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Innovation The Research Concept

Application of Conformational Studies to The Configurational Assignments of The Diels-Alder Adducts

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Abstract

Conformational studies are all most invariably made by physical methods such as X-ray, electron diffraction dipole moment, micro wave and other spectroscopy measurements.X-ray diffraction is one of the well development methods for the determination of structure of a molecule. Although X-ray diffraction patterns established the conformation of a compound, the utility of a technique is limited because a complication involved in analysis of such patterns and technique provides structural information of a compound only in crystalline state because it is not same in liquid state.

In the electron diffraction method the weak molecular scattering which is used to determine the molecular structure, is identified carefully from the strong atomic scattering and campared with the calculated pattern of different possible structures. This method is best applied to the compound in gaseous phase. The dipole moment of a compound may be utilized to estimate the conformational exchanges involved in the compound in solution. The equilibrium constant can be evaluated from the experimental value of the dipolemoment and calculated value of the different conformers.

This method is very useful in the study of rotational isomerism. Change of temperature leads to a change in the proportion of the isomers and thus to a change in effective dipole moment. Vibrational, IR and Raman spectroscopy have also been successfully applied to the structural studies. Fundamentaly these methods are based on the determination of symmetry classes of molecules, a correct structure can be picked up by comparing the spectroscopically determined symmetry class of a compound with those of different possible structures of that compound.

Microwave spectroscopy is one of the most applied technique for the determination of the conformational barriers, particularly when the energy barriers are less than 5 kcal/mol like those in ethane which can easily be determined from the intensity of rotational absorption bands. During recent years extensive use of high resolution NMR spectroscopy has been made to study the conformational changes in both cyclic and acyclic molecules. Barriers to various rate processes have been determined in the range of 5-25 kcal/mol. Such large barriers include stereoelectrically hindered rotation about single bond and partial double bonds, hindered inversion of atoms like N, S etc. and strained ring inversion.

The lower limit of temperature attainably with the available commercial NMR instruments in still too high for appreciable slowing down of the conformational rate processes for system possessing barriers less than 5 kcal/mol. A compound in which the rate of conformational exchanges is considerably slow on the NMR time scale gives rise to the spectra characteristics of all the different conformers present in that compound. But as the rate of conformational exchange are increased by raising a temperature above a certain level. A compound shows only a time averaged spectrum of all the conformers.

Keywords Naphthalene, Diels-Alder, Endo-Exo, H1NMR Spectroscopy, IR Spectroscopy. UV Spectroscopy.

Introduction

In organic chemistry, the Diels – Alder reaction is a chemical reaction to form a substituted cyclohexene derivative between a conjugated diene and a substituted alkene, commonly referred to as the dienophile. It is the prototypical example of a concerted mechanism of a pericyclic reaction. The Diels-Alder reaction is a cycloaddition of a 4 pi + 2 pi (diene + dienophile) system which creates a more stable substance because of the sigma bonds that have been formed are more stable than the pi bonds that have been broken. A diene or dienophilic is that (diene is an organic compound), particularly a hydrocarbon, containing two double bonds whereas dienophilic is a compound which readily reacts with a diene, in general an alkene in the diels-alder reaction. The reaction is highly stereospecific and is mentioned as a (π4s+π2s) process. This technique involves certain advantages over other physical methods employed for configurational assignments. Experimentally this technique is simple and straight forward & also avoids skeletal rearrangements (Scheme I). The testing probe is held directly over the dienyl part of the adduct & provides a clear picture of the cage magnetic envitonments of the endo exo cage moieties of the adducts could be utilized for structural assignments. The endo/exo may be helpful in eatablishing the configuration when one comprises the spectral patterns of the two isomeric adducts. But in certain cases one of the isomeric adduct may not be available and then this technique would be more helpful in configurational assignments.

“ Diels – Alder reaction is one of the most useful of synthetic reactions.”
(Robert B.Woodward (1965) Nobel Prize in Chemistry)

“ The Diels – Alder reaction is one of the most important and fascinating transformations in Chemistry and continue to surprise, excite, delight and inform the chemical community.”
Elias J. Corey (1990) Nobel Prize in Chemistry)

Aim of study

The aim of research is overall purpose of conducting the Research. It could be to add to the knowledge in the area, to address an existing gap in the knowledge, to devise and test a solution to an existing problem.

Review of Literature

The last 15 years have seen an explosive growth in applications of the Diels-Alder reaction, principally the intermolecular (IMDA) reaction but also the transannular (TADA) version. In this review we present these developments with special emphasis on the stereo chemical concepts and the experimental results and include related theoretical studies.

Main Text

60 MHz ^{1}H NMR Spectrum of N^1-diacetyl-N-Aminoimide of Naphthalene-Maleic Anhydride endo and exo Adducts in $CDCl_3$

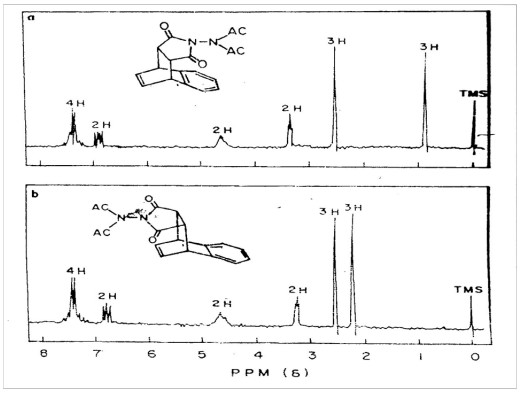
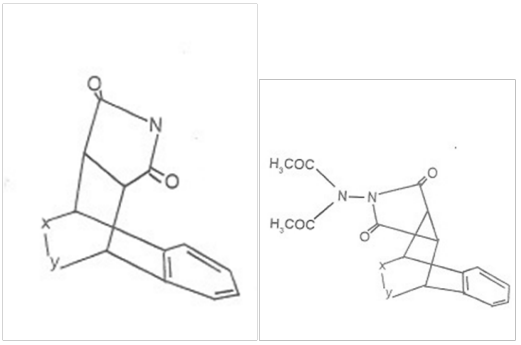
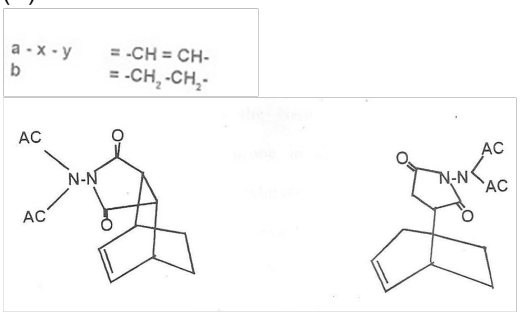


Figure : 1



(1) (2)



(3) (4)

Figure : 2

Methodology

This technique involves certain advantages over other physical methods employed for configurational assignments. Experimentally this technique is simple and straight forward & also avoids skeletal rearrangements The testing probe is held directly over the dienyl part of the adduct & provides a clear picture of the cage magnetic envitonments of the endo exo cage moieties of the adducts . Adducts could be utilized for structural assignments. The endo/exo may be helpful in eatablishing the configuration when one comprises the spectral patterns of the two isomeric adducts. But in certain cases one of the isomeric adduct may not be available and then this technique would be more helpful in configurational assignments. The chemical methods used for configurational assignments are quite laborious and gives many side reactions e.g. rearrangements etc., where the identification of the products becomes difficult. Therefore chemical methods may not yield fruitful results regarding the configurational identification

Tools Used : H1NMR spectroscopy, IR Spectroscopy. UV Spectroscopy.

Result and Discussion

The conformational studies of a series of N^1-(diacetylamino) – imide derivatives of endo and exo adducts of cyclic dienes and maleic anhydride have elegant method of determination of configuration of the Diels-Alder adducts[1-9]. Since the N^1-(diacetylamino) imide system assume a non planar conformation about the N-N bond at room temperature. The N^1-(diacetylamino)-imide system could be a sensitive probe when there is a large magnetic asymmetry about the plane of the diene and dienophile linkage, such as adducts of naphthalene and its derivatives with maleic anhydride (1) and (2). In the spectrum (fig. 1) of one of the isomeric adducts (1a), the two acetyl signals are separated by 1.65 ppm appearing at δ0.90 & δ2.55 while in the other (2b) appear at δ2.20 and δ2.33 (δ-.13 ppm). The appearance of the acetyl signal at a very high field could be due to the large expected magnetic anisotropy of the benzo ring in the endo-adduct. Thus (1) was assigned the endo (2) & the exo configuration. The similarty in the chemical shift values of acetyl groups in N, N-diacetyl-N-amino 1,2,3,4 – tetra hydro, 4-ethanonaphthalene – 2, 3- exo dicarboximide (1a) and (2b) suggested that the magnetic influence of olefinic and ethylenic bridge on the N^1-actyl groups are

very much similar, hence it became very difficult to assign the configuration of endo and exo products (3) and (4) on the basis of δ values of N^1 -diacetyl groups.

Conclusion

The aim of this experiment was to explain the stereochemistry of Diels-Alder adduct of N1-diacetyl-N-Aminoimide of Naphthalene-Maleic Anhydride (endo and exo) by conformational and configurational assignments.

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References

1. H.H. Engelhard, M. Egi and J.m. Rozental, Red Neuro surgery, 28, 279 (1998).
2. K.C. Niacolaou, D. Vourloumis, N, Winssinger and P.S. Baran, Angew, Chem.. int. ed. Engl. 39, 44 (2000).
3. P.K. Ghose, P. Kumar and K. C. Gupta, J. Ind. Chem.. Soc., Vol. 77, pp. 109-132 (2000).
4. U. Kaznaier and A. Krebs, Tetrahedron Lett., Vol. 40, 479 (1999).
5. J.B. Hendrickson, D.L. Crem and G.S. Hommond, “Organic chemistry”, McGraw Hill, 3rd Ed., Int. student Ed., Chpt. 6, New York (1970).
6. H. Kulinowski and H. Kesseler, Top. Stereochem., 7, 295 (1973)
7. A. S. Kende, P. T. Izzo And W. Fulmor, Tetrahedron Lett., 3697 (1967).
8. T. Ficher And N. Pelz, Chem Ber., 103, 2647 (1970).
9. H. Kesseler And A. Ricker, Tetrahedran Lett., 5257 (1966).

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Innovation The Research Concept

Anaerobic Work Capacity and Body Composition in Relation to Performance in Selected Athletic Events

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Abstract The purpose of the study was to find out the relationship of body composition in term of body fat percentage in selected Athletic events i.e standing broad jump, 100 meters, shot put and to see the relationship between anaerobic work capacity and body composition, lastly to see the relationship of anaerobic work capacity with the performance in selected athletic events . The body composition variables were size (height and weight) and percent body fat. The present study was conducted on 80 male subjects, who were standing different physical education courses at Government college of Physical Education, Patiala and Department of physical education, Punjab University, Chandigarh. The mean age of the subjects was 24.39 years ranging from 19.33 to 34.33.

Keywords Anaerobic Work, Capacity, Body Composition.

Introduction

The physical characteristics play a significant role in the performance in sports. The physical characteristics are related to two areas namely the body constitution and body composition. The former deals with the structure of a supposedly unchangeable frame, while the later deals with the analysis of the existing composition or changes in composition within that frame. The bulk of shot putter, the muscularity of weightlifter and the leanness of the distance runner are a few examples of the relationship between structure and function which although lacking in quantification, are readily apparent to all who have been spectators of sports by virtue of their keen interest in the filed of games and sports. Truly speaking, human bio-type is the compound of morphological, functional and psychological characteristics. Coaches, physical education teachers, psychologists, medical experts and scholars from other fields have shown their interest in finding out relationship of factors related to their respective areas in order to help their athletes by their technical advice enabling them to further improve their performance. The scientists, however, have failed in their efforts as the new concepts have emerged out of consistent research and improved technology. Today, the concept of interaction of morphological, functional and psychological characteristics is well-recognized. It has been emphasized that in the research of athletes biotype the morphological profile (somatotype and body composition) must be related to those of functional (ergo type) and psychological (psyeho type), One's. It is further conceived that the findings of such investigations can help in defining for each sports discipline the ideal type or champion.

Body composition has been found related to performance and physical activity, in turn also effects the body composition. Studies have also been conducted to find out relationship of body composition to a number of physiological factors, but no effort seems to have been made to evaluate body composition and to find out its relationship with anaerobic work capacity and performance in the track and field events simultaneously.

Aim of study

1. To find out the relationship of body composition in term of body fat percentage in selected athletic events.
2. To study the relationship between anaerobic work capacity and body composition.
3. To examine the relationship of anaerobic work capacity with the performance in selected athletic events.

Review of Literature

Ackland T.R, et.al. (2012) The purpose of the study was to analyze the current status of body composition assessment in sport on behalf of the Ad hoc research working group on body composition health and performance, under the auspices of the I.O.C. medical commission. He found that there is no universally applicable criterion or 'gold standard' methodology for body composition assessment. Having considered issues of accuracy, repeatability and utility, the multi-component model might be employed as a performance or selection criterion, provided the selected model accounts for variability in the density of fat-free mass in its computation. However, when profiling change in interventions, single methods whose raw data are surrogates for body composition (with the notable exception of the body mass index) remain useful.

Battinelli (2010) The purpose of this study was to analyze the anthropometry and body composition associated with performance of university level male track and field athletes of South India. This study was conducted on 93 track and field athletes from South India, comprised of 22 sprinters, 20 middle distance runners, 16 long distance runners, 20 throwers and jumpers, Besides height and weight, six skin folds were measured. Somatotype evaluations were made according to Carter and Heath (1990) method. BMI was calculated as body mass divided by square of height (kg/m2). The somatochart indicated that sprinters and middle distance runners are ectomorphic mesomorphs, long distance runners are mesomorph ectomorphs while throwers are endomorphic mesomorphs. The jumpers fell into the somatotype category of balanced mesomorphs. Among all groups body fat percent is lowest in sprinters (6.23±0.83%) and highest in throwers (7.38±0.85%). This was reflected in their endomorphic components which is lowest in sprinters (2.53±0.45) and highest in throwers (3.39±0.65). Ectomorphic component is highly marked in long distance runners (3.56±0.65) while mesomophy was highest in sprinters (4.31±0.91). Throwers have significantly higher values of skin folds than other groups. Compared to their overseas counterparts, the athletes of both track and field events in the present study exhibited greater endomorphic values.

Larsson P, Henriksson Larsen K (2008) The purpose of this study was to investigate the relationships between body composition and performance in cross-country skiing. Ten male college-aged elite cross-country skiers (17.9 yrs; S 1.0 yrs) participated in a 5.6-km cross-country skiing time trial and in dual energy X-ray absorptiometry (DXA, Lunar DPX-L, Madison, WI, USA) body composition measurements. A differential global positioning system (dGPS, GPS 12 CX, Garmin Int. Inc., Olathe, KS, USA; RXMAR 2, Aztec SA, Strasbourg, France) was used to compute speed in different sections of the course. Spearman correlation analyses were applied. Total body weight and absolute lean body mass were significantly related to final time ($r = - 0.721$; $p < 0.05$ and $- 0.830$; $p < 0.01$, respectively). Absolute lean arm mass (kg) was negatively correlated to final time ($r = - 0.648$; $p < 0.05$) and the relative lean arm mass was significantly related to speed mainly in uphill sections ($r = 0.636$ to 0.867; $p < 0.05$ to $p < 0.01$). We suggest that large amounts of lean body mass, especially in the arms, seem to be of great importance for cross-country skiing performance.

Ostojic S. M., Stojanovic M.D. (2010) A cross-sectional study was conducted in a random sample of 10 elementary schools. The study participants were a 170 healthy fifth-grade elementary school boys aged 11.9±0.4 years. Anthropometric data (height, body mass, waist circumference, abdominal skinfold thickness) were collected according to standard procedure. Aerobic fitness (VO2max) was assessed with the multistage shuttle-run fitness test. He found that waist circumference, abdominal skinfold thickness and total body fat were lower while muscle mass percentage was higher in overweight boys with high aerobic fitness in comparison with boys at the same BMI category with low fitness level ($P<0.05$). Aerobic fitness was inversely correlated with body fat in the whole group of subjects ($r=-0,57$, $P<0.05$), with particularly high correlation between VO2max and muscle mass in overweight boys ($r=0.68$, $P<0.05$).Indicators of local and total adiposity were lower in boys with high aerobic fitness. It seems that high aerobic fitness has is positively associated

with body composition in overweight boys.

Stoggl T. et. al. (2010) The aims of this study were to ascertain the anthropometric characteristics of world-class sprint skiers and to evaluate whether a specific body composition and/or body dimension characterizes a successful sprint skier. Fourteen male national and international elite skiers performed two peak speed tests in double poling and diagonal stride roller skiing on a treadmill and were analysed using dual-energy X-ray absorptiometry to determine body composition and body dimensions. Relative pole length was positively correlated with both techniques (double poling: $r = 0.77$, $P < 0.01$; diagonal stride: $r = 0.60$, $P < 0.05$) and was the only variable that was part of the multiple regression model for both double poling and diagonal stride peak speed. Body height was not correlated with any technique, whereas lean trunk mass ($r = 0.75$, $P < 0.01$), body mass index ($r = 0.66$, $P < 0.01$), total lean mass ($r = 0.69$, $P < 0.01$), and body mass ($r = 0.57$, $P < 0.05$) were positively related to double poling peak speed. Total lean mass (absolute: $r = 0.58$, $P < 0.05$; relative: $r = 0.76$, $P < 0.001$) and relative lean mass of the trunk, arms (both $r = 0.72$, $P < 0.01$), and legs ($r = 0.54$, $P < 0.05$) were positively related to diagonal stride peak speed. In conclusion, skiers should aim to achieve a body composition with a high percentage of lean mass and low fat mass. A focus on trunk mass through increased muscle mass appears to be important, especially for double poling. The use of longer poles (percent body height) seems to be advantageous for both double poling and diagonal stride peak speed, whereas body dimensions do not appear to be a predictive factor.

Main Text

Design and Procedure- The main purposes of the present study were: to find out relationship of body composition in terms of body-fat percentage with performance in the events of 100 meters, standing broad jump and putting the shot; secondly, to see if body composition had any relationship with anaerobic work capacity and lastly to see the relationship of the anaerobic work capacity with the performance in the events of 100 meters, standing broad jump and putting the shot. The study was designed to find out the association of body composition with anaerobic work capacity (power) of body composition with performance in selected track and field events including with performance in selected track and field events including standing broad jump, 100 meters and shot put and of anaerobic work capacity with the performance in aforesaid athletic events. The body composition variables were size (height and weight) and percent body fat.

The study was conducted on 80 males subjects undergoing Teachers Training Course in physical education at Punjab Govt. College of Physical Education, Patiala and Department of Physical Education, Punjab University, Chandigarh during the session 2014-15. The mean age, weight of the subjects was – 24.39 years, 63.53 kg and 68.09 inches respectively.

Methodology After the collection of data appropriate statistical tools were employed for describing the results and also their interpretation. Statistical correlation like Mean, standard Deviation, standard error of mean, standard error of standard Deviation, and zero order co-efficient of correlation were worked out for the entire sample in order to compare the association of performance scores obtained in 100 meters, putting the shot and standing broad jump with body composition and anaerobic work capacity. In order to determine the significance of the correlation the 't' value were also worked out. The height of the subjects was recorded to nearest .05 inch with the help of standard steadiometer the weight was taken with the help of a standard weighing machine in bathing suit i.e. with a short only. The weight was recorded to the nearest 0.5 pound and the percent body fat was obtained with the help of sloan-weir nomogram using the measurements from thigh and subscapular skin-folds thicknesses. The measurement techniques prepared by Heath and carter were followed. The power in which an individual ATP-PC system is employed, was obtained from the performance of sargent jump (vertical jump) and the power (anaerobic work capacity) was determined with the help of Lewis-nomogram taking jump reach score and body weight into account (Mathews and Fox, 1976). The performance in athletic

events was adjudged on the college track observing all normal rules of the events.

Analysis

Keeping in view the purpose of the present study, the data obtained by best available methods on various variables of body composition, performance and anaerobic work capacity very classified, organized, analyzed and statistically treated as per requisition. Zero-order correlations were obtained for the entire sample to compare the association of performance scores in the events of 100 meters, shot put, standing Broad jump, with anaerobic work capacity, age and measure of body size and composition. Means, standard Deviations and range of all the variables included in the study are presented in the Table no. I.

Zero-order correlation coefficients for body composition measurements with physical performance scores and power (anaerobic work capacity) are presented in Table no. II.

Table No. 1

Showing Mean SD and Range of Age, weight composition variables anaerobic work capacity and Athletic events (N = 80)

Variable	Mean	SD	Range
Age	24.39	2.97	19.33 to 34.33
Weight	63.54	2.07	51.00 to 80.00
Height	68.09	2.62	63.00 to 75.00
Fat	11.01	3.54	5.75 to 24.00
Power	99.75	17.04	77.00 to 190.00
Vertical Jump	19.45	2.58	14.00 to 25.00
Broad Jump	92.84	6.58	81.00 to 105.5
100 meters	7.00	0.37	6.1 to 7.7
Shot Put	281.48	41.21	205 to 439

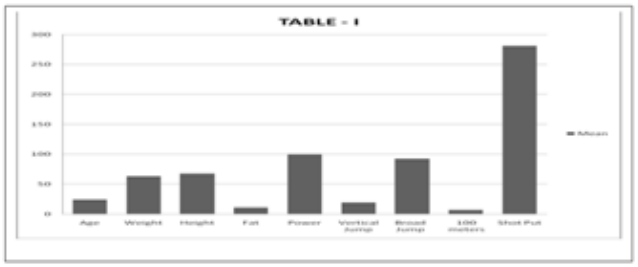


Table No. II

Showing Zero-order correlation coefficients for body composition measurements with physical performance scores and power (anaerobic work

capacity)

	Age	Weight	Height	Fat	Power	Vertical	Broad	100m	Shot put
Age	-	+.075	-.089	+.170	-.049	-.185	+.155	-.091	+.019
Weight	-	-	+.637	+.470	+.636	+.202	+.160	-.134	+.536
Height	-	-	-	-.052	+.598	+.245	+.346	-.196	+.338
Fat	-	-	-	-	+.165	+.105	-.277	-.008	+.114
Power	-	-	-	-	-	+.252	+.303	-.131	+.471
V. Jump	-	-	-	-	-	-	-.138	-.017	+.106
B. Jump	-	-	-	-	-	-	-	-.172	+.429
100 mtr	-	-	-	-	-	-	-	-	-.137
S. Put	-	-	-	-	-	-	-	-	-

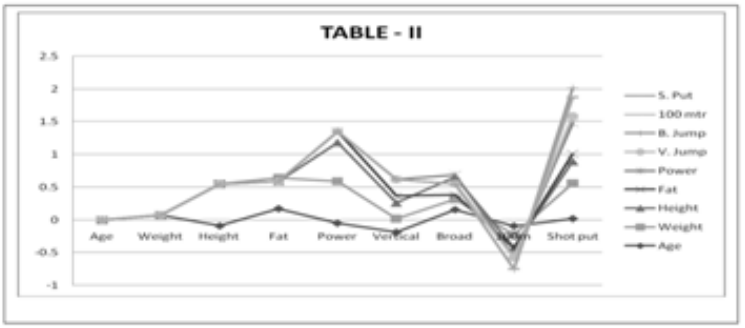


Table III

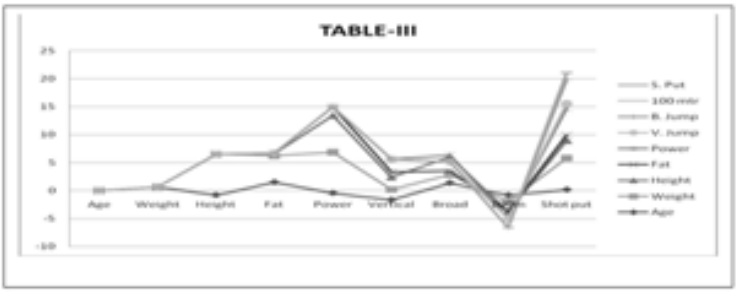
t-value for the body composition variables anaerobic work capacity and physical performance variables (N=80)

	Age	Weight	Height	Fat	Power	Vertical	Broad	100m	Shot put
Age	-	0.66	-0.79	1.52	-0.43	-1.66	1.39	-0.81	0.17
Weight	-	-	7.30*	4.70*	7.28*	1.82	1.43	-1.19	5.61*
Height	-	-	-	0.46*	6.59*	2.23	3.26*	-1.77	3.17*
Fat	-	-	-	-	1.48	0.93	-2.55**	0.07	1.01
Power	-	-	-	-	-	2.30	2.81*	-1.17	4.72*

V. Jump	-	-	-	-	-	-	-1.23	-0.15	0.94
B. Jump	-	-	-	-	-	-	-	-1.54	4.19*
100 mtr	-	-	-	-	-	-	-	-	1.22
S. Put	-	-	-	-	-	-	-	-	-

***2.58 significant at .01 level**

****.195 significant at .05 level**



Result and Discussion

on the basis of the data statistically treated and analyzed it is concluded that the size including weight and height are positively correlated with anaerobic work capacity which means that as weight and height increase the power also increases.

The variable of percent body fat did not show significant correlation ship with anaerobic work capacity which means that more the fat of an individual less the anaerobic work capacity. Hence it is desirable that the fat is decreased by proper methods of training and conditioning by proper methods of training and conditioning to have success in the athletic events of power.

Anaerobic work capacity effects the performance in the events of standing broad jump, 100 meters sprint and the shot put. The V.J.P. had positive correlation with the performance in standing broad jump and shot put showing that if power increases the performance in the two events is also increased. The anaerobic work capacity was found to be negatively correlated with the performance in 100m sprint showing that as the power increase the performance in sprint is better.

It can be summarized that extra subcutaneous fat affects the anaerobic work capacity and the performance in the athletic events of power adversely. Also, the performance in the athletic events of power is improved with the improvement of anaerobic work capacity. Hence, the success in the athletic events of power can be predicted by putting the athletes to sargent jump test and working out their power with the help of Lewis nomogram.

Conclusion

After Determine the significance of the correlation of ‘t’ value it is observed that extra subcutaneous fat affects the anaerobic work capacity and the performance in the athletic events of power adversely. Also, the performance in the athletic events of power is improved with the improvement of anaerobic work capacity. Hence, the success in the athletic events of power can be predicted by putting the athletes to sargent jump test and working out their power with the help of Lewis nomogram.

Suggestions for the future Study

The following recommendations can be had from the study.

1. The present study had been conducted on male subjects only. It is suggested that in order to confirm the results of the study, similar study may be conducted on females also.
2. The number of subjects had been small hence it is suggested that further studies should be undertaken to cover more population and to confirm such results.
3. The present study was conducted to find out the association of anaerobic work capacity with only three events. It is suggested that such association may also be verified with other similar athletic events.
4. The anaerobic work capacity was obtained with the help of lewis formula only. It would be better if other test of anaerobic work capacity like that of Margaria Kalaman power test is also applied to verify the accuracy of the scores of power.
5. It is suggested that the association of body composition with anaerobic work capacity of the athletes participating in the events of endurance and with their physical performance may also be investigated.

References

1. Ackland T.R, et.al. (2012) Current status of body composition assessment in sport; Sports Med. Mar.1:42(3):227-49.
2. Battinelli (2010), Indian Journal of Science and Technology Research article “Anthropometry of Indian athletes” George Abraham. Vol. 3 No. 12 ISSN: 0974- 6846.
3. Burke L. M., G. Millet, and M. A. Tarnopolsky (2007), Nutrition for distance events Journal of Sports Sciences 25 Suppl 1: 29-38.
4. Burke L. M. (2001), Nutritional practices of male and female endurance cyclists Sports Medicine 31: 521-32.
5. Chauhan, M.S. Sehgal, Subash., Yadav, Dinesh. (Jan, 2003) “Prediction of sprinting ability of secondary school boys of Haryana in relation to their anthropometric measurements.” Sports Authority of India, NSNIS Patiala.
6. Chauhan, M.S. (July, 2003) “Correlation between selected anthropometric variables and middle distance running performance”. Sports Authority of India, NSNIS Patiala.
7. Chauhan, M.S. (2004), "Prediction of Performance of University Throwers in relation to their Anthropometric measurements." Journal of sports and sports sciences. 26 (2):30-35.
8. Gil, S.M., J. Gil, F. Ruiz, A. Irazusta, and J. Irazusta (2007) “Physiological and anthropometric characteristics of young soccer players according to their playing position: relevance for the selection process”. Journal of strength and conditioning research: the research journal of the NSCA, ISSN 1064-8011, Vol. 21, Nº. 2, p. 438-445.
9. Gopinathan, P and Helina, G. (2009) : Correlation of selected anthropometric and physical fitness variables to handball performance. Journal of sports and sports sciences, 32(1): 25-30.
10. Larsson P, Henriksson Larsen K (2008) Body composition and performance in cross-country skiing. Int J Sports Med. Dec;29(12):971-5.
11. Latt, E. Jurimae, J., Haljaste, K., Cicchella, A., Purge, P., Jurimae, T. (2009) “Anthropometrical parameters and body composition influence swimming performance in young swimmers”. 14th annual Congress of the European College Of Sport Science Oslo/Norway, June 24-27. p 568.
12. Meckel, Y, Machnai, O, and Eliakim, A. (2009) : Relationship among repeated sprint tests, aerobic fitness, and anaerobic fitness in elite adolescent soccer players. J Strength Cond Res 23(1): 163–169.
13. Okely A.D, Booth M.L, Chey T (2004) Relationship between body composition and fundamental movement skills among children and adolescents. Rea Q Exerc Sport. Sep; 75(3):238-47
14. Ostojic S. M., Stojanovic M.D. (2010) : High aerobic fitness is associated with lower total and regional adiposity in 12-year-old overweight boys. Journal of Sports Medicine and Physical Fitness December; 50(4):443-9.
15. Sallinen J., Ojanen T., Karavirata L., Ahtiainen J. P., Hakkinen K. (2008) : Muscle mass and strength, body composition and dietary intake in master strength athletes

vs untrained men of different ages. The Journal of Sports Medicine and Physical Fitness June; 48(2):138-42.
15. Stoggl T. Enqvist J. Muller E. Holmberg H.C. (2010) Relationships between body composition, body dimensions, and peak speed in cross-country sprint skiing J Sports Sci. Jan;28(2) : 161-9.

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Review on: Image Restoration Using LRMR and SVM

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Abstract Typically, Contrast stretch is followed by tonal restoration in image restorations, though those can be completed in one step. Process of restoration is non-linear optimisation problem. By altering settings of a unique extension of a local restoration method, in order to improve the contrast and detail in an image, the recommended LRMR seeks to maximize an objective wellbeing metric. Restoration is used as base for enhanced field development, LRMR with SVM, in this paper. We will discuss about natural biogeography and its mathematics before examining at how may it be used to resolve optimisation problems.as we can see SVM, like additional optimisation strategies based on biology like Genetic Algorithm and particle swarm optimisation, has features as a classifier. As a result, SVM is appropriate for a lot of same problems, including high-dimensional problems with many local optima, for which GAs and PSO are used.

Keywords (SVM)Support Vector Machine, Image Restoration, and (LRMR) Low Rank Matrix Recovery.

Introduction

The term "optimization" refers to a method of making any design or choice as efficient as feasible. In order to extract the best solution, various optimization approaches have been applied. Optimization techniques include LRMR (Low Rank Matrix Recovery), PSO (Particle Swarm Optimization), and GA (Genetic Algorithm). We employ LRMR and SVM techniques in this Paper. LRMR is probability method used for resolving a variety of issues including blurriness, MSNR, and MPSNR that may be summarized to finding effective ways across graphs. Although actual ants are blind, they have ability to locating the fastest way from a food source to their colonies by utilizing a liquid known medically as pheromone, which they release along the route. In swarm intelligence methods, this algorithm belongs to the ant colony algorithms family and met some smart optimisations. LRMR is a population based, comprehensive Research strategy for the solution of difficult ongoing issues, pheromone track laying activity of realistic ant colonies promotes. As in artificial ant colonies, ant behavior is used to find approximate solutions to discrete optimization problems, continuous optimization problems, and important telecommunications challenges like routing and load balancing. Marco Dorigo first proposed the approach in his PhD thesis in 1992, based on the behaviors of ants looking for a path between their colony and a food source in order to discover the optimal route in a network. The LRMR conceptual is a colony of artificial ants that contributes in the finding of good solutions to difficult discrete optimization problems. The alternative is just to distribute computing resources such as group of basic creatures ‘artificial ants’ who interact through indirect means. The agents' cooperative interaction produces good solutions as an emergent characteristic. Since, the original idea has expanded to address a broader range of numerical problems, leading to the emergence of a number of new problems based on various aspects of ant behavior. The basic underlying idea is that of parallel research over numerous constructive computational threads based on local issue data and a dynamic memory structure including information on the quality of previously obtained results, which is informally inspired by the behavior of actual ants. Combinatorial optimization issues have been solved using collective behavior that emerges from interaction of multiple search links. The developed AS strategy attempts to simulate the behavior of real ants by adding

several artificial characteristics like visibility, memory, as well as discrete time to successfully solve many complex problems such as the travelling salesman problem (TSP), vehicle routing problem (VRP), and best path planning. Even though the LRMR algorithms have seen numerous changes over the years, their essential the ant behavior mechanism, A colony of ants has demonstrated a positive feedback Process, remains the same. The Ant's algorithm is used several networking apps, including communication as well as electricity supply networks.

