness and Involvement in Environmental practices -Gender

Variables	N	Environmental Awareness				Environmental practices			
		Mean	SD	t-value	Sig*	Mean	SD	t-value	Sig*
Gender	Male	500	65.91	6.21	14.2*	NS (0.05 level)	67.15	6.91	S (0.01 level)
	Female	500	62.36	6.1		65.16	6.34	8.29	
Location of the school	Urban	500	63.51	6.31	5.70*	S (0.05 level)	65.61	5.91	NS (0.05 level)
	Rural	500	62.14	6.21		64.91	5.60	4.00	

and Location of the school

*Significant, NS - Not significant, S - Significant

A. Environmental Awareness:

In order to check the null hypothesis with respect to gender (Table 2), the t- test was employed. The Mean of male Secondary school students (N= 500) is found to be 65.91 with an SD of 6.21. The Mean of female Secondary school students (N=500) is found to be 62.37 with an SD of 6.10. The computed t value is 14.2 which is significant at 0.05 level. Since the calculated t- value is greater than the tabulated t- value, the hypothesis no.3 (a) is rejected and alternate hypothesis accepted. In order to check the null hypothesis with respect to location of the school, the t- test was employed. The Mean of urban school Secondary school students (N=500) is found to be 65.51 with an SD of 6.31. The Mean of rural school Secondary school students (N=500) is found to be 62.14 with an SD of 6.21. The computed t value is 5.70 which is significant at 0.05 level. Since the calculated t- value is greater than the tabulated t- value, the hypothesis 3(b) is rejected.

B. Environmental practices:

In order to check the null hypothesis with respect to gender, the t- test was employed. The Mean of male Secondary school students (N=500) is found to be 67.15 with an SD of 6.91. The Mean of female Secondary school students (N=500) is found to be 65.16 with an SD of 6.34. The computed t value is 8.29 which is significant at 0.01 level. Since the calculated t- value is higher than the tabulated t- value, the hypothesis 4(a) is rejected. In order to check the null hypothesis with respect to location of the school, the t- test was employed. The Mean of urban school Secondary school students (N=500) is found to be 65.61 with an SD of 5.91. The Mean of rural school Secondary school students (N=500) is found to be 64.91 with an SD of 5.60. The computed t value is 4.00 which is significant at 0.05 level. Since the calculated t- value is greater than the tabulated t- value, the hypothesis 4(b) is accepted

4.2.2 Significance Difference in the Sub-samples (type of school group and Type of management) of Secondary school Students' Environmental Awareness:

Table-3: Significance Difference in the Sub-samples of Secondary School Students' Environmental Awareness –type of school group and Type of management group

Variables	Sources of Variation	Sum of Squares	df	Mean Square	F - Value	Level of Significance
Subject group	Between groups	420.30	2	210.15	9.15	Significant at 0.01 level
	Within groups	22888.8	997	22.96		
	Total	23316.34	999			
Type of Management	Between groups	142.68	2	71.34	3.07	Significant at 0.05 level
	Within groups	23190.59	997	23.260		
	Total	233316.34	999			

As seen from Table 3, to check the null hypothesis with respect to subject group, the F test was made. The F value is found to be 9.15 which is significant at 0.01 level for 997 degree of freedom. It denotes that there is significant difference among the Secondary school students who belong to different type of school groups with respect to their environmental awareness. The null hypothesis 3(c) is rejected.

In order to check the null hypothesis with respect to the type of management, the F test was made. The F value is found to be 3.07 which is significant at 0.05 level for 997 degree of freedom. It denotes that there is no significant difference among the Secondary school students who belong to different types of management with respect to their environmental awareness. The null hypothesis 3(d) is rejected.

4.2.3 Significance Difference in the Sub-samples (type of school group and Type of management) of Secondary school Students' Environmental practices:

Table- 4: Significance Difference in the Sub-samples of Secondary School Students' Environmental practices - type of school group and Type of management

Variables	Sources of Variation	Sum of Squares	df	Mean Square	F - Value	Level of Significance
Subject group	Between groups	219.18	2	109.59	5.03	Significant at 0.01 level
	Within groups	21717.58	997	21.78		
	Total	21936.76	999			
Type of Management	Between groups	353.51	2	176.75	8.17	Significant at 0.05 level
	Within groups	21583.25	997	21.65		
	Total	21936.76	999			

As seen from Table 4, to check the null hypothesis with respect to subject group, the F test was made. The F value is found to be 5.03 which is significant at 0.01 level for 997 degree of freedom. It denotes that there is significant difference among the Secondary school students who belong to different subject groups with respect to their environmental practices. The null hypothesis 4(c) is rejected.

In order to check the null hypothesis with respect to the types of management, the F test was made. The F value is found to be 8.17 which is significant at 0.01 level for 997 degree of freedom. It denotes that there is significant difference among the Secondary school students who belong to different types of management with respect to their environmental practices. The null hypothesis 4(d) is rejected.

4.3 Correlation Analysis

Table-5: Correlation of Co – efficient between Environmental Awareness and Environmental practices of Secondary school Students

Variables	N	'r' Value	SD
Environmental awareness	1000	0.378	Significant 0.01 level
Environmental practices			

As seen from Table 5 the correlation co-efficient (r) between environmental awareness and environmental practices is found to be 0.378 for the sample of 1000 of Secondary school students. It is higher than the table value of 0.081 at 0.01 level. It is concluded that there is significant relationship between environmental awareness and environmental practices of Secondary school students of Honnalli taluka. Hence the null hypothesis 5 is rejected.

V. MAJOR FINDINGS OF THE STUDY

1. The Secondary school students of Honnalli taluka have high environmental awareness.
2. The Secondary school students of Honnalli taluka have higher level of environmental practices.
3. The male and female Secondary school students of Honnalli taluka do differ significantly with respect to their environmental awareness.
4. The urban and rural school Secondary school students of Honnalli taluka differ significantly in their environmental awareness.
5. There is significant difference among the Secondary school students who belong to different subject groups with respect to their environmental awareness.
6. There is no significant difference among the Secondary school students who belong to different types of school management with respect to their environmental awareness.
7. The male and female Secondary school students differ significantly in their environmental practices.
8. The urban and rural school Secondary school students do not differ significantly in their environmental practices.
9. There is significant difference among the Secondary school students who belong to different subject groups with respect to their environmental practices.
10. There is significant difference among the Secondary school students who belong to



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)

Volume - 4, Issue -2, October 2016

Continuous 38th Edition, Page No: 5184-5190

different types of school management with respect to their environmental practices.

11. There is significant relationship between environmental awareness and environmental practices of Secondary school students of Honnalli taluka.

VI. REFERENCES

- [1] Kaul Lokesh (1984). Methodology of Educational Research Vani Educational Books.
- [2] Khopkar S.M. (1994). Environmental pollution analysis Department of Chemistry and centre for environment science and engineering Indian institute of Technology Bombay.
- [3] Khoshoo, T.N. (1985). Environmental Education for conservation and development. Presidential Address of 66th Annual Session National Academy of Science, India.
- [4] Khoshoo, T.N. (1986). Environmental concerns and strategies, Third Edition, Ashish Publishing House, 8/81 Panjabi Bagh, New Delhi.
- [5] Khoshoo, T.N. (1986). Environmental priorities in India and Sustainable Development, Presidential Address, Indian Science Congress Association, pp. 1-224.
- [6] Kidwai Zeena (1991). Development of an environmentally oriented curriculum in geography at secondary stage Indian Education Review Vol. 26 (3), 87-94.
- [7] Kinsuy and Wheatl S.H. (1980). An Instrument to inventory the defensibility of environmental attitudes journal of E.E 12 (1), 29-35.
- [8] Klean Richard P. (1997): "Environmental education around the Pacific Rim: A comparative study of secondary school curricula". Seattle University (0551) Degree Ph.D., 1997.
- [9] Kosho T.N. (1984). Environment concerns and strategies, New Delhi, Indian Environment society.
- [10] Kukarni B.R. (1993). Environmental Education. A Blue print, University News XXXI (43), 11-14.
- [11] Kulkarni B.R (1993). Environmental Education a blue print, University New XXX I (43), 11-14.
- [12] Kumar R. (Ed) (1987). Environmental pollution health Hazards in India New Delhi, Ashish publisher House 8/81 Panjabi Bagh.

To Cite This Article

Sunanda, H., Laxmi, N. (2016) : “A Study On Honnalli Taluka Secondary School Students’ Environmental Awareness And Practices” International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5184-5190, Paper ID: IJIFR/V4/E2/011.