IMAGE RESTORATION(IR)- Image restoration's main goal is to process a given image in such a way that the end result is better suited for a certain application than the actual Image. To make a visual display more beneficial for presentation and analysis, it highlights, sharpens image features like borders, boundaries and contrast. The restoration does not improve the data's underlying information quality, but it does expand the dynamic range of the selected characteristics, making them more clearly visible. Because establishing the objective for restoration is the most challenging aspect of IR, a huge amount of IR systems is observed and involve interactive procedures to get appropriate results. Techniques in the spatial or frequency domain can be used to restore images. In this paper, we use both methodologies to achieve the goal of IR.

Aim of study

The objective of the study is-

1. To restore an image with the amalgamation of low rank matrix recovery and SVM algorithm.
2. To restore images efficiently from different origins and captured at distinct focal length so as to obtain vast amount of information.
3. To evaluate degree of restoration using BER, Entropy, SSIM, PSNR and MSE.

Review of Literature

H. Fan, J. Li, Q. Yuan, X. Liu, M. Ng (2019) This paper [1] quantitatively evaluates results of the different Image Processing techniques in the simulated experiments. In this research it was concluded that Gaussian noise, stripes and deadlines can be removed from any image by using LRMR technique. This method has achieved a promising result by taking into consideration the relation between spectral and spatial dimensions of HSI.

Reginald L. Lagendijk and Jan Biemond (2019) This book describes in detail about the various processes of the image restoration. It also describes importance of restoration of images [2]. The main focus of this book is on the improvement of medical images of any human being.

R. Wang, Wei Li, Rui Li , Liang Zhang (2019) Using Support Vector Machines (SVM), this research suggests describing the blur type category of digital images [3]. Every image is subjectedto one of 3 types of blur: motion, defocus, and haze. 35 blur features are created using transform domains and image spatial information in this proposed methodology.

T.Ince (2019) Presented a mixing prior model for the spatial and spectral regions that takes advantage of the variation in HISs in spatial and spectral regions [4].

S.Bourennane,C.Fossati, Lin (2018) Demonstrated the PARAFAC model, which developed a model using a dynamic multilinear algebra model known parallel analysis for finding, an efficient de-noising method for the suppression of Gaussian noise from HSIs in this study (PARAFAC)[5].

L.Zhang, Q. Yuan, and H. Shen (2018) An HSI de-noising technique based on a model SSAHTV (spectral-spatial adaptive total variation)in this research [6.]SSAHTV method noise reduction method utilises spectral noise variance and spatial information discrepancies in account.

L Mredhula, M Dorairangaswamy (2017) This article describe how signal features can be used to remove noise. The main aim is to work on variable parameters of image and noises. Here medium filters were employed to

remove noises and also describes importance of AI in image processing [7]

D. Sangeetha and P. Deepa (2016) Determines edge detection with the latest technique. In paper edge detection algorithm is used.This architecture decreases processing time by 6.8% and uses very few resources for edge detection process[8].

Wei He, Liangpei Zhang, Huanfeng Shen, Qiangqiang Yuan, Hongyan Zhang,(2014) According to the research, throughout the acquisition process, hyper spectral images are commonly damaged by mixture of the numerous type noises, including deadlines, stripes, impulse noise, and other phenomena. In this work, novel HSI restoration technique based on low-rank matrix recovery is presented that substantially suppresses Gaussian noise, impulse noise, delays, and colors [9]. The low-rank attribute of hyper spectral imagery is explored by lexicographically structuring a patch of th e HSI into a 2-D matrix, which means that clean HSI patch can viewed as low-rank matrix. LRMR framework is then expanded to accommodate the HSI restoration task. To overcome "Go Decomposition" approach is to solve LRMR issue without mixed noise. The performance of the suggested LRMR-based HSI restoration strategy has validated by experiments using simulated or real world data situations.

Yazeed A. Al Sbou (2012) Presented neural network as a noise reduction efficient and robust tool. In this research the BPNN is used as a learning algorithm. This approach includes using both mean and median stastical functions for calculating the output pixels of the NN. This uses a part of distorted image pixels to generate the system training pattern. The output of the proposed approach provided a good image de-noising performance which exhibits promising results of the degraded noisy image in terms of PSNR, MSE and visual test.

Main Text

Low Rank Matrix Recovery(LRMR) Digital image methodology plays a very important role within the investigation and rationalization of remotely perceived knowledge. Image restorations techniques ease in enhancing the visibility of any zero.5 or feature of the image by dominant the knowledge in many parts or properties. Image restoration improves the clarity of objects within the scene by increasing the shine feature between objects and their backgrounds. Image restorations unit usually conducted as a distinction stretch followed by a tonal restoration. Neural Network (NN) A NN may be a machine learning approach galvanized by within which the brain performs a selected learning task. A neural network is associate assessing style that consists of massively parallel relation of adaptation 'neural' processors. As a result of its parallel nature, it'll conduct calculations at a high ranking as compared to the classical techniques. As a result of its variable nature, it wills befits changes among the information and learn the characteristics of sign. Outcome from one node is delivered to more one among the network and thus the top product depends on the advanced correlation of all nodes.

Support Vector Machine(SVM) It’s basically a classification wherein the optimization criteria are the width of the margin between the classes, i.e., the vacant region surrounding the decision border specified by the distance to the nearest training patterns. Support vectors are what they're called. Support vectors modify prototypes, which is the main difference between SVM and traditional template matching algorithms. A choice limit distinguishes the classes. The minimal distance function does not define this decision threshold. Vapnik introduced the Support Vector Machine (SVM) idea. Given a finite quantity of training data, any learning system's purpose is to attain high generalisation performance. With no prior understanding of the data, support vector machines have demonstrated high generalization performance. SVM's primary concept is to map the input data. On to 3-D feature space discover a separation hyper plane that is nonlinearly related to the input space in the feature space which has the max margin between the two classes. SVM is a maximal margin hyperplane in feature space based on kernel functions. As a result, the data space has a nonlinear boundary. Using kernel functions in the input space, the best separation

hyper plane can be calculated without any calculations in the higher dimensional feature space. The following are some of the most often utilized kernels:

1. Liner Kernel- A Linear Kernel is employed when the data is Linearly separable, that is, it can be split using a single Line. It is one of the most often used kernels. It is commonly used when a data set has a significant number of characteristics.

2. Polynomial Kernel- Polynomial kernels are kernel functions commonly used with support vector machines and other kernelized models to express the similarity of vectors in a feature space over polynomials of the original variables, allowing non-linear models to be learned. GEOMETRICAL REPRESENTATION OF SVM MARGIN Figure.

1. Geometrical representation of SVM margin SVM ALGORITHM

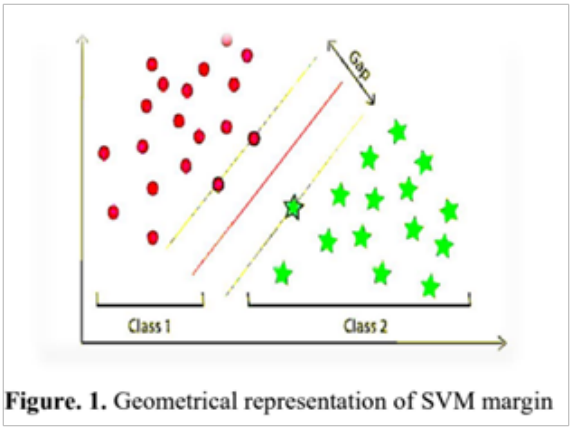

Figure. 1. Geometrical representation of SVM margin

i. . Define a hyperplane that is optimal.

ii. Extend previous definition to include issues that are not linearly separable.

iii. Transform data into a high-dimensional space where linear decision surfaces may be used to categorize it more easily.

Conclusion

We studied variety of image restoration observations and results in this paper. Even though both of these steps might be done in one step, image restorations (IR) are usually done as distinction stretch followed by tonal restoration. It's a non- linear Problem to restore image, in this study restoration occurred on the foundation for the development of another field, LRMR with SVM. We found that SVM is the most effective of all the methods. SVM, as well as other biology- based optimization techniques such as GAs and particle swarm optimization as a result, SVM may be used to solve a wide range of issues, including high-dimensional problems with many local optima, for which GAs and PSO are commonly used.

References

1. Anna Veronica C. Baterina, Carlos M. Oppus," Low rank matrix recovery for Image Edge Detection" Department of Electronics and Communications Engineering Ateneo de Manila University Katipunan Avenue, Loyola Heights, Quezon City Philippines
2. Jing Tian, Weiyu Yu, Shengli Xie ," An Low rank matrix recovery Algorithm For Image Edge Detection", 2008 IEEE Congress onEvolutionary Computation (CEC 2008).
3. R. Wang, W. Li, R. Li and L. Zhang, "Automatic blur type classification via ensemble SVM", Signal Processing: Image Communication, vol. 71, pp. 24-35, 2019.
4. Alirezae Rezaee," Extracting Edge of Images with Ant Colony", Journal of ELECTRICAL ENGINEERING, VOL. 59, NO. 1, 2008, pp.57–59.
5. Shahab Kamali, Jaroslav Opatrny, "A Position Based Ant Colony Routing Algorithm for Mobile Ad-hoc Networks", JOURNAL OFNETWORKS, VOL. 3, NO. 4, APRIL 2008.
6. M. Dorigo, G. D. Caro, L. M. Gambardella., "Ant algorithms for discrete

optimization. Artificial Life", 5(2): pp. 137–172, 1999.
7. J. Dr´eo, P. Siarry., "Continuous interacting ant colony algorithm based on dense heterarchy". Future Generation Computer Systems, 20(5): pp. 841–856, June 2004.
8. Bonabeau, M. Dorigo, and G. Theraulaz. Swarm Intelligence: From Natural to Artificial System. Oxford University Press, New York, 1999.
9. Hongyan Zhang, Wei He, Liangpei Zhang, Huanfeng Shen and Qiangqiang Yuan, "Hyperspectral Image Restoration Using Low-Rank Matrix Recovery", IEEE Transactions on Geoscience and Remote Sensing, vol. 52, no. 8, pp. 4729-4743, 2014.
10. A. Karami, M. Yazdi and A. Zolghadre Asli, "Noise Reduction of Hyperspectral Images Using Kernel Non- Negative Tucker Decomposition", IEEE Journal of Selected Topics in Signal Processing, vol. 5, no. 3, pp. 487-493, 2011.
11. G. Di Caro, F. Ducatelle, L. M. Gambardella. AntHocNet: An adaptive nature-inspired algorithm for routing in mobile ad hoc networks.European Transactions on Telecommunications, 16(5):443-455, 2005.
12. J. Kennedy, R. C. Eberhart, and Y. Shi. Swarm Intelligence. Morgan Kaufmann, San Francisco, CA, 2001.
13. Miller, Peter (2010). The Smart Swarm: How understanding flocks, schools, and colonies can make us better at communicating, decisionmaking, and getting things done. New York: Avery
14. Bernstein, R.M., K. Edwards and E.M. Eliason, 1975, 'Synthetic Stereo and Landsat Pictures', Photogrammetric Engineering, Vol. 42, pp.1279-1284.
15. Bu ch an, M.D., 1979, 'Effective utilisation of colour in multidimensional data presentation', Proc. of the Society of Photo-OpticalEngineers, Vol. 199, pp. 9-19.

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Evidenciary Value of Confession Under Criminal Law- Critical Study

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Abstract A confession is an acknowledgment created by people accused with a wrongdoing that states or implies that he did the offense. It might be either oral or scientific. Confessions are classified into two types: judiciary and extra-judicial. A judiciary confessions is one that is made before a Magistrate or in Court during the course of legal procedures, while an extra-judicial confessions is one that is not made before a Magistrate or during the event of regular processes.

Sec. 24 of the Indian Evidence Act states that a confession given by an alleged offender is immaterial in a criminal action if the court believes the admission was obtained via enticement, intimidation, or promise. Similarly, admissions made to a police official and those made in police custody by the accused to anybody other than the Magistrate are removed from testimony. Confessions are only acceptable to police if they lead to the identification of certain circumstances.

Confession is a strong bit of testimony and may be used to condemn someone, but if the prosecution is exclusively based on confessional comments, they should be supported by some other evidence. The current research studied the difficulties of the examination of the evidential value of confessional comments, where the many obstacles encountered by intel agencies and the legal system about the acceptability of confessional declarations were listed.

Keywords Confession, Admission, Crime, Judicial, Extra-Judicial, Accused, Co-accused, Fact, Statement, Admissible, Evidentiary, Corroboration.

Introduction

Crime predates civilisation itself. If individuals were to live along, social standards were established to recognize the do's and don'ts. The explicit goal was to compensate those who do not adhere to the established standards, to punish and separate them from the majority, and so to maintain society spotless. This gave rise to a variety of methods for the detection and prosecution of offenders, as well as the management of criminal justice, which eventually led to the development of institutions for research, trial, and unbiased management. Originally, the criminal justice system relied heavily on the evidence of bystanders to the crime. This reliance on "eyewitnesses" did not prove beneficial, since they were shown to become antagonistic for a myriad of purposes, such as a danger to life or the allure of wealth, and so lacked credibility. But what happens to evidence supplied by the defendant directly out of his own tongue? In fact, this will be the most effective and comprehensive evidence of the murder. A confession is an admission made by an individual without his or her will in relation to a legal accusation. Previously, many religions viewed repentance to be solely a moral requirement to absolve themselves of misdeeds. Nevertheless, as years passed, similar ethical responsibilities seeped into tribunals and were recognized as proof. Confession has its origins in the Indian legal process, which may be linked back to the CrPC, 1861, and was subsequently integrated into the Indian Evidence Act, 1872.

This particular kind of evidence, including oneself, is the outcome of a variety of factors such as physical, emotional, moral, social, socioeconomical, governmental, judicial, ecological, and so on. Even if there is a tiny possibility that the statement was obtained by coercion or deception, it is regarded as a poor bit of data. On the other end, if it is proven more than a reasonable doubt, it is the greatest kind of evidence, predicated on the premise that no one would make a statement against oneself by subjecting oneself to sufferings and consequences unless it becomes

genuine. The primary emphasis is on the question of what value is assigned to confessing when it is utilized as evidence.

The confession must involve not only the admittance of the crime, but also admissions of implicating information pertinent to the infraction, such as real motivation, time to prepare, nonattendance of incitement, dissimulation of weapon, and control and experimental group that shed light on the seriousness of the crime and the perpetrator's original intent of expertise.[1] However, there are statements which do not come under confession: -

(i) Guilty Conduct: Criminal behaviour, such as the guilty escaping from capture, manipulating evidence, hiding signs of wrongdoing, and so on, cannot equate to confessing.

(ii) Exculpatory Statements: Declarations that exonerate an individual from the conduct of a crime.

(iii) Acknowledgement of minor facts: Acknowledgement of minor facts that are colourless in relation to real culpability does not constitute guilt.[2]

Aim of study

The objectives with which this research paper drafted are as follows:

1. To know the admission and confession
2. To know about judicial and extrajudicial confession
3. To determine the methods of confession to police.
4. To know the use of confessional statement by accused and recommendation.

Review of Literature

1. "C.D. Field's Law on Admissions and Confessions" revised by Gopal S. Chaturvedi. The entire book disconnected in two segments at first is associated with the Admissions and second with the confirmations. Under second part the maker referred to the importance and significance of the term affirmation with help of continuous case guidelines and analyse various conditions in which the confirmation made to cop or another person. Present title oversees Sections 17 to 31 of the Indian Evidence Act, 1872. The Indian Evidence Act doesn't portray "Confirmation", from this point forward, endlessly a long time the Indian courts embraced the definition given in Stephen's Digest of guideline Evidence. In this book the author endeavoring to get a handle on the long way significance of confirmation from Aghnoo Nagesia (1966) to Dhawal Khairnar (2002).

2. "Law Relating to Confessions including Accomplice's Evidence and Constitutional aspects of confessions", by D. Jagannadha Rao In times past the systems used for removing confirmation were fundamentally dazzling in their barbarity and mercilessness. Luckily such procedures have not made because of our times, but it can't be said that we are totally freed from a need to give safeguards against confirmation unduly got. An affirmation for inspiration driving guideline is a prompt certification in clear terms by a charged person, that he did the bad behavior for which he is brought, or a critical affirmation by him of ensnaring real factors from which an overwhelming derivation of his culpability follows.

3. "Law of Evidence" by Dr. Asis Mallick, The book secluded into three segments and eleven sections, deals with the entire degree of the law of confirmation. The business connected with confirmation and attestation is astoundingly captivating and very simple to understand. This book covers essential parts of confirmation like history, thinking and law of affirmation isolated from that the essayist describe every attestation with the help of legitimate announcements of Apex Court and different High Courts.

Main Text

Classification of Confessions

A confessional speech might take any shape. It may be addressed to the judge or to anyone else beyond the courtroom. A confession may therefore be split into two classes: Judicial Confession and Extra-Judicial Confession.

1. Judicial Confession- Judicial confessions are those given in front of a Judge

or in trial. Such statements are made before or throughout the public inquiry of an offense or in court throughout the event of legal processes. Judicial confessing has been described as a pleading guilty given voluntarily by an individual in a fit condition of mental on indictment (before a court)[3]. The rules of Sec. 164 of the 1973 CrPC govern judicial confessions. Once the trial starts, a defendant may admit his or her wrongdoing before a Magistrate, who may register it in accordance with Sec. 164 of the Code. The defendant may admit his confession during the sentencing hearings before the Magistrate or throughout the prosecution before the Sessions Judge.

2. Extra-Judicial Confession- Extra-Judicial Confessions are ones occurs when a party outside of a courtroom or infront of a Magistrate. Extra-judicial confessions encompass:

(i) Confessions spoken to authorities,

(ii) Confessions spoken to policemen, whether in detention or not, to the degree data contributes to the identification of any facts, as defined in Sec. 27 of the Indian Evidence Act.

(iii) Other confession, such as those made to a government employee who is not in power.

It could even be talk to yourself, which could be used as testimony if seen by some other. As in the case of ***Sahoo v. State of U.P.***[4] On the day of the homicide, a defendant who was convicted of murdering his daughter-in-law with who he had been often squabbling was spotted leaving the house stating, "I have ended her and with her the daily quarrels." The remark was deemed to be a genuine confession since it is not essential for a confession to converse with another individual in order for it to be relevant.

Evidence of alternative confession is weak evidence and should be treated with great care and care. In ***State of Punjab v. Bhagwan Singh***[5] The Supreme Court has held that an extrajudicial confession can only be trusted if it is clear, consistent, and persuasive. In ***Balwinder Singh v. State***[6] The Supreme Court ruled that, in the case of an out-of-court confession, the court must verify the truthfulness of the person making the confession and determine whether that person is credible.

In ***Sahadevan v. State of Tamil Nadu***,[7] The Apex Bench ruled that unofficial confessions are accepted and that the main guidelines form the foundation of finding of guilt:

a. It is regarded poor evidence in and of itself and must be evaluated by the court with additional attention and attention.

b. It must be provided willingly and truthfully.

c. It should instil trust.

d. An extra-judicial statement gains legitimacy and evidential value when it is backed by a chain of exceptional conditions and is again bolstered by other prosecutorial material.

e. There should be no significant contradictions or fundamental inconsistencies for an arbitrary admission to be used as the foundation for judgment.

f. Like with any truth, such a declaration must be proven in compliance with the constitution.

Psychological of Confession

Confession is a highly unusual issue. There are several aspects to a person's psychological status after confessing to an offense. We are only interested in the plight of individuals who admit willingly, not those who repent for the sake of reputation, status, or respect. The issue thus becomes, first and foremost, why should confession take place? Second, does a person condemn himself via confession when no confession would render him at least too though off (if not better off) in addition to the physical and political ramifications of his actions?

Reconciliation is excellent for the soul, according to religious doctrine.[8] However, we are not interested with confession in religious activity; rather, we are engaged with confessions of actions or activities that, if acknowledged, pose a harm to the user's well-being. So, the response to the first issue, why should confessing happen, is based on the social psychological circumstances that a person admits under. Knowledge of this behavior will come from an examination of the intellectual, emotional, and social settings under which it happens. Confession's Social Psychological Conditions-

a) Allegation

b) Testimony

c) Remorse

d) The Road to Liberty

Retracted Confession and Its Value

A retracting is an act of repentance. To retract is to officially repudiate or condemn previous assertions.[9] A retracted confession is one that is subsequently withdrawn by the person who made it.

Retraction of testimony occurs most often in criminal proceedings. The grounds for this might be a vulnerability or an inadequate structure for protective custody, or the natural insecurities of observers or the convicted under the impact of the other party's prestige, as is common in most elevated instances. Surprisingly, the Indian Evidence Act makes no difference among a retraction confession and an unretracted confession, since both are similarly acceptable and may be seen by the defendant, however a rejected confession may be given less value.[10]

1. Right to Retract Confessions- Confessions are often retracted since they are obtained via non-validating ways. As a matter of routine, a very substantial proportion of confessions in criminal trials result in denials.[11] In India, retractions outnumber confessions, indicating that most confessions do not stem from a sense of penance and sorrow, as they ought to, but rather from an enticement danger, pain, desire, or any other non-validating factor.[12] As a result, the confessor has the right to withdraw from a confessions, and most of the convicted have consistently used that prerogative.

2. Assessment of Retracted Confessions- If a statement is retracted, the court is required to analyze the facts connected to the statement by considering all factors.[13] The first test that the court must follow is to determine if the confession was spontaneous or coerced, i.e. produced by incentive, danger, or assurance. If such is the case, it will be immaterial.[14] This standard must be met in order for a confession to be admissible as evidence. In light of this, everything from a mere suspicion to definite proof should be dismissed. Because the confession must be explicit, particular, and unequivocal, the retraction must likewise be clear, particular, and straightforward. The individual asserting repentance of confessions or previous potentially incriminating remark must demonstrate that he retracted his remark as soon as feasible.[15] and without any afterthought and must give reasons for doing the same.[16] The significance to be assigned to a withdrawn confession must be determined by the conditions under which it was provided then retracted, as well as the grounds for such renunciation.[17]

Admission

Admission is very significant in legal procedures. The task of the judge is made simpler when one participant to a lawsuit or other process establishes that the other side has acknowledged his case. Black's Law Dictionary defines[18] "admission is a voluntary acknowledgement made by a party of the existence of certain facts which are inconsistent with his claim in an action." The word 'admission' has a technical meaning in law and it has been defined in Section 17 of the Evidence Act, thus:

"An admission is a statement, oral or documentary or contained in electronic form, which suggests any inference as to any fact in issue or relevant fact, and which is made by any of the persons and under the circumstances, here in after mentioned."

Admission is a positive act of recognition or confession. It is a conscious and intentional act, isn't something assumed, that a party may accept as true or legitimate the charge made in processes or in the notification by willing recognition of the presence of specific facts throughout judicial or quasi-judicial procedures.[19]

In India, admission of fact constitutes evidence against with the person who makes the admission, although admission is a legal issue that is not enforceable on the creator. An admission on a question of law is not an admission of a matter in such a way that the issue of estoppel is resolved.[20]

Confession and Admission

An admission is a statement, verbally or in writing, that suggests any conclusion as to any reality in question or significant fact stated by any of the people listed in the Act.[21] It is mainly used for civil law transactions. However, in criminal cases, confession is synonymous with confession. The idea of confession belongs to the broad umbrella of the home. Articles 17-31 of the Indian Evidence Act deal with confessions in general, and paragraphs 24-30 deal with confessions, not confessions. So, confession is a kind of general assumption. Section 21 states that acknowledgment is an important fact that may be brought against the creator or his/her interested parties. Since a confession is a kind of confession, the same rules as verse 17 apply to a confession, but not all confessions are confessions and not all confessions become confessions. In criminal circumstances, a confession is not a confession, but it is a statement that suggests that the accused may have committed a crime. Confession is an essential part of admission, but there are differences between them. A confession that meets the dual criteria of willingness and truthfulness can be considered decisive as to what is to be confessed, but can act as estoppel when the confession is not conclusive about what is admissible. While confession is always used against the person who did it, confession may be used on the other side's side with the exceptions set out in section 21 of the Code of Evidence. A confession made by one defendant during a trial against another defendant may be used against another defendant or another person in accordance with the provisions of Article 30, but not a confession.

"The acid test which distinguishes a confession from an admission is where a conviction can be based on the statement alone, it is a confession, and where some extraneous evidence is needed to authorize a conviction, then it is an admission."[22]

Use of Confession

It is a well-known rule in the usage of confession that it must be approved overall. The court lacks the authority to accept solely the potentially incriminating portion of the confession while dismissing the executory portion as intrinsically unbelievable.[23] The entire confession must be used. However, it is possible to reject the entire document or a part of it. The evidence for a confession offered

by an individual defendant on behalf of the government must be taken as a whole and cannot be selected in part to the exclusion of the other. However, if part of a statement tends to prove the accused guilty and part of it tends to prove his innocence, the court may believe the part that is against him and reject the part that is for him. When the admissible component of a confessional statement is not only implausible but is also called into question by other evidence, the court may accept the main element and convict the prisoner by combining it with the other justification.[24] Thus exculpatory part may be excluded where the evidence or record disproves it or where it is apparently inconsistent with the other part.[25]

Evidentiary Value of Confession

An admission is significant proof against its producer, and in the event that it has been appropriately reported and is liberated from imperfections, it is adequate to denounce the charged who made the admission.

There have likewise been contrasting sentiments on the probative meaning of an admission. It has been found that a class of the entire authority has said that an admission is an adequate sort of proof. Opposite assessments have been expressed by similarly prominent lawful specialists. They accept that admissions ought to constantly be seen with doubt and that depending on them ought to be finished with intense consideration. Both of these perspectives are outrageous. An admission shouldn't really be respected with doubt, nor would it be a good idea for it be viewed as the most satisfactory proof. An admission, particularly an oral one by the observer regarding the extra-legal admission, should be seen with intense consideration and worry by the Judge. The more the reality of the charge, the more noteworthy the consideration important to concentrate on the proof, and accentuation ought to continuously be put on the affirmation of the declaration, particularly in the event that there is a capability of the equivalent.

In countless occasions, confessions have been obtained as a consequence of seduction, coercion, torture, or the prospect of some favor or a desire to accuse others. The majority of these admissions are retracted during the trial, generating shame and worry. Although it may be difficult to imagine that an accused would admit his guilt, especially if he has done a horrible crime, there may be various additional factors that drive a perpetrator to confess guilt that he has not committed. However, regardless of the consequences of the confession, the defendant may be in a frame of mind. At times, the perpetrator charges his adversary to exact retribution, and he takes pride in believing oneself to have redeemed. At times, the suspect makes a confession out of profound contrition, believing that confessing his wrongdoing would alleviate him of his concern. In the case of *Smt. Bani Bhatacharay**[26]*, a Division Bench of High court of Calcutta said that such confessions are always voluntary and must be accepted as such.

A confession, then, proven by indisputable witness and without any question as to its voluntariness, is unquestionably the most reliable evidence.

Admissibility of Confessions

Confessions are typically deemed admissible in testimony on the basis that no one would make statements against his interest unless it becomes true, whether they will be regarded alternatives to the rule against overheard or not at all infringes of the aforementioned rule (as Wigmore holds). There is no distinct provision in the Indian Evidence Act that makes them acceptable. However, they are important in criminal cases as a kind of admission against the maker's advantage under Sec. 21 of the Act. This incorporation rule is broadly acknowledged and hence provides no difficulties.

Importance of Confession

Whenever made unreservedly, an honest admission may be viewed as the most bona fide piece of proof. Since it is against the producer's advantages, it is more reliable than witness declaration, which might deceive dole out some retribution

with the denounced or for some other explanation. An admission made in court by a charged during preliminary, either as a supplication of blameworthy in light of the allegation rested against him or while the criminating proof given by the indictment is displayed to him to permit him an opportunity to make sense of something very similar, would regularly bring about his conviction. Furthermore, which is all well and good, considering that the admission in this present circumstance is made after completely grasping its implications and, by and large, later (or regardless) converses with his advice. Such an admission would be made intentionally and without excessive impact. There is no strain on the charged to admit, regardless of whether he has truly perpetrated the wrongdoing, since he isn't expected to unveil his guard until the arraignment has demonstrated its case for certain. There is no ethical punishment either, since he isn't even expected to make a vow while conceding or making sense of the arraignment's case. The trouble happens when the admission is made beyond court, which is before the beginning of the preliminary, and is tried to be utilized as proof against him in court. Another person is endeavoring to prove his own cases, regularly contrary to his disavowal. This is verifiably prattle proof, which is frequently disliked in customary regulation and, generally speaking, is forbidden. One of the notable exemptions for the standard against noise proof is the tolerability of an admission in proof in view of the possibility that it would probably be exact notwithstanding being against the creator's advantages.

Modern Day Usage

Starting around 2001, as a component of its conflict on Terror, the United States utilizing the CIA works an organization of seaward penitentiaries, called dark locales. Presumably the most notorious of which is Guantanamo Bay Detention Camp. State authorities have confessed to the press and in court to utilize different torment methods (approved by the District Attorney) to cross examine suspects of psychological warfare, now and again after constrained vanishing or additional normal version by the United States.

At the point when these deliberate demonstrations were disclosed by the global media the European Union, United Nations, the worldwide press and different basic liberties developments censured their training. The US Supreme Court didn't suspend its utilization and over and over disallowed hearing residents that went through constrained admissions, even after they were viewed as guiltless, guaranteeing that a preliminary would comprise a break of public safety.

A well known contextual investigation of Khalid El-Masri is a genuine illustration of this. He pursued a few times supported by various worldwide basic freedoms developments and legal counsellors, yet the US Supreme Court held its utilization of constrained admission procedures, and kept a meeting from getting the proof.

On December 20, 2001, German TV Channel "Das Erste" broadcast an assessment of the White House's understanding of the tape. On the program "screen", two independent mediators and an expert on oriental assessments saw the White House's translation as both mixed up and manipulative communicating "at the fundamental places where it is held to exhibit the obligation of Bin Laden, it isn't unclear with the Arabic" and that the words used that show feeling can't be heard using any and all means in the first. Prof. Gernot Rotter, educator of Islamic and Arabic Studies at the Asia-Africa Institute of the University of Hamburg said "The American mediators who focused on the tapes and unravelled them clearly made a ton out of things in that they expected to hear yet that can't be heard on the tape paying little heed to how much of the time you focus on it.[27] Actually, it was found later to be edited by US agency to prove guilt of Laden.

Conclusion

Admission is an exceptionally delicate region in our criminal regulation framework since it goes quite far to decide the destiny of a blamed. Perhaps of the main rule in the law of proof is that an admission can't be conceded in a criminal preliminary except if the indictment has demonstrated without question that it is valid and has been gotten willfully, that is all there is to it was not acquired from the blamed by dread for bias or any desire for advantage practiced or held out by an individual in

power, or by mistreatment.