Sunanda H., Dr. N. Laxmi :: A Study On Honnalli Taluka Secondary School Students’ Environmental Awareness And Practices

5190

SENSE OF HUMOUR AMONG THE PARTICIPANTS OF RC-295 IN RELATION TO THEIR GENDER

Paper ID	IJIFR/V4/ E2/ 025	Page No.	5191-5196	Subject Area	Education
Keywords	Sense Of Humour, RC-295 Participation, Gender				

1st	Dr. Umender Malik	Assistant Professor-II, Department of Education, M.D. University, Rohtak (Haryana)
2nd	Dr. A Q Suhail Ahmed Choudhury	Assistant Professor, Department of Education, A.L. Choudhury College, Algapur, Hailakandi (Assam)

Abstract

Humour is social phenomenon that had been extensively explored throughout centuries, whereas sense of humour is aspects of personality that was hardly explored and defined around 1970. It is ability to create joyful moment or laughter in the situation of despair, sadness, anxiety, tension and even in all situations for shedding the clouds of sadness or for dreaming away the panic moments. Now days, the quality of teacher education is a burning topic in the society and teaching learning is going downwards. Keeping this in view, the present study was carried out on among the participations of RC-295. The population of the study was 31 participants. Descriptive survey method was used in the study. The study revealed that gender plays an important role on the sense of humour of the participation. Females were having less sense of humour as compare to male..

I. INTRODUCTION

Sense of Humour is defined as a sort of catch-all term to refer to habitual individual differences in all sorts of behaviors, experiences, affects, attitudes, and abilities relating to amusement, laughter, jocularity and so on (Martin, 1998). Sense of humour is define as a sort of terminology used to refer the habitual individual differences in all sorts of behaviours, experiences, affects, attitudes and abilities relating to amusement, laughter and so on. Humour is social phenomenon that had been extensively explored throughout



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

centuries, whereas sense of humour is aspects of personality that was hardly explored and defined around 1970. It is the ability to experience humour, a quality which all people share, although the extent to which an individual will personally find something humorous, depends on a host of absolute and relative variable including geographical location, culture, maturity, level of education, intelligence. It is ability to create joyful moment or laughter in the situation of despair, sadness, anxiety, tension and even in all situations for shedding the clouds of sadness or for dreaming away the panic moments. Many types of behaviour can be leveled as attributes of good sense of humour. A person has good sense of humour means, that the person has an excellent repertoire of good jokes that he has memorise a large number of funny stories and that he is skilled at repeating them for the amusement of others. In this sense, he is able to make others laugh at his stories and /or actions.

Eysenck (1972) pointed out three different possible meanings of humour—conformist, quantitative and productive. In conformist meaning of humour, the person laughs at the same things that we do. In quantitative sense, humour means that the person's laughs a great deal and easily amused. Third, productive meaning that the person is the "life and soul of the party", telling funny stories and amusing other people.

The present study helps the people to understand better about the role of sense of humour in an individual's life both personal as well as social.

II. RESEARCH DESIGN

2.1 Significance Of The Study

Humour, used well, is a mark of self-confidence, intelligence and an ability to connect effectively with others" (Schwab, 2005). Individuals with a greater sense of humour are thought to be more socially competent (Bell, McGhee, & Duffey, 1986); in turn, it may be easier for such persons to attract and maintain friendships and develop a rich social support network, and consequently to obtain the mental and physical health benefits of social support (Cohen & Wills, 1985).

2.2 Statement of the Problem

Sense of Humour Among the Participants of RC-295 in relation to their gender

2.3 Operational Definitions of the Term Used

➤ Sense of Humour

Sense of Humour is defined as a sort of catch-all term to refer to habitual individual differences in all sorts of behaviors, experiences, affects, attitudes, and abilities relating to amusement, laughter, jocularity, and so on (Martin, 1998).In the present study sense of humour refers to the total score obtained by the RC – 295 participants in teacher sense of humour scale.

➤ Gender

According to Oxford school of dictionary the word **gender** has been used since the 14th century as a grammatical term, referring to classes of noun designated as masculine or feminine. The sense 'the state of being male or female' has also been used since the 14th century, but this did not become common until the mid 20th century. Although the

words **gender** and sex both have the sense ‘the state of being male or female’, they are typically used in slightly different ways: sex tends to refer to biological differences, while **gender** refers to cultural or social ones.

In the present study gender refers to the male & female RC – 295 participants.

➤ **RC – 295 Participants**

In the present study RC -295 participants refers to the teachers who has come at HRDC, H. P. University, Shimla to attend the refresher course on Research and Teaching Methodology from 22.08.2016 to 10.09.2016 from different colleges and universities of the country.

2.4 Objective

- To study the sense of humour of RC – 295 participants in relation to their gender.

2.5 Hypothesis

- There is no significant difference in the sense of humour of RC-295 participants in relation to their gender (Male / Female).

2.6 Delimitations

- The study was delimited to the RC – 295 participants only.
- Only sense of humour and gender were taken as variables of the study.

III. REVIEW OF LITERATURE

Narula et al. (2011) studied humor as a learning aid in medical education. Finding revealed in group A there was no significant difference in marks obtained by students in class 1 and class 4, however in group B in which humor was used it was observed that in class 4 percentage of students getting marks above 50% increased as compared to class 1. They concluded that humor not only increases interest but also promotes learning.

Makewa et al. (2011) studied teachers' use of humor in teaching and students' rating of their effectiveness. The results indicate that the use of humour in teaching is generally good and that there is a significant, moderate relationship between the use of humour and students' rating of teachers' effectiveness. The results also indicate that the most commonly used styles of humour among the students are the positive styles of humour.

Dange & Jagannath (2012) investigated the association of sense of humour with job stress among the primary school teachers. The study found that, there was no significant difference in mean scores of sense of humour and job stress in relation to Gender and Type of the school. But significance difference was found between Rural and Urban primary school teachers sense of humour. There was negative high correlation between sense of humour and job stress among the primary school teachers. The topic of incorporating humor into higher education classrooms has been studied extensively in the past 20 years. The position most, if not all, researchers and 71 authors have taken is that the appropriate use of humor in the classroom makes the environment not only fun, but conducive to learning. These authors argue that appropriate reduces stress, anxiety, and uncertainty in the classroom. The reduced level of negative factors creates a classroom environment that is comfortable, safe, and supportive for the students and the teacher.

Umender M. & Sarita (2015) investigated teaching effectiveness of secondary school teachers in relation to their sense of humour. There they found that found that the sense of humour of male and female secondary school teachers differ significantly.

Umender M. & Anju (2015) in their study of occupational stress among secondary school teachers in relation to their sense of humour found that occupational stress of secondary school teachers with high or low sense of humour differ significantly.

IV. PROCEDURE OF THE STUDY

The present study aims at finding out the relation between sense of humour and gender of RC- 295 participants.

4.1 Variables of the Study

- Dependent Variable : Sense of Humour
- Independent Variable: Gender.

4.2 Population

The population is any group of individuals that has one or more characteristics in common and that are of interest to the researchers (Best and Khan 2010). The accessible population of the present study consisted of male and female participants of RC- 295.

4.3 Tools Used

Teachers Sense of Humour Scale (TSHS) by Malik and Kapoor (2014).

4.4 Statistical Analysis

The mean, S.D. and 't' test were used to analysis the data.

4.5 Method Of The Research

Descriptive survey method was used.

V. RESULTS

The collected data was analyzed both quantitatively as well as qualitatively. In order to verify the objective and to test the null hypotheses, the present study has been analysed as given below:

Objective: To study the sense of humour of RC-295 participants in relation to their gender.

Hypothesis: There is no significant difference in the sense of humour of RC-295 participants in relation to their gender (Male / Female).

Table-1: Sense of humour among RC – 295 participants

Sr. No.	Groups	N	Mean	S.D.	t-value	Level of Significance
1.	Male	21	165.28	15.10	4.644*	Significant
2.	Female	10	146.1	7.93		

- Significant at 0.01 level of significance
- Table Value = 2.04 (at 0.05 level), 2.76 (at 0.01 level)

Table no 1shows mean of sense of humour of male and female RC-295 participants. The study of the mean score of sense of humour of male and female RC – 295 participants shows that there is a difference among them in sense of humour. The table shows that male RC – 295 participants have more sense of humour (i.e 165.28) as compared to female



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)**Volume - 4, Issue -2, October 2016****Continuous 38th Edition, Page No: 5191-5196**

participants of RC- 295 (i.e, 146.). Thus, the hypothesis i.e. there is no significant difference in sense of humour of male and female RC – 295 participants is rejected.