References

1. Aghnoo Nagesia v. State of Bihar, AIR 1966 SC 119
2. Dr. S.R. Myneni, Law of Evidence 193 (Asia Law House, Hyderabad, 1st edn., 2007).
3. J.P. Taylor, A Treatise on the Law of Evidence 732 (The Blackstone Publishing Company, Philadelphia, 1878).
4. AIR 1966 SC 40.
5. 1975 Cri L J 282 (SC)
6. AIR 1998 SC 607.
7. AIR 2012 SC 2435.
8. Milton W Horowitz: "The Psychology of Confession", 47 Jour. Cr. Crime & P.S. 197. (1956).
9. P. Ramanath Aiyar, Advanced Law Lexicon 4122 (Wadhwa and Co., Nagpur, 3rd edn., 2002).
10. "In re Kodar Thimma Reddi and Ors, AIR 1957 AP 758."
11. "Queen Empress v. Babulal, (1884) ILR 6 All 509."
12. "R. v. Thompson, [1893] 2 Q.B. 12."
13. State of Tamil Nadu v. Kutty @ Lakhshmi Narsimhan, AIR 2001 SC 2778
14. Shavkaria v. State of Rajasthan, AIR 1978 SC 1248
15. "Taj Mohammad Khan v. State of Karnataka, 1998 Cri L J 2312 (Kant)."
16. "Subramania Goundan v. State of Madras, AIR 1958 SC 66."
17. "Bhuboni Sahu v. The King, AIR 1949 PC 257."
18. Available at: www.legalsolutions.thomsonreuters.com/law-products/law-books/blacks-lawdictionary (last visited on June 20, 2022).
19. Mukesh Kumar Ajmera v. State of Rajasthan, AIR 1997 Raj 250.
20. Jagwant Singh v. Sitan Singh, AIR 2010 All 285.
21. The Indian Evidence Act, 1872, s.17
22. Ram Singh v. State, AIR 1959 All 518.
23. Ratan Lal and Dhiraj Lal, The Law of Evidence 316 (Wadhwa and Company, Nagpur, 22nd edn., 2002).
24. Nishi Kant Jha v. State of Bihar, AIR 1969 SC 422.
25. Mohan Lal v. Ajit Singh, AIR 1978 SC 1183.
26. 1989 Cri L J (NOC) 4 Cal (DB).
27. Available at: http://youtube.com/watch?v=x0FVeqCX6z8(last visted on June 20, 2022)

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Innovation The Research Concept

Study on Fluctuations of Plasmatocytes Numbers in Injury of Dysdercus Koenigii

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Abstract In Dysdercus koenigii six haemocytes are reported in these one is plasmatocytes(PLs). The haemocytes are cellular elements of the haemolymph those are associated to number of physiological and biochemical activities of the insects. In the present work it is observed that the fluctuations in plasmatocytes(PLs) are directly associated to injuries effect and the healing process of injuries. Initially up to day 2 slightly more plasmatocytes (PLs) reported in experimental insect comparison to the controls. But after day 2 to up to day 6 significantly higher plasmatoytes(PLs) reported in the experimental insects than to the controls. After day 6 plasmatocytes(PLs) numbers in more or less same in both the experimental and control insects.

Keywords Haemocytes, Plasmatocytes(PLs), Injury, Immunity, Dysdercus koenigii.

Introduction

In the haemolymph (blood) of Dysdercus koenigii six types of haemocytes are reported these are Prohaemocytes(PRs), Grannocytes(GRs), Adipohaemocytes(Ads), Oenocytes(OEs), Vermicytes(VEs) and Plasmatocytes(PLs). These haemocytes are directly or indirectly associated to number of physiological and biochemical activities for example defense transport of nutrients, egg maturation, phenoloxidase activity, intermediary metabolism, gene regulation etc. Many workers findings, reports and reviews are present regarding role of heamocytes with physiological and biochemical activities. These reports clearly stated a marked changes seen in fluctuations of total heamocytes count (THC) and differential heamocyte count (DHC) with numbers of vital activities of insects (Berger et al 2003, Kurucz et a 2003l, Mishra and Tiwari 2005, Merchant et al 2008, Greeny et al 2012, Pandey and Tiwari 2012, Liegeois and Ferrandon 2020). But very little informations are available regarding role of specific haemocytes in injury and its associated activities particularly in Dysdercus koenigii. Therefore the present work has been carried out.

Aim of study

To study the roles of plasmatocytes in defense of the insects body particularly in relation to injury and heeling of injury processes. The present study also carried in objective these heamocytes may use as experimental materials for the immune related study of human being.

Review of Literature

For the present study number of literatures and findings are reviewed and as conclusion it is noted very little work has been carried out on the topic the role of plasmatocytes in relation to injury of Dysdercus koenigii. The reports of Mishra and Tiwari 2005, Pandey and Tiwari 2012, Rizki 1957, Merchant et al 2008, Liegeois and Ferrandon 2020, Kurcuz et al 2003, Gupta 1979, Greeny 2012 and Berger et al 2003 papers are reviewed.

Methodology

For the present work the red cotton bug Dysdercus koenigii are collected from the fields nearby of cotton plants and lady finger's plants from villages surrounding of our college. These insects are cultured in BOD at 28±1°C, 75% RH and 16hr of photoperiod. In cultured jars insects were feed on soaked cotton seed and get water from small vials. For the present work "0"hr of freshly molted females were sorted out and they divided into two groups one experimental and other as controls. In the experimental group a 1 mm fine injury made on neck of the insect by sharp scalpel blade and by forceps some fat body removed from the incision. In

controls only touch the neck region and physical stress given by scalpel blade not made incision. After 24 hr of interval 10 insects were collected by cutting antenna a drop of haemolymph taken on slide made a smear, stained them by Giemsa and counted 100 haemocytes and note the plasmatocytes numbers in these 100 cells and marked them as %.

Result and Discussion

From the study of Table 1 it is shown that from day 2 to up to day 6 plasmatocytes numbers are significantly higher in the experimental insect comparison to the controls. After day 6 numbers of plasamatocytes still higher in the experimental insects but it not significant. In the initial days the haemocytes; particularly plasmatocytes (PLs) are more or less same in both the group of insects.

Table: **1** (**Fluctuations in Plasmatocytes** (**PLs**) **numbers of adult female Dysde rcus koenigii**)

S.N	Age in days	Experimental (% of PLs)	Controls (% of PLs)	P Value
1	1	36.8 ±3.82	34.7±3.72	N S
2	2	38.4± 3.86	35.9± 3.91	N S
3	3	39.1±3.88	33.1± 3.89	<0.01
4	4	41.2±4.01	32.8 ±2.98	“
5	5	42.9± 4.12	31.6 ±3.01	“
6	6	44.1±4.23	29.9±2.47	“
7	7	41.6 ±4.19	34.7 ±3.12	“
8	8	36.7 ±3.87	35.8 ±3.13	N S

In the present study the higher plasmatocytes (PLs) from day 0 to day 8 in the experimental insects are reveals the role of PLs in the injury and injury associated activities of *Dysdercus koenigii*. The report of Pandey and Tiwari 2015 stated the higher PLs are associated to egg maturation in adult female. But in the present case it not be true because PLs are significantly higher to controls further the reports of Gupta 1979 and Rizki 1957 they stated the inter conversion of other types of haemocytes increase the PLs. This assumption not clearly reveals the fact in the present study. The present findings support the reports of Liegeeis and Ferrandon 2020 that stated PLs and its sub types involve in immunity.

Conclusion

Plasmatocytes (PLs) plays roles in defense activities of Dsdercus koenigii. Higher PLs are noted in the experimental insects than to the controls.

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References

1 . Berger Josef, Walczysko Sylvin, Powkova Jitka and Gutzeit o Herwing 2003. Effects of genistein on insect haemocytes. Journal of Applied Biomedicine l.161-168.

2 . Greeny H F Dyer L A, Smilanich A M, 2012. Feeding by Lepridopteran is dangerous : A review of caterpillars chemical physiological haemolymph and also

to morphological and behavioural defenses against natural enemies I S J Vol.9 : 7-34
3 . Gupta A.P. 1979 Haemocytes types : their structure, synonymies, interrelationships, and taxonomic significance in haemocytes. Edited by A. P. Gupta, Cambridge University Press, Cambridge, pp.85-127.
4 . Kurucz Eva, Zettervall Johan Cari, Siuka Rita, Villmos Peter 2003. Hemese, a haemocytes specific transmebrane protein, affects the cellular immune response to Drosophila. PANAS 100:5:2622-2627 Edited by John h. Law, University of Arizona, AZ
5 . Liegeois Samuel and Ferrandon Dominique 2020. Single cell RNA sequencing has revealed distinct snbpopulations of haemocytes in fruitfly larvae (An Atlas for haemocytes in an insect) e Life, 9, e 59113. DOI: https//doi.org/ 10.7554 (eLife.59113).
6 . Merchant D., R. L. Erti, S. I. Rennard, D. W. Stanely and J. S. Miller, 2008. Eicosanoids mediate insect haemocytes migration J. Insect Physiol, 54:215-221.
7 . Mishra Ashutosh and Tiwari R.K., 2005: Fluctuation in total haemocyte count during postembryonic development of red cotton bug Dysdercus koenigii FABR J. Exp. Zool.India:8:1:129-134.
8 . Pandey J. P. and Tiwari R.K., 2012. An overview of insect haemocyte science and its future Application in Applied and Biochemical fields. A.J.B.M American Journal of Biochemistry and Molecular Biology) 2(3):82-105.
9 . Rizki MTM. 1957 Alterations in the haemocyte population of Drosophila melanogaster Journal of Morphology 100: 437-458.

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Innovation The Research Concept

Economic Role of Trade in Early Growth of Buddhism

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Abstract Trade is a profession for earning a livelihood. Trade has played a very significant role in the life of the people. It reflects not the only economic condition but also reveals the standard of living and status of culture. If a place has a trading link to another place, that will soon have communication and interaction between human inhabitants. The guild was one of great corporate activity. The relationship between trade and Buddhism is very complicated. The Buddha shaped the relationship between trade and Buddhism in two ways. One, he decided the duties of Bhikkhu-Sangh with minimum requirements and dependency on laymen mostly traders. Two, the Buddha preached or influenced the Buddhist texts. Early Pali texts provide much analysis of the importance of trade in society and its practical aspects. Many Jataka stories are named after traders or trader's associates. Trade and traders contributed a vital role in Buddhist history from the initial phase. Trade was important from the point of view of spreading Buddhism. Trade and traders were dependent on monks for their security for long travelling and moral upliftment. On the other hand, monks depended on traders rather than laymen for their daily minimum requirements of food, cloth and shelter.

Keywords Trade, Traders, Buddhism, Jataka, King, Guild, Money, Economic Role of Trade.

Introduction

Vanijya is an ancient term for trade. Trade is the selling and buying of goods and services between two or more parties in consideration of cash and cash equivalent. In another word, trade is the activity of exchanging goods or services between people or countries.[1] A person who purchases and sells goods and services to gain profit or margin is called a trader. Jambudipa or modern India, Pakistan, Afghanistan, Nepal, and Bangladesh together has a very peculiar geographical location. Sumeru or Himavanta is a huge mountain range situated in the north of Jambudipa. A major portion of Jambudipa has surrounded by sea. Jambudipa has a broad area in middle, which became gradually triangular and pointed towards the south of the sea. This special geographical location and vast ocean in the south are responsible for the four-month rainy season and a complete seasonal cycle of climate. Thus people have different food, clothing and shelter according to the season. Thus traders have a better range of products. Several other favourable geographical circumstances were responsible for trade. Fertile plains with networks or rivers early Buddhist texts have most reference to Ganga plains with tributaries of Ganga and local rivers. The rivers are near which fulfil the water requirement of agriculture and flood maintain fertility.

The one fact about ancient trade which impresses itself on the most casual observer is the fact of trade by groups, caravans, and companies. The king also knew the importance of traders. Money is a cumulative form of currency. Money is a motif instrument and result of trade. Trade is started by a trader because of the motif to earn money. Long-distance land trade was done by Sattavaha and his five hundred companion traders. The group comprises five hundred traders because of security and comfortability reasons. The inland trade of a country may either be wholesale or retail. Trade between distant country parts was in the hands of adventurous merchants, who led great caravans from one part of the country to another. Trade and Buddhism have two distant purposes; trader wants to earn money but monks have business with their mind, thought and preaching laymen. Instead of this major difference, they influenced each other and were interdependent. The Jataka has 547 stories also called Jataka. Jataka stories have much evidence of trade. Trade played a role in the economic foundation of Buddhism and its spread.

Aim of study

The main objectives of the proposed research paper to be study the role of trade of inland and foreign , to study significance of trade land and sea, to study the kings and merchants financial support to monks, to analyze the contribution and growth of trade as depicted in early Buddhist sources in the economic foundation of Buddhism. The paper provides information about relationship between trade and Buddhism.

Review of Literature

F.L. Pryor's 'A Buddhist Economic System in Practice' tells about the information regarding to the economic supports to Buddhism. The actions of the ruler and economic policies affected the economic positions of Buddhist monks. The economic dialectic between monks and laity has a strong influence on capital formation. This work provides great information of state economic support to Buddhism but lacks in merchants and trading class's economic supports to Buddhism.[2]Simon Zadek's 'The Practice of Buddhist Economics: Another view', provides the nature of Buddhist economy. He has been discussed the impact of Buddhist institutions on laity supports to monks on economic, role material welfare in Buddhist conception development. This work also lacks in discussing role of trade in the economic supports to Buddhism.[3] Moti Chandra's book *Trade and trade routes in ancient India* provide information about trade and different trade routes in ancient Indian times. This study was in the canonical and story literature of Buddhists and Jains such accounts have survived which throw light on ancient trade, trade routes, organization of the caravans and the position of the caravan leader. The stable political conditions help in growth of trade and commerce in a realistic manner. The book has not been provided information about the role of trade in the economic foundation of Buddhism.[4] Hajime Nakamura's book *Indian Buddhism* is a survey of Indian Buddhism with bibliographical notes. He said that Buddhism grown along trade routes. The role of rich people, cities, merchant class was in origin of Buddhism. He did not talk of trade in the economic foundation of Buddhism.[5]

Main Text

Kings Support to Trade and Traders

The first evidence of politically united ancient India, some extraordinary archaeological evidence e.g. Sanchi, Bharahut *Stupas*, Asokan inscriptions and pillars, Ajanta, Ellora caves, their main or earliest theme the Buddha indicate *Jatakas* are the birth stories of the Buddha in the previous existence. It was impossible to build these monuments without the help of Kings and traders. They form a vast literature, written in Pali, and afford an interesting account of the social, political and economic condition of India about the time of Gautama Buddha. The stories reveal the economic condition of India in the age of the *Jatakas.*[6]

Gana-Sangha (Republic) Raja and Muddavisitta (Monarchy) Raja were two types of political systems in *Jambudipa*. Malla, Sakya, Licchavi and Vajji were famous for their Gana-Sangha. Magadha, Vamsa, Avanti and Kosala were the most famous example of a monarchy system. Their kings were the supreme authority. In the administrative city lived the king's family, officials and traders. The safety provided for traders. The king also knew the importance of traders.

The king encouraged the public *Vanijja*. The public became happy and live peacefully. They gave more tax and kings provided them peace. There were three types of kings' roles in trade. The first was in the establishment of development of trade. The next one was in the establishment of law and order which is necessary for trade. The last was a settlement of traders and related disputes. *Digha-Nikaya* refers king's contribution for provide money to traders for trade. Providing money to traders establish trade in no trading areas. Other investments in safety-security, agricultural and animal husbandry also indirectly encourage trade. An extra output of agriculture milk products, as well as bullocks for agriculture and transportation, ultimately help in trading. Peace and good law and order situation of a *Janapada* is a very important part of the trade. There were many thieves and robbers. It was the duty of the king to punish these culprits. There are many references in early Buddhist texts which indicate that the king follows his responsibility to establish law and order and peace in his *Janapada* city and trade

route. A strong administration was required for the authority of justice and peace. A wise king knows the importance of trade and he encourages trade. The *Janapadas* mostly have the power to control law order situations and maintain a peaceful and healthy environment for peace and development.

The kings were aware of the importance of traders. *Gahapati* was one of seven Jewels of the king. He had money when the king needed he provided money. The Setthi was mostly were most prosperous trader of *Janapada*. He was an unpaid official of the king. The trade provides revenue to the king. Traders and *Gahapatis* were the main trading group who involve, direct and initiate the trading system. They often travel a lot for trade. This generated new ideas and implement new technologies. The traders have a good relationship with the king, Sippika, and Dasa- Kammakara and even with compatriots of other *Janapadas* etc.

Early Buddhist Trade

In the earliest literature of the Buddhists, we find the word *Vijo* meaning merchants in general. Some of these merchants traded with foreign countries and carried their goods in their vessels (*Samudda-vanijo*). The *Nikayas*, too, speak of sea-voyages to distant foreign lands but details are lacking until we come to the period during which the *Jatakas* and other later books were composed. The evidence is available in the context of Indian goods in foreign literature which goes to confirm the existence of commercial intercourse with the people of Western Asia.

Vohra word has four broad and diverse meanings, first trade, Business; second current appellation, common use (of language), a common way of defining, designation, the proper mode of speech; third lawsuit, law, judicial practice; the fourth name of *Yakkha* of the sea.[7] But trade as the meaning of *Vohra* has maximum references. *Suttanipata* says the person who depends on *Vohra* for his livelihood is called *Vanija*. *Majjhima-Nikaya* cites the Buddha asked Potaliya *Gahapati* about well being of his work and business *Majjhima-Nikaya*. The word used for business in Pali is *Vohra*.

Every individual or group has different needs and surpluses. It is not possible to satisfy all needs on their own without any help or exchange of goods and services. The initial form of trade was barter or direct exchange of goods and services. Thus fulfilling needs and giving surpluses in exchange at the same time were perquisites for trade. Later one side of the barter started to involve precious metals, which refers to trade in early Pali literature.[8] Early Pali texts provide much analysis of the importance of trade in society and its practical aspects. *Anguttar-Nikaya* mention three types of people; first who successfully indulge in trade, second who failed in trade, and third other people who benefited from trade. The Buddha suggested some restrictions for *Upasakas* and *Bhikkhu*. *Upasakas* were denied to involve five types of trades e.g. *Satthavanijja, Sattavanijja, Mamsavanijja, and Visavanijja.* The Buddha strictly denied involving in any type of economic activity for *Bhikkhu and Bhikkhunis.* Trade is economic activity in which money and profit are involved thus it is not allowed for *Bhikkhu and Bhikkhunis*. Trade and other money-earning activities are forbidden such as *Naccam, Vesim, Panagaram, Sunam, Apanam, Vaddhim, Vanijjam, and Haritakapakkim*. *Vanijja* has two meaning broader meanings for all trading activities including *Kayavakkaya, Apanam and Vohara*[9] but sometimes it excluded these trading activities.

Several words were used to denote Traders in Early Pali texts as *Vanija, Apanika* etc.[10] *Gahapati, Satthavaha, Negama, Jetthaka Niyyam, Assavanija, Varunivanija Kacchaputta Vanija, Vessika, and Voharika* were the other people who were involved in a trade or similar jobs. One who has the livelihood of *Kayavikkaya* is called *Vanija*, and one who is the leader of *Vanija* for long-distance travellers is *Satthavaha*.[11] *Gahapati* word has maximum references used for a trader.

The ports of departure were noted many; the *Losaka-Jataka* speaks of the port

of *Gambhira (Gambhira Pattana), Bharukaccha, Roruka, Supparaka, and Kavira-pattana* were the other ports of departure of vessels. Some of the merchants were carried on a coasting trade, while others journeyed across the ocean. The vessels' at sea were under the command of *Niyamakas* and were guided by skilled mariners, who noted the position at sea by marking the position of *pianets* and stars (*Vannu-patha*). The *Jatakas* are telling to us nothing about the principal commodities. Probably the exports carried Indian cotton, birds, ivory and other raw produce of the country.

Inland trade- Commonly, Indian merchants who were moved with goods in great caravans from one part of the country to another, elected one of their members as their leader and this man was called the *Satthavaha* or caravan leader. The *Jatakas* have described the difficulties of caravan merchants. Robbers often looted the caravans. Long-distance land trade was done by *Sattavaha* and his five hundred companion traders. The group comprises five hundred traders because of security and comfortability reasons. Individuals also do long-distance trade also referred to in early Buddhist texts. Gandhara Setthi and Anathapindika trade reference also indicates long-distance trade. Gandhara Setthi sends five hundred bullock cart trade material to sell in Savatthi. Anathapindika helped him to sell the material. When Anathapindika sent his five hundred bullock cart trade material Gandhara setthi did not help him. Once again Gandhara Setthi sends his five hundred bullock cart trade material for sale in Savatthi this time Kammakara of Anathapindika beat the workers of Gandhara setthi. Traders Tapassu and Bhallika came from Ukkala and were on their way to reach Bodhgaya and meet the Buddha. In another reference, a person says that he went to Kalinga and do trade. The Pali text *Milinda-Panho* also informs us regarding a wholesaler or Pataliputra, returning to his city with five hundred wagons.[12]

Trade between distant country parts was in the hands of adventurous merchants, who led great caravans from one part of the country to another. Most of these caravans followed the great trunk roads, while some merchants used river traffic in exporting their goods. In one *Jataka*, we find a merchant travelling from Sravasti to Rajagraha. Another mentioned ivory merchants of Banares moving to Ujjain. The Gandhara *Jataka* refers to the Journey of caravans from Videha to Gandhara, a distance of more than 1200 miles.[13]

Sea trade- *Jataka* have a reference for long-distance sea trade from Bharukaccha. The *Baveru-Jataka* has reference to *Niyyam-Jataka* who was the leader of sea Voyage. Besides trade material, they sold crow in one hundred *Kahapana*. In the next trade journey beside their trade material, they sold peacocks in one thousand *Kahapana* after a long request conversation by residents of Baveru. The Baveru people craze peacocks because there were no birds. In *Supparka-Jataka* a group of seven hundred traders returned to Bharukaccha. Other merchants carried their goods on board vessels, and this use of water traffic for purposes of trade is proved by the *Jataka* evidence. Thus from the *Cullasetthi-Jataka*, we know of a merchant who took a vessel to Banaras, while the *Mahajanaka-Jataka* suggests that in those days the Ganges was navigable by river crafts of considerable size, and merchants from big cities on her bank came down right up to the sea.[14]

Trade provided availability of thing e.g. Varanasi trade centre provided cloth and sandal. Avanti king has Sivivattha. Trade provided support city and *Janapada* economy. e. g. Kasi was a big trade centre and thus has large earnings. So Kosala and Magadha fought many wars for Kasi. Setthi and *Gahapati* were very respectful and have an important place in *Janapada* (seven jewels of the king) and city (*Nigama* increased earning of the city; people of Saket were worried because their Setthi was ill). Trade reduced the rate of things. Trade provide technology and information transfer quickly. Trade especially sea trade has more profitability in less time. So different segment of society was attracted to trade. Trade provides employment and a good lifestyle. Types of cloth/clothes- Pali word *Vattha* means cloth and clothes both.[15] Clothes were a very popular material of trade and *Dussavanija* or clothes trade was one of the famous trades mentioned in early Buddhist texts. Kasi was most famous for *Vattha*.[16] The religious impression/symbol of clothes

has religious importance. During the time of the Buddha different *Ganacarya* used different types of clothes to show their devotion. *Kusaciram, Vakaciram, Phalakaciram,, Kesakambalam, Valakambalam, Ulukapakkham, Ajinakkhipam, vattha* were very rarely mentioned in the Pali texts.[17] *Bhikkhus* wear *Civar* because it protects from cold, summer, Dansa, Mosquitoes, wind, sun rays, protect from attack of Snake and Scorpion bites. The *Civar* is not for play, pride, or decoration purpose. White clothes are excellent. Clothes have many stages of manufacturing e.g. raw material collection, spinning, weaving, sewing, colouring, washing, and polishing. Every stage needs a skilled person. The process of each stage is well defined in *Sutta* and *Vinay* texts. Dhunki or carding cotton instrument[18]and weaving by weaver[19] is mentioned in *Jataka*. It has social value and popular gift items, the people from the high class wear *Kasika Vattha* or costly clothes which indicate their richness and place in society. People gifted clothes including *Civara* and Dusala to the Buddha, kings and other people. *Majjhima-Nikaya* cites *Atthaka Nagara Dasam Gahapati* called *Bhikkhusangha* for *Bhojanadana*. He gave one *Dussayuga* to each *Bhikkhu* after food.[20] He gave *Civar* of three layers to Anand.[21]

In the question of King Milinda, the various parts of a ship are described as well as the ship as a whole. Thus we find various commercial objectives mentioned: Bharukachaha, Suvannbhumi (Burmah), and Sobhira. Tambapanna dipa (Ceylon), Baveru (Babylon), and China are mentioned in later literature, in the Questions of the King Milinda.[22] The story of *Baveru-Jataka* indicates that the Vamas of Western India undertook trading voyages to the shores of the Persian gulf or its rivers in the 5^{th} perhaps even in the 6^{th} century B.C. just as in our days. The story of *Baveru-Jataka* relates the adventures of Indian merchants who took the first peacock by sea to Babylon. The Greeks very well knew certain Indian commodities by their Indian names in the fifth century B.C. The direct overseas intercourse with China was a late development. In the Pali literature, the earliest reference to sea trade with China occurs only in later works like the Questions of the King Milinda.[23] The articles of this trade were rubies, pearls, sugar, aromatics, peacocks, corals and the like many embassies from Indian sovereigns who brought merchandise under the name of tribute to the Chinese court. Later on, the intercourse between the two countries received a special stimulus from the Indian propaganda of Buddhism, and the result was that at one time and in one province more than 3000 Indian monks and 10,000 Indian families were there to impress their national religion and art on Chinese soil.[24]

Another direction that the commerce of India took was towards the East which is an ultra-Gangetic peninsula, comprising Java, Pegu, and Malacca. The *Jataka* stories are full of references to an active Indian, trade with the Suvannabhumi or the Golden Chersonese all these accounts point to complete navigation of the Bay of Bengal and the Indian Ocean and the flow of steady and ceaseless traffic between Bengal and Ceylon, Madras and Burma.[25]

In the international field, ancient India had sound and well-developed trade relations with Egypt, Greece, Rome, Arabia, Persia, China and countries of central and South-eastern Asia. Also, she had her commercial sway over many civilized islands lying within the orbit of the Indian Ocean. The increasing trade links with distant countries overcame the difficulties of distance, diversity in climate, differences in languages and the dangers of wild animals and pirates to a great extent. Among the exports from India, are items like live animals; minerals including precious stones, beryls, diamonds and pearls; manufactures including iron and steel, cutlery, weapons of war, armours, metal wares, cotton cloth, muslins, ivory-work, ships, perfumery and pottery; drugs including opium and other unguents, dyestuffs and indigo and food items including pepper, ginger, cloves, cinnamon, cardamom, betel-nuts, corn and rice figured in prominence. The main items of imports had been minerals like brass, tin, lead, gold and silver, consumable articles like wine, fruits and frankincense; manufactures like silk fabrics, boats, precious stones, and Chinese porcelain; and China and Southeast Asian countries and the Western nations in the fields of commerce and trade. China exported silk fabrics through Indian merchants.[26]

Reflected Trade in Jataka

The Buddha shaped the relationship between trade and Buddhism in two ways. One, he decided the duties of *Bhikkhu-Sangh* with minimum requirements and dependency on laymen mostly traders. Two, the Buddha preached or influenced the Buddhist texts. These texts have teachings of the Buddha for monks and laymen. The Buddha solved the problems of the monks and laymen and taught them with daily life examples. The relationship between trade and Buddhism is not mentioned. But instead of trade, all laymen community was advised by the Buddha. The Buddha was very clear about his ideas and thoughts. Probably the Buddha deliberately established Panchvatthuni. Devadutta has manor disagreements on these five things. These are in which building *Vihara* and begging alms were most important. These two things reveal the Buddha intentionally created a dependency of *Bhikkus* on laymen. Because the monks were not allowed to do any physical, monetary work e.g. digging, transaction of money etc, it was the duty of laymen. On the other hand, begging alms removed the ego of monks and increased dependency on laymen. There was a lot of Jungle at that time. It was easy to survive for food and dwelling in the jungle. It was easier for a *Bhikkhu* to practice personal upliftment in the jungle than living near human settlements. But the Buddha has *Karuna* for many, so he established this type of complex but more beneficial system. Among the public, this useful system of the Buddha was first understood, recognized and followed by the traders.

Jataka, Digha-Nikaya, Majjhima-Nikaya, Samyutta-Nikaya, Angutta-Nikaya and some other *Khuddaka-Nikaya* texts as *Dhammapada, Suttanipata, Theragatha, Udana* are the major the Pali texts. Although *Jataka* is a part of *Khuddaka-Nikaya* because of its ancient subject matter and a lot of trade evidence it has given importance. The Buddha's teachings are preserved in the early Buddhist texts. The early Pali sources are based on size *(Digha-Nikaya, Majjhima-Nikaya, Khuddaka-Nikaya),* nature (philosophical as *Majjhima-Nikaya* and daily life as *Suttanipata, Jataka, Udana*) and counting (*Anguttar-Nikaya and Yamakavagga*) make it more complex to establishing a relationship between trade and Buddhism. But Buddhist texts have their peculiar style and nature.

The organization of Pali texts is not similar or unique. The *Jataka* has 547 stories also called *Jataka*. These *Jataka* are classified into forty-two *Vagga* and these *Vagga* are further organized under twenty-two *Nipata*. Thus the smallest and most important chapter unit of *Jataka* is *Jataka*. *Jataka* stories have much evidence of trade. This evidence can be classified into several groups.

Many *Jataka* stories are named after traders or trader's associates. *Serivani-Jatakam* is a *Jataka* story name after a greedy *Kacchaputavanijo*[27], or a hawker named Seriva[28]. *Culasetthi-Jatakam*[29] is a story of distressed Kulaputta who became rich with his efforts.[30] *Pannika-Jatakam*[31] is a story of a vegetable and herb seller, who inspects the character of his daughter.[32] *Illisa-Jatakam* is the story of Setthi named Illisa, who was a big miser. But his forefathers were big Dani or generous. *Kalakanni-Jatakam*[33] is a story based on Anathapindaka's friend named Kalakanni. Some people said he is unfortunate, but he was a close friend of Anathapindika.[34] *Nanda-jatakam[*35], *Katahaka-jataka*[36] have stories are named on traders' *dasa*. Who married to distant daughters of another *Setthi* pretend as *Setthiputta*.[37] *Nanda-Jatakam*[38] is a story of a reliable *Dasa* named Nanda who does not tell treasurer place to his master's son.[39] Mode of trade, type of traders and names of traders pieces of evidence in *Jataka* mode of trade in *Jataka* are a shop, hawker, and wholesaler. *Satthavaha, Vanija, Jettaka navika* are type of traders.

Under this category, *Jataka[38]* stories are not named after traders or their associates. These stories have content of famous traders e.g. Anathapindika and Visakha. *Khadirangara-Jatakam*[40]is a story related to Dana given by Anathapindika.[41] *Varunidusakala-jatakam*[42] is a story of Anathapindika's friend, who was trader of liquor.[43] *Veri-Jatakam*[44] is a reference of Anathapindika. Who saw thieves but did not stop his bullock cart.[45] Many *Jataka* has long-distance trading shreds of evidence. Their

evidence is many types as under the guidance of *Satthavaha*, without *Satthavaha* but in a group, individuals as Anathapindiaka and Gandhara Setthi. *Jataka* has long-distance sea trade evidence. *Baveru-Jatakam* has a reference to reaching Baveru.[46] According to *Supparaka-Jatakam*, traders' boats came from Bharucaccha for searching money.[47] *Sonaka-Jatakam* referred to the traders who took their boats to sea in search of money.[48]

The *Jatakas* contain explicit professes to the trade of India with Babylon. The Babylonian markets offered fabulous prices for some of the luxury articles exported from India. The growth of trade and Commerce had two significant consequences. First, it promoted a broader Outlook. This wider orientation is seen in the attitude of Buddha. Buddha hopes that his message should spread in all quarters and corners. This machinery outlook of Buddha would have been possibly influenced by the Dynamic economy of the day. The ritualistic cult of the Brahmins had fostered a local and restricted Outlook. It was complicated and required for its performance trained priesthood. Hence it is spread aid in countries outside India was difficult. In the early Buddhist works, there is a reference to great mercantile magnates. These Magnates substantially helped in the strengthening of the Buddhist movement. The increase in trade and Commerce is an index of the economic prosperity e of the richer sections, and the merchants who helped Buddhism must have been indirect sharers in the expanded wealth of the country. Thus it appears that the increase in trade and Commerce had two consequences for the new movement of Buddhism. It fostered acceptance of a wider missionary outlook and it prepared the ground for the expansion of wealth which made it possible at least in some cases that large gifts could be extended to the religious movements.

Jatakas form a vast literature, written in Pali, and afford an interesting account of the social, political and economic condition of India about the time of Gautama Buddha. The stories reveal the economic condition of India in the age of the *Jatakas*. Thus we can deduce that the merchants and traders were rich and great merchant Anathapindika lavished fifty-four cores on the faith of the Buddha. We further notice in *Jatakas* that 18 cores of family property of Anathapindika were washed to sea.[49] A Brahman merchant daily gave in alms six hundred thousand pieces of money to way-farers and beggars.[50] Thus it seems that inland trade in the age of *Jatakas* was in a flourishing condition.