VI. DISCUSSION OF RESULTS

The study reveals that sense of humour of male participants was more as compared female participants. It has further been supported by Gorham (1999) i.e, gender shows its effect on sense of humour and further effects the teaching process.. Generally it is observed that mind works better in lighter mood than in tense mood. Many a time's humour is required to change the monotonous situations of the classroom. Dange and Jagannath (2012) found significant difference between male and female primary school teacher sense of humour. It is further supported by Malik and Sarita (2015) that male and female teachers differ significantly in relation to their sense of humour. Males are generally extrovert in nature and outspoken where as females may be introverts or ambivert and have low risk taking behavior due to which they are a bit reserved. Due to these reasons female have less sense of humour as compared to their male counterparts?

VII. RECOMMENDATIONS FOR FURTHER STUDY

Based on the current study some of the suggestions are identified as below:

- The present study can be conducted on large scale.
- Similar type of studies can be conducted in other HRDC of India rather than Shimla.
- The study can be conducted using other methodology.

VIII. REFERENCES

- [1] Aggarwal, S. (2012). Correlational Study of Teaching Effectiveness and Job Satisfaction of Higher Secondary School Teachers. EduTracks, 12(2), 38.
- [2] Balakrishnan (2013). Emotional Maturity of Teachers in Relation to their subjects and their years of experience. International Journal of Teacher Educational Research (IJTER), 2(8).
- [3] Best J.W and Khan J.V. (2010). Research in Education. Pearson Education, Inc., Publications, New Jersey. U.S.A. Bhatnagar S. 2003. Advance Education Psychology, R.Lall Book Depot Meerut. Second edition.
- [4] Gordon, J. (1992). All Seriousness Aside: The Laughing-Learning Connection, International Journal of Instructional Media, 19 (3), 269-76.
- [5] Hill, D.J., (1988). Humor in the Classroom, A Handbook for Teachers, Springfield, IL, Charles C. Thoma. 179
- [6] Jagannath K. (2012). Sense of humour in relation to job stress among the primary school teachers. International Journal Of Social Sciences & Education, . 2(4), 173.
- [7] Jones (2006) The Effects of Principals' Humor Orientation and Principals' Communication Competence on Principals' Leadership Effectiveness as Perceived by Teachers, The University of Akron. Kagathala.
- [8] Malik, U. & Anju (2015), A Study of Occupational Stress Among Secondary School Teachers in Relation to their Sense of Humour, Paripe Indian Journal of Research, Vol. 4, Issue 11, ISSN – 2250-1991.
- [9] Malik, U. & Sarita (2015), Teaching Effectiveness of Secondary School Teachers in relation to their Sense of Humor, Global Journal for Research, Vol. 4, No. 7, ISSN No. 2277-8160.



Dr. Umender Malik, Dr. A Q Suhail Ahmed Choudhury:: Sense Of Humour Among The Participants Of RC-295 In Relation To Their Gender

5195

- [10] Malik, U. & Sindhu, P. (2015), A Study of Teaching Aptitude of B.Ed. Pupil Teachers in Relation to their Intelligence, *Paripex Indian Journal of Research*, Vol. 4, Issue 10, ISSN – 2250-1991.
- [11] Malik, U. & Sindhu, P. (2016), A Study of Teaching Aptitude of B.Ed. Pupil Teachers in relation to Different Levels of Intelligence, *Asian Journal of Multidisciplinary Studies*, Vol. 4, No. 5, ISSN – 2321-8819.
- [12] Mary, Bennett, P. (2006). Humour and Laughter May Influence Health. Complementary Therapies and Humour in a Clinical Population Published by Oxford University Press. 182 McBer,
- [13] Michael G. Lovorn (2008). Humor in the Home and in the Classroom: The Benefits of Laughing While We Learn. *Journal of education and human development*, 2(1). Miller,
- [14] P.U.Chandigarh. Loomax, R. G., Moosavi, S. A. (1998). Using Humor to Teach Statistics; Must they be Orthogonal?, Paper presented at the annual meeting of the American Educational Research Association.
- [15] Provine, R.R.(2000). The Science of Laughter. In: *Psychology Today*, 33, 61.
- [16] Ron Deiter (2000). The use of humour as a teaching tool in the college classroom. *NACTA journal*.
- [17] Thorson, J.A, & Powell, F.C (1993). Development and validation of a multidimensional sense of humour scale. *Journal of clinical psychology*, 48, 13-23. 188
- [18] Vaezi, S. & Fallah, N. (2012). Sense of Humour and Emotional Intelligence as Predictors of Stress among EFL Teachers. *Journal of Language Teaching and Research*. 3(3), 584-591. Vashitha,
- [19] Wrench & Richmond (2004). Understanding the Psychometric Properties of the Humour Assessment Instrument through an Analysis of the Relationships between Teacher Humour Assessment and Instructional Communication Variables in the college Classroom, 21(1), 92-103.

To Cite This Article

Malik,U., Suhail Ahmed Choudhury,Q.A.(2016) : “Sense Of Humour Among The Participants Of RC-295 In Relation To Their Gender” International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5191-5196, Paper ID: IJIFR/V4/E2/025.

CUSTOMS AND CULTURE OF IRULA TRIBES IN COIMBATORE DISTRICT, TAMIL NADU

Paper ID	IJIFR/V4/ E2/ 031	Page No.	5197-5201	Subject Area	Economics
Keywords	Irulas Customs & Culture, Blind Faith, Absence Of Education, Lack Of Contact, Pastoral & Agrarian Economy				

T.Sheela

**Research Scholar,
Department of Economics,
PSGR Krishnammal College for Women,
Coimbatore-Tamilnadu**

Abstract

Irular tribes are one of the second largest groups of Tamil Nadu after the Badgas. They are situated at the base of the western ghat. In the family of the tribes in this region, male members exercise dominant authority over the family members while women occupy a subordinate position. Wedding ceremonies vary from one tribe to the other. By and large all these tribes permit the wedding at an early age for the principal reason that the source of happiness consists of the solace of a domestic life. But many of the rites and formalities are similar among the tribes. The life of these tribes revolves around the pastoral and agrarian economy. No fundamental innovations were introduced in the agricultural work by them inspite of advancement in science and technology of the present day. Blind faith, absence of education and lack of contact with the rest of the society seem to be the reasons for the unchanging belief and practices. Irulas culture is one of the different ways. They are considered marriage function is not an important ritual in the community. But death ceremonies are considered is an important ritual in this community. This paper focuses on customs and culture of the Irula tribes of Coimbatore District, Tamil Nadu.

I. INTRODUCTION

According to Census 2011, India has a population of 1.21 billion. More than 800 million Indians live in rural areas and 400 million live in urban areas. Scheduled Tribes (STs) constitute 8.6 percent of the country's population. Scheduled Tribes in India are Adivasis with 622 Adivasi Communities still speaking 325 Languages, living in 645 Districts in



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

105295 Villages. Over 57% of them are living out of Forest and less than 40% are still in Forest areas. Tribes are distributed all over India, viz. Central zone, Western zone, North Eastern zones, Southern zone and Andaman & Nicobar and Lakshadweep Islands but mostly concentrated in Central, Eastern and North-Eastern India. About 75 Tribal groups in India are PVTGs (Particularly Vulnerable Tribal Groups). Their primitive traits, geographical isolation, distinct culture with traditions, language, shy of contact with community at large are causes for economical backwardness.

2. PROFILE OF THE DISTRICTS

The study was undertaken in Coimbatore district. Coimbatore District is situated in the East of Tamil Nadu. It is one of the small districts of Tamil Nadu. The district has an area of 4723 sq.kms of the state's geographical area, with a scheduled tribe population of 28342 as per the 2011 census.

3. TERM OF TRIBES

The tribal people constitute 8 percent of the total population of India. The term "tribe" means, a group of people who live at a particular place from time immemorial. Anthropologically the tribe is a system of social organization which includes several local groups- villages, districts on lineage and normally includes a common territory, a common language and a common culture, a common name, political system, simple economy, religion and belief, primitive law and own education system (India tribal belt, en.Wikipedia.org).

4. HISTORY OF IRULA TRIBES

The Irula inhabit the northern districts of Tamil Nadu, a state in north eastern India. Located not far from the city of Madras, they live in a tropical area subject to monsoon rains. Their language, Irula, is related to Tamil and Kannada, which are southern Dravidian languages. In the Tamil language, the name Irula means "people of darkness." This could refer to their dark-colored skin or to the fact that all important events traditionally took place in the darkness of night.

5. CUSTOMS AND CULTURE OF IRULA TRIBES

5.1 Dress Code

The tribal men wear cotton dhoti and shirts, women wear saree with blouse and adult women wear sarees only without blouse. Adolescent girls residing in the tribal schools wear salwars and half sarees. Middle age women wear nighties in the full time.