Foreign trade seems to be in flourishing condition during the Buddha period. It is obvious from the references to the caravan trade in *Jatakas* and items of export and import such as spices, slaves, garland, ass, horses, jewellery ivory work, embroideries, silk, muslin, cutlery, gems of various kinds,[51]perfumes, gold, and silver.[52] The *Mahajanaka-Jataka* shows that there was something like, what we term foreign trade between Indian and outside, but does not mention the name to which country these merchants came from. We have ample references to maritime activities and sea-faring activities in Pali literature. It has been mentioned in the *Valatassa-Jataka**[53]* that five hundred ships shattered in the sea, but the name of the country is not mentioned. It is noted in the *Supparaka-Jataka**[54]* that a body of merchants who started their journey by ship from sea-port of Bharukaccha lost their way and took four months to reach their destination. It is very clear from the *Jatakas* that trade had existed between India and outside India because *Jatakas* contain several stories describing voyages to distant lands and perilous adventures by the sea.

Thus, we can deduce that trade was the natural corollary of the economic life of people in early India, in the age of *Jatakas*. Inland and foreign trade were vigorous in most of ancient India. Trade had a very deep effect on the life and culture of early Indian people. During this time trade between India and foreign nations was successfully carried out both by land and sea. We come to know from the Pali literature that certain places became prominent and towns had long existed around centres of trade.

We come to know from the *Jatakas* that early India had trade relations with Ceylon, Burma, Siam and Babylon. Thus from the above analysis, we notice that the volume of foreign trade in early India with foreign nations had greatly

influenced the economic and cultural life of the people in the age of *Jatakas*. The first two vacasika *Upasaka* Tapussa and Bhallika were traders.[55] Anathapindika the famous Setthi and Visakha were from prosperous trading families. These two were called fathers and mothers of *Bhikkhu-Sangh*. No other person got such respect in Buddhist history. Money references to money and trading are found in Buddhist literature. Thus it is clear that traders and trade were existing and flourished at that time.

Conclusion

Trade was a big factor to generated surplus capital in the second urbanization of ancient India. Trade is Important from the point of view of the spread of Buddhism. Trade and traders contributed a vital role in Buddhist history from the initial phase. The main quality of this profession is traders earn money in less time, but they have to invest more time and risk in public dealing and travelling. Thus traders have more information and knowledge of society in comparison to other professions. A large number of references to trade in the Jatakas indicate the growth of the economic condition of ancient India and it seems that during the age of Jatakas ancient India must have attained a high state of economics and Trade. These references easily detect the contribution of traders and trade to Buddhism. The religious people came to the Buddha to solve their queries including religious, political, social and economic. The Buddha also solved their problems. The increase of money with the trade influenced the economic foundation of Buddhism. The increasing trade had been generated money from traders and merchants who supported Buddhism by money.

References

1. “Trade” The oxford advanced Learner’s Dictionary, A. S. Hornby, 2015, p. 9.
2. Pryor,F.L. A Buddhist Economic System In Practice: The Rules Of State Policy Making Of The Ideal Kings Sought A ‘Middle Way’ Between Right And Left,The American Journal Of Economics And Sociology,1991,50,17-32.
3. Zadek,S. The Practice Of Buddhist Economics? Another View, American Journal Of Economics And Sociology, 1993,52(4),pp.433-445.
4. Chandra,Moti,Trade And Trade Routes In Ancient India, Abhinav Publications,New Delhi,1917.
5. Nakamura, Hajima. Indian Buddhism: A Survey with Bibliographical Notes, Motilal Banarsidass, Delhi,1987.
6. S. Bhattacharya, A Dictionary of Indian History. Delhi, 1994, Vol.11, p. 490.
7. Pali-English Dictionary, T. W. Rhys Davids and William Stede, MLBD Pub, Pvt, LTD, Delhi, 2007, p. No. 652.
8. English-Pali Dictionary, A. P. Buddhadatta Mahathera, P. T. S. London, p. no. 540.
9. Abhidanappadipikatika, Myanmar, p. 319.
10. English-Pali Dictionary, A. P. Buddhadatta Mahathera, Pali Text Society, London.
11. Abhidhanappadipikatika, Bhukhanda, Myanmar, p. 319.
12. SBE, XXXV, p. 27.
13. N. C. Bandyopadhyaya, Economic Life and Progress in Ancient India, Abinash Prakashan, Allahabad, 1925, p. 236.
14. Ibid, p. 237.
15. Ibid, p. 598.
16. Samyutta-Nikaya-2, p. no. 641.
17. Vinaya-Pitaka, p. No. 293.
18. Jataka-6, p. No. 41.
19. Jataka-6, p. No. 27.
20. Majjhima-Nikaya, p. No. 211.
21. Majjhima-Nikaya, p. No. 211.
22. Questions of the King Milinda, VII-2, pp. 8-12.
23. Questions of the King Milinda, VII-2, pp. 13-17.
24. Ibid, p. 224
25. Ibid, p. 225.
26. Periplus, CAI, p. 308.
27. Jataka-Atthakatha-1,VRII, p. 118.
28. Jatakapali-1, VRII.2
29. Jatakapali-1, VRII.2

30. Jataka-Atthakatha-1,VRII, p. 127.
31. Jatakapali-1, VRII. p. 23.
32. Jataka-Atthakatha-1,VRII, p. 395.
33. Jatakapali-1, VRII. p. 20.
34. Jataka-Atthakatha-1,VRII, p. 347.
35. Jatakapali-1, VRII. p. 9.
36. Jatakapali-1, VRII. p. 28.
37. Jataka-Atthakatha-1,VRII, p. 432.
38. Jatakapali-1, VRII. p. 10.
39. Jataka-Atthakatha-1,VRII, p. 220.
40. Jatakapali-1, VRII. p. 9.
41. Jataka-Atthakatha-1,VRII, p. 228.
42. Jatakapali-1, VRII.p. 11.
43. Jataka-Atthakatha-1,VRII, p. 245.
44. Jatakapali-1, VRII. p. 23.
45. Jataka-Atthakatha-1,VRII, p. 395.
46. Jatakapali-1, VRII. p. 96.
47. Jatakapali-1, VRII. p. 186.
48. Jatakapali-2, VR12. p. 37.
49. Jat. Op, cit. Nos, 40, 78.
50. Ibid, Bhadra-Ghata- Jataka, p. No. 442.
51. Jat. Op, cit. Bhadra-Ghata-Jataka, Vol., IV,21, pp. 139-41.
52. C. A. F. Rhys David, op. cit. p. 190.
53. Ibid, p. no. 196.
54. Ibid, Supparaka-Jataka.
55. Vinaya-Pitaka,Tr. By Rahula Sanskrityayanda, p. 77.

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Innovation The Research Concept

Youth Perspective Towards NEP-2020: A Survey

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Abstract "Education is the most powerful weapon which you can use to change the world" -Nelson Mandela

To keep pace with the changing scenario in education at the international level and to establish India as a global knowledge superpower, a need for major changes in our education policy was being felt seriously. The main objective of the new education policy is to establish such multidisciplinary institutions that provide high quality education and research. There should be flexibility in education so that the students can choose the subjects of their own choice from any faculty. Add vocational and co-curricular courses, so that the education will provide not only theoretical knowledge but practical knowledge also, which will help in making them self-reliant. Keeping this objective in mind, a new education policy was formed in which minor subjects of other faculties should also be taught along with major subjects and co-curricular and vocational subjects should also be taught together to provide a multidisciplinary approach. The present study examined the youth perspective about nep-2020 among the first year students of the Government Post Graduate College Noida. who has been admitted to college according to a new education policy A questionnaire was distributed among the students to understand their feedback and knowledge about various new policies and procedures introduced by the new education policy. The study explores different policies and aspects from the view of the young students.

Keywords New Education Policy, Minor Subject, Co-curricular Subject, Skill Development, Vocational Course.

Introduction Indian Education System is the one of the finest and oldest education systems in the world. It has produced so many talented minds that are making India proud all over the world such as Dhaniya, patanjali, Nagarjuna etc. The Indian education system faces so many problems and it needs to be resorted to reach its fullest potential. The First NEP was pronounced by the Government of India by the Prime Minister Indira Gandhi in 1968, the second by the Prime Minister Rajiv Gandhi in 1986. India's education policy has been amended three times till now. In June 2017, the draft on a new education policy was submitted by a panel constituted by the Indian space research organization (ISRO) Chief Shri Krishnaswamy Kasturirangan. The same draft (New Education Policy 2019) was later released by the Ministry of Human Resource Development under the new education policy, many important changes have taken place from school education to higher education, which aims to establish India as a superpower in the field of education at the global level.

Many important changes have been made through the New Education Policy 2020, such as emphasizing on vocational education to make students self-reliant, making interdisciplinary subjects necessary and converting higher educational institutions into multidisciplinary institutions, make practical knowledge as an integral part of education. The present paper reviews the New Education Policy 2020 from the youth perspective.

Aim of study The present research survey attempts to gather information about NEP-2020 from the viewpoint of the youth. The study is limited to the first year students of the Government postgraduate College Noida. The main objectives of the study are:

1. Review the different provisions in national education policy 2020.

2. To analyse the awareness of different provisions of NEP-2020 among the students.
3. To analyse the view of young generation towards the NEP-2020

Review of Literature

The brief description of literature studied is given below- Jha, P. and Parvati, P. (2020) discussed on limitations of the National Education Policy, approved by the union cabinet on 29 July 2020. NEP-2020. After the 34 years of gap since the first education policy. This is the third educational policy of the country. The article focuses on some of the relevant concerns about the question of provisioning for good quality universal education, equitable access to education and increasing push toward privatisation. Deb, P. (2020) stated the Indian beliefs and cultural values in teaching which is the area of main focus of National Education Policy- 2020. Suryavanshi, S. (2020) has compared the teacher education in Indian universities with Chinese university as a case study and concluded that autonomy is essential to faculty members. Aithal, P. S. and Aithal, S. (2020) published a paper on "Analysis of the Indian National Education Policy 2020 toward Achieving its Objectives" and highlighted various policies announced in the higher education system and compared them with the currently adopted system. Discussion on various innovations and predicted implications of NEP 2020 on the Indian higher education system along with its merits. Some suggestions are also proposed for effective implementation towards achieving its objectives.

Methodology

Research Methodology is a systematic way to solve a problem. It is a science of studying how research is to be carried out. Essentially, the procedures by which researchers go about their work of describing, explaining and predicting phenomena are called research methodology. It is also defined as the study of methods by which knowledge is gained. Its aim is to give a work plan for research. An online survey is a set of structured questions that the respondent completes over the internet, generally by filling out a form. It is a more natural way to reach out to the respondents as it is less time-consuming than the traditional way of gathering information through one-to-one interaction and is less expensive. Some benefits of the survey method are: Surveys allow you to gather data from a large sample size or research population. This helps to improve the validity and accuracy of your research findings. The cost of creating and administering a survey is usually lower compared to other research methods. It is a convenient method of data collection for the researcher and the respondents.

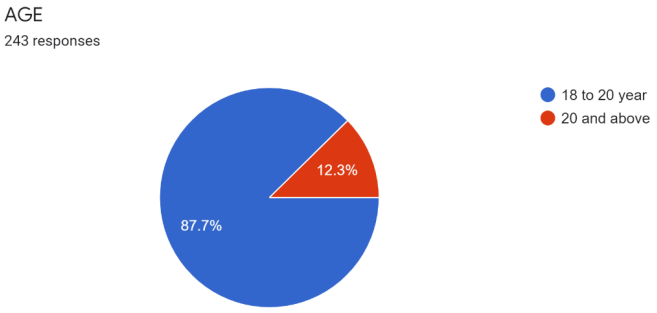
Sampling

Total sample of 243 students from government post graduate college was taken to the study in which 114 (46.9%) students from arts faculty, 82 (33.7%) students from science faculty and 48 (19.8%) students from the commerce faculty.

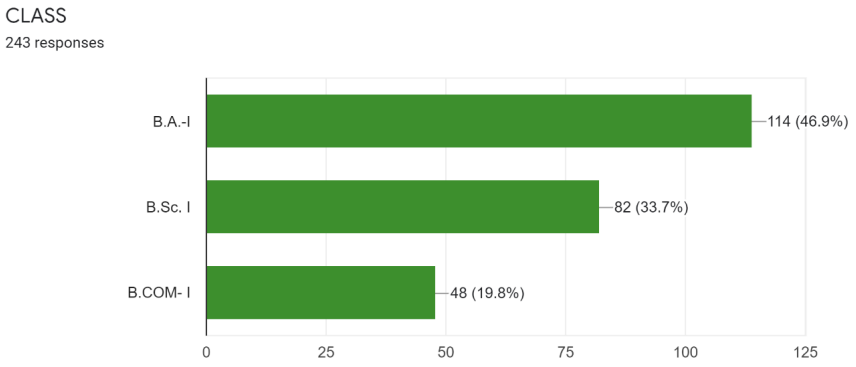
Tools Used

Questionnaire is used as a tool of survey method. An online survey was conducted for the fist year students of the government postgraduate college Noida, over Google form. Response of each participant was collected using a link survey and responses were automatically generated and recorded.
The questionnaire included 16 questions covering general question, minor subject, skill development course, co- curricular course, choice of the medium (language) of the study and other new implementations to be incorporated and replacing the old education policy.

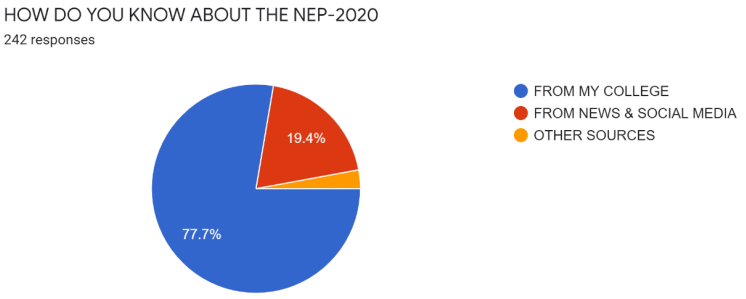
Result and Discussion



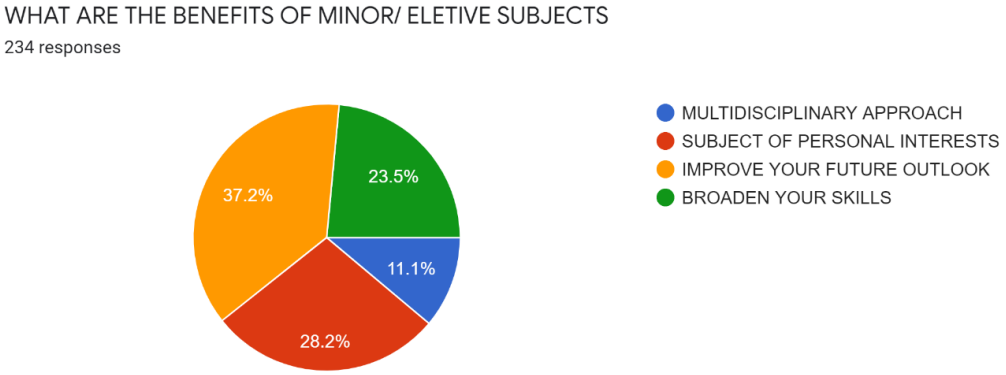
Analysis- about 87.7% of the students belong to the age group of 18 to 20 years and 12.3% students belong to the group of 20 and above. The sample for the study has been taken from the first year students therefore maximum students belong to the age group of 18 to20 years.



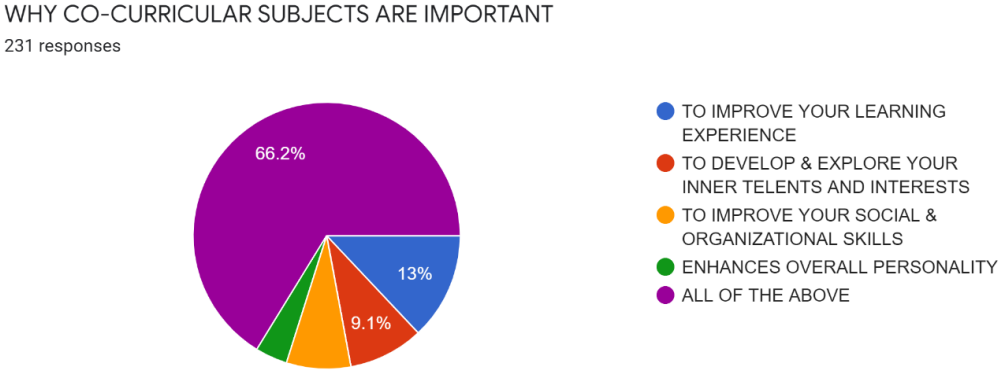
The above figure depict that 46.9% participants belong to art faculty, 33.7% participants belongs to science faculty and 19.8% participants belongs to commerce faculty.



The study revealed that 77.7% participants get informed about the new education policy-2020 from their own college, 19.4% from the news and social media and only 2.9% get informed from other sources.

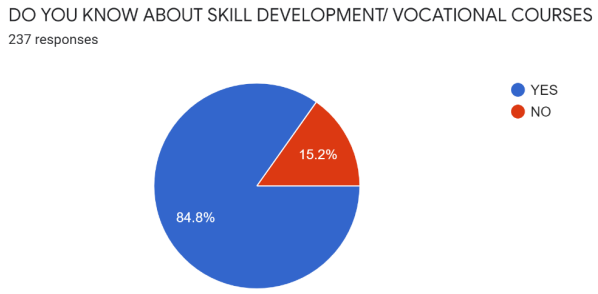


The study revealed that 11.1% of the participants believe that minor subjects are beneficial for a multi disciplinary approach, 28.2% believe that subjects of personal interest is the benefit of minor subjects, 37.2% believe that minor subjects improve your future Outlook and 23.5% believe that minor subjects broaden year skills. One finding regarding the choice of a subject indicates that students are interested in other subjects also rather than subjects from their faculty.

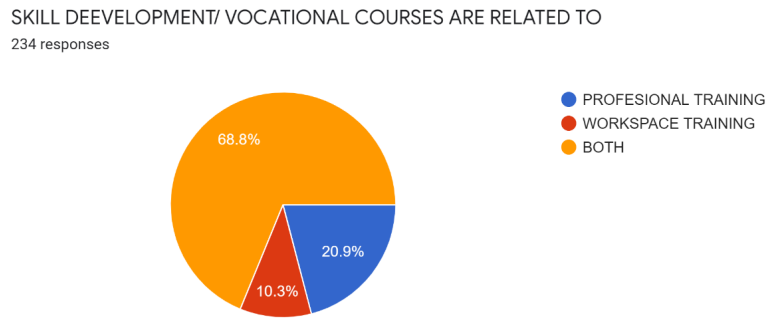


Above figure depicts that 13% participant believe that co-curricular subjects are

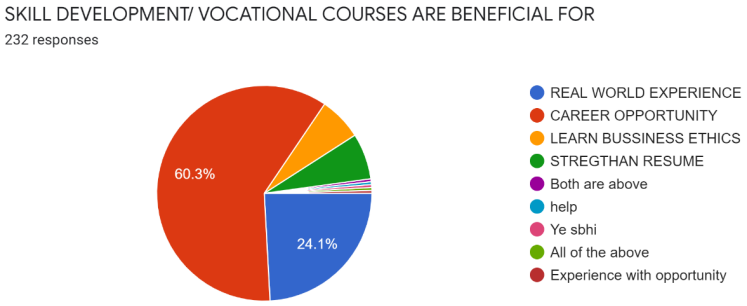
important to improve your learning experience, 9.1% participants believe that co-curricular subjects are important to develop and explore your inner talent and interest, some of the participants believe that co- curricular subjects are important to improve your social and organisation skills, few participants believe that co curricular subjects are important to enhance overall personality. Where 66.2% participants believe that co-curricular subjects are important due to all the above factors.



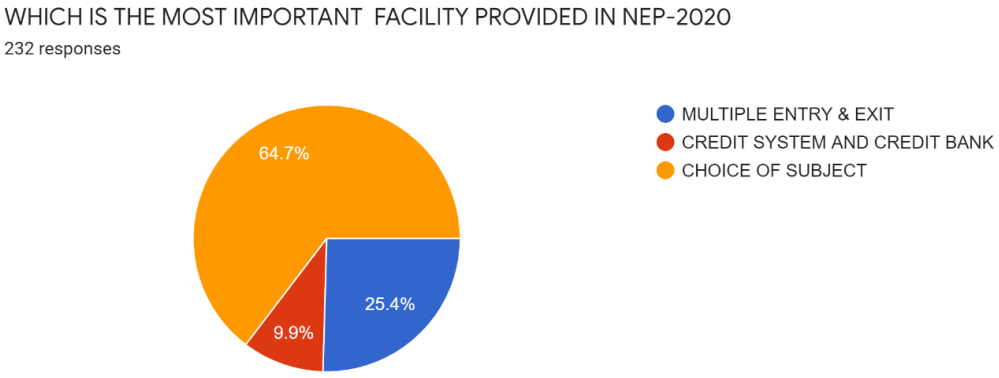
The figure shows that 84.8% participants know about skill development/vocational courses and 15.2% participants don't know about skill development/vocational courses.



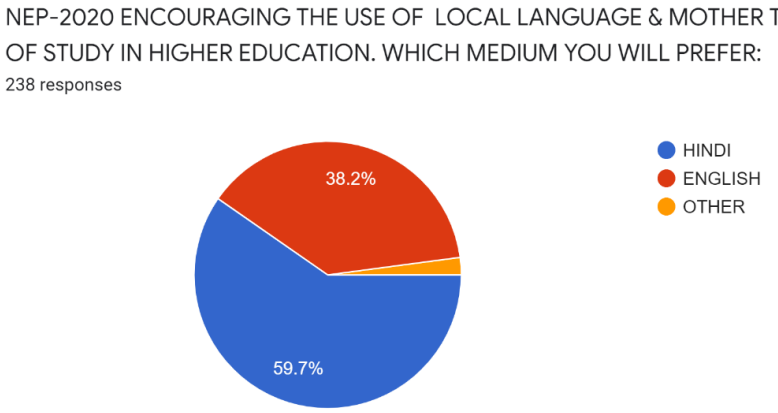
The above diagram shows that 20.9% participants believe that skill development/vocational courses are related to professional training, 10.3% participants believe that skill development/vocational courses are related to work space training whereas 68.8% participants believe that skill development and vocational courses are related to professional training as well as work space training both.



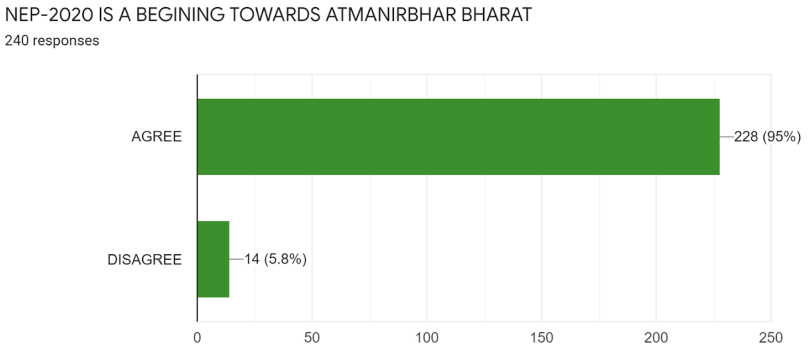
Study revealed that 60.3% participants believe that skill development courses are beneficial for career opportunity, 24.1% believe that skill development courses are beneficial for real world experience, approx. 10% participants believe that is skill development courses are beneficial for learn business ethics approx. 10% participants believe that skill development courses are beneficial for strengthen resume and approx. 5.6% participants believe that skill development courses are beneficial for other reasons.



About diagram shows that 25.4% participants believe that multiple entry and exit is the most important facility provided by the nep 2020, 9.9% participants believe that credit system and credit Bank is the most important facility provided by the nep 2020 and 25.4% participants believe that choice of subject is the most important facility provided by the nep 2020.



Study revealed that 59.7% participants like to prefer Hindi as a medium of study in higher education and 38.2% participants like to prefer English as a medium of study in higher education whereas very few participants like to prefer study in other languages.



Above diagram depicts that 95% students agree that the new education policy 2020 is a beginning towards (आत्मनिर्भर भारत) self reliant India whereas only 5.8% students disagree

Conclusion

Education is the most important thing in human life. Aim of New Education Policy 2020 is enable an individual to study one or more specialised areas of interest at a deep level, and also developed character and ethical values. This study shows that there is lots of hope and enthusiasm among the students about provision such as multidisciplinary subject approach, choice of language, flexibility of course etc. Students are very optimistic about the co-curricular subjects and vocational courses Although some of the students are not properly aware of all the provisions implemented in the new education policy. Most of the participants believe that this education policy will take us towards self-reliant India.

Suggestions for the future Study

Following topics can we use for the further study-
Digitisation in education: some aspects in NEP-2020
NEP-2020: vision of making young entrepreneurs

References

1. Sahai, S. (1970). Newspapers and magazines reading habits and its relation to the personality traits. Library Herald, 12(3), 167-177.
2. Satija, M.P. (2002). Reading and book culture. Herald of Library Science, 41(1/2), 55-59.
3. Jha, P. & Parvati, P. (2020). National Education Policy, 2020. (2020). Governance at Banks, Economic & Political Weekly, 55(34), 14-17.
4. Deb, P. (2020). Vision for Foreign Universities in the National Education Policy 2020: A Critique. Rajiv Gandhi Institute for Contemporary Studies, 1-29. https://www.rgics.org/wpcontent/ uploads/Foreign-Universitiesin-India-Palash-Deb.pdf
5. Suryavanshi, S. (2020). Reflections from a Comparative Study for Reimagining Indian Universities. University News, 58(33), 96-102.
6. Aithal, P. S. & Aithal, S. (2020). Analysis of the Indian National Education Policy 2020 towards Achieving its Objectives. International Journal of Management, Technology, and Social Sciences (IJMTS), 5(2), 19-41.
7. https://www.pib.gov.in/PressReleasePage.aspx?PRID=1654058
8. https://www.hindustantimes.com/education/new-education-policy-2020-highlights-key-takeaways-of-nep-to-make-india-a-global-knowledge-superpower/story-eIXTkJrcNJHhXdshWDpu1I.html
9. https://www.education.gov.in/en/nep-new
10. Prof. Jagdish Sheth “NEP 2020: Impact on higher education”,16th October, 2020, Ranchi https://iimranchi.ac.in/p/nep-2020-impact-on-higher-education.html
11. https://www.thehindu.com/education/why-a-skill-based-education-is-becoming-more-important-now/article33819878.ece
12. https://www.bestvalueschools.com/lists/benefits-of-declaring-a-college-minor/
13. https://idreamcareer.com/blog/importance-of-co-curricular-activities-for-students/
14. https://www.pib.gov.in/PressReleasePage.aspx?PRID=1654058
15. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf
16. International Research Journal of Modernization in Engineering Technology and Science
17. Volume:03/Issue:04/April-2021 www.irjmets.com
18. https://www.researchgate.net/publication/346654722_Impact_of_New_Education_Policy_2020_on_Higher_Education
19. National Education Policy (2020). Ministry of Human Resource Development, Government of India
20. Dr. Kavitha Balakrishnan (2021) EMPOWERING EMERGING INDIA THROUGH EXCELLENCE IN EDUCATION-REFLECTIONS ON NEP 2020. Elementary Education Online, 20 (1), 3596-3602 doi:10.17051/ilkonline.2021.01.406
21. https://www.education.gov.in/en/nep-new

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Innovation The Research Concept

Hybrid Grid connected Solar Power Inverter

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Abstract This paper proposes a simpler synchronized series RC phase angle control based push pull inverter topology using parallel combination of Power MOSFETS and a step up center-tap transformer to convert DC power available through solar panels, supported by battery backup to AC grid. A single phase quasi square wave three level inverter is employed to convert Solar DC solar power to a quasi square AC voltage, using a step-up centre tap transformer. The output voltage and phase angle of the inverter connected to the AC bus is kept controllable by duty ratio control and phase angle cantor respectively. A proposed prototype inverter model tested to verify power fed to 230 Volts AC supply.

Keywords MOSFET, Transformer, Inverter

Introduction

Sun Energy is abundantly available unending energy from sunlight where as non – renewable energy resources are depleting fast. The proposed topology can be utilized for minimizing electric bills during the availability of AC power and also for making the availability of AC power in case of power failure or stand alone mode. During stand alone mode the ac power will be generated using independent free running oscillator. All countries are moving toward the renewable energy. The advantage of hybrid green energy utilization system is that the power can be utilized during power failure also.The battery is continuously charged with the solar panel and the stored energy in battery is converted into AC voltage using inverter circuit. In presented scheme a battery charge controller is employed to continuously charge the battery with solar PV panels. Earlier, following researchers have contributed to utilize solar power and also to feed power to a single phase AC system. Off grid applications, sine wave PWM modeling have been explained in[1-4] Power Quality in Grid connected Renewable Energy systems [5] and SCR based solar to grid feedback is explained in[6].Capacitive isolated solar to grid is explained [7] Design technique of mixed solar power inverter system for connecting to the grid is presented in [8].Novel yet simpler method for synchronized phase shifting for grid power control with improved power quality using only simple two sets of parallel connected semiconductor switches is proposed with experimental results have been presented in this paper. A well known push pull inverter topology with parallel connected MOSFETS to minimize conduction losses and obtaining increased current rating is used to convert DC power having low voltage and high current to high voltage low current line synchronized

Aim of study

A simple push-pull inverter using 4/6/8 MOSFETs IRFZ44N 150 has been fabricated. Initially to test the performance of the system for 150 W, 440V Quasi Square wave Inverter to minimize the harmonics using 9V-0-9V/230V, 50 Hz, center tap transformer are connected as shown in Fig.3. Two synchronized AC pulse using RC phase shift limb connected across the supply is used to obtain two 180 phase shifted gate pulses which are generated using zero crossing detector circuit across resistance of the RC branch and fed to the four parallel connected MOSFETs bank of push pull inverter.Synchronized phase shifted gate pulses are generated and fed to the two MOSFET banks (four MOSFETs connect parallel) are alternately are switched on and off.Generated solar DC power is feedback to grid by controlling the leading phase shift angle of inverter by controlling pulse width and phase shift of the gate pulses by using control circuit working test modal is created and tested

successfully.

Methodology

Inverter to minimize the harmonics using 9V-0-9V/230V, 50 Hz, center tap transformer are connected as shown in fig 1. Two 180 phase shifted gate pulses are generated and fed to the Eight MOSFETs are alternately are provided from our control circuits shown in Fig.2. The practical gate pulse controller have been fabricated using IC 555, IC 324 and IC 4017 to generate controllable variable Gate pulses with variable pulse width as shown in Fig.6. These pulses are generated either independently or in synchronized mode depending upon whether we wish to operate in stand alone or grid connected mode. The Solar Power to be feedback to grid is controllable by R-C phase shift circuit by varying the value of resistance and power factor is controlled by pulse width of the gate pulses from control circuit.

Analysis

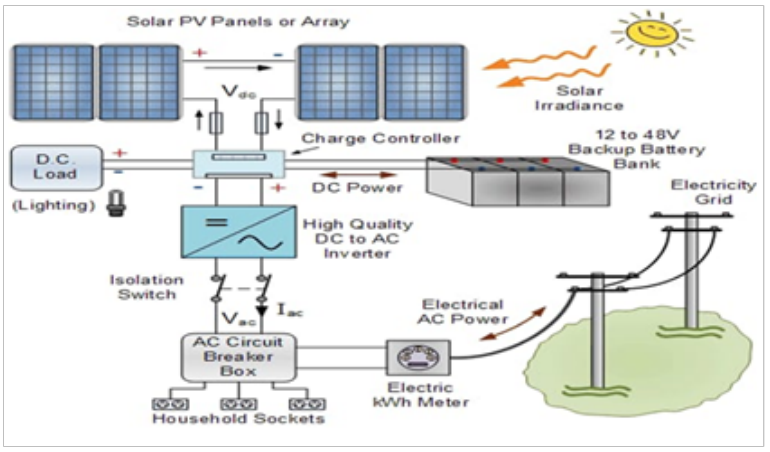

Fig 1: Block diagram proposed grid connected solar inverter

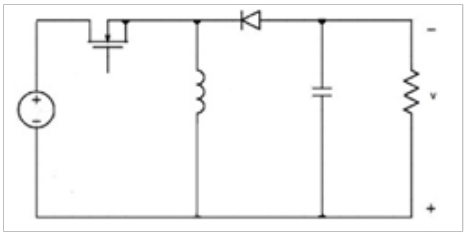

Fig 2: Concept and circuit for proposed Buck-Boost Charge controller

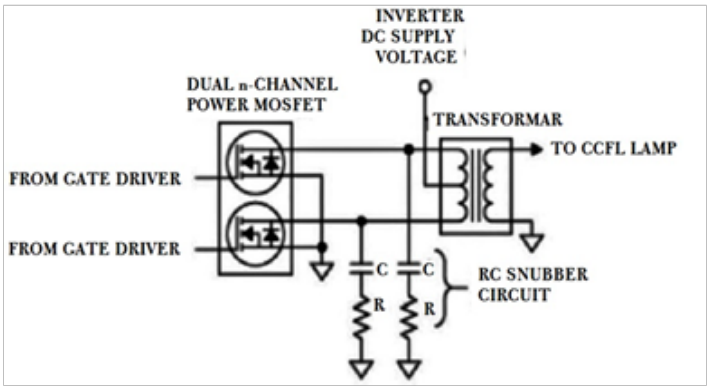

Fig 3: Schematic Diagram of Power Circuit of proposed Push–Pull Inverter.