5.2 Puberty

When a girl attains puberty, she is confined to a seclusion hut for seven days, where she is assisted by a few girls of her settlement who have not yet attained puberty. Every day, the girl is given bath after applying turmeric paste and coconut oil on the body. After the

seventh day, the girl is taken to the river, accompanied only by women. Once at the river, her bloody clothes will be burned, and the girl will be bathed. Then, if the girl's family has enough money, a function will be held. In this function, the girl will be ritually bathed again. The girl's mother's sister's daughter will drip oil from her left hand onto the back of the girl's hand. Then the mother's sister's daughter with very large rings on her finger will tell the girl to bring her hand up and put the oil on top of her own head. When the girl tries to lift her hand, her mother's sister's daughter with the large rings on her right hand will slap the girl's hand down. Then she will tell the girl to do it again, and again she will slap the girl's hand down. This happens several times. All the members of the settlement assemble and give presents of money to her.

5.3 Marriage Ceremonies

Marriage is considered as a sacred and an important event in the life of any individual. Among the Irula tribes, men or women were allowed to marry according to their wish and marrying more than one man or woman was not considered as a crime. The marriage is fixed for girls within age limit of 12-18 whereas boy's age is from 14-24. People from the same clan within the Irula tribe do not intermarry. Marriages are fixed within family by the parents. Dowry system (money given to the bride groom during the time of marriage by the bride's parents) was common among the Irular tribes from the ancient times. Prize has to be bride's house in the form of cash (Rs.1000 – 2000) or cattle. Marriage ceremony takes place in the front of the home or in village temple. The conformation of the marriage is called the groom tie the yellow rope of thali (marital necklace) along with two black beads as the bride. The married women were not allowed to participate in any of their community function if they were not wearing mangal sutras and along with the family members these women will be thrown out of their community and village. The customs and habits of the Irulas are very crude. Irulas are accepted child marriage. Divorces are not permitted for Irular tribes.

5.4 Delivery Pattern

Normally, delivery is considered to be the second birth for any woman. But as far as Irular tribes were considered, deliveries were conducted at home with the help of a local old lady who had attended the delivery. After the birth, the child is bathed in warm water. The mother confines herself to the seclusion hut for 10 days during which she takes hot water bath after applying a turmeric paste and coconut oil on the body. On the 10th day, she is removed to another seclusion hut, where she remains for 80 days during which she is prohibited from doing any manual work even in the kitchen. The Irular thus observes 91 days birth pollution. The naming ceremony is performed on that day. On the other hand, if the labor pain develops she would pour little amount of castor oil in her left palm and touch it with the right hand fingers, at the same time uttering some words of prayers. The old lady delivery attendant would drop the castor oil and they have a superstitious belief that if the oil drops continuously, the delivery would be very easy for the expectant mother. On the other side, if the oil drops down in separate drops, the delivery would be very difficult.

5.5 Death Ceremony

One's death will be proclaimed to everyone. These communities followed the death ceremonies are the body will be kept in a typical tent on a bamboo platform in a posture where both the legs had to be drawn backwards and tied. The closest relatives bring water from the tap. Water is drawn after uttering the name of the dead person three times without looking left or right. Ground saffron or turmeric liquid mixture is sprinkled over the body. Visitors spread white dhoti (cloth) over the body if the death is male and colour cloth in case of female. If the dead is a married man, seven persons from seven clan remove the thali (marital necklace) from his wife. If the husband dead, his wife is called widow. The women should not attend any functions and should not remarry.

6. CONCLUSION

In the family of the tribes in this region, male members exercise dominant authority over the family members while women occupy a subordinate position. Wedding ceremonies vary from one tribe to the other. By and large all these tribes permit the wedding at an early age for the principal reason that the source of happiness consists of the solace of a domestic life. But many of the rites and formalities are similar among the tribes. The life of these tribes revolves around the pastoral and agrarian economy. No fundamental innovations were introduced in the agricultural work by them inspite of advancement in science and technology of the present day. Blind faith, absence of education and lack of contact with the rest of the society seem to be the reasons for the unchanging belief and practices.

The tribes are also the citizens of India and hence the promotion of their welfare is of equal importance. Both the governments, individuals and service organizations must jointly formulate certain plans and programmes to improve the economic conditions of the tribes and bring them to a state of secured living. To realize this, the housing, educational, medical, and agricultural, trade, communication and banking facilities can be provided by the said agencies generously. The tribes want improvement without being disturbed. Their age old customs should be respected and their local rights should be protected. The government should consider their basic requirements and demands.

The tasks that can be imposed on our government and non-government organizations are as follows: The first is to preserve, strengthen and develop all that is best in the tribal society, culture, art and language. The tribes like to strengthen themselves from the contaminating influences of modern civilization and like to protect themselves not only economically, but culturally, from outside exploitation. The second is to protect the tribal economic rights. The government of India should help the tribal people to develop according to their own culture and tradition.

7. REFERENCES

- [1] Vaidyanathan K.S. *The Ancient Geography of the Kongu Country*, Kalaimahal Meenakshisundaram Archaeological Learning and Research Centre, Erode, 1983, p. 6.
- [2] Ramamurthy V. *History of Kongu*, International Society for the Investigation of Ancient Civilization, Madras, 1986, pp. 26–27.

- [3] Office Record, Indira Gandhi Wildlife Sanctuary, Pollachi.
- [4] *The Encyclopaedia of Dravidian Tribes*, Vol. III, International School of Dravidian Linguistics, 1996, p. 367.
- [5] Chouthry, M. *Tribals of Ancient India*, Indian Museum, Calcutta, 1977, p. 76.
- [6] Gunasekaran K.A. *Tamilaga Malaiyina Makkal*, (Tamil), New Century Book House, Chennai, 1993, p. 9.
- [7] Ananthakrishna I.L.K. *The Tribes and Castes of Cochin*, (Reprint 1981) Cosmo Publications, Delhi, 1906, p. 123.
- [8] Thurston E. *Castes and Tribes of Southern India*, Vol. VIII, Asian Educational Services, Delhi, 1987, p. 10.
- [9] Tribal and Forest Development Project, Format-II, Indira Gandhi Wildlife Sanctuary, Pollachi.
- [10] Fuchs S. *Aboriginal Tribes of India*, Macmillan Company of India Ltd., Bombay, 1973, pp. 257–258.
- [11] Personal interview with Karuppama, Kadar woman, age 62.
- [12] Thurston E. *Castes and Tribes of Southern India*, Vol. VIII, Asian Educational Services, Delhi, 1987, p. 17.
- [13] Thurston E. *Castes and Tribes of Southern India*, Vol. VIII, Asian Educational Services, Delhi, 1987, p. 27.

To Cite This Article

Sheela, T. (2016): “Customs And Culture Of Irula Tribes In Coimbatore District, Tamil Nadu” International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5197-5201, Paper ID: IJIFR/V4/E2/031.

CHARACTERIZATION OF BIODIESEL ON VCR ENGINE

Paper ID	IJIFR/V4/ E2/ 030	Page No.	5202-5210	Subject Area	Automobile Engineering
Keywords	Biodiesel, Blend, Variable Compression Ratio, Brake Power, Brake Thermal Efficiency				

1 st	Dipak Virkar	Assistant Professor, Department of Automobile Engineering Sanjeevan Engineering and Technology Institute Panhala, Kolhapur-Maharashtra
2 nd	Sachin Pisal	Assistant Professor, Department of Automobile Engineering Sanjeevan Engineering and Technology Institute Panhala, Kolhapur-Maharashtra

Abstract

This paper present a research work on biodiesel to find out the optimum compression ratios, better performance blend & lesser exhaust gas temperature at different blends of laxmitaru oil on C.I. engine. In this project test were carried out with the diesel & blend of Laxmitaru oil in proportion 10, 20, 30, 40, 50, 70 and 100%. The engine performances were tested on Variable Compression Ratio (VCR) Diesel Engine as per ASTM standard. The performance parameters were tested like Brake specific fuel consumption, Brake power, Brake thermal efficiency at different load & variable compression ratio.

I. INTRODUCTION

The energy is the prime entity for the world. The energy is consumed for various systems functioning in day to day life can be categories as consumption of fuel used for those system and their subsystems. The energy sources available in present days are in non renewable and renewable form as the non renewable sources are in limited quantity which includes fossil fuels and natural gases are going to exhaust one day, may be after some years. The relief for these consequences is the use of alternative energy sources like alternative fuels. Diesel is one of the most used fuels for Transportation and power sectors also coal is the major fuel used by these sectors, as coal and diesel are the non renewable source the alternative fuel that is biodiesel can replace diesel partially [1].



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

The first use of vegetable oil in a compression ignition engine was first demonstrated through Rudolph Diesel who used peanut oil in his diesel engine. The use of oils from coconut, soy bean, sunflower, safflower, peanut, linseed, rape seed and palm oil amongst others have been attempted. The long term use of vegetable oils led to injector coking and the thickening of crankcase oil which resulted in piston ring sticking. Therefore, vegetable oils are not used in diesel engines because of endurance issues. To overcome this problem, various modifications of vegetable oils have been employed such as transesterification biodiesel is made through a chemical process called transesterification whereby the glycerin is separated from the fat or vegetable oil. The process leaves behind two products-methyl esters (the chemical name for biodiesel) and glycerin (a valuable byproduct usually sold to be used in soaps and other products). The transesterification is achieved with monohydric alcohols like methanol and ethanol in the presence of an alkali catalyst [2].

Biodiesel and its blends with petroleum-based diesel fuel can be used in diesel engines without any significant modifications to the engines. The advantages of biodiesel are that it displaces petroleum thereby reducing global warming gas emissions, tail pipe particulate matter, hydrocarbons, carbon monoxide, and other air toxics [3].

In this research work, brake power, brake specific fuel consumption, brake thermal efficiency have been tested at different blend, load on variable compression ratio engine. For the present work of experimental investigation of engine performance parameters the Laxmitaru oil has been selected. Laxmitaru is a plant as the tree has been christened here, is being promoted by horticulturists, agro-scientist, holistic health hub and practitioners of traditional Indian medicines across the country as the latest wonder tree whose edible, therapeutic and other utility values may outweigh those of common medicinal and edible herbs found in India. The tree, which first came to India from central (Latin) America in 1960, can be grown anywhere from the sea coast to elevations of 1500 feet in tropical climatic conditions. At the village level, the plant is cost effective as its farming is nearly zero-budget and completely organic.

II. BIODIESEL PRODUCTION

For production of biodiesel following steps are implemented.

2.1 Oil extraction

In oil extraction process, the oil seeds are first crushed and then with the help of soxhelt apparatus the oil is extracted from crush. In this process, polar solvent (petroleum ether, hexane, diethyl ether) is used with given seed sample with the ratio 1:5.

2.2 Transesterification Reaction

This reaction is also called as alcoholysis which is the displacement of alcohol from an ester by another in a process similar to hydrolysis, except an alcohol is used in water. The reaction can be represented as follows; the general equation will be.



For transesterification process the feedstock should not have more than 5% of free fatty acid content. The major components of vegetable oils and animal fats are

Triglycerides. To obtain biodiesel, the vegetable oil or animal fat is subjected to a chemical reaction termed transesterification. Following fig 1.1 shows the transesterification process.

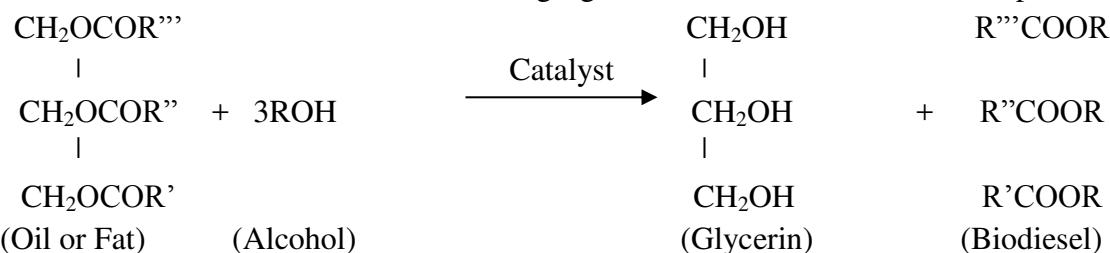


Figure 1: Transesterification Process

2.3 Filtering

Filter the vegetable oil to remove solid particles from it. You may have to warm it up a bit first to get it to run freely; 35°C should be enough. A Cartridge filter is used for the same.

2.4 Removing the Water

Heat the oil for to remove the water content. Vegetable oil will probably contain water, which can slow down the reaction and causes saponification (soap formation). Raise the temperature up to 100°C, hold it there and allow water contents to boil off. Run the agitator to avoid steam pockets forming below the oil and exploding, splashing hot oil or drain water puddles out from the bottom as they form, you can save oil that comes out with the water later. When boiling slows, raise the temperature to 130°C for 10 minutes and allow it to cool [2].

III. EXPERIMENTAL TEST RIG

A single cylinder, four stroke, vertical, water cooled, constant speed, variable compression ratio engine was used for tests. The compression ratio of the engine was varied by raising the bore and head of the engine. Different blends of biodiesel were prepared as B10, B20, B30, B40, B50, B70, & B100 so that they can be conveniently used during the experiment.fig 2 shows photograph of experimental setup.



Figure 2: Photograph of VCR experimental test rig.

Table 1: Engine Specification

Parameters	Specification
Engine manufacturer	Kirloskar oil engines Pvt.
Engine type	VCR Diesel Engine
Number of cylinders	1
Number of Strokes	4
Fuel	H.S. Diesel
Rated power	3.5 kW @1500 RPM
Cylinder Diameter	87.5 mm
Stroke Length	110 mm
Connecting Rod Length	234 mm
Compression ratio	12-18.1

3.1 Experimental procedure

Before the actual tests were carried out the engine was checked for lubrication and fuel supply. During this trial the speed of engine was kept almost constant at 1500 rpm and the load on the engine is given as 3kg, 6kg, 9kg & 12kg. During test the fuel consumption, exhaust gas temperature, engine speed, calorimeter inlet and outlet temperature measured. All the tests were carried out in same way at different compression ratios for diesel, and biodiesel blended fuels. The performance parameter measured during these provided in the table no. 2

Table 2: Set of experiments

SR. NO.	FUEL	COMPRESSION RATIO		LOAD STEPS (kg)
		16:1	17.5:1	
1	Diesel	✓	✓	3, 6, 9, 12.
2	B10	✓	✓	
3	B20	✓	✓	
4	B30	✓	✓	
5	B40	✓	✓	
6	B50	✓	✓	
7	B70	✓	✓	
8	B100	✓	✓	

IV. RESULT & DISCUSSION

For each test the engine was run for fifteen minutes. During test the speed of the engine was kept almost constant at 1500 rpm. The parameters were measured during these tests at steady state working condition. From the measured parameters the performance parameters evaluated and they were compared with pure diesel. The performance parameters like Brake Power, Brake Specific Fuel Consumption, Brake Thermal Efficiency, Exhaust Gas Temperature

4.1 Effect of load on brake power

From fig. 3 & 4 it has been observed that as load increases there is brake power is also increases at blends of B10, B30, B40, B70 BP & it is almost same as B00 for entire load range, but we also found that at CR 17.5 for blend B50 & B100 brake power is much lower than other blends and diesel.

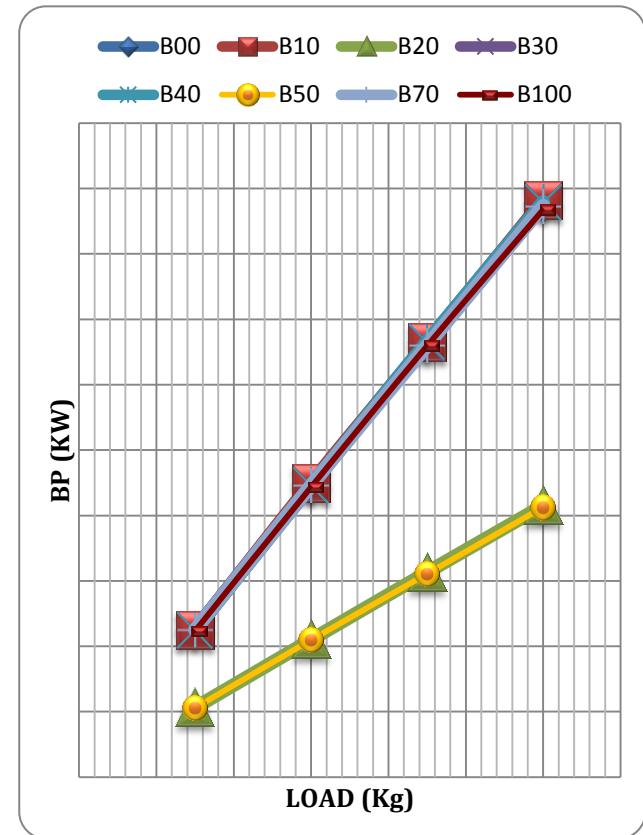
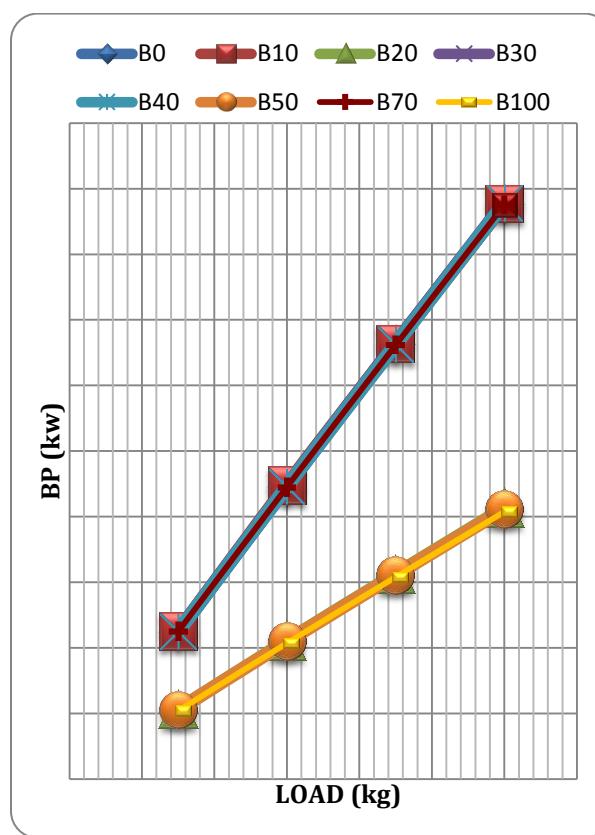