Proposed three level solar inverter feeds 50 Hz ac power to the ac low voltage

bus of 230 volts AC.A simple push-pull inverter using 4 MOSFETS IRFZ44N in parallel in each push pull inverter limb have been fabricated.A150 W, 440V Quasi Square wave Inverter to minimize the harmonics using 9V-0-9V/230V, 50 Hz, center tap transformer are connected as shown in fig 1. Two 180 phase shifted gate pulses are generated and fed to the Eight MOSFETs are alternately are provided from our control circuits shown in Fig.2. The practical gate pulse controller have been fabricated using IC 555, IC 324 and IC 4017 to generate controllable variable Gate pulses with variable pulse width as shown in Fig.6. These pulses are generated either independently or in synchronized mode depending upon whether we wish to operate in stand alone or grid connected mode. The Solar Power to be feedback to grid is controllable by R-C phase shift circuit by varying the value of resistance and power factor is controlled by pulse width of the gate pulses from control circuit. Prototype working model is and tested successfully is shown in Fig

2.High frequency 25 kHz, Buck-boost converter is employed to charge the Battery bank under different solar intensity and load power and load conditions operating under MPPT .Duty ratio of the buck boost is controllable from 16Volts to 20volts. Output voltage Buck boost converter is controlled using Duty ratio control.

Power Circuit

A simple push-pull inverter using 4/6/8 MOSFETs IRFZ44N 150 has been fabricated. Initially to test the performance of the system for 150 W, 440V Quasi Square wave Inverter to minimize the harmonics using 9V-0-9V/230V, 50 Hz, center tap transformer are connected as shown in Fig.3. Two synchronized AC pulse using RC phase shift limb connected across the supply is used to obtain two 180 phase shifted gate pulses which are generated using zero crossing detector circuit across resistance of the RC branch and fed to the four parallel connected MOSFETs bank of push pull inverter.Synchronized phase shifted gate pulses are generated and fed to the two MOSFET banks (four MOSFETs connect parallel) are alternately are switched on and off.Generated solar DC power is feedback to grid by controlling the leading phase shift angle of inverter by controlling pulse width and phase shift of the gate pulses by using control circuit working test modal is created and tested successfully.

Control Circuit

For off grid applications a100 Hz oscillator is used in a stable multi vibrator mode. For grid connected system a series resistance capacitance RC limb is connected across the AC side of the control circuit and an ac voltage across resistance R is used to generate the phase shifted synchronized square pulsesThisSquare wave clock pulse at pin 3 are fed to dived by two digital divider using IC 4017.The Control circuit of solar power inverter with stand alone mode. These pulses are fed to the base of two pulses amplifier through pulse amplifier using transistor BC547. The complimentary output from output from driver circuit using transistor are fed to two Power MOSFET banks MOSFET banks are connected to the power circuit in pushpull configuration. The ac voltage output across low voltage winding of centre tap transformer is fed to the low voltage grid using step-up transformer whose high voltage winding terminals are connected to the AC grid .This way the low voltage AC from push pull inverter is step up to 230 volt AC.

Result and Discussion

Experimemntal Results

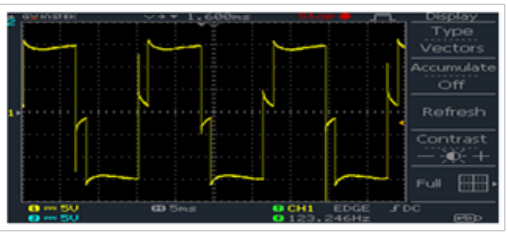

Fig.4 Low voltage side, inverter voltage AC 50 Hz waveform, at 70% duty ratio quasi square wave

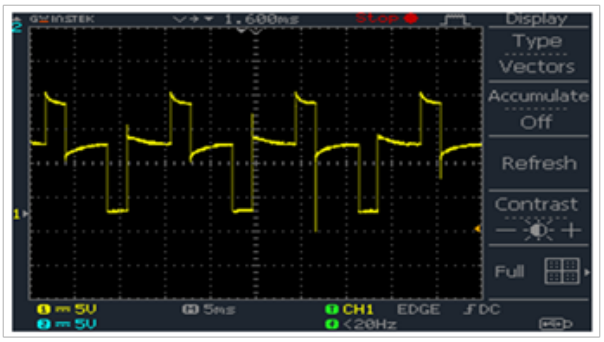

Fig.5 Low voltage side, inverter voltage AC 50 Hz waveform, at 40% duty ratio quasi square wave

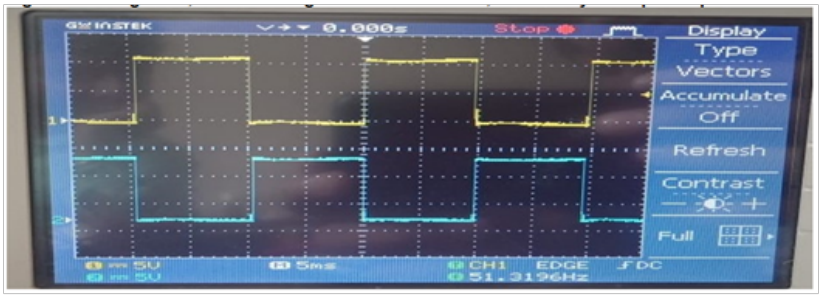

Fig.6 Complementary Gate pulses for maximum inverter voltage for square wave output

Table 1.Phase angle Vs Solar inverter output power fed to grid

Sr.no	Phase Angle of inverter w.r.t. Grid Voltage (degree)	Power Fed to 1ph AC Grid (Watts)
1	10(leading)	45.8
2	20(leading)	85.2
3	30(leading)	122
4	40(leading)	156.44
5	50(leading)	183.03
6	60(leading)	203.7

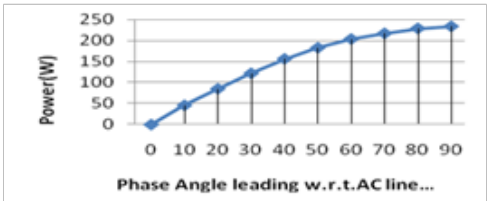

Fig.7. Phase angle Vs Inverter power

Experimental Results:

Fig.5 Shows Low voltage side, inverter voltage AC 50 Hz waveform, at 40% duty ratio.

Fig.6 Shows Complementary Gate pulses for maximum inverter voltage for square wave output at 50% duty ratio.

Table 1and Fig. 7, shows the increase in output power fed from solar hybrid inverter to the grid as the inverter phase angle becomes leading. The phase angle is variable from 0-90 degrees using variable resistance of R-C series branch with upper terminal of the capacitor connected to the ac source available from transformer and bottom terminal of their resistance is connected at the other terminal of ac supply available across low voltage side of the 230V to 9 Volt transformers.

The increase in output power fed from solar hybrid inverter to the grid as the inverter phase angle becomes leading. The phase angle is variable from 0-90 degrees using variable resistance of R-C series branch with upper terminal of the capacitor connected to the ac source available from transformer and bottom terminal of their resistance is connected at the other terminal of ac supply available across low voltage side of the 230V to 9 Volt transformers.

Conclusion

From the experimental results it is concluded that the power fed to grid using 3 level inverter increases as the leading phase shift angle between ac grid voltage and inverter ac voltage is increased from 0 to 90 degrees. The maximum power fed to the grid is found near 90 degrees leading with respect to ac grid voltage. In absence of grid power the solar power can be utilized using independent 100 Hz square wave oscillator to obtain 50 Hz quasi square wave output 230 volts Ac supply .which can be used to drive domestic electrical utilities.The proposed hybrid inverter has therefore the specialty that it can feed to the ac grid during availability as well as non availability of ac grid supply. It can also provide the ac power in absence of sun energy for some time because of the power stored in the battery. During availability of grid supply it will minimize the electric bills if net metering type energy meter is used. The proposed scheme is very simple and economic easily applicable.

References

1. Amir MushtaqPalla. Nipun Aggarwal, “ Desing of Hybrid Grid-Connected inverter for renewable Energy Generation with power QualityConditioning” IJRTE ISSN:2277-3878, Volume-8 Issue-3,September 2019.
2. Hannan, Sundas, Sohaib Aslam, and Muhammad Ghayur. "Design and real-time implementation of SPWM based inverter." In 2018 International Conference on

Engineering and Emerging Technologies (ICEET), pp. 1-6.IEEE, 2018.
3. Sujit Kumar Bhuyan, Dr. Prakash Kumar Hota, Dr. Bhagabata Panda, "Modeling and Simulation of Hybrid Energy System Supplying 30 Load and its Power Quality Analysis". International Journal of Renewable Energy Research, Vol.8, No.1, March, 2018.
4. Mohd Rizwan Khalid, "Development of Single Stage Thyristor Based Grid Connected Single Phase Inverter for Renewable Energy Systems ", International Journal of Innovative Research in Electrical Electronics, Instrumentation and Control Engineering Vol. 5, Issue 2 February 2017.
5. M.I. Fami, R. Rajkumar, R Arelhi, R Rajkumar and D. Isa, "Solar Hybrid PV System for Off-Grid Electrification in Smenyih Malaysia", International Conference on Power and Energy Systems Engineering, 2014.
6. Wen-Chen Zhang. Ning-Yi Dai, Man-Chung Wong, Chi-Kong Wong. "Capacitive-coupled Grid-connected Inverter with Active Power Injection Ability" 2012 IEEE 7th International Power Electronics and Motion Control Conference ECCE Asia June 2-5, 2012. Harbin, China
7. Khadem, Basu, Conlon, "Power Quality in Grid connected Renewable Energy systems: Role of Custom Power Devices", European Association for the Development of Renewable Energies, Environment and Power Quality, 2010.
8. T I Maris, St. Kourtesi, L. Ekonomou and G.P. Fotis, “Modeling of a Single- phase Photovoltaic Inverter”, Elsevier Journal on Solar Energy Materials and Solar Cells, 91(18), pp. 1713-1725,November 2007.

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Innovation The Research Concept

Educational practices in Teacher Education Institutions using Six Sigma Concept– An Assessment

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Abstract The term quality in education is no longer limited to students' performance only; it covers all as pects of the functioning of the institute. Therefore, quality improvement, today, is not only limited to improvement in the results of examination but also an improvement in all as pact of the functioning of the institute. The institutional assessment, based on the philosophy of Total Quality Management, provides the base line data on the various as pects of the institution, on which, the developmental schemes can be built upon. With the Total Quality Management paradigm, based on systematic change, improvement of the institution becomes a carefully planned and managed process so that the goals can be achieved more effectively and efficiently. Objective of the study is to know the levels of the Total quality of Teacher Education Institutions in Faridabad District. The investigator has used Survey Method and Simple Random Sampling Technique. The sample selected from 5 Teacher Education Institution (B.Ed. colleges) for the study,100 Teacher Students and 50 Teacher Educators TQM as applied to education in general and educational institutions in particular, means management of quality of physical, intellectual, emotional and spiritual dimensions of institutional life. Only such comprehensive TQM of educational institution can lead to Total Quality Education.(Mukhopadhyay,2005). The investigator developed the tools with the purpose of assessing the quality of the Pre-service Elementary Teacher Education Institutes of Delhi. This study finds that none of the institutes under the study had any formal quality improvement and quality management mechanisms in place. All long term planning is done at the higher levels with not much participation by any of the majors take holders. The short-term planning is usually done at the level of the department or the institute as the case may be, but even in this planning some of the stake holders do not find any representation.

Keywords Educational practices, Teacher Education, Six Sigma Concept, An Assessment.

Introduction

Youth is the prime resource of a country. The development of a country is dependent on the quality of its youth. The future of the youth, and hence the future of the country, is shaped in the classrooms. Thus, the quality of the youth is directly dependent on the quality of education.

The school education and teacher education are the two inseparable elements of any educational system. The quality of teacher education has a very profoundeffect on the quality of school education. The quality of teacher education in turn is dependent on the management of quality of the institutes of teacher education.

Aim of study

In order to provide solutions to the problems and to fulfil the demand of prime Educational problems, the objectives of the research were as follows:

1. To identify and investigate the Educational practices which leads to the quality of the Teacher Education Institutions in Faridabad District.
2. To study the levels of the Total quality of Teacher Education Institutions in Faridabad District.
3. To analyze the strengths, weaknesses, opportunities and threats for (SWOT) the Teacher Education Institutions.
4. To provide effective strategies to the Teacher Education Institutions by adapting six sigma concept for enhancing the Total Quality of Education.

Research Questions-

What are the main Problems and its causes which effects the Total Quality of

Education among Top Teacher Education Institution in Faridabad District?
What are the most effective strategies to improve the quality of Teacher education institutions by adaption of Six Sigma:
1. To identify and investigate the Educational practices which leads to the quality of the Teacher Education Institutions in Faridabad District.
2. To study the levels of the Total quality of Teacher Education Institutions in Faridabad District.
3. To analyze the strengths, weaknesses, opportunities and threats for (SWOT) the Teacher Education Institutions.
4. To provide effective strategies to the Teacher Education Institutions by adapting six sigma concept for enhancing the Total Quality of Education sigma concept

Review of Literature

Literature studied about Six Sigma application in the field of education to improve the pass percentage of the students, their satisfaction and expectations to improve the overall goodwill of the institute. The main focus on the importance satisfaction model application in the higher education institutes of the different fields of Science colleges, commerce colleges and arts colleges. No literature found on the research done on the institutes of the mentioned above fields. From the literature point of view the researcher has been contributed the application of Six Sigma through the Importance Satisfaction Survey done on the undergraduate students of Faridabad city, Haryana. It has been found that Six Sigma mainly focus on the industrial production organization so it is an attempt to implement Six Sigma methodology in the field of education to improve the overall quality of education services provided to the students by the higher education institutes.

Main Text

Teacher's Education

Teacher's Education refers to all the activities and experiences which are designed to equip the teachers with the knowledge, attitudes, behaviors and skills that they require to perform their tasks effectively in the school and the classroom. The importance of teacher education cannot be sidelined, as no curriculum is teacher-proof.
Organization of teacher education is often divided into-
Initial Teacher Education- It is a pre-service course taken by the would-be teacher before he /she enters the classroom as a fully responsible teacher;
Induction
It is a process of providing training and support to a teacher during his/her initiation to the role of a teacher. It is carried out in the initial few days, months or year of the teacher in a particular school; Teacher development or continuing professional development: It is an in-service programme for the practicing teacher Pre-service Teacher Education is a course that is offered to the student- teachers before they join the teaching profession, and it leads to certification to make a person eligible to work as a teacher. Pre-service Teacher Education develops better understanding of children, builds confidence in the new teachers, make them familiarwith the methodology of teaching, builds positive attitudes towards teaching profession, develops aptitude and orients the student-teachers towards research and experimentation, creates social insights and teaches the teachers to live a community life, improves their standards of teaching and strengthen the democratic set up of the country by making themgood citizens of the country.

Concept of Quality and Its Development

Defining quality is far from easy. Quality, according to American Society for Quality (1990), "is the totality of features and characteristics of a product or service that bear on its ability to satisfy the stated or the implied needs".
Modern definition emphasizes that quality is meeting or exceeding customer expectations. Customer can either be external customers or internal customers. External customers are the recipients of an output but are not part of the organization supplying it, whereas internal customers are the recipients of

another person's or department's output within an organization. According to Shejwalkar (1999), "Quality is essentially a product of intensive investment of capital, talent and hard work. Quality cannot be superficially achieved. Quality is not a chance, but a choice. Quality, again, is not an accident but a design. Quality is not a destination but a continuous journey."

Quality in Teacher's Education

There is no single generally accepted definition of quality of teacher education as the employers, institutions, managers, lecturers, accreditation bodies, students etc. differ in what to expect from teacher education, or what indeed constitutes the objectives of teacher education, its quality and how it can be measured. Quality of education is dependent on several factors such as school infrastructure, the curriculum, the activities, the teaching- learning material and the other facilities available but it is the teachers who are the most significant factor and thus, they should be central to all initiatives for school improvement. Teacher education is, therefore, key determinant in ensuring quality of education in the schools of the country.

Total Quality Management in Pre-Service Teacher Education

The quality of the learning experience is seen to have been assured with qualified personnel or increased funding, though it is not the case in reality. Unlessquality enhancement practices adopt a comprehensive approach to the educational process, ensuring high quality standards would always be incomplete. TQM could provide a sustainable answer to the perennial quality problems plaguing the Teacher Education Institutions in India.

It is often fallaciously believed that the quality of the learning experienceis assured with the provision of qualified personnel or increased funding. Any endeavor to ensure high standards of quality in education would always be incomplete unless the quality enhancement mechanisms do not adopt a comprehensive approach to the educational process. Total Quality Management could provide a sustainable answer to the perennial quality problems plaguing the Teacher Education Institutions in India.

Each institution comprises several sub-components that are interrelated and interdependent: infrastructure, instructional resources, personnel, programmes, activities, etc. Action in one area often results in a chain of reactions in other areas. For total quality management (TQM), it is necessary to develop holistic thinking about the institution; therefore, there is a need for looking at an institution as a complete organism.TQM as applied to education in general and educational institutions in particular, means management of quality of physical, intellectual, emotional and spiritual dimensions of institutional life. Only such comprehensive TQM of educational institution can lead to Total Quality Education. (Mukhopadhyay, 2005) In the 1980's, the quality initiative was at its peak in India, but after 1992, there is a downward slide. Today, in Indian organizations, efforts are on to revive this concept (Rao, 2000). TQM might prove effective in realizing quality enhancement in Indian Educational System, in general and in teacher education, in particular.

Sampling

The investigator has used Survey Method and Simple Random Sampling Technique. The sample selected from 5 Teacher Education Institution (B.ed colleges) for the study. 100 Teacher Students and 50 Teacher Educators of various Teacher Education Institution affiliated to Chaudhary Ranbir Singh University, Jind, Haryana would be asked to fill questionnaire related to Quality Landmarks for Educational Practices for assessing the efficiency for Total Quality in their Institutions.

Sample Size

The population of study is taken from the five top Teacher Education Institutions established in Faridabad District which are affiliated to Chaudhary Ranbir Singh University, Jind, Haryana, among which 220 Teacher-Students, 75 Teacher-Educators and 5 principals or Head- in-charge will be taken as sample for this Qualitative Research Study.

Five Teacher Education Institutions are as follows :

1. Aravali College of Advance Studies in Education, Pali, Faridabad, Haryana.
2. Shiv College of Education, Faridabad, Haryana.
3. Aggarwal College of Education, Faridabad, Haryana.
4. Sai Mohan College of Education, Faridabad, Haryana.
5. Rise Max College of Education,

Name of Teacher's Education Institutions	**Questionnaire distributed (Population)**	**Selected sample (Sample Size)**
Aravali College of Advance Studies in Education	100	60
Shiva College of Education.	100	60
Aggarwal College of Education	100	60
Sai Mohan College of Education	100	60
Rise Max College of Education.	100	60
Total:	500	300

Graphical presentation

Tools Used

The investigator has used Mukhopadhyay's Institutional Assessment System (MIAS), as a tools of Investigation.

For this study, the data was collected with the help of tools and techniques that were an adaptation of the Mukhopadhyay's Institutional Assessment System (MIAS), keeping in mind the indicators of quality, as proposed by NAAC and NCTE.

This assessment system includes qualitative methods of assessment. MAIS comprises of the following:

1. Principal's Opinionnaire
2. Teacher's Opinionnaire
3. Student's Opinionnaire
4. Parent's Opinionnaire
5. SWOT Analysis
6. The other sections are:
7. Personal Details

This part consist of demographical personal information of the respondents like gender, name of the college, filed of the study, year and semester of the study and the type of the college which belong to the students.

Importance Rating-

This part consists of the importance level means the students have to rate for the quality according to their expectation for the attribute. The importance level ranged from 1 to 5 Likert scale means 1 represents extremely low importance and 5 represents extremely high impotence.

Satisfaction Rating-

This part consists of satisfaction level means the students have to rate for the quality

according to their satisfaction given by the institute for the particular attribute. The satisfaction level ranged from 1 to 5 means 1 represents extremely dissatisfied and 5 represents highly satisfied.

Techniques to be used-

Analysis of data for the present investigation had been made in conformity with the objectives and research Questions as formulate by the investigator. Main purpose of the study was to assess the Educational practices in Teacher Education Institutions using Six Sigma Concept and its effectiveness in Providing Total Quality.

Construction of the Tools-

The investigator developed the tools with the purpose of assessing the quality of the Pre-service Elementary Teacher Education Institutes of Delhi. The tools were prepared to cater to both aspects of quality namely, the intangible aspect and the tangible aspect.

To collect the data on the perception of the stakeholders about the quality of their institute, an opinionnaire was prepared each for the Principals or Teachers-in-charge, for the teacher-educators and for the student-teachers.

Besides the above, a semi-structured interview schedule was prepared for the Principals or Teachers-in-charge and another was prepared for the teacher-educators. Furthermore, an Information Blank was prepared to gather tangible information regarding the institute.

Development of the Items of the Tool-

The investigator conducted an extensive literature review and felt that the MIAS suited the requirements of the objective of his study. However, the tools that constitutes the MIAS were for assessing the quality of the schools and therefore, the investigator had to amend the tools by adding certain dimensions and by changing or removing or adding the items of the tool, for which she again undertook an extensive literature review.

The researcher also went to the field and interacted with the student-teachers and the teacher- educators which helped him immensely in framing items of tools of his study. All the items so developed were then categorized under their respective dimensions and those that were repetitive were removed.

Throughout this process, the investigator continually updated the supervisor on the progress and sought her opinion, suggestions and feedback. Same procedure was followed for the Semi- structured Interview Schedule and for the Information Blank.

Validity/Experts Review-

The tools thus constructed were subjected to an expert review. The tools were given to my research guide and experts Dr. Anshu Radha Agarwal. However, some of the items were added, deleted or modified as per the suggestions and remarks of the experts

After collection of data the score were put in to a tabular form to make the process of analysis easier.

Analysis

The researcher, first of all, constructed the opinionnaires, the semi-structured interview schedules and the information blank for the assessment of the quality of the institutes of teacher education. He made appropriate amendments to the MIAS to make it more relevant for the assessment of the teacher training institutes. These amendments were based on the NAAC and NCTE proposed indicators of quality for teacher education institution. The researcher then collected from the institute, the factual information and data on the performance in academic and non-academic activities, resources and facilities, physical infrastructure, financial resources and the staff of the institute. This was done with the help of Information Blank that the investigator had prepared. Thereafter, the researcher administered the opinionnaires on the principal, teacher-educators and the student-teachers of the institute and also conducted the interviews with them. The principal, teacher-educators and the student-teachers were also asked to fill up a SWOT form. The opinionnaires and the SWOT forms were filled by the principals and the teacher-educators individually whereas the opinionnaire and the SWOT form were administered on the student- teachers in a group. The

teacher-educators, and the student-teachers were selected randomly for the study. The data so collected were then tabulated and analyzed by the researcher.

Findings

The analysis and interpretation of the data has resulted in the following findings which have been categorized in three parts:

1. To study the Principal's or Teachers-in-Charge's perception of the quality of their Institutions

From the responses of the principals, it is evident that in their perception, Satisfaction with Quality, Customer Orientation, Client Education, and Innovation are the areas which are stronger whereas Participation, Community Involvement, Linkages and Staff are the areas which are weaker.

2. From the analysis of the interview carried out with the principals of five selected B.Ed. Colleges of Faridabad, Haryana. It was found that the principals consider the faculty, curriculum, library, infrastructure, opportunities for professional development, adequate space, relationships, commitment and punctuality of the staff and innovations as the important quality parameters in a Teacher Education Institute.

3. Principals told that no formal programme is dedicated to the improvement and management of quality in college and most of the efforts in this direction are informal and on a personal level.

4. Principals told that there is no formal mechanism is in place to take the feedback of the student-teachers, regarding the quality of the institute, but verbal feedbacks are taken from the student-teachers informally.

5. Principals told that there is no formal mechanism is in place to take the feedback of the teacher-educators, regarding the quality of the institute, but meetings are constantly held where they can voice their concerns and suggestions.

Most of the principals are not satisfied with the quality of their institute. They were,

however, satisfied that they are doing the best we can under the given condition.

6. The principals told that they do whatever is possible and feasible at the institute's level to enhance the quality of their institutes.

7. The principals told that their endeavor is to produce capable and committed teachers and also to encourage good research work by the faculty and the institute.

8. The principals told more functional autonomy and training programs could improve the effectiveness of the Principals.

9. The principals told that lack of sufficient number of staff, of autonomy, of infrastructure, of funds, of space, of labs and of jobs are the most important problem being faced by the institute.

Finding 2: 1. To study the Teacher-Educator's perception of the quality of their Institutions

From the responses of the teacher-educators, it is evident that in their perception, Objectives and Goals, Teaching, Teacher Quality, Co-curricular Activities, Relationships, School Experience Programme, Evaluation Process and Students are the areas which are stronger whereas Leadership, Office Management, Linkages, Management Process, Facilities and Material Resources, and Job Satisfaction are the areas which are weaker.

2. From the analysis of the interview carried out with the teacher-educators of theDIETs, it was found that the teacher-educators consider that the curriculum must be reviewed.

3. The teacher-educators told that the construction of the curriculum should be a collaborative effort which should consider the voices of the teacher-educators and the student-teachers along with that of the experts.

4. The teacher-educators feel that there should be more opportunities for professional development and more academic freedom at the same time people should also be held accountable.

5. The teacher-educators admitted that no induction training or orientation is ever given to make the teacher-educators aware of the objectives and goals of the institute but according to them, the permanent faculty know about it and the contractual try their best according to what is known or made known to them.

6. The teacher-educators told that qualifying the exam held for the selection of candidates as teacher-educators indicates that one is capable, however interviews are also necessary to gauge the communication skills and exposure to research.
7. The teacher-educators mentioned that only on rare occasion come an opportunity to participate in a professional development programme but only a selected few get the chance due to the widely prevalent biases in the system.
8. The teacher-educators pointed out that a lot of co-curricular activities takes place but they are disjoined with the objectives with which they were placed in the curriculum.
9. The teacher-educators told that school experience programme be made more effective by decreasing the distance to be travelled by the teacher-educators and also by widening the range of the experiences made available to the student-teachers.
10. The teacher-educators told that a lot of clerical job is done by the teacher-educators themselves and they feel that that situation could be improved by providing them with better training and by addressing their grievances and understanding their limitations.
Finding 3:1. To study the student-teachers' perception of the quality of their institutes.
2. From the responses of the student-teachers, it is evident that in their perception, Objectives and Goals, Relationships, School Experience Programme, Admission Procedure, Leadership, Office staff, Linkages, and Student-teachers are the areas which are stronger whereas Teaching-learning process, Co-curricular activities, School Experience Programme, Institute, Evaluation Process, Timetable, Management Process, and Facilities/Material Resources are the areas which are weaker.
Finding 4: 1. To identification of Strengths Weaknesses Opportunities and Threats (SWOT) for the Teacher Educational Institutions.
2. From the SWOT analyses conducted on the principals, the strength of the institutes were found to be highly qualified and dedicated staff and the co-operation among the members of the institute, the bright and hardworking student-teachers of the institute and the prevalent democratic atmosphere of the institute along with some of the facilities available. The weakness of the institute in view of the principals are the inadequate infrastructure, funds, space, autonomy and proper work conditions for the staff, shortage of staff, inefficiency of the office staff, recruitment on contractual basis, and differently-abled unfriendly buildings of the DIETs. Opportunities for the institute are considered to be in improving the linkages, sharing of resources and experimentation with the Public-Private Partnership model. The major threats for the institute as outlined by the principals were lack of autonomy, staff and resources along with elaborate administrative hierarchy and its style of functioning and unfavorable working conditions for the staff, lack of good and quality research, inappropriate location of the institute, multiplicity of training programs and lack ofunderstanding of the objectives of B.Ed. Colleges.
3. From the SWOT analyses conducted on the teacher-educators, the strength of the institutes were found to be highly qualified staff and the relationship between them, the student-teachers, discipline, location of the institutes, co-curricular activities carried out in the institute. The weakness of the institute in view of the teacher-educators are the inadequate infrastructure, staff, research opportunities, proper work conditions, opportunities for faculty development, library, autonomy, opportunities to link with other educational institutes, its being government institute, the number of student- teachers and the negative atmosphere prevalent in the institute. The opportunities for the institute were found in the areas such as incorporation of the latest technology, developing linkages, limiting the work of teacher-educators, provision of research facilities to the teacher-educators, placement services for the student-teachers, improving the canteen, improving teaching and training, use ofinstitute as a resource centre, judicious use of the playground and provision of recreation for the student-teachers. The major threats for the institutes as outlined by the teacher-educators are the lack of infrastructure,

maintenance, staff, resources, proper working conditions, the lack of academic environment, mushrooming of the private institutes, the student-teachers of the institute and the average age of the student-teachers of the course.

4. From the SWOT analyses conducted on the student-teachers, the strength of the institutes were found to be the principal, the faculty and the students and the co-operation amongst them, the discipline, teaching, use of technology, the School Experience Programme, the admission process, liberty to the student-teachers, the relationship between the members of the institute, the course and its fee, conduction of regular workshops and co-curricular activities, and the emphasis on the all-round development. However, some student-teachers insisted that there were no strengths of the institute worth mentioning. The weakness of the institute in view of the student- teachers are lack of infrastructure, of discipline, of staff, of cleanliness, of sports, of co- ordination, of maintenance, of space, of facilities, of resources, of teaching aids, of good canteen, of good library facilities, of sensitivity of the institute towards the student-teachers, of good relationship between the members of the institute, of practical aspect in the programme, of good and useful excursion and tours of the student- teachers, of adherence to time-table, of transparent evaluation procedure and of proper functioning labs, the politics in the institute, too much of co-curricular activities, unsafe building, enforcement of uniform, uninteresting and useless assignments, irregular teaching, wastage of time of the student-teachers, the method of teaching, the principal, very strict rules and regulations, inappropriate location of the institute, preventing the student-teachers to use computer lab, too much of co- curricular activities, lack of practical aspect in the curriculum transacted, teacher- educators, their lack of punctuality, their being partial and their using the student- teachers for their own work.

5. The opportunities for the institute were delineated by the student-teachers as incorporation of technology, of proper micro-teaching sessions and of workshops, and provision of placement services, of scholarships for the deserving student-teachers, of hostel facilities and of proper functioning labs, increased number of student-teachers and their involvement in the management of the institute, coaching for CTET, use of locally available resources, optimum and judicious use of available resources, online admission process, encouragement of innovative activities, fostering co-operation between the members of the institute, meaningful assignments, tours and evaluation, participation in state level events,creative utilization of the free time of the student- teachers, community interaction, making the programme a degree level programme, and improving the area and the building of the institute though local help. The major threats for the institutes, as outlined by the student-teachers are the teacher-educators being unpunctual, partial and not interested in teaching, the lack of discipline, of dedication on the part of student-teachers, of infrastructure, of maintenance, of staff, of resources, of space, of cleanliness, of time management, of job prospects and ineffective teaching, absence ofdisaster management cell, inappropriate location of the institute, more number of student-teachers, over emphasis on co-curricular activities, no emphasis on technology, relationships between the members of the institute and the mechanism of evaluation and admission.

Conclusion

It is widely accepted that no education system can rise above the quality ofits teachers; therefore, it is imperative for the teacher education to not only have good quality but to make an endeavor to continuously improve quality. Quality assessment is the beginning of quality improvement of an institution. Quality assessment is a measure of overall personality of the institution. The findings of such an assessment are help the administrator to utilize and mobilize the physical, the human and the financial resourcesin the best possible way so as to realize the goal of qualitative improvement.

The term quality in education is no longer limited to students' performanceonly; it covers all aspects of the functioning of the institute. Therefore, quality improvement, today, is not only limited to improvement in the results of examination but also an improvement in all aspect of the functioning of the institute. The institutional assessment, based on the philosophy of Total Quality Management, provides the

baseline data on the various aspects of the institution, on which, the developmental schemes can bebuilt upon. With the Total Quality Management paradigm, based on systematic change, improvement of the institution becomes a carefully planned and managed process so that the goals can be achieved more effectively and efficiently.

This study finds that none of the institutes under the study had any formal quality improvement and quality management mechanisms in place. All long term planning is done at the higher levels with not much participation by any of the major stakeholders. The short- term planning is usually done at the level of the department or theinstitute as the case may be, but even in this planning some of the stakeholders do not findany representation.

Ad hoc/contractual teacher-educators, who in some cases are more than fifty percent (50%) of the strength of the faculty, have either no or negligiblecontribution to the decision- making of the institute/department. No formal feedback is taken from the students who are one of the major stakeholders. In most of the institutes, the teacher-educators and the student-teachers were not happy with the style of theworking of the higher management who they feel are overtly authoritative and infringe onthe autonomy of the institute or the department. Most of the heads/principals/teachers-in- charge were concerned with the lack of autonomy of the institute/department and although they were aware of some of the impediments to improvement of the quality of the institute, they expressed their helplessness to do anything about it. They also felt that the administrative procedures to get things done must also be trimmed down so that a lot of wastage of effort and time could be prevented. It was also found that the teacher- educators were not able to ensure their participation in programs of continued professional development either due lack of opportunities or due to their work load.

Noneof the institute arrange any induction training programs for the new faculty members (whether ad hoc/contractual or permanent) who have to learn most of what they do on the job by informal means. Absence or inadequacy of the support for the non-academic work of the department necessitated the teacher-educators to do them which increase their work load considerably and distracts them from their primary objective of conducting the teaching-learning process. There are hardly any incentives in place to promote excellence among the teacher-educators in fact some of the teacher-educators confided that theperson who does good work is given more work the next time. Most of the teacher- educators mentioned that most of the linkages with other institutions except that with the schools are informal and personal in nature. Laboratories, in most of the institutes under the study, were either non-existent or were rarely ever used which is worrisome considering the importance of concretization of the concepts for the students at elementary stage of their education. Some of the teacher-educators also feel that remaining in one institute throughout stagnates the teacher-educators which is why there should be an exchange of faculty between the teacher education institutes so that they are exposed to different types of practices in teacher-education. Student-teachers in all the institutes under the study were skeptical of the process of evaluation which they felt was not transparent creating conditions favorable for favoritism and biases to creep in. Lackof space, lack of infrastructure and lack of staff were the most frequently cited problems that the institute faces in all the institutes under study.

As with all the other institutions, the government sponsored pre-service elementary teacher education institute of Delhi, too, have certain strengths, as enumeratedby the members of the institute, which need to be further strengthened and certainweaknesses, which need to be taken care of. These institutes also have certain opportunities which must be grabbed and utilized so that they can be converted into strengths; and it also faces certain threats and challenges, which require its immediate attention.

These institutes have a good pool of talent, be it the well-qualified and experienced teacher- educators or the academically sound and energetic student-teachers. With good leadership, greater autonomy and little attention from the government, these institutes could transform themselves into total quality institutions and in the process, transform the very scene of elementary education in Delhi and in India, helping the

nation realize the dream of providing quality education to each and every child.

Suggestions for the future Study

1. On the basis of findings, the following suggestions are proposed,
2. Quality improvement and quality management mechanisms must be introduced in the institutes of elementary teacher education.
3. Inputs must be formally sought from all the stakeholders while formulating plans, including those for quality enhancement.
4. The higher management must not be isolated from the major stakeholders and must consider the views and suggestions of all major stakeholders while formulating policies for the institute.
5. Authority must be delegated to the Principal or Teachers-in-charge so that they might solve problems of the institutes more effectively.
6. Administrative procedures that are the hallmark of a government institution must be trimmed to the bare necessary so that the wastage of a lot of time and effort could be prevented.
7. Linkages of the institutes with the community, with the universities, with the other teacher-education institutes and with the schools must be given due attention.
8. There should be an exchange of faculty between the various institutes of elementary teacher education institutes.
9. Workload of the staff must be lessened especially that of the non-academic nature.
10. Ad hoc/ contractual teacher-educators must also be involved in the decision-making process of the institute/department as they form a sizable part of the faculty.
11. Canteen facilities must be improved and health and hygiene must be given due importance and this might prove profitable for the contractor, too.
12. New faculty members (whether permanent or Ad hoc/Contractual) must be oriented towards the aim and objectives of the institute and the working of institute, before they start their tenure.
Curriculum of the elementary teacher education programs must be reviewed and technological inputs must find their due space in it.
13. Teacher-educators must make sure that all the student-teachers take part in co-curricular and co-academic activities so that the shy and introverted student-teachers may also get confident of themselves.
14. Libraries must be provided sufficient funds to upgrade its reservoir of books and journals. Care must be taken to ensure availability of books in the languages in which the course is being offered.
15. Evaluation procedure must be transparent, especially the internal assessment.
16. Grants must be increased so as to keep pace with the rapid rise in enrolment and escalation of prices.
Implementation of the Study-
1. Some of the studies that can be taken up in this area by the researchers are given below.
2. This study was conducted on government sponsored pre-service elementary teacher education institutes only, so another study of same type can be taken up to include private pre-service elementary teacher education institutes as well.
3. The same study could be extended to include the perceptions of the employers as well.
4. The same study could be conducted as a case study on each of the government sponsored pre-service elementary teacher education institutes as it would throw more light on the state of quality in each institute and the results obtained would be more reliable and valid.
5. The same study could also be extended to the pre-service elementary teacher education institutes of other states.
6. Comparative study could also be undertaken between the pre-service elementaryteacher education institutes of various states of the country.
7. The same study could be extended to compare the quality of the government sponsored pre-service elementary teacher education institutions with the quality of theprivate pre- service elementary teacher education institutes.
8. The same study could be extended to compare the quality of the various pre-service elementary teacher education programmes conducted by various bodies.

9. The same study could also be conducted on the other pre-service teacher education institutes.

Limitation of the Study

The study was delimited to the students and Faculties of five selected Teacher Education Institutions of Faridabad District, Haryana which are affiliated to Chaudhary Ranbir Singh University, Jind, Haryana (India).

The results of the efforts carried out in the descriptive study, which is carried in favor of the successful practical implementation of Six Sigma in five Teacher education Institutions.

First, due to the paucity of time and cost only self-financing B.ed colleges have been considered for studying the applicability of six sigma methods. In India, apart from self- financing private B.ed colleges, there are other categories of Educational college namely Pre-primary teacher education, Primary teacher education, Secondary teacher education, Higher education programs, Vocational Teachers Training. The conduct of student's feedback survey consumed an ample time for the application of further projects.

Second, due to time constraint only a five six sigma projects like employment improvement and academic performance improvement are selected for consideration.

The third limitation is that for a sustainable control and monitoring of six sigma success depends onhow the teacher's colleges and affiliating Institutions.

The fourth one is the financial justification of each six sigma project to be evaluated. Despite these debacles, it is envisaged that the findings and contribution of this research work would be helpful in the application of Six Sigma projects in self-financed, Private Educational colleges in India.

References

1. Lunenburg, F.C. (2010) Total Quality Management Applied to Schools. Schooling, 1, 1-9.

2. Koslowski, A.F. (2006) Quality and Assessment in Context: A Brief Review. Quality Assurance in Education, 14, 277-288. https://doi.org/10.1108/09684880610678586

3. Crosby, P.B. (1979) Quality Is Free. New American Library, New York.

4. Short, P.J. and Rahim, M.A. (1995) Total Quality Man-agement in Hospitals. Total Quality Management, 6, 255-263. https://doi.org/10.1080/09544129550035422

5. Deming, W.E. (1986) Out of the Crisis. MIT Press, Cambridge.

6. Yang, C.C. (2005) An Integrated Model of TQM and GE-Six Sigma. International Journal of Six Sigma and Competitive Advantage, 1, 97-105. https://doi.org/10.1504/IJSSCA.2004.005280

7. Goetsch, D.L. and Davis, S. (1994) In-troduction to Total Quality: Quality, Productivity, Competitiveness. Macmillian College Pub-lishing Co., New York.

8. Vinni, R. (2011) Total Quality Management and Paradigms of Public Administration. International Public Review, 8, 15-23.

9. Witcher, B.J. (1990) Total Marketing: Total Quality and Marketing Concept. The Quarterly Review of Marketing (Winter), 12, 55-61.

10. Oakland, J. (2003) Total Quality Management: Text with Cases. Elsevier, Butterworth Heinemann, Oxford.

11. Escrig, A.B. (2004) TQM as a Competitive Factor: A Theoretical and Empirical Analysis. International Journal of Quality & Reliability Management, 21, 612-637. https://doi.org/10.1108/02656710410542034

12. Kumar, V., Choisne, F., Grosbois, D. and Kumar, U. (2009) Impact of TQM on Company's Performance. International Journal of Quality & Reliability Management, 26, 23-37. https://doi.org/10.1108/02656710910924152

13. Spanbauer, S.J. (1995) Reactivating Higher Education with Total Quality Management: Using Quality and Productivity Concepts, Techniques and Tools to Improve Higher Education. Total Quality Management, 6, 519-537.

14. Yudof, M.G. and Busch-Vishniac, I. (1996) Total Quality: Myth or Manage-ment in Universities. Change, 28, 19-27. https://doi.org/10.1080/00091383.1996.9937148

15. Anderson, K. and Zemke, R. (1998) Delivering Knock Your Socks off Service. Amacom, New York.

16. Lee, M.C. and Hwan, I.S. (2005) Relationships among Service Quality, Customer Satisfaction and Profitability in the Taiwanese Banking Industry. International Journal of Management, 22, 635-648.

17. Wani, I.A. and Mehraj, H.K. (2014) Total Quality Management in Education: An Analysis. International Journal of Humanities and Social Science Invention, 3, 71-78.
18. Schargel, F.P. (1994) Transforming Education through Total Quality Management: A Practitioner's Guide. The Leadership Management Series, Princeton.
19. Gaither, N. (1996) Production and Operations Management. Duxbury Press, Cincinnati.
20. Yusuf, S.M. and Aspinwall, E. (2000) TQM Implementation Issue: Review and Case Study. International Journal of Operation and Production Management, 20, 634-655. https://doi.org/10.1108/01443570010321595

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Innovation The Research Concept

Talibans Takeover of Afghanistan: Assessing India's Strategies

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Abstract Since U.S. combat forces have left Afghanistan that has changed the security situation in that country. The power balance is likely to shift in favor of Taliban's ambit which can lead to the outbreak of a more volatile situation in that country, concerns the regional powers who can receive the spillover effect of such a situation. Under such backdrop, India who has showed its rise of soft power influence within that country since 2001 by investing about 3 billion USD for strategic infrastructure and capacity building projects has to reassess its strategies after the Taliban's takeover of Afghanistan-the group that India considers illegitimate. In this ongoing paper an attempt has been made to assess the India's strategies after Taliban took hold of Afghan affairs. It also brings forth the role that India can play in order to restore peace in Afghanistan and also secure its developmental projects in order to stay engaged with that country. The paper also impinges on the challenges that India is facing after the Taliban's takeover of Afghanistan. Finally the paper provides a brief description about the options that India can avail so as to create a conducive environment that can work in favor of both Afghans and for itself as well.

Keywords Talibans Takeover, Afghanistan, Powers, Decades.

Introduction

Decades of military intervention of US in Afghanistan failed to establish its ambition of liberal democratic institutions successfully. Not only this, it could not check the Taliban's control of Afghanistan for establishing a social order that could free Afghanistan from falling prey into the hands of corrupted leaders backed by their allies. The Taliban aspires to build a social order that could be placed on Islamic traditions and practices that they believe are misused by the corrupted leaders of Afghanistan.[1] The Taliban's seizure of Kabul came to the place on August 15, 2021, that led to their strong foothold over the country. It came in the response as US was completing its military mission that it concluded in the February 2020 in U.S.-Taliban accord. Finally, it was on August 30, 2021, when U.S. military and diplomatic presence in Afghanistan came to an end after the departure of U.S. combats from Afghanistan that changed the security situation in the country[2] India's former security adviser M.K. Narayanan while opining on the changing security situation in Afghanistan writes, "Due to its geographical positioning and influence on regional stability, the political future of Afghanistan will be of considerable significance to several nations with competing sets of interests as well as to pan-Asian relations as a whole.". Thus, the neighboring countries along with India will receive the security implications that can emanate from the Afghanistan after the Taliban resurgence. India considers the importance of peaceful, stable and prosperous Afghanistan favorable for security in Kashmir and a prerequisite to the protection of its ongoing developmental projects in the country[3] as well as to its ambition of emerging out as a regional leader along with its power projection as a major global power.[4] Against this backdrop, the India's active engagement with Afghanistan since from 9/11 through the developmental initiatives has raised some of the pertinent questions. Can India's economic engagement sustain keeping in view Taliban takeover of Afghanistan? What political strategy is maneuvered by India after Taliban resurgence? How India is going to balance its interests in Afghanistan amidst of the presence of the Pakistan. Such questions are being answered in this research paper. The paper impinges on Taliban resurgence and its impact on India, and relies on the material from both primary and secondary sources. [5]

Aim of study

1. To examine the India's strategies keeping in view US Exit strategy and Taliban's takeover of Afghanistan.
2. To examine the challenges that India is facing in dealing with Taliban led Afghanistan.
3. To find out the policy options that India can avail in order make a regional solution possible for Afghan conundrum secure its development projects and stay engaged there.

Review of Literature

The available literature on Taliban's takeover of Afghanistan- Assessing India's strategies is limited and in the form of newspaper articles. Also, most of the India-Afghanistan relations are analyzed while keeping in view the Pakistan factor. Candidate has provided a description of following two books regarding India's strategies in Afghanistan.

Avinashi Paliwal, *(2017) My Enemy's Enemy*.
The book provides a description about how India as a global rising power engages itself in South Asia in general and with Afghanistan in particular right from the Soviet invasion and up to the ongoing US withdrawal. Central to the debate is the containment of Pakistan, the country, which is believed as a key factor behind India's Afghan policy. The author also gives an account of description about the Afghanistan's internal dynamics that is the central reason to its conflict. The book also brings forth reveals the debate on Taliban Dilemma that existed between Partisans and Conciliators within the policy corridors of India. The Conciliators who were in favour of 'Engage with all' dictum, reflecting their pragmatic stance in reaching to Pakistan for Afghan conundrum. While on the other hand, Partisans approach was against it, reflecting the containment of Pakistan. Along with it, the book focuses on changing strategies of India towards Afghanistan, keeping in view, the Soviet invasion, years of Taliban regime and ongoing US withdrawal. However, the book does not provide a detailed description on India's policy reformulations, keeping in view the changing security scenario in Afghanistan after the US withdrawal from the country.

Harsh V Pant, "India's Changing Afghanistan Policy: Regional and Global Implication," in *India in Africa and Afghanistan* ed. Cameron Buzatto.

The work signifies the reassessment of policies by the regional players who find their stakes in Afghanistan including India, keeping in view, the changes that have taken place in the western strategy towards Afghanistan. Central argument of the work reflects that India's policy towards Afghanistan has remained in a changing trajectory since 2001. In addition to it, the work provides an insight how New Delhi has responded to a strategic environment that is shaped by the involvement of other actors in the region. What is more, the book takes a note of the fact that ISAF is preparing to leave the country and is in the middle of a pull out which evokes a concern in India to preserve its interests in Afghanistan. However, the book falls short of the policy options that India should take if the regional solution to the Afghan problem fails. Such a gap is addressed by the ongoing study which attempts to provide a description about the policy options that should be carried by India in Afghanistan after US draw down.

Main Text

Brief Background: India's engagement with Afghanistan

Both India and Afghanistan are sharing historical and cultural bonds dating back at least to the Indus Valley civilization. Such ties were institutionalized by the signing of a Treaty of Peace and Friendship in 1951.[6]After the withdrawal of Soviets from the country in 1989, the region was held in a state of civil war that went on in between different Mujahideen factions who wanted to gain the power position. India's support at that time went in favor of Northern Alliance along with Russia and Iran against the strong foothold and advances of Taliban. So, India's involvement in Afghanistan from the period of 1996-2001 remained covert for the reason Afghanistan was held in the clutches of Taliban rule which India views as antithetical to its domestic security.[7] However, India remained rigorously active in Afghanistan in the aftermath of 9/11 through its soft and smart power initiatives which were clearly manifested in the 'Strategic Partnership Agreement'[8] that

both India and Afghanistan signed in 2011 backed by the US pressure on India. What is worth to mention here, Pakistan was used as a frontline state by the US in its 'Global War on Terror'; due to which Pakistan time and again gained a strategic leverage in the multiple negotiations with the Taliban to end the war in Afghanistan.[9] India's active engagement in the country in the meantime was also driven by the India's striking capabilities in terms of political, economic and military dimensions. Afghanistan provided a space for this aspiring global power to enhance its security parameters and increase its sphere of influence over external environment. Calculating India's course of relations since 9/11 one founds a changing trajectory that divides the said course of relations into three distinct phases.[10]In the phase first, India extended aid-receptive programmes to Afghanistan for institution building, capacity creation, and infrastructure development in reference to social, education and government sector projects for that India invested USD 2billion. Therefore, it can be said that India engaged itself with Afghanistan through soft power initiatives that generated goodwill among Afghan people for India and helped her to develop a state identity and strategic narratives as a rising global power.[11]In the phase second, power equation shifted in the hands of Pakistan and its allies and New Delhi stood marginalized. Thus, India faced a risky track at this juncture, this was the outcome, when west got diverted by its war in Iraq and had to withdraw some of its forces from Afghanistan. This paved a way to Taliban in claiming the strategic space back that it was enjoying earlier.[12] In Phase third a historic pact called- The Strategic Partnership Agreement (SPA) was signed between the two countries on October 2011. Such a development signifies that India had to rethink over its engagement with Afghanistan keeping in view the changing security scenario in that country because of U.S. announcement of troops draw-down by 2014. The signing of 2011 Strategic Agreement is counted as a great shift in India's policy attitude towards Afghanistan as it released India on having restraint on security matters and on holding the exclusive focus on development to a greater security engagement. Such an engagement reflects the fact that India lifted its focus from soft power and shifted it to Smart power initiatives in that country. Therefore, it can be said that SPA has played a critical role in shaping Afghanistan's future in coordination with India and this pact reflects the increased India-Afghanistan bilateral relations from 2011-2014 and from 2014-2017, keeping in view the exit strategy of US from the country. The former is marked by the formalization of Strategic Partnership Agreement and latter by the continuation of the said pact.[13]

Drawdown of US troops from Afghanistan and Establishment of Taliban's office in Qatar

Obama administration's announcement of troops draw-down from Afghanistan by 2014 raised the concerns among the countries of the region including India. Such a decision was likely to change the security situation in Afghanistan and the regions adjacent.[14] Surrounded with the top military leaders at the White House, Obama declared that the security situation in Afghanistan is "precarious" and the presence of Taliban in Afghanistan he says is a threat. He affirms the fact that he was committed against any group that will put Afghanistan into violence and will use it "as a safe haven for terrorists to attack our nation again." Furthermore He declared that "It is in our national security interest-especially after all the blood and treasure we've invested in Afghanistan over years-that we give our Afghan partners the very best opportunity to succeed."However, the president affirmed for the greater focus on "training and advising" Afghan security forces in order to gain their momentum in counterterrorism operations against the left behind of the terrorist organization like al-Qaida that US believes has attacked it on September 11.[15] It was in the meantime that Taliban established its office in, Doha Qatar, in order to hold the peace talks with the parties to end the Afghanistan conflict. The Taliban spokesperson Mohammad Naeem declared that one of the main aims of this decision was to "meet Afghans". The main parties to the peace process are the Government of Afghanistan along with its High Peace Council that was established in 2010 with the intent to look for Taliban and to join them in peace process with U.S. In the process of this peace deal Pakistan is considered to play an important role as it acts as a mediator between the Afghanistan government and Taliban.[16]

Peace agreement between U.S. and Taliban: India's Stand

It was in February 29, 2020 that a peace deal was signed between the U.S. and Taliban after the months of negotiations in Doha, Qatar that guarantees the full withdrawal of U.S. troops from the Afghanistan however based on certain conditions that provides a

possibility for America to end its eighteen years of war from there. The “Agreement for Bringing Peace to Afghanistan” brings with it certain commitments on the Intra-Afghan dialogue, “a permanent and comprehensive ceasefire”, Counterterrorism and troop’s level. However, it has been said by Pompeo who is United States secretary of the state that “Theirs is a great deal of hard work ahead on the diplomatic front.” The agreement signifies that the Taliban “will start intra-Afghan negotiations with Afghan sides on March 10, 2020,” in Oslo, Norway. Meanwhile, it is observed that India did not extend its support to U.S. in finalizing the agreement with the Taliban and did not recognize its stand for legitimizing the group as a political actor.[17] India perceives the group as pro-Pakistan, although a state of stress is being noticed in the Pakistan-Taliban relations. Not only this, India also shows tolerance to other militant groups operating in Afghanistan whom India recognizes hostile to its interests. As a result, India took its side with Kabul government and did not participate in the U.S-Taliban peace talks even though receiving requests from former President Hamid Karzai. So, India seems interested in favor of an Afghan government that should be inclusive and pluralistic.[18]

Taliban back for second time: How India is responding

As Kabul felled again in the hands of Taliban on 15 August 2021 and has completed its six months in power on February 15, 2022. The situation in Afghanistan is time and again worse under the shadows of Taliban. None of the countries around globe has provided recognition to this regime including Pakistan who has withheld his stand officially. India being concerned about its national security has not provided any positive signal for recognizing Taliban rule. However, it is being noticed that New Delhi has added some sort of flexibility in its approach towards Taliban as is evident from the fact that India has showed its presence in several negotiations that were going on in between Taliban and US over peace deal with the intent to address its security concerns that are going to emanate from Afghan soil, and is committed to its all time stand of continuing people-to-people exchanges. Therefore, it did not lag behind in providing emergency humanitarian assistance to the nation.[19]It was also observed that the country stood cooperative to the Afghan refugees particularly with the Hindu and Sikh minorities as New Delhi’s MEA has asserted that it will facilitate the said communities in Afghanistan, however would such a stand welcome all the Afghans is yet undecided.[20]

Earlier stated by Taneja that India’s responses to the changing power matrix in Afghanistan resembles to the strategy that it adopted when Taliban gained its power in 1996 up to 2001. At that time, India along with other nations like Iran chooses to extend its support in favor of Northern Alliance. Once again, India’s engagement with the persona from the said coalition and others that sideline themselves from Taliban seems appearing on the ground.[21]Not only this, India mobilized the Afghanistan’s western neighbors, who together share the common concern that Taliban should be motivated not to support the terrorist organizations in its neighborhood. Along with it, India remained active in the resolutions backed by it in UN Security Council for ensuring that government in Kabul led by Taliban should not be provided with the membership of UN, keeping in view the Taliban’s support to some terrorist organizations. In addition to it, India also mobilized the Central Asian Republics along with Iran and Russia to work out a strategy for the ongoing crisis in Afghanistan. Such an imitative is evident from the fact when the said countries together attended a meeting in pursuit of this common cause and to motivate the Taliban for the establishment of more inclusive form of government in the country. Furthermore, the safeguard to the human rights of the ethnic minorities along with the women were also discussed in the agenda of the meeting. Parthsarthy analyses that in such a volatile situation, India has joined itself with the international community to endorse a two-track approach in which primary attention is given to the sufferings of common people. Therefore, India has supplied the 50, 000 tons of wheat to Afghanistan across the Wagah-Attari border along with it, India has also supplied six tons of medicinal supplies through airlifting.[22] The Pakistan has this time informed India that it will allow its humanitarian assistance transportation through its territory on the precondition that only Afghan trucks will carry it.[23]

India has also worked to receive the recommendations from the several countries on Afghan conundrum, for that matter it has hosted a regional security dialogue which was held on November, 2021. This meeting was attended by seven other nations including Russia, Iran, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. However, both China and Pakistan refrained from attending the meeting as China mentioned that it had scheduling issues while Pakistan blamed India as ‘spoiler of peace’. The first two dialogues of the meeting were earlier held in Russia and Iran in 2018 and 2019.What is worth to mention here is that India has not invited the present government in Afghanistan that is led by Taliban as it does not recognize the group as the legitimate authority. While as the Taliban on the other hand has extended a note of appreciation for India in carrying

out such efforts in series till now. This meeting signals that India is having a leadership role in reaching out to the regional solution for Afghan problem and the threats that are emanating from it. Pant says that such a role played by India is not going to bring immediate results but will help India to shape the strategic conversation over the issue in the region and will provide a clear picture about its priorities. At the end of this dialogue, the participating countries adopted the 'Delhi Declaration'.[24] Also, taking into consideration the views of D' Souza here who is having an expertise over Afghan issues suggests that India has to adopt a 'Pragmatic and astute' policy for its engagement with Taliban so as to secure a conducive environment for its ongoing aid and development programmes for the Afghans so that it can avoid the humanitarian crisis within that country.[25]

India's challenges for now

Taliban's takeover of Afghanistan is going to change the geo-political dynamics in the region. The security threats that can emanate from Afghanistan's current situation and their spillover effect to the countries like China, Russia, and India along with CAR' is the common concern that these nations share. However, the countries on their individual front are looking to shift the changing dynamics in Afghanistan into their favor. In such a changing security scenario, Afghanistan-Pakistan-China axis is also going to create a policy coordination that could be antithetical to the India. China has its economic stakes in Afghanistan and will look for its projects to get done. It is more concerned about its transnational Belt and Road Initiative-the China-Pakistan Economic Corridor (CPEC) that it does not want to get affected by the Taliban insurgents and wants Afghanistan to be included in the same project.[26]Pakistan also stays desirous for the successful operationalisation of this project and seems interested to make itself the part of such connectivity so as to fulfill the geo-economic dreams to get done the prospectus of 'New Great Game' in Afghanistan. Moreover, China has provided positive signals to Taliban for conducting business with them. It wants Taliban not to provide a support to the insurgents that are operating in its Uyghur valley of Xinjiang province. Both China and Taliban seem reciprocating to each other by their responses, as is evident from the statement of Mullah Abdul Ghani Baradar who is Afghanistan's new first deputy prime minister confirming China a "trustworthy friend". On the other end, Pakistan is maneuvering its strategies in Afghanistan that seem more or less against to Indian interests. It is Pakistan through which US channeled its funding for the creation of Taliban against the Soviets during 1996. M.K. Narayanan opines that Pakistan has emerged as 'patron saint' of new Taliban government in Afghanistan. He further reiterates that Islamabad along with Beijing and Moscow are the main supporters of Taliban regime. Meanwhile, it is being analyzed that Russia also wants to increase its influence in the region thus is found to be the supporter of China-Pak axis against the US influence in the area. However it has not provided recognition to present Taliban regime due to her concern that the insurgents could infiltrate in the surrounding countries of Russia that will trigger the chances of terrorism. Therefore, any closeness between China and Pakistan along with Afghanistan based on the convergence of their interests creates a concern for India that it has to balance.[27]

Taliban's preparations for setting a cabinet and its decision to provide a place to the persons from the Haqqanis faction who are believed to have their close ties with Pakistan and are dominated by the ideology of having belief in global jihad has faded the hopes of many Indians that there could emerge a less fundamentalist Taliban than that which existed and ruled the Afghanistan in the 1990's. As is also reiterated by Kabir Taneja, "It is a massive strategic victory for Pakistan to have a Taliban administration over which they have quasi-control," He believes that it is now great opportunity for Pakistan to maneuver anything that it wants to have in Afghanistan. So, such a situation creates much challenging position to India in the coming years.[28]Notwithstanding the fact, London who was a former counter-terrorism chief across south and south-west Asia opines that there are certain issues between Taliban and Pakistan on which both are showing resistance including the recognition of the Afghanistan-Pakistan border. Talking about the Afghan population, he further goes on saying that they are showing resentments about Pakistan's interference in the internal affairs of Afghanistan. Some Taliban prisoners in Pakistani Jails that were being arrested on the recommendations of US are also the ones who are not happy with the Pakistan. So, Taliban more or less wants to be more independent in their state affairs and what suits better to them for sharing the power position in Afghanistan. But what London concludes is that such a situation is not going to be positive for India as Pakistan was acting as a constraint factor over Taliban in controlling them from taking any such decision that could prove

detrimental to the collective security of the region. Next to it, Taliban is believed to have their ties with the Lashkar-i-Toiba and Jaish-i-Mohammad, the groups that are fighting for Kashmir issue against India in Kashmir- a Muslim dominated region. Some in India expresses their concern that Taliban inclination to the Muslim brotherhood may aggravate the ongoing insurgency in Kashmir. Albeit, the security laws of Indian government for counter insurgency are much comprehensive.

Adding the views of Avinash Paliwal to the ongoing debate, he reflects that Taliban considers India a strong driver to counterbalance the influence of Pakistan over them. He opines that Taliban was interested in developing its relationship with India since its first takeover of Afghanistan, and both the two were maneuvering on it though covertly and was not coming to the surface due to the Taliban's dependence on Pakistan. He further adds that "The relationship between Pakistan and Taliban is more of a coercive one than a consensual one. So there is a lot of space for India to operate as well." What is more, Ashley Tellis while opining on Taliban's present foreign policy says that "The Taliban have recognized that they cannot go back to the old model of simply exporting jihad if they want their regime in Kabul to be successful. The face of moderation is the only thing that will get them what they want-at least for now."[29]

Conclusion

Presently, Afghanistan is again held in a chaotic situation.[30] The U.S. has finally withdrawn its troops from the country by ending its combat missions[31]which has provided a space to the Taliban for the seizure of capital city of Afghanistan, the Kabul, after their earlier takeover of other provinces.[32] The ANDSF is not in a full capacity to counter the Taliban militia; as a result Taliban is going to have a more military advantage in Afghanistan over them. [33]The security transition in the country has send the alarming signals to neighboring countries about spillover effects of the security implications that are going to emanate from it including India.[34]India since times immemorial has shared cultural bonds with the Afghanistan and has rigorously engaged itself there with a more robust strategy through the soft power initiatives after 9/11. The country stands desirous to carve out a stable, prosperous and peaceful Afghanistan which is quite reflective from its foreign policy agenda. However, India has to fully balance the challenges that it is facing more particularly the Taliban resurgence in order to remain engaged with that country so as to pursue its strategic goals.[35] India can come out of its 'Wait and Watch' policy for ongoing security situation in the Afghanistan[36] and can play a more robust leadership role for democratization process of that country[37] which is gradually decreasing by opening the convincing channels with Taliban however based on certain preconditions.[38] Along with it, India can make possible a regional solution to the Afghan conundrum by bringing the countries on a single platform with which it shares common interests with regard to the Afghanistan.[39]

References

1. "Afghanistan: Taliban takeover and way ahead," AIDIA, published 24 December 2021, https://aidiaasia.org/research-article/afghanistan-taliban-takeover-and-way-ahead#_edn1.
2. "U.S. Military Withdrawal and Taliban Takeover in Afghanistan" Congressional Research Service, published September 17, 2021, https://crsreports.congress.gov /product/pdf/R/R46879.
3. AIDIA, "Afghanistan: Taliban takeover."
4. Tanvi Pate. "Soft power, strategic narratives, and state identity: Re-assessing India-Afghanistan relations post-2011," India Review17, no. 3 (2018): 320-351.
5. Smruti S. Pattanaik. "India's Afghan Policy: Beyond Bilateralism,"Strategic Analysis 36, no. 4 (2012): 569.
6. Pattanaik, "India's Afghan Policy...,"570.
7. Siddhant Kishore, "Rallying old friends: Adapting to an evolving Afghan theatre," ORF, last updated January 7, 2021, https://www.orfonline.org/expert-speak/rallying-old-friends-adapting-evolving-afghan-theatre/.
8. Pate, "Soft power, strategic narratives, and state identity: Re-assessing India-Afghanistan relations post-2011," 320.
9. AIDIA, "Afghanistan: Taliban takeover."
10. Cameron Buzatto, ed., India in Africa and Afghanistan (New York: Nova Publishers, 2013), 43.