Figure 3: Effect of Load on Brake Power at CR 16

Figure 4: Effect of Load on Brake Power at CR 17.5

4.2 Effect of load on Brake Specific Fuel Consumption

As shown in fig. 1.5 & 1.6 it has been observed that as load increases there is brake specific fuel consumption (BSFC) is increases. But we also found that at CR 16 for blend of B10, B20, B30 & B40 brake specific fuel consumption is lower than other blend & for CR 17.5 for blend of B30, B40 & B70 brake specific fuel consumption is lower.

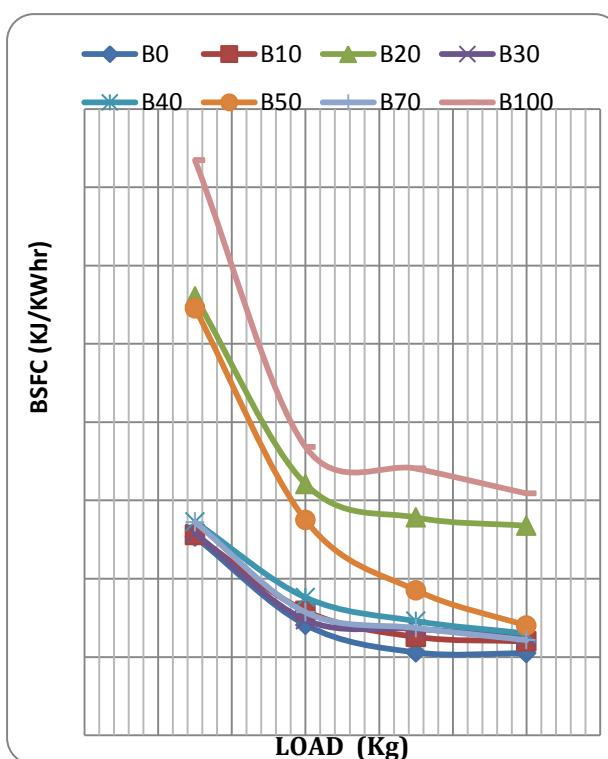


Figure 5: Effect of load on BSFC at CR 16

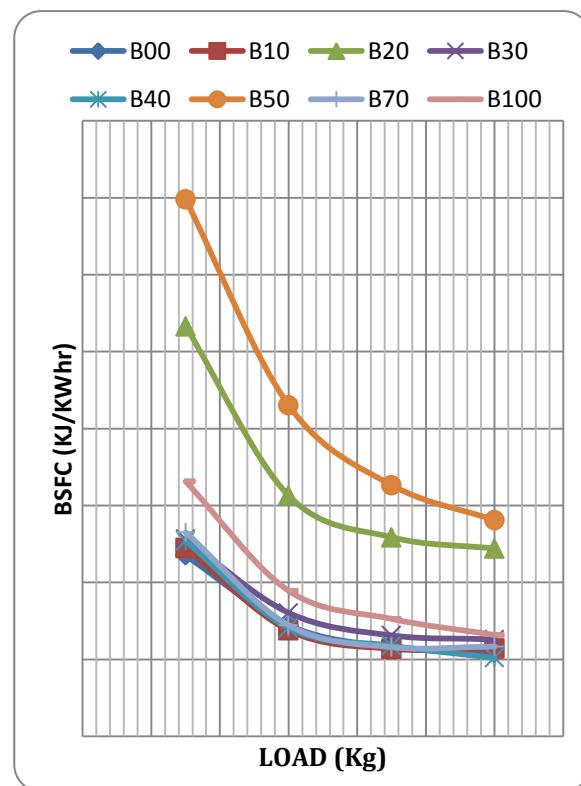


Figure 6: Effect of load on BSFC at CR 17.5

4.3 Effect of load on brake thermal efficiency

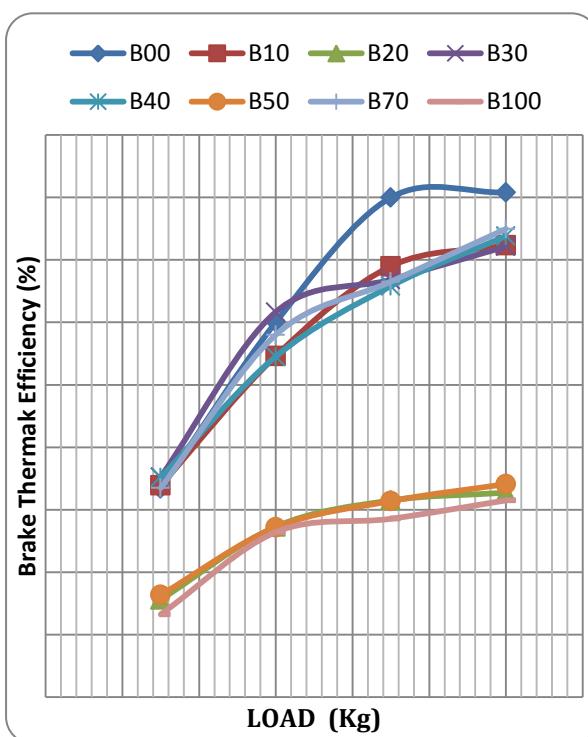


Figure 7: Effect of Load on BTE at CR 16

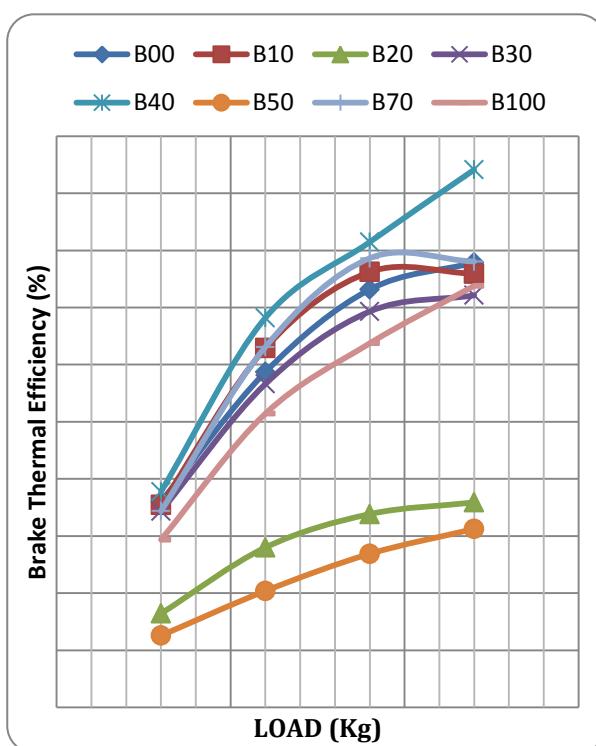


Figure 8: Effect of Load on BTE at CR 17.5

As shown in fig. 7 & 8, it has been observed that as load increases there is a brake thermal efficiency increase. But we also found that at CR 16 for blend B10, B30, B40 brake thermal efficiency is higher than other blend & also it is found that at CR 17.5 for B 10, B30, B40, B70, and B100 brake thermal efficiency is higher.