11. Pate, “Soft power, strategic narratives, and state identity: Re-assessing India-Afghanistan relations post-2011,” 320.
12. Pant, “India’s Changing Afghan Policy...,” 45.
13. Pate, “Soft power, strategic narratives, and state identity: Re-assessing India-Afghanistan relations post-2011,” 321.
14. Pattanaik, “India’s Afghan Policy...,”570.
15. Josh Lederman, “Obama slows troops drawdown in Afghanistan,” PBS, last updated July 6, 2016, https://www.pbs.org/newshour/nation/watch-live-obama-delivers-statement-on-troops-in-afghanistan.
16. “Q and A: Afghan Taliban open Doha office,” BBC, published June 20, 2013. https://www.bbc.com/news/world-asia-22957827.
17. Lindsay Maizland,“U.S.-Taliban Peace Deal: What to know,” Council on Foreign Relations, last updated March 2, 2020, https://www.cfr.org/backgrounder/us-taliban-peace-deal-agreement-afghanistan-war.
18. Raj Verma. “The US-Taliban peace deal and India’s strategic options,” Australian Journal of International Affairs 75, no. 1 (2020): 10-14.
19. Sarral Sharma and Sameer Patil, “India’s strategy towards Post-August 2021 Afghanistan,” ORF, last updated February 28, 2022, https://www.orfonline.org /research/indias-strategy-towards-post-august-2021-afghanistan/.
20. “Taliban takeover of Afghanistan: India’s perspectives,” Journals of India, published August 16, 2021, https://journalsofindia.com/taliban-takeover-of-afghanistan-indias-perspectives/.
21. Kabir Taneja, “India-Pakistan rivalry heating up over Afghanistan,” ORF, last updated May 19, 2021, https://www.orfonline.org/research/india-pakistan-rivalry-heating-up-over-afghanistan/.
22. G.Parthsarathy, “India’s Afghan policy a tricky affair,” BusinessLine, last updated December 15, 2021, https://www.thehindubusinessline.com/opinion/columns/indias-afghan-policy-a-tricky-affair/article37963132.ece.
23. Vinay Kumar, “India’s search for a new role in Afghanistan,” MEI, last updated December 8, 2021, https://mei.edu/publications/indias-search-new-role-afghanistan.
24. Harsh V. Pant, “India is in a unique position to bridge the gap on Afghanistan,” ORF, last updated November 10, 2021, https://www.orfonline.org/research/india-is-in-a-unique-position-to-bridge-the-gulf-on-afghanistan/.
25. Deutsche Welle, “Afghanistan: What taliban takeover means for the region,” The Indian Express, August 19, 2021. https://indianexpress.com/article/world/afghanistan-what-taliban-takeover-means-for-the-region-7461798/.
26. Shashi Tharoor, “India’s Taliban Problem,” Project Syndictae, last updated October 5, 2021, https://www.project-syndicate.org/commentary/india-threatened-by-taliban-pakistan-china-by-shashi-tharoor-2021-10.
27. AIDIA, “Afghanistan: Taliban takeover.”
28.Hannah Ellis-Petersen, “India weighs up new security risks in wake of Taliban takeover,” The Guardian, September 13, 2021, https://www.theguardian.com/world /2021/sep/13/india-weighs-up-new-security-risks-in-wake-of-taliban-takeover.
29. Petersen, “India weighs up new.”
30. Ujjwal Samrat, “Afghanistan: Situation turns chaotic as thousands gather outside Kabul airport,” Republic World, last updated August 26, 2021, https://www.republicworld.com/world-news/rest-of-the-world-news/afghanistan-situation-turns-chaotic-as-thousands-gather-outside-kabul-airport.html.
31. Libby Cathey, “After 20 years, US ground troops leave Afghanistan, but Americans left behind,” abc News, last updated August 30, 2021.
32. “Afghanistan: Kabul encircled, the Taliban approaches the seizure of power,” archyde, published August 15, 2021, https://www.archyde.com/afghanistan-kabul-encircled-the-taliban-approach-the-seizure-of-power/.
33. Jonathan Schroden. “Afghanistan’s Security Forces Versus the Taliban: A Net Assessment,” Combating Terrorism Centre 14, Issue 1 (2021): 1.https://ctc.westpoint.edu/afghanistans-security-forces-versus-the-taliban-a-net-assessment/.
34. “As Taliban Offensive Escalates, Afghanistan at Dangerous Turning Point,” United

Nations, published August 6, 2021, https://press.un.org/en/2021/sc14596.doc.htm.
35. Ashfaq Maqsood Ali, India's Afghan Policy (New Delhi: Dilpreet Publishing House, 2015), 3.
36. "India adopting 'wait and watch' policy on Afghanistan, says government," The Hindu, published August 26, 2021, https://www.thehindu.com/news/national /jaishankar-briefs-political-leaders-on-afghanistan-situation/article36112751.ece.
37. Rakesh Sood, "Redefining India's role in Afghanistan," ORF, last updated November 27, 2021, https://www.orfonline.org/research/redefining-indias-role-in-afghanistan/.
38. Saloni Kapur, "Why India should engage the Taliban," Deccan Herald, last updated August 27, 2021. https://www.deccanherald.com/opinion/why-india-should-engage-the-taliban-1024043.html.
39. Kamal Davar, "Afghanistan's problems require a collective regional solution; India must play a leading role," South Asia Monitor, last updated January 3, 2022. https://www.southasiamonitor.org/spotlight/afghanistans-problems-require-collective-regional-solution-india-must-play-leading-role.

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Innovation The Research Concept

E-Learning and Adjustment among Adolescents

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Abstract The present study entitled e-learning and adjustment among adolescents was carried out with the intent to study about the correlation between e-learning and adjustment among adolescents. A random sample of 200 adolescents was selected from private schools of Hoshiarpur district. E-learning scale by Dimple Rani (2014) and Adjustment Inventory for school students (AISS) by Sinha and Singh (2013) was used to collect the data. Statistical techniques such as Mean, Standard Deviation, SED, t-test and coefficient of correlation were used to collect the data. The results indicated that there is a positive correlation between e-learning and adjustment. It is also found that there exists significant relationship between e-learning and adjustment of adolescents.

Keywords E-Learning, Adjustment, Secondary Schools, Adolescents

Introduction

E-learning with adolescents refers to the process through which students make efforts to achieve balance in their learning environment and improve their academic performance (Nie et al, 2004) consisting of learning habits utilization of e-learning resources, learning motivation, learning styles etc. The rise of e-learning has helped to encourage students to take on more responsibility to their own acquisition of knowledge. Online education may provide few opportunities for social and emotional development. One of the main adjustments to online learning is becoming comfortable in a virtual community rather than the face to face environment. The lack of physical virtual presence of both the teacher and fellow course-mates in definitely major adjustment.

One of the innovative applications of computer in the teaching and learning process is known as e-learning. E-learning can be CD-ROM based, network based, internet based or intranet based. It can include text, video, audio, animation and virtual learning. It is self-paced, hand on carrying. The quality of e-learning, as in every form of training is in its content and its delivery. The beauty of e-learning, however, is the new software allows the creation of every effective learning environment that can engulf you in the material. E-learning refers to a wide range of applications and processes designed to deliver instruction through electronics devices such as CD-ROM or video conferencing through sattelite transmission. It also includes online-learning, web-based learning and computer based learning. Online education may provide few opportunities for social and emotional development. One of the innovative applications of computer in the teaching and learning process is known as e-learning. An individual is adjusted if he is adjusted with himself to his environment.

Adjustment is a process of finding and adopting modes of behavior suitable to the environment or the change in the environment. It is the establishment of a satisfactory relationship as representing harmony, conformance and adaptation or like. In other words, both personal and environment factors work side by side in adjustment. An individual is adjusted if he is adjusted to himself and to his environment. It is the ways and means to help the individual to meet the demands of changed conditions by adopting or modifying his previous ways of doing or facing things. An individual needs to change of modify himself in some way or the other to fit into or accommodate himself with his environment. As the conditions in the environment are changing all the time, adjustment is also a continuous process. It is process of directing one's efforts towards modification of behavior and attitudes. It can be interpreted as both process and the outcome of that process in the form some attainment or achievements.

Aim of study

1. To study the e-learning of the adolescents.
2. To compare the e-learning of the adolescents with respect to gender.
3. To compare the e-learning of the adolescents with respect to locale.
4. To study the adjustment of the adolescents.
5. To compare the adjustment of the students with respect to gender.
6. To compare the adjustment of the adolescents with respect to locale.
7. To find out the relationship between e-learning and adjustment of the adolescents.

Review of Literature

Upadhyaya (2016) examined the difference in adjustment among day scholars and hostel students. A total sample of 600 school students was selected 300 day students. The data was collected with the help of Bell's Adjustment Inventory and analysis by t-test. The results revealed that the day scholars and hostel students different significantly, on health, social, emotional and overall adjustment. Kour (2017) studied exploring adolescent student's attitude towards the effectiveness of e-learning in their academic life. Random sampling technique was used to draw the sample from various high schools of district Srinagar. The sample for the present study consisted of 100 adolescent students (50 male and 50 female). Data was collected by using Dimple Rani's attitude towards e-learning scale. Statistical techniques of Mean, SD and t-test were used to analysis the data. The results indicated that adolescent students have favourable attitudes towards e-learning. Both male and female high school students have positive attitude towards e-learning. The results of the study further revealed that there exists no significant difference between adolescent male and female students in their attitude towards e-learning. Bhatt (2018) examined the assessment of e-learning readiness among adolescent children in relation to self regulation. The purpose of the study to assess readiness among adolescent students in relation to self-regulation of Govt. Sen. Sec. Schools. The sample of the study comprised of 196 students (boys and girls) selected randomly from the Govt. Sen. Sec. Schools of Punjab. E-learning readiness self assessment tool and self regulation questionnaire were employed to collect the information. The findings of the study revealed a significant negative relationship between total e-learning readiness and self-regulation among adolescent boys of senior secondary schools. A study also revealed e-learning readiness and self-regulation of adolescent girls. Janardhanam and Murthy (2020) conducted a study on adjustment among college students. Sample of the present study consisted of sixty college students in Chittor district of Andhra Pradesh state. Adjustment inventory was designed by Sinha and Singh (1968) was administered. Findings of the study revealed that male have poor adjustment than female. Further, it was found that there exists significant difference between arts and science course studying on their adjustment i. e.students studying of arts course have poor adjustment than the students studying of science course. Researchers further wanted to investigate that whether ages of 18-20 years and 21-24 years would differ significantly on their adjustment among college students. It was found that the student age of 18-20 years has poor adjustment that the students age of 21-24 years.

Sampling

A sample of 200 private school students (100 boys and 100 girls) was randomly selected from the 10 private schools of Hoshiarpur district of state Punjab.

Tools Used

1. E-learning Scale (2014) by Rani.
2. The Adjustment Inventory for the school students (ASSI) by Sinha and Singh (2013).

Statistics Used in the Study

1. Mean, SD and SE_D were computed.
2. 't' – ratio was calculated.
3. Co-efficient of correlation was calculated.

Table-1: Showing the Mean, SD, SE_D and 't'-ratio of E-learning of 100 boys and

100 girls of adolescents.

Group	N	Mean	SD	SE_D	't'Value
Boys	100	189.09	17.34	2.47	3.98**
Girls	100	198.93	17.59		

Table-2: Showing the Mean, SD, SE_D and 't'-ratio of Adjustment of 100 boys and 100 girls of adolescents.

Group	N	Mean	SD	SE_D	't' Value
Boys	100	94.64	25.40	3.25	1.51
Girls	100	99.57	20.34		

Table-3: Showing the Coefficient of Correlation between E-learning and Adjustment of adolescents.

S. No.	Group of Variables	N	'r'
1	E-learning	200	0.276
2	Adjustment	200	

Result and Discussion

On the basis of findings of the present study, the following educational implications are should be keeping in consideration:

1. These results will give immense help to the Principals,Teachers, Parents, Curriculum Planners, Guidance Workers and Counselors to know and solve the problems of adolescents.
2. The results will be very beneficial in the development of the curriculum at the school level.
3. The results will be very beneficial in the development of mobile apps and software's so that the adolescents can learn anytime and anywhere.
4. E-learning programs conducted like seminars, workshopsshould be organized to help the students to improve study habits through adjustment.
5. E-learning with adjustment has improved the academic level of future ahead the combination of both e-learning and adjustment make self confident &optimistic.
6. Today's guidance services should be provided to develop e-learning with adjustment.

Findings

1. Significant difference was found in the e-learning of boys and girls adolescents.
2. No significant difference was found in the adjustment of boys and girls adolescents.
3. There is a positive relationship between e-learning and adjustment.

Conclusion

In adolescent stage e-learning is gaining more and more impact, blended learning and this new teaching and learning can be adjusted in many ways. To compared face to face teaching to online learning or blended learning in order to try to define which of the format provides e. g. the highest learning outcome, creator the most satisfied and adjusted students or has highest rate of course completion. E-learning is more important task in the present life style due to gaining scenario. Some educational difficulties and academic success are occur in now -a -days, so we need to day, adjustment through e-learning with stress free life because e-learning is an important developmental aspect of education.

References

1. Bhatt, H. (2018). Assessment of e-learning readiness among adolescents children in relation to self regulation. International Journal of Creative Research Thoughts, 6(1), 343-351.
2. Janardhanam, V. & Murthy, P.(2020). Adjustment among college students. International Journal of Recent Scientific Research, 11(2), 37464-37465.
3. Kour, S.(2017). Exploring adolescent student's attitude effectiveness of e-learning in their academic life. Indian Journal of Applied Research, 7(7), 425-427.
4. Rani, D. (2014). Consumable Booklet of ATLES – RD.
5. Sinha, A. K. P. & Singh, R. P. (2013). Manual of Adjustment Inventory for School Students (ASSI). Agra: National Psychological Corporation.
6. Upadhyaya, C. (2016). A comparative study of adjustment among day scholars and hostel students. The International Journal of Indian Psychology, 3(4), 122-128.

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Innovation The Research Concept

Studies of Role of Urinary Constituents on Urinary Bladder Interface by Using Electro Kinetics

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Abstract Biological systems experience varying degrees of hydrostatic pressure & electrical potential gradients. These forces may act individually & collectively. The process of urination may be described in terms of hydrostatic pressure and electrical potential gradient. The urinary bladder is a membranous structure and it collects urine. Urine is a multi-component system and its composition varies with the clinical status of the individual and the diet taken by the individual. The presence of various constituents in urine throws light on the clinical status of the individual, e.g. in diabetes mellitus and during impaired liver functioning, glucose is observed in urine. Urinary constituents may either be acidic or basic in nature and are always in contact with the urinary bladder membrane, hence their interaction with the urinary bladder membrane cannot be ruled out. Present study is an effort to find out such interactions and is an attempt to establish a relation between physical properties of urinary constituent solution and electro kinetics of these solutions. In present study urine-oxalic acid mixture solutions have been examined and results have been analyzed by using non-equilibrium thermodynamics and electro kinetic energy conversions.

Keywords Urinary Bladder Membrane, Non-Equilibrium Thermodynamics, Electro Kinetic Energy Conversion, Urinary Constituent.

Introduction

Life is a complicated and integrated form of complex chemical reactions. This chemical reaction occurs at membrane surface, or in an intracellular environment, or in an extracellular environment [K.E. Anderson et. al. & Smith et. al[1&2] various processes, viz. Physical and chemical, occurring in the biosystems, are the outcomes of these complex chemical reactions. Biological systems experience varying degrees of hydrostatic pressure and electrical potential gradients [Andreoli et. al 1978][3]. These forces may act individually & collectively. Urinary process is the one, which is the collective property of these forces [Guytan, 1981][4]. The process of urination may be described in terms of hydrostatic pressure and electrical potential gradients [Shukla & Mishra 1987[5,6], Shukla Mishra & Mishra 1989][7]. Urinary bladder is a membranous structure, which performs useful functions like passive collection and active expulsion of urine.

Aim of study

Thus from the above study, it can be concluded that the electro kinetic measurements and physical properties measurement of urine oxalic-acid mixture give the same result. And by using any one of these, the interaction of urine and its constituents with the urinary bladder interface can easily be understood.

Review of Literature

The generation of micturition wave produces voiding tendency in the bladder and whenever bladder develops voiding tendency, electrical energy is converted into mechanical work [Shukla et. al; 1990][7]. The normal functioning of the bladder depends on the proper generation of micturition waves. The proper functioning of the urinary bladder clearly indicates the proper functioning of various body organs. Urine is a multi component system and its composition varies with the clinical status of the individual and also with the diet taken by the individual [Schoffenicls, 1967][8]. The presence of various constituents in urine throws light on the clinical condition of the individual, e.g. In diabetes mellitus and during impaired liver functioning glucose is observed in urine. The glucose is not a normal constituent of

urine.[9]
Urine is always in direct contact with urinary bladder membranes; hence its constituents would also be in direct contact with urinary bladder membrane. Since the constituents of urine may either be acidic or basic in nature, hence their interaction with urinary bladder membranes cannot be ruled out. Oxalic acid occurs in traces in urine and increase of its concentration leads to saturation and ultimately crystallization leading to urinary stones occurs in the bladder [Shukla & Mishra, 1991][10].
Regarding this viewpoint, Electro kinetics of urine-oxalic acid mixture solution and its relation with the physical properties of urine oxalic acid mixture solution have been examined.

Main Text

Theoretical :- The Electro Kinetics of
the urine oxalic acid mixture solution has been explained by using non-equilibrium thermodynamics, the volume flow J_V and current flow (I), across a membrane in a non-linear range may be described as follows. [Lakshminarayanaih, 1984;[11] Lorimer, 1985][12].

1. $J_V = L_{11}$

$\Delta P + L_{12}$

$\Delta \emptyset + L_{112}\, \Delta \emptyset \,.\, \Delta P + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$ (1)

And

$I = L_{21}\Delta P + L_{22}\, \Delta \emptyset + L_{212}\, \Delta \emptyset \,.\, \Delta P + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$ (2)

Where

L_{ij}, L_{ijk} (i, j, k = 1, 2, 3, ……) are phenomenological coefficients. The conversion efficiency [Kedem & Caplan, 1965;[13] Morrison & Osterle, 1965;[14] Shukla & Mishra, 1992[15] & 1994[16]].

4

$$J_e = -\frac{J_v \Delta P}{I \Delta \emptyset} \quad (3)$$

And

$$J_s = -\frac{I \Delta \emptyset}{J_v \Delta P} \quad (4)$$

Subscripts 'O' and 'S' denote the phenomena of electro-osmosis and streaming potential. The degree of coupling 'q' can be represented as follows-

$$q = \frac{L_{io}}{\sqrt{L_{ii} L_{oo}}} = \frac{\sqrt{n_{max}}}{1+n_{max}} \quad (5)$$

where $$n_{max} = \frac{\left(1+\beta_{io}\right)^{1/2}-1}{\left(1+\beta_{io}\right)^{1/2}+1} \quad (6)$$

and $$\beta_{io} = \left[\frac{L_{ii} L_{oo}}{L^2 io} - 1\right]^{-1} \quad (7)$$

The degree of coupling (q) lies between zero and unity [o q 1]. It has a value of zero when there is no coupling between two processes and a value of unity when the

two processes are most tightly coupled.

Methodology

(A) Membrane :- The urinary bladder membrane of a goat was used due to its easy availability and to withstand high pressure. It was preserved for experimental purpose as described earlier [Shukla & Mishra 19876; Shukla, Mishra & Mishra, 19897; Shukla et-al, 1990; shukla & Mishra 199110; Shukla & Mishra 199215; and Shukla & Mishra 199416.] (B) Permeating materials: - Permeating material used was urine-oxalic acid mixture solution. The oxalic acid was obtained from BDH and was used as such without any further purification. The output amount of oxalic acid in urine is of great clinical importance. The normal output of oxalic acid is 20-50 mg 24 hr. The increased amount of oxalic acid indicates impaired liver functioning. The normal output volume of urine per 24 hours falls within the range of 1100 to 2000 ml. The volume of urine clearly indicates the clinical status of an individual, e.gIn diabetes insipidus, an increased volume of urine is observed. For experimental purposes, urine of a healthy individual was taken and was used immediately without any delay. The mixtures of urine and oxalic acid were prepared on 1:1 basis with respect to volume. (C) Experimental procedure :- The electro kinetic measurements performed as described earlier,6, 7, 10, 15, 16. The physical properties of urine – oxalic acid mixture solution were measured as they were performed previously [Mishra, Shukla & Mishra; 1999]17.

Result and Discussion

The value of various phenomenological coefficients and conversion maxima for oxalic acid/urinary bladder membrane are given in table I & II. The various physical properties are mentioned in table III.

Table I – Values of different phenomenological coefficients, degree of coupling and conversion efficiency for aqueous oxalic acid solution (1991)[10].

(a) Membrane — Area = 1.65×10^{-4} m^2

Thickness = 0.17×10^{-2}m

(b) Temperature of the system = 35^0C 0.1^0C

Oxalic Acid	Coefficients				
	L_{11} x 10^{-13} $[m^5s^{-1}N^{-1}]$	L_{12} x 10^{-13} $[m^3As^{-1}]$	$L_{21} \times 10^{-10}$ $[m^3As^{-1}]$	$L_{22} \times 10^{-3}$ $[Av^{-1}]$	$q_0 \times 10^{-2}$ [equ.6]
0.002 M	1.87	0.97	0.95	0.22	1.51
0.004 M	1.47	1.12	1.15	0.35	1.56
0.006 M	1.10	1.65	1.70	0.63	1.98
0.008 M	0.70	1.97	2.05	0.91	2.46
0.010 M	0.55	2.67	2.70	1.38	3.06

Oxalic Acid	Coefficients		
	q_s x 10^{-2} [equ.5]	$n_0$max x 10^{-5} [equ.6]	$n_0$max x 10^{-5} [equ.6]
0.002 M	1.47	5.71	5.47
0.004 M	1.58	6.09	6.31
0.006 M	2.04	9.81	10.42
0.008 M	2.56	15.23	16.50
0.010 M	3.09	23.50	24.01

Table II – Values of different phenomenological coefficients for urine – oxalic acid mixture systems (1992)[15].

(a) Membrane
- Area = 2.15 x 10^{-4} m^2
- Thickness = 0.16 x 10^{-2}m

(b) Temperature of the system = 35^0C 0.1^0C

Phenomenological Coefficients		Coefficients			
		Urine + 0.000 M Oxalic Acid	**Urine + 0.002 M Oxalic Acid**	**Urine + 0.004 M Oxalic Acid**	**Urine + 0.006 M Oxalic Acid**
1	L_{11} x 10^{-13} [m^5 sec^{-1} N^{-1}]	2.63	3.93	5.13	7.20
2	L_{12} x 10^{-10} [m^5 sec^{-1} V^{-1}]	0.79	0.56	0.34	0.22
3	L_{21} x 10^{-10} [m^3 sec^{-1} V^{-1}]	078	0.57	0.32	0.21
4	L_{22} x 10^{-1} [AV^{-1}]	1.09	0.58	0.27	0.14

5	$n_0$max x 10^{-5}	5.43	3.34	2.07	1.19
6	$n_s$max x 10^{-5}	5.29	3.55	1.84	1.08

Table III – Values of various physical properties of urine-oxalic acid mixture system (1999)[17].

Composition	Surface tension (dyne cm^{-1})	Viscosity n (poise)	Density (gm cm^{-3})	pH
Water	70.38	0.7225	1.0193	-
0.002 M Oxalic Acid	68.78	0.7085	1.0194	3.770.01
0.004 M Oxalic Acid	69.79	0.7105	1.0195	4.410.02
0.006 M Oxalic Acid	70.81	0.7281	1.0196	4.600.02
0.008 M Oxalic Acid	71.88	0.7499	1.0197	4.880.02
0.010 M Oxalic Acid	72.97	0.7628	1.0198	4.960.02

Composition	Surface tension (dyne cm^{-1})	Viscosity n (poise)	Density (gm cm^{-3})	pH	Temperature of Mixing (^0C)
Urine	65.83	0.7595	1.0454	4.490.01	-
Urine + 0.002 M Oxalic Acid	71.68	0.7041	1.0321	3.640.02	0.2
Urine + 0.004 M Oxalic Acid	70.79	0.6653	1.0318	4.140.02	0.3
Urine + 0.006 M Oxalic Acid	68.63	0.6721	1.0308	4.670.02	0.4
Urine + 0.008 M Oxalic Acid	67.87	0.7199	1.0305	4.730.02	0.6
Urine + 0.010 M Oxalic Acid	67.00	0.7276	1.0303	5.100.02	0.7

From the tables, I, II and III following conclusion can be drawn-

1. As the concentration increases, the phenomenological coefficient relating

pressure (i.e. $l_{,11}$) decreases whereas the phenomenological coefficients relating potential gradient (i.e. L_{22} and L_{12} and L_{21}) increases for oxalic acid/urinary bladder system.

2. In case of urine-oxalic acid/urinary bladder system, the hydrodynamic permeability (i.e. L_{11}) increases as the concentration of oxalic acid in urine-oxalic acid mixture solution increases; whereas coefficients relating potential gradient (i.e. L_{22} & L_{21}) decreases with increasing concentration of oxalic acid in mixture solution.

3. The conversion efficiency maxima [n_{max}] and degree of coupling (q) increases with increasing concentration of oxalic acid for oxalic acid/urinary bladder membrane system. In case of urine-oxalic acid/urinary bladder membrane system, both the coefficients represent a decreasing trend as the concentration of oxalic acid in urine-oxalic acid mixture solution increases.

4. Various physical properties like surface tension, viscosity, density and pH show an increasing trend for oxalic acid system when concentration increases. For urine-oxalic acid mixture solution the surface tension, density and pH decreases with increasing concentration oxalic acid. But the viscosity of mixture solution decreases only up to the 0.004 M concentration of oxalic acid & afterward it shows an increasing trend.

The process of urination can be defined as (a) process of progressive and rapid increases of pressure (b) a period of sustained pressure and (c) return of pressure to the basal tonic pressure of the bladder[4]. In the urinary bladder, urine is collected from the kidney by ureters and this collection of urine is drop by drop. These ureters are tubular structures of smooth muscles and are to prevent back flow of urine when pressure builds up in the bladder during the micturition. As urine collects, the bladder wall gets stretched due to increased pressure. At the time of micturition the contraction of detrusor muscles empty the bladder. During the normal functioning of the bladder, there is a proper generation of micturition waves and micturition reflex. In terms of electro kinetic measurements, the process of urination may be given as follows-

As the pressure develops in the bladder, streaming potential is developed which in turns produce streaming current. The streaming current is probably responsible for micturition waves and finally micturition reflex. At the time of micturition reflex, pressure of bladder becomes almost zero and thus streaming potential and streaming current tends to at a minimum. This is a continuous process and thus phenomena are generative.

In other words, it may be stated that the electrical energy due to streaming potential and streaming current is converted into mechanical action i.e., expulsion of urine in order to overcome the effect of electrical energy on the urinary bladder. Such an action is the combined effect of pressure and electrical potential gradient acting on the membrane. The proper functioning of the bladder means maximum chances of voiding and minimum residual urine in the bladder.

The transport behavior of urine depends upon the constituents of urine. The various constituents of urine affeet the bladder membrane interface and thus proper function and normal generation of micturition waves and micturition reflex. Continuous presence of acidic urine in the bladder ruptures the bladder mucosal layer and increases the adherence of uric acid crystals[16] if present in the urine and thus leads to ineffective functioning of the bladder. The sluggish flushing action of the bladder may allow time for precipitation of crystal from supersaturated urine besides the chances of infection. The proper functioning of the bladder depends upon the interaction of urinary constituents with the urinary bladder membrane. The continued presence of supersaturated urine with oxalic acid leads to its adsorption on the bladder membrane interface. As a result of which it loses its distention power. Since expulsion of urine is related with the conversion of electrical energy into mechanical work, more energy is required to

expel urine saturated with stone forming material, the oxalic acid.

This fact is also supported by to values of conversion efficiency maximum [n_{max}] and degree of coupling (q) given in table II & I. Low values of degree of coupling (q) indicate the less tightly coupled membrane permeant system. The increase of oxalic acid in urine tends to reduce the polarization power of the urinary bladder membrane, which ultimately leads to the formation of urinary calculi in the urinary bladder itself. Although the whole process is quite complex, and urine usually undergoes changes in its composition, measurements of physical properties may be of some help in analyzing the changes taking place.

The density of urine oxalic-acid mixture solution shows a decreasing trend with increasing concentration of oxalic acid. This can be related with osmotic diureter nature of oxalic acid. The viscosity of the solution represents the interaction between solute and solvent. From table III, it is clear that the viscosity of urine-oxalic acid solution decreases only 0.004 M concentration of oxalic acid. And afterward it starts to increase with increasing concentration of oxalic acid.

Conclusion

Thus it can be concluded that the proper functioning of the urinary bladder will be maintained only up to 0.004 M concentration of oxalic acid present in urine. Afterward due to reduction in polarization power of the urinary bladder, a sluggish flushing action is developed in the bladder, which ultimately leads to the formation of urinary stones in the urinary bladder itself. The decrease in surface tension with increasing concentration of oxalic acid in urine oxalic-acid mixture solution also develops the chances of adsorption16 on the bladder surface. The measurement of surface tension is also quite important as measurement of interfacial tension is related with the potential difference across the interface(17-20). Since the surface tension decreases with increasing concentration, electrical potential will also decrease. Electrical potential across the interface is found to be proportional to electro-osmosis and streaming potential. Mixing of oxalic acid and urine is an exothermic process. With increasing concentration of oxalic acid, the temperature of mixing shows an increasing trend which also suggests the chances of crystallization due to poor miscibility.

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References

1. E.L. Smith et.al. "Principles of Biochemistry: General Aspects", (1985), McGraw Hill Book Company; 7th ed. pp. 19
2. Kart-Erik Anderson and Anders Arner," urinary bladder contraction and relaxation," 01 July 2004II https; II dio.org.I 10.1152I physrov. 00038. 2003.
3. Andreoli, T.E. et. al., "Membrane Physiology "Plenum, New York, 1980
4. A. C. Guyton, "Text book of Medical Physiology" pp 226, 473 Sounders, Philadelphia 1981.
5. P.C. Shukla, and G. Mishra, Hydrodynamic permeability measurement of Aqueous solution of urea, glucose, & their liquid mixtures across urinary bladder membranes of goat. "J. Memb. Scien. 26 277 (1986)
6. P.C. Shukla, and G. Mishra, "J Memb. Sc." , 'Electro kinetic studies of Aqueous solution of of urea across urinary bladder membranes', 157 (1987).
7. P.C Shukla], G Mishra. , and J.P. Mishra, 'Electro' kinetic studies of aqueous solutions of urea, thiourea, Glucose, and creatinine across urinary bladder membranes II st"J. Colloid and Interface Scei." 129, 53, (1989)
8. E., Schoffeniels, "Cellular aspects of Membrane permeability" Pergman Prem, oxford (1967).
9. B.L. Oser, "Hawks Physiological chemistry, Tata Mc Graw Hills Publishing Co., New Delhi (1979).

10. P.C. Shukla & J.P. Mishra, “Electro kinetic energy conversion studies of equous solution of oxalic acid and urea across urinary bladder membrane. “ ”Ind. J. Exptt. Bid.” 29 (1991) 831-836
11. N.Lakshminaranyaih, ”Equation of membrane Biophysics”, Academic Press, New York (1984) P-106
12. J.W. Lorimer “J. membrane. Sci.” 25(1985) 2”
13. O. Kedern & S.R. Caplar,” Trans. Forest. Soc.” 61 (1965) 1887. “Degree of Coupling and its relation to the efficiency of energy conversion”.
14. F.A. Morrison and J.F. osterla, “Elect kinetic energy conversion in ultrafine capillaries,” J. Phy. chem..” 43 (1965) 2”.
15. P.C. Shukla, J.P. Mishra, “Electro kinetic energy conversion studies of aqueour solution of urine-oxalic acid across urinary bladder membrane” Ind. J. Exptt. Bid. 30 (1992) 114-118
16. P.C. Shukla & J.P. Mishra, “Electro kinetic energy conversion studies of alkaline solution of uric acid, oxalic Acid, L-cystine and 2-Tynosine across urinary bladder membrane.” “J. Bio Sci” 19(1) 1994, pp 27-36
17. P.C. Shukla, J.P. Mishra, & Anuradha Mishra, “Studies on physical properties of urine-oxalic acid mixture,” Pak. J. Ind. Res. (1999) 42 (5) 220-222
18. P.C. Shukla & J.P. Mishra, “Studies on sensitive dependence of forces and fluxes across membranes. “Asian Journal of chemistry” 4 (1992) 251-256
19. P.C. Shukla, and D.K. chaubey,” Electro kinetic studies of urine-urea mixture across urinary bladder membranes.” Journal of urology 01 September 1995 “”https;IIdoi.org.I10.1016I S0022-5347(01) 66955-6”
20. P.C. Shukla, S.N. Singh, and A. Shukla,” studies on polarizability across urinary bladder membranes, by permeants such a Aquafina water, Aquagaurd water, mountain Dew and Mirinda.” Journal of Surface Science and Technology, 25(3) (2009) 177-178.