4.4 Effect of Load on Exhaust Gas Temperature.

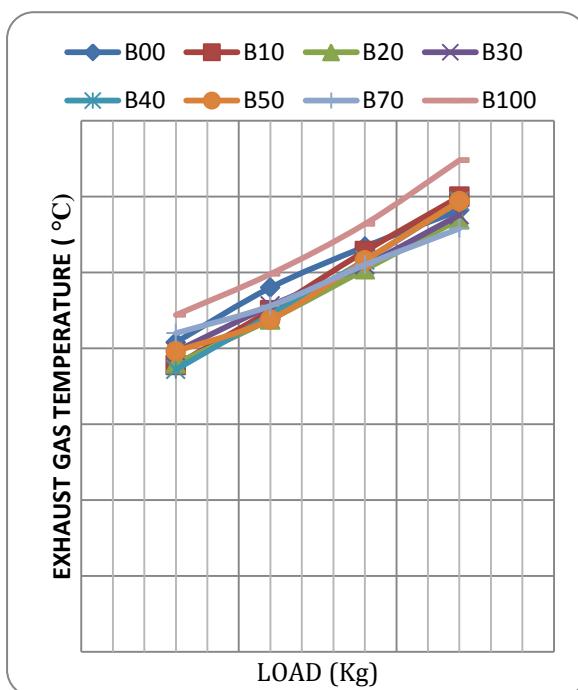


Figure 9: Effect Load on EGT at CR 16

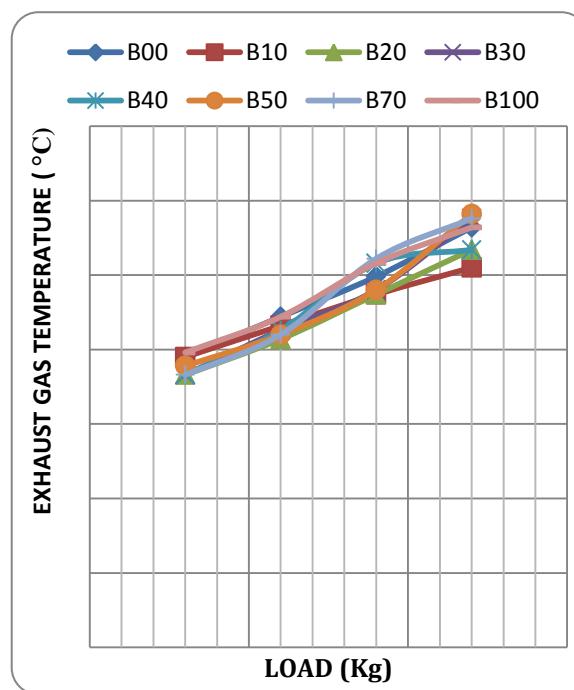


Figure 10: Effect Of Load on EGT at CR 17.5

As shown in fig. 9 & 10, it has been observed that as load increases there is exhaust gas temperature is increases. But we also found that at CR 16 for blend B40 exhaust gas temperature obtained is much lower than other blends & also we found that at CR 17.5 for B10 EGT obtained is lower than diesel.

V. CONCLUSION

- After use of biodiesel we found that as increases of load & compression ratio there is increases of brake thermal efficiency, brake specific fuel consumption & exhaust gas temperature.
- As compression ratio increases brake power also increases, we found that at CR 17.5 has high Brake Power for all blends than CR 16 at full load condition.
- As load increases the exhaust gas temperature increases, for CR 17.5 has lower exhaust temperature for almost all blends than CR 16. We found maximum temperature at CR 17.5 is 270^0c & CR 16 is 300^0c at maximum load.
- As load increases the brake specific fuel consumption increases, for CR 17.5 gives lower brake specific consumption at lower load than CR 16.
- As compression ratio increases the brake thermal efficiency increases, for CR 17.5 has higher brake thermal efficiency than CR 16.

6. After all observations we can conclude that blend B60 can be recommended for use in diesel engine without making any engine modification.

VI. ABBREVIATIONS AND ACRONYMS

BTE	Brake Thermal Efficiency
EGT	Exhaust Gas Temperature
BSFC	Brake specific fuel consumption
CR	Compression Ratio

VII. REFERENCES

- [1] R K Singh, & Saroj k padhi, "characterization of Jatropha oil for the preparation of biodiesel", *natural product residence*, vol. 8(2), 2009, pp.127-132.
- [2] N. Stalin and H. J. Prabhu, "Performance test of IC engine using karanja biodiesel blending with diesel" *ARPN Journal of Engineering and Applied Sciences*, vol. 2, no.5, october 2007.
- [3] Oguntola J ALAMU, Opeoluwa Dehinbo and Adedoyin M Sulaiman, "Production and Testing of Coconut Oil Biodiesel Fuel and its Blend, *Leonardo Journal of Sciences*, Issue 16, January-June 2010 pp. 95-104
- [4] Praveen K. S. Yadav, Onkar Singh and R. P. Singh, "Performance test of palm fatty acid biodiesel on
- [5] Compression ignition engine", *Journal of Petroleum Technology and Alternative Fuels*, Vol. 1(1), November 2010, pp. 1-9.
- [6] Mohamed F. Al-Dawody, S. K. Bhatti, "Theoretical modeling of combustion characteristics and Performance parameters of biodiesel in DI diesel engine with variable compression ratio" *international journal of energy and environment*, Volume 4, Issue 2, 2013 pp.231-242.
- [7] D.R. Prajapati , Gurpreet Singh, "Effect of Blended Fuels on Specific Fuel Consumption at Varying Engine Loads Using CVCRM Engine Test Rig", *Int. Journal of Thermal & Environmental Engineering*, Volume 6, No. 2 (2013) 69-74.
- [8] Dinesha P , Mohanan P, "experimental investigations on the performance And emission characteristics of diesel engine Using preheated pongamia methyl ester as fuel", *International Journal of Advances in Engineering & Technology*, Nov. 2012, IJAET ISSN: 2231-1963.

VIII. AUTHOR'S BIOGRAPHIES



Dipak Virkar- Born on 3 Nov 1987 in Dhule. Obtained bachelor degree in Mechanical Engineering and M.Tech in Automobile from R.I.T, Sakhrale, Sangli, India. At present he is working as Asst. Professor in Automobile Engineering Department at Sanjeevan Engineering & Technology Institute, Panhala, Kolhapur India. His research interest includes Alternative fuel & emission, Vehicle Dynamic, internal combustion engine. He is the member of Society of Automotive Engineering.



Sachin Pisel.- Born on 21 May 1985 in Karad, India. Obtained Bachelor's degree in Automobile Engineering and M.E. CAD/CAM/CAE from R.I.T. Sakhral, Sangli, India. At present he is working as Asst. Professor in Automobile engineering department at Sanjeevan engineering and Technology Institute (S.E.T.I.) Panhala, Kolhapur India. His research interests include Fluid Mechanics, IC Engine, Heat transfer and computational fluid mechanics. He is the member and Faculty advisor of Society of Automotive Engineers (SAE).



ISSN: 2347-1697

International Journal of Informative & Futuristic Research (IJIFR)

Volume - 4, Issue -2, October 2016

Continuous 38th Edition, Page No: 5202-5210

To Cite This Paper

Virkar, D., Pisel, S.(2016): "Characterization Of Biodiesel On VCR Engine" *International Journal of Informative & Futuristic Research* (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5202-5210, Paper ID: IJIFR/V4/E2/030.



Dipak Virkar, Sachin Pisel :: Characterization Of Biodiesel On VCR Engine

5210

A STUDY ON LABOUR INVOLVEMENT WITH SPECIAL REFERENCE TO SEA FOOD INDUSTRY ERNAKULAM DISTRICT, KERALA

Paper ID	IJIFR/V4/ E2/ 032	Page No.	5211-5215	Subject Area	Management Studies
Keywords	Labour involvement, Involvement, Commitment, Seafood				

1 st	Renjith K.P.	Assistant Professor, Department of Management Studies, Siena College, Edacochin, Ernakulam
2 nd	John Christy T.L.	Assistant Professor, Department of Commerce , Siena College, Edacochin, Ernakulam
3 rd	Lakshmi K.R.	Siena College, Edacochin, Ernakulam

Abstract

Labour involvement is level of involvement and commitment on behalf of an employee's level of participation in their organization and its values. An involved employee is aware of business context, and works with colleagues for the benefit of the organization to improve performance within the job. This is a positive attitude towards the organization and its values held by employees. This research study is an effort to understand how labour involvement is associated with job satisfaction and how employee loyalty leads to better work force. The results show that majority of employees are in compliance with the organization which brings maximum involvement of the employees and in turn retaining the employees.

I. INTRODUCTION

Labour involvement is the level of commitment and involvement an employee has towards their organization and its values. An involved employee is aware of business context, and works with colleagues to improve performance within the job for the benefit of the organization. The organization must work to develop and nurture Labour involvement, which requires a two-way relationship between employer and employee. Thus Labour



This work is published under Attribution-NonCommercial-ShareAlike 4.0 International License

Copyright © IJIFR 2016

involvement is a barometer that determines the association of a person with the organization.

Engagement at work was conceptualized by Kahn, (1990) as the 'harnessing of organizational members' selves to their work roles. In engagement, people employ and express themselves physically, cognitively, and emotionally during role performances. The second related construct to engagement in organizational behaviour is the notion of flow advanced by Csikszentmihalyi (1975, 1990). Csikszentmihalyi (1975) defines flow as the 'holistic sensation' that, people feel when they act with total involvement. Flow is the state in which there is little distinction between the self and environment.

When individuals are in Flow State little conscious control is necessary for their actions. Engagement is most closely associated with the existing construction of job involvement (Brown 1996) and flow (Csikszentmihalyi, 1990). Job involvement is defined as,, the degree to which the job situation is central to the person and his or her identity (Lawler & Hall, 1970). Kanungo (1982) maintained that job involvement is a „Cognitive or belief state of Psychological identification. Job involvement is thought to depend on both need saliency and the potential of a job to satisfy these needs. Thus job involvement results form a cognitive judgment about the need satisfying abilities of the job. 'Jobs' in this view are tied to one's self image. Engagement differs from job as it is concerned more with how the individual employees his/her self during the performance of his / her job. Furthermore engagement entails the active use of emotions. Finally engagement may be thought of as an antecedent to job involvement in that individuals who experience deep engagement in their roles should come to identify with their jobs. When Kahn talked about labour involvement he has given important to all three aspects physically, cognitively and emotionally. Whereas in job satisfaction more importance has been given to cognitive side.

HR practitioners believe that the engagement challenge has a lot to do with how employee feels about the about work experience and how he or she is treated in the organization. It has a lot to do with emotions which are fundamentally related to drive bottom line success in a company. There will always be people who never give their best efforts no matter how hard HR and line managers try to engage them. "But for the most part employees want to commit to companies because doing so satisfies a powerful and a basic need in connect with and contribute to something significant".

II. REVIEW OF LITERATURE ON LABOUR INVOLVEMENT

- **Fred Luthansed (2001)-** A study an "employee engagement and manager self-efficacy". According to this study, first examine the theoretical understanding of the employee engagement. Then an empirical investigation is made of the role that a wide variety of the managers psychological a state of self – efficacy play in the relationship between the employees measured engagement and multiple measure of the manager effectiveness. Results of the statistical analysis indicate that the manager's self-efficacy is a partial mediator relationship between his and her employer's engagement and the manager rated effectiveness. Over all the finding and suggestion that the both employee engagement and

self-efficacy are important antecedents that together may more positively influence manager effectiveness than either predictor by itself.

- **Alan M. Saks (2006)** A study on "Antecedents and consequences of employee engagement" he conducted a survey among by 102 employees working in a variety of jobs and organizations. The average age was 34 and 60 percent were female. Participants had been in their current job for an average of four years, in their organization for an average of five years, and had on average 12 years of work experience. The survey included measures of job and organization engagement as well as the antecedents and consequences of engagement. Results indicate that there is a meaningful difference between job and organization engagements and that perceived organizational support predicts both job and organization engagement; job characteristics predicts job engagement; and procedural justice predicts organization engagement. In addition, job and organization engagement mediated the relationships between the antecedents and job satisfaction, organizational commitment, intentions to quit, and organizational citizenship behaviour.
- **Patricia Soldati (2008)** A study on "employee engagement". According to this report, twelve major studies on employee engagement had been published over the prior four years by top research firms such as Gallup, Towers Perrin, Blessing White, the Corporate Leadership Council and others. Each of the studies used different definitions and, collectively, came up with 26 key drivers of engagement. For example, some studies emphasized the underlying cognitive issues, others on the underlying emotional issues. Finally, there is some evidence that companies are responding to this employee engagement challenge - by flattening their chains of command, providing training for first-line managers and with better internal communications. Changes won't happen overnight, but with such significant upside to the bottom line - they might happen more quickly than you think
- **Dow Scott (2010)** A study on "The impact of reward programs on employee engagement" According to this study world at work is a global is a human resource association focused on compensation ,benefit ,work life and integrated total reward to attract, motivate and retain a talent workforce ,Founded in 1955 world at work provided network of nearly 30000 members in more than 100 countries with training certification , research, conference, and community .
- **Dr. P. Vaijayanthi (2011)** A study on " Employee Engagement predictors: A study at GE Power & Water " The findings of the study confirm infrastructure , cross functional discussions , communication & interaction with the corporate office employees , reflection on the feedbacks and proper support and orientation through induction programs, to foster employee engagement, and inadequate interaction with peers from other locations/offices, lack of accountable response from the corporate office for issues including dearth of personnel, employee facilities , deficient communication regarding seminars, workshops, and other training sessions from the corporate office , and inadequate visits by the business team to be the stumbling blocks to better employee engagement.

III. OBJECTIVES OF THE STUDY

- To study the various factors that determines labour involvement in the seafood industry.
- To provide suitable suggestions for improving labour involvement in the seafood industry.

IV. METHODOLOGY

The study is conducted at Sea Food Industry at Ernakulam District, Kerala. The sample size is 50 selected using simple random sampling. The data is collected through questionnaire, and has been tabulated and analyzed by using simple Percentage and correlation.

V. ANALYSIS, FINDINGS AND INTERPRETATION

1. 30% of the respondents belong to the age group between 36-40 years.
2. 32% of the respondents are Diploma holders.
3. 24% of the respondents are having more than 10-25 years of experience.
4. 54% of the respondents are getting remuneration of above 10000.
5. 28% of the respondents are satisfied with the infrastructure in their company.
6. 38% of the respondents are neither satisfied nor dissatisfied about recognition in their company.
7. 56% of the respondents opine that their suggestions are considered in decision making.
8. 32% of the respondents opine that frequently chance has been given to improve skill and knowledge.
9. 60% of the respondents agreed that training programs are conducted in their company.
10. 86% of the respondents agree to adequate information in their company.
11. 76% of the respondents opine that they are happy with the co-workers.
12. 82% of the respondents are feeling happy to come to workplace.
13. 79% of the respondents are highly satisfied with the overall functioning of the organization.

Table 1: The Relationship between Remuneration and the Recognition given by the Management.

Correlation		Remuneration	what is your suggestion about the recognition given by the management
Remuneration	Pearson Correlation	1	.139
	Sig. (2-tailed)		.335
	N	50	50
what is your suggestion about the recognition given by the management	Pearson Correlation	.139	1
	Sig. (2-tailed)	.335	
	N	50	50

Interpretation

The above table shows the result of the correlation calculated to find whether significant relationship between Remuneration and the recognition given by the management is. As the $p=0.139$, greater than level of significance of 0.05 There is no relationship between Remuneration and recognition of the respondents.

VI. RECOMMENDATIONS

- ✓ The management provides sufficient training to employees. A few measures can be taken to develop and organize the training program.
- ✓ The employee's works are being recognized by the management and appreciated. It can be maintained in such a way that the employees morale will be improved.
- ✓ Need to improve the working environment
- ✓ A few measures can be taken to revise regarding pay and benefits.
- ✓ Team performance must be highly encouraged and recognized.

VII. CONCLUSION

Labour involvement is the buzz word term for employee communication. It is a positive attitude held by the employees towards the organization and its values. It is rapidly gaining popularity, use and importance in the workplace and impacts organization in many ways. Labour involvement emphasizes the importance of the communication on the success of the business. An organization should thus recognize employees more than any other variable, as powerful contributors to a company's competitive position. Therefore labour involvement should be a continuous process of learning, improvement, measurement and action.

VIII. REFERENCES

- [1] Seijts, Gerard H. and Dan Crim (2006). "The Ten C's of Employee Engagement". Ivey Business Journal.
- [2] Seafood Export Journal (March 2016). Employee Engagement Report 2015.
- [3] Konrad, Alison M. (March 2006). "Engaging Employees through High-Involvement Work Practices". Ivey Business Journal. "Engage Employees and Boost Performance". Hay Group. 2002. Archived from the original on 2006-11-23.
- [4] Robinson, Dilys and Sue Hayday (2003). "Employee Engagement". In Brief (129).
- [5] C.R. Kothari "Research Methodology" Wishva prakashnan 2001
- [6] <http://www.employment-studies.co.uk/news/129theme.php>.
- [7] <http://web.ebscohost.com/>

To Cite This Paper

Renjith, K.P., John Christy, T.L., Lakshmi, K.R. (2016): "A Study On Labour Involvement With Special Reference To Sea Food Industry Ernakulam District, Kerala" International Journal of Informative & Futuristic Research (ISSN: 2347-1697), Vol. 4 No. (2), October 2016, pp. 5211-5215, Paper ID: IJIFR/V4/E2/032.