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Innovation The Research Concept

Man-Woman relationship: A Study of Shashi Deshpandes A Matter of Time

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Abstract Shashi Deshpande indisputably depicts the different roles of women in our society. The place of women in society has differed from age to age, yet almost societies never been considered the equal of men. Shashi Deshpande focus in her fiction the major themes such as man -woman relationship. She has constructed a grand edifice to expose and to speculate on the nature of man -woman relationship. The present paper deals with the inner life of middle class woman relationship with man as a father, brother and husband. The women are caught in the process of redefining and rediscovery their roles and position in society. This paper focuses the complexities of man-woman relationship.

Keywords Patriachal, Relationship.

Introduction

Shashi Deshpande's novels primarily present a social world of many complex relationship. She is winner of the Sahitya Academy Award, for the novel That Long Silent, Shashi Deshpande major concern is to show the torments of the modern educated Indian women caught between patriarchy and tradition. She bears the multiple levels of oppression, including sexual oppression. Shashi Deshpande represent the suffering of women under the hands of their husbands. Marriage plays a vital role in the life of women. A matter of time, Deshpande's seventh novel, published by penguin India in 1996. A Matter of Time was her favorite book because of her deep understanding and closeness to the characters. In Shashi Deshpande novels location is of prime significantly when she saw an old stone house with a garden, In Mall Easwaran, a locality still exuding an old – world charming Bangalore, but today is computer capital of India. Shashi Deshpande says that in her mind she saw the figures of three women in their combined with the real-life experience of a friend's mother who, her husband after forty abandoned by years of marriage found the story of A Matter of Time.

Usha Bande said about the novel:- There are three generations of women with their impregnable silence and suffocating life ; but it is the impatient new generation ready to fight It out tooth and nail that provided a whiff of cool breeze. How successful will this new generation be in getting justice is in fact, a matter of time.

Aim of study

In this article we can discuss about inequality and discrimination of women. They face unequal treatment at home and at work place. Women tries to prove that she have got ability to face the setback of life and to battle against men.

Gur Pyari Jandial expresses-

Shashi Deshpande's A Matter of Time particularly deals with the theme of the quest for a female identity. The complexities of man-woman relationships especially in the context of marriage, the trauma of a distributed adolescence the attempt to break traditional moulds in which women are trapped, sexual description, the reflection of the dependence syndrome and introspection are some of the concerns which give the novel a feminist bent.

Review of Literature

The work in this paper is focusing on relationship between man-woman in our society. A male dominated society is bound in a patriarchal societal system. Where decision-makers and rule makers are mostly men and hence women are not consider a part of society. In India we worship various woman deities and goddesses but this is women sadly do not get the same respect and equal status.

Main Text

First Generation (Manorama-Vithalrao)

A comprehensive picture of the Indian women belonging to different generation. Manorama who represent the first generation, came from humble background and married with Vithalrao she broke off all the ties with her family. Manorama birth a baby girl whose name is Kalyani. Vithalrao never grudged the birth of Kalyani. It made no difference whether he had a son or a daughter. He wanted Kalyani to became a engineer. But Manorama was tormented by the fear that her husband marry again to have a son. Manorama knew that our tradition allowed him to leave his wife if she can not give birth to male child. The whole life Manorama could not established a healthy relationship with Kalyani. Manorama did not allow Kalyani was average in looks and Manorama wanted Kalyani to be beautiful so that she could find a better match for her. Manorama forced her youngest brother to marry Kalyani, so the property would remain in the family. Manorama emerges as an insecure woman in the novel. She breaks the image of suppressed wife who takes the traditional superior place of her husband. **Stanley Carballo opines:**

A Matter of Time, basically Is the human predicament. Always she concerned about people, their predicament and moral values. It is a search in every human being; something more than more mundane life.

Second Generation (Kalyani-Shripati)

Kalyani emerges as the most powerful character in the novel. . The most striking silent suffering is Kalyani who losing their son, a male heir, so her husbands punished her and spends nearly thirty five years in total silence with her husband. Shripati suspected Kalyani of deliberately losing the mental retarded son. The male child is necessary to carry forward the family name and legacy. Son is the provider, the protector and the rightful heir to the family. Kalyani and her husband Shripati which was filled only with dread, hopelessness, hatred, anger and silence. Shripati searched for the lost boy throughout the station like a mad man. He blamed Kalyani for all this incident so last thirty five years, never spoke to Kalyani. She knows the pain of absconding and rejection. **Sunita Goyal Says:**

Kalyani attitude shows her enlightened state of mind where she can think of resisting patriarchal oppression instead of suffering silently, passively and endlessly by talking solace in other women's company.

Third Generation (Sumi-Mohan)

Sumi is very silent and suffering woman. She is mature and have a good presence of mind. She has easily accepted the desertion of her husband but never complains anyone for her position. After twenty three years of marriage, Gopal could not speak, and easily way unburden his responsibility as a husband and father of three daughters. Hence Sumi along with her three daughters came to her parental home, her father Shripati refuses to let his daughter Sumi and her daughters stay all by themselves. Sumi remains silent and engage herself in empowering herself she starts to search a job. She finds a way to create herself identity she finds a job as teacher. She manages her role as a single parent very beautifully. Sumi finds her real identity after her separation from Gopal. Her decision of taking to teaching shows Sumi's resilient spirit to create and her identity and realizing her autonomy and asserting her selfhood. In the words of **H. Ranjita**:

Sumi is one who does not compromise as an individual. She neither interferes with others decisions and individual to space not even with her husband's decisions and individual space not even with her husband's decisions to leave her and family life for good, nor does she let others interfere with sufferings and uncertainties of life Stoically and still maintains her individual self and independence.

Sumi's daughters Aru becomes a symbol of indomitable spirit. Aru notice how the

women finds no place in the family document. Aru was in dilemma, she was unable to understand her mother's quite indifference, Sumi has found her own identity before her death. Manorama, Kalyani and Sumi live life of suffering and they tolerated due to having a son. Sumi's daughter Aru, Charu and Seema are very educated. Aru become a lawyer and a Charu is going to be a doctor. The fourth generation acts like a male child in the family finally in this novel women proven their own power in the male dominated society.

Conclusion

According to Shashi Deshpande there is a sharp difference between woman's world and a man's world in our society. The tradition by which a woman is trained to play her sub-servient role in family.Manorama, Kalyani and Sumi suffering and tolerated due to not having a son. But Aru, Charu and Seema are very educated and try to balance a married life and professional life.

References

1. Bande ,Usha. Violent Responses: Murder in Fiction by women. Literature Ideology. Ed. Veena Singh Jaipur: Rawat Publications 1998.:134.print.

2. Goyal Sunita. Communication with one's own self. Crossing the barriers: A study of Shashi Deshpande's. Print Fiction. New Delhi K. k. publications 2013.163

3. Gur Pyari Jandial. New world order : The Female Self in Shashi Deshpande's A Matter of Times.

4. Ranjita, H. The changing image of women in the novels of Shashi Deshpande New Delhi: Prestige Books, 2011.145.print

5. Stanley Carvalho, Everyone choose a Language. The Sunday observer, 11 feb.1990.

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Innovation The Research Concept

Green Synthesis, Characterisation and Antibacterial activities of 3-Nitroacetophenonethiosemicarbazone and 4-Hydroxyacetophenonethiosemicarbazone

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Abstract The present study describes the Synthesis, characterization and biological activities of thiosemicarbazone ligand i.e. 3-Nitroacetophenonethiosemicarbazone (3NAT). The thiosemicarbazone ligand i.e. 3NAT has been synthesized by the condensation reaction of 3-Nitroacetophenone with thiosemicarbazide by conventional heating method as well as microwave irradiations method. The synthesized compounds have been characterized by elemental analysis, melting point determination, FTIR, UV-visible spectral analysis. The synthesized ligands have been screened in vitro for antibacterial activity against Escherichia coli, Staphylococcus aureus and Bacillus subtilis bacteria.

Keywords Thiosemicarbazone, Microwave Irradiations, Antibacterial Activity.

Introduction

Thiosemicarbazones is an important class of compounds obtained by condensing thiosemicarbazide with suitable aldehydes or ketones [1]. The active group for chelation is Sulphur [2]. In most of the complexes, the thiosemicarbazones coordinate to the metal ion as a bidentate ligand bonding through the sulphur atom and the hydrazino nitrogen atom. In a few cases they behave as unidentate ligands by bonding only through the sulphur atom. In certain cases thiosemicarbazones also act as multidentate ligands if donor groups are also present in the parent aldehyde or ketone moiety [3]. Ligands with N,N- and N,S-donor atoms and their complexes with first transition series metals have remarkable chemical and biological properties [4]. Active sites of various metallobiomolecules are coordinated by N and S atoms which is very important for biological aspects of these complexes. [5]. Interest in metal complexes with thiosemicabazone ligands has been stimulated because biological activities are often enhanced on complexation [6]. Thiosemicarbazones and their metal complexes have received considerable attention because of their antibacterial, antifungal, antitumor, antiamoebic, antimalarial, antiviral, radioprotective, trypanocidal and anti-inflammatory activities [7-22]. With the growing interest of thiosemicarbazones the present work was undertaken in order to investigate the ligational behaviour of the thiosemicarbazone towards metal ion as well as their biological activity in inhibiting the growth of some pathogenic bacteria [23].

Aim of study

To research some medicinal importance of synthesized compounds.

Methodology

All the chemicals and solvents used in the synthesis of ligands and transition metal complexes were of AR grade used as received. Thin layer chromatography was used to check purity of prepared compounds. IR spectra are recorded between the frequency 4000-500 cm-1 using KBr disc. Magnetic susceptibility of the synthesized transition metal complexes were measured on the vibrating sample magnetometer. Microwave synthesis was carried out in domestic microwave oven specially designed for green synthesis. Double Beam UV-Visible Spectrophotometerwas used for absorption measurement. All biological activities have been carried out with horizontal laminar.

Result and Discussion

A. Preparations of Ligands

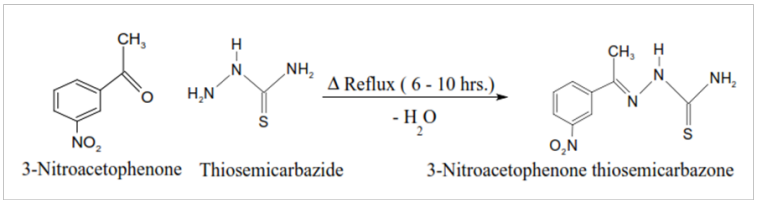
i. The Synthesis of 3-Nitroacetophenone Thiosemicarbazone (3NAT)

a. Microwave Irradiation Synthesis

A novel method for the preparation has been developed as per the principles of green chemistry, in which, either the reaction mixture was irradiated in a domestic microwave at 600 W for 2-10 minutes on alumina bed or reaction mixture in the solvent or the slurry of reaction mixture was exposed in a microwave reactor at 600 W maintaining different time intervals with respect to occasional and or definite inspection of TLC data. For the synthesis of 3NAT in accordance this novel synthesis method, water or water alcohol mixture of thiosemicarbazide (0.01mol) and 3-Nitroacetophenone (0.01mol) has been taken in Erlen Meyer flask capped with a funnel placed in a microwave oven and irradiated at 600 watt for 2-10 minutes. The reaction was monitored by TLC. After completion the reaction, the reaction mixture was allowed to attain room temperature and solid separated was filtered. The crude product was recrystalized from redistilled ethanol and dried under vacuum after filtration and separation. Purity of compound has been checked by TLC techniques in various solvents.

b. Conventional Thermal Method for Synthesis

In conventional thermal method, a hot ethanolic solution (25 mL) of 3-Nitroacetophenone (0.01 mol) has been mixed to a hot ethanolic refluxing solution (30 mL) of thiosemicarbazide (0.01 mol) in a 1: 1 molar ratio. The reaction mixture was refluxed in a water bath for about 6-10 hours. Thin layer chromatography was used to check the progress of the reaction. After the concentration and cooling of the reaction mixture, product in crystallized form obtained. Purity of the compound was checked by TLC after a multiple washing and filtration.



The structures of ligands are shown in (Fig.II.B.13). A comparison between the thermal method and microwave method is given in (Table II.B.1).

ii. Synthesis of 4-Hydroxyaetophenone thiosemicarbazone (4HAT)

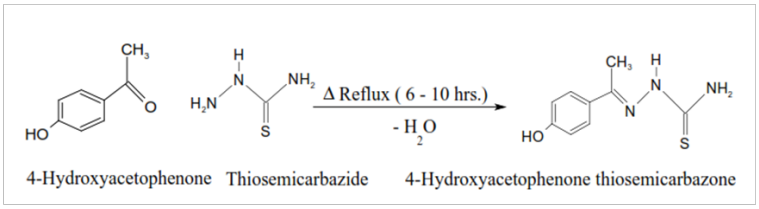
a. Microwave irradiation synthesis

In microwave irradiation preparation, water or water alcohol mixture of thiosemicarbazide (0.01mol) and 4-Hydroxyaetophenone(0.01mol) has been taken in Erlen Meyer flask capped with a funnel placed in a microwave oven and irradiated at 200 watt for 2-5 minutes. The reaction was monitored by TLC. After completion the reaction, the reaction mixture was allowed to attain room temperature and solid separated was filtered. The crude product was recrystalized from redistilled ethanol and dried under vacuum after filtration and separation. Purity of compound has been checked by TLC techniques in various solvents.

b. Conventional Thermal method for synthesis

In conventional thermal method, a hot ethanolic solution (25 mL) of 4-Hydroxyaetophenone (0.01 mol) has been mixed to a hot ethanolic refluxing

solution (30 mL) of thiosemicarbazide (0.01 mol) in a 1: 1 molar ratio. The contents have been refluxed for about 6-10 hours in a water bath. The reaction was monitored by TLC. The reaction was monitored by TLC. After the concentration and cooling of the reaction mixture product in crystallized form obtained. Purity of the compound was checked by TLC after a multiple washing and filtration.



The structures of ligands are shown in (Fig. II.B.17). A comparison between the thermal method and microwave method is given in (Table II.B.1)

TabIE I
Physico-chemical Data of Thiosemicarbazones

(C.M. = Conventional method, M.M. = Microwave method)

Compound	Colour	Reaction Period		Yield (%)	
		C.M. (Hrs)	M.M. (Min.)	C.M.	C.M.
3NAT	Brown	9.0	2.00	43	56
4HAT	Light Brown	8.0	2.30	53	64

Infrared Spectra

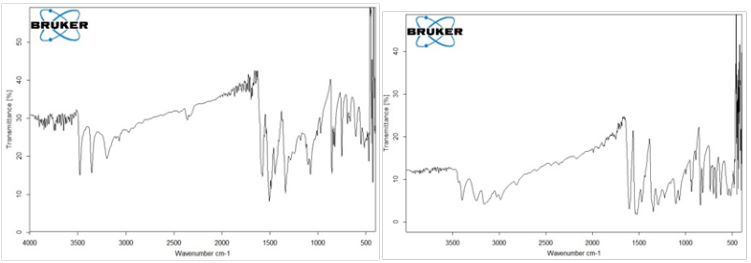
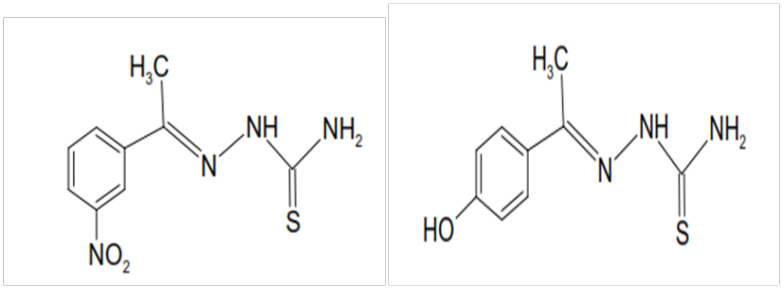


Fig.1. IR spectra of 3NAT and 4HAT



Structure of 3NAT and 4HAT

iv. Biological Activities

The antibacterial activity of the compounds against *E.coli*, *S.aureus*and *B.subtilis*were carried out using Muller Hinton Agar media (Hi media). The activity was carried out using paper disc method is represented in Table 2 which shows that both the 4NAT and 3NBT ligands have moderate antibacterial activities against these bacteria. Among the both ligands, 3NBT ligtand has been found out to be most effective against *S.aureus* bacteria showing maximum clarity of zones.

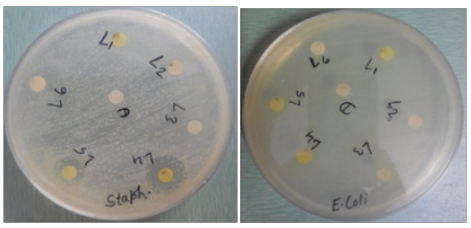


Fig.3 Biological avtivities

Table 2 Biological activities of Ligands

S. No.	Ligands	Zone of inhibition (in mm)		
		E. coli	*S. aureus*	*B. subtilis*
1	4NAT	0.5	0.6	0.7
2	3NBT	0.5	8.0	0.6

Conclusion

The thiosemicarbazone ligand 3NAT and 4HAT were characterized by elemental analysis, spectral studies and magnetic moment measurements. On the basis of above study probable structure of the ligand is determined.. The antibacterial properties of the ligands were studied against E.coli, S.aureusand B.subtilis bacteria. The result shows that all the ligands have moderate antibacterial activities against these bacteria.

References

1. Parekh AK, Desai KR. Synthesis and antibacterial activity jof thiosemicarbazones. Indian journal of chemistry 2006; 45B: 1072-1075.
2. West DX, Padhye SB, Sonawane PB, Chikate RC. Copper(II) complexes of tridentate (O,N,S) thiosemicarbazones. Asian Journal of Chemistry Review 1990; 4(1): 125.
3. Agrawal PK, SinghalRenu, Arora SS, Agrawal Ajay. Synthesis and

characterisation of Mn(II), Co(II) and Ni(II) complexes of semicarbazones and thiosemicarbazones of 2-pyridylglyoxal. International Journal for Chemical and Pharmaceutical Sciences 2015; 6(1): 30-35.
4. Ferrari MB, Bisceglie F, Fava GG, Pelosi G, Tarasconi P, Albertini R, Pinelli S. Synthesis, chacterisation and biological activity of two new polymeric copper(II) complexes with α-ketoglutaric acid thiosemicarbazones. J InorgBiochem 2002; 89(1): 36-44.
5. Singh K, Barwa MS, Tyagi P. Synthesis and characterisation of cobalt(II), nickel(II), copper(II) and zinc(II) complexes with Schiff base derived from 4-amino-3-mercapto-6-methyl-5-oxo-1,2,4,-triazine. Eur J Med Chem 2007; 42(3): 394-402.
6. Patil SD, Dawane BS, Kamble RD, Hese SV, Achaya AP, Kote JR, Gachhe RN. Synthesis and antimycobacterial activity of Cu(II) complexes containing thiosemicarbazones ligand. Der Pharmacia Sinica 2013; 4(2): 171-175.
7. Affan MA, Salam MA, Ahmad FB, White F, Ali HM. Organotin(IV) complexes of 2-hydroxyacetophenone-N(4)-cyclohexylthiosemicarbazone (H2dact):synthesis, spectral characterisation, crystal structure and biological studies. InorgChimActa 2012; 38: 219-225.
8. Bakheet TM, Doig AJ. Properties and identification of antibiotic drug targets. BMC Bioinformatics 2010; 11: 195.
9. Shim Jaesool, Jyothi NR, Mohammad Farook NA. Biological applications of thiosemicarbazones and their metal complexes. Asian Journal of Chemistry 2013; 25(10): 5838-5840.
10. Kumar Devesh, Singh VK.Application of metal complexes of schiff base with special reference to thiosemicarbazone: a review. Journal of Drug Discovery and Therapeutics2014; 2(13): 24-32.
11. French FA, Blanz EJ. The carcinostatic activity of α-(N-heterocyliccarboxaldehyde thiosemicarbazones II.3-hydroxypyridine-2-carboxaldehyde thiosemicarbazone. Cancer Res 1965; 25(9): 1454-8.
12. Kowol CR, Trondl R, Heffeter P et al. Impact of metal co-ordination on cytotoxicity of 3-aminopyridine-2-carboxaldehyde thiosemicarbazones (triapine) and no vel insights in to terminal dimethylation. J Med Chem 2009; 52(16): 5032-5043.
13. Mendes IC, Soares MA, Santos Dos RG, Pinheiro C, Beraldo H. Gallium (III) complexes of 2-pyridineformamide thiosemicarbazones: cytotoxic activity against malignant glioblastoma. Eur J Med Chem 2009; 44: 1870-7.
14. Kolesar JM, Schelman WR, Geiger PG et al. Electron paramagnetic resonance study of peripheral blood mononuclear cells from patients with refractory solid tumors treated with triapine. J InorgBiochem 2008; 102: 693-8.
15. Richardson DR, Sharpe PC, Lovejoy DB et al. Dipyridyl thiosemicarbazones chelators with potent and selective antitumor activity from iron complexes with redox activity. J Med Chem 2006; 49: 6510-21.
16. Chaston TB, Lovejoy DB, Watts RN, Richardson DR. Examination of the antiproliferative activity of iron chelators: multiple cellular targets and the different mechanism of action of triapine compared with desferrioxamine and the potent pyridoxal isonicotinoylhydrazone analogue 311. Clin Cancer Res 2003; 9: 402-14.
17.Mendes IC, Moreira JP, Speziali NL, Mangrich AS, Tskahashi JA, Beraldo H. N(4)- tolyl-2-benzoylpyridine thiosemicarbazones and their copper (II) complexes with significant antifungal activity. Crystal structure of N(4)-para-tolyl-2-benzolpyridine thiosemicarbazone. jBrazChemSoc 2006; 17(8): 1571-1577.
18. Ali S, Draksha. Synthesis, Characterization and Biological Evaluation of Some Cobalt(II), Nickel(II) and Copper(II) Complexes of 4[N(2',4' Dichlorobenzalidene)Amino]Thiosemicarbazone and 4[N(2',4'Dinitrobenzalidene) Amino] Thiosemicarbazone. Asian J. Research Chem., 2011; 4(6): 976-983.
19. Fatondji HR, Gbaguidi F, Kpoviessi S, Hannaert V, Quetin-Leclercq J, Poupaert J, Accrombessi GC, Bero J, Moudachirou M. Synthesis, characterization and trypanocidal activity of some aromatic thiosemicarbazones and their 1,3,4-thiadiazolines derivatives. African Journal of Pure and Applied Chemistry 2011; 5(1): 59-64.
20. Fatondji HR, Kpoviessi S, Gbaguidi F, Bero J, Hannaert V, Moudachirou M,

Quetin-Leclercq J, Poupaert J, AccrombessiGC. Structure activity relationship study of thiosemicarbazones on an African trypanosome: Trypanosoma bruceibrucei. Med Chem Res 2013; 22: 2151-2162.
21. Shipman C, Smith SH, Drach JC, Klaymanl DL. Thiosemicarbazones of 2-acetylpyridine, 2-acetylquinoline, 1-acetylisoquinoline and related compounds as inhibitors of herpes simplex virus in vitro and in a cutaneous herpes guinea pig model. Antiviral Reasearch 1986; 6: 197-222.
22. Gokhale N, Jain S. Synthesis and evaluation of novel thiosemicarbazones derivatives as anticancer agent. IJPSR 2015; 6(4): 1792-1804.
23. Yadav N, Bhojak N. Microwave assisted synthesis, spectral and antibacterial investigation on Co(II) complexes with amide ligands. The Int J EngSci 2013; 2(2): 166-168.
24. Silverstein RM, Bassler GC, Morrill TC. Spectroscopic identification of organic compounds, Johan Wiley and Sons: New York, 1991.

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Innovation The Research Concept

Impact of Solar Activities on Global Temperature

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Abstract The Energy that drives the Earth'sClimate is undoubtedly provided by the Sun. Thevariations in the intensity of radiation hitting the Earth are quite significant on regional climate but also on a global scale so it is essential to give due importance to natural causes including sunspot activity. The present paper has been structured using significant studies carried out by researchers. It offers statistical approach towards the dramatic changes of the climatecaused by small solar irradiance.

Keywords Solar Activities, Natural Causes, Sunspots, Climate Change.

Introduction

1.The Sun-Ultimate source of energy of all the planets including Earth.
Earth is the only place that has all the right conditions for life to exist. The main reason for this is the right spot of Earth to receive the Sun's abundant energy that is needed for proper chemical reaction. The Sun is vital to life on Earth. Its heat influences the environment of all the planets, Moon andComets in our Solar System. Variations in the intensity of solar radiation hitting the Earth may produce changes in global and regional climate which are both different and additional to those from man-made climate change.

Aim of study

The solar-climate connection has often been disregarded by meteorologists until the late20thcentury. Nowadays computer models of the atmosphere are providing a route to understand this complex process involved. The main objective of this paper is to find a suitable explanation for globally changed climate.

Review of Literature

Since 90's scientific research on climate change has included multiple disciplines and expanded. FromCharless Grelly Abott's theory(1930) that persistently connected the sunspot as a main cause of climate change to Milutin Milankovitch's (1950)improved theory of James Crall with tedious calculations of varying distances and angles of the Sun's radiations convinced that sunspot variations were a main cause of climate change. Early 1970's also brought claims that far slower variations in the Earth's magnetic field correlated with climate, however it failed to convince. In 1973 Jack Eddy drew attention to a spell of low Carbon-14 and thus high solar activity. By the early 21st century all the trends in the Sun that could have an influence on the earth's climate has been in the opposite direction to that required to explain the observed rise in global mean temperature. Recent reviews have been presented by Haigh(2007), Lockwood (2012), Olayinka S. Ohunakin (2015), Jesse L.Reynlds (2019),**Seleshi G. Yalew** (2020).

Main Text

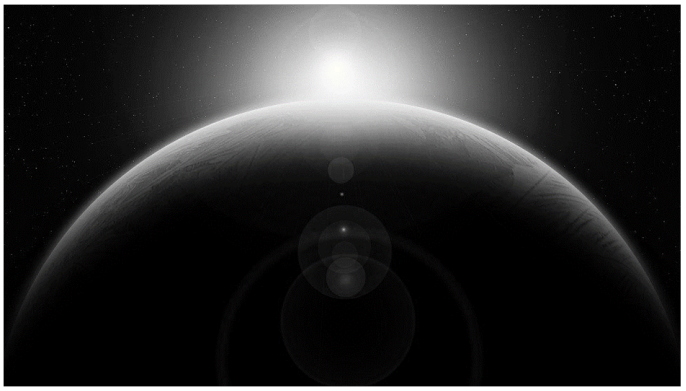

Fig. (1) Earth and Sun

The Solar energy to the Earth is significant even after passing through millions of kilometers of the Earth's atmosphere. It is generally considered to produce a constant amount of power in spite of small variations. Average radiation that hits the edge of the Earth's atmosphere is known as the Solar Constant, that varies 7.1% according to the distance of the Earth from the Sun.There are two main sources of variation in solar radiation. The first one is the Inter stellar process that affect the radiant energy emitted by the Sun and the second is the Earth's orbit that directly affect the amount of energy hitting the Earth and its distribution around the Globe.

2.Effect of Earth's Orbit-The solar energy flux i.e.,total amount of solar energy reaching the Earth in a given time period depends upon the distance of Earth to the Sun.Seasons exist because of the elliptical orbit of Earth that varies during the year. As Earth's axis is tilted from the direction perpendicular to the plane of its orbits, so when one pole is tilted towards the Sun at a particular point in the orbit it is summer in the associated hemisphere and winter in the other hemisphere. Another parameter that measures the wobble of the Earth's axis affecting the timing of the seasons relative to the Earth's position is the elliptical orbit.On time scale of many millennia the amount of radiation received at the Earth is affected by variations in these orbital parameters. The Earth -Sun geometry play the major role in the variation of magnetic flux.The total solar energy that hits the Earth is basically depends upon its distance from the Sun and Its elliptical path. But the distribution radiation over the globe depends on the tilt & precession.

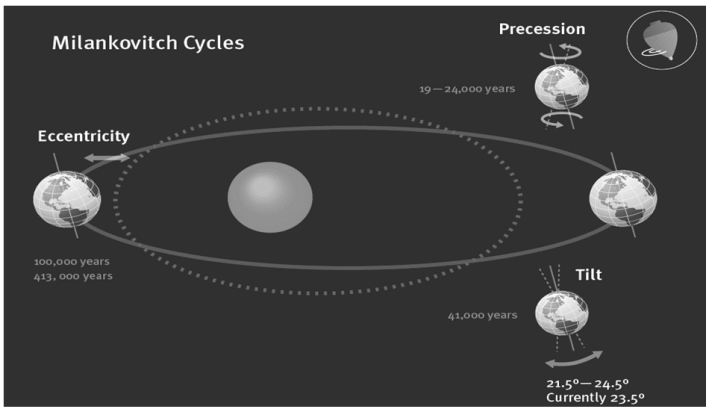

Fig. (2)The different parameters responsible for solar energy flux.

The amount of energy arriving in summer at high latitudes determines whether the winter growth of the ice cap will recede or the climate will be precipitated into an ice age. Changes to the seasonal irradiance, when amplified by other mechanism such as greenhouse gases released by the initial warming can lead to much longer- term shifts in climate regime. Data showing a connection between solar variations and climate are often dismissed as mere correlations since there is no generally accepted theoretical basis to explain these correlations. This is hardly an acceptable position given that the strongest arguments in approval of carbon dioxide in the atmosphere, mostly due to human activities. In the case of carbon dioxide, there is a generallyaccepted mechanism for linking changes in climate to variations in the concentration of this gas since it is an absorber of long wavelength infrared radiation and simple dimensional radiative equilibrium model illustrates the connection. It is defined as the change in net downward radiative flux at the troposphere resulting from any process that acts to perturb the climate system and measured in w/m^2.

It is convenient to characterize the response of the Earth's surface and troposphere to a radiative perturbation after the stratosphere has come to thermal equilibrium considering the case of carbon dioxide, labeled as "the most

important" greenhouse gas.

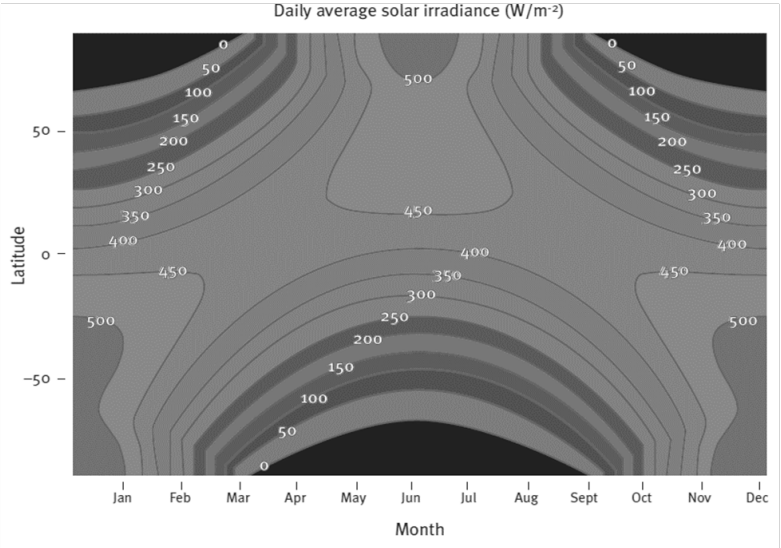

Fig. (3) Daily average solar radiation (Wm-2) entering the top of the atmosphere as a function of time, year and latitude.

If we increase the carbon dioxide by a factor of two it does not double the amount of infrared radiation absorbed by this. The reason for this is the position of carbon dioxide absorption bands relative to the earth's emission spectrum CO_2 has three absorption bands at wavelength of 4.25, 7.52 and 14.99 microns. The Earth's emission spectrum peaks at b/w 15 and 20 microns and falls off rapidly with decreasing wavelength.As a result, the CO_2 absorption band at 4.26 and 7.52 microns absorb negligible amounts of thermal radiation compound to the band at 14.99 microns.Accordingly adding more carbon dioxide to the atmosphere would contribute nothing to greenhouse gas effect.However, 14.99-micron band is essentially saturated so additional carbon dioxide may have some disturbance at the edge of the band. Because of this marginal effect, the change in forcing due to a change in carbon dioxide concentration is proportional to the natural logarithm of the fractional change in concentration of this gas.

$$\Delta F = \alpha / n(c/co)$$

Where c is the concentration of carbon dioxide at the time c_0 is the concentration at a given reference time and is the sensitivity of the climate to changes in carbon dioxide concentration.The approximation is valid in the range of practical interest therefore the earth's temperature is relatively insensitive to changes in carbon dioxide concentrations.

3.Solar Influence on Surface Climate -

Climate variability and climate change depends crucially on the existence and accuracy of records of meteorological parameters. That would consist of long time series of measurements made by well calibrated instruments located with high density across the globe. But measurements with global coverage have only been made since the start of the satellite era just about thirty years ago.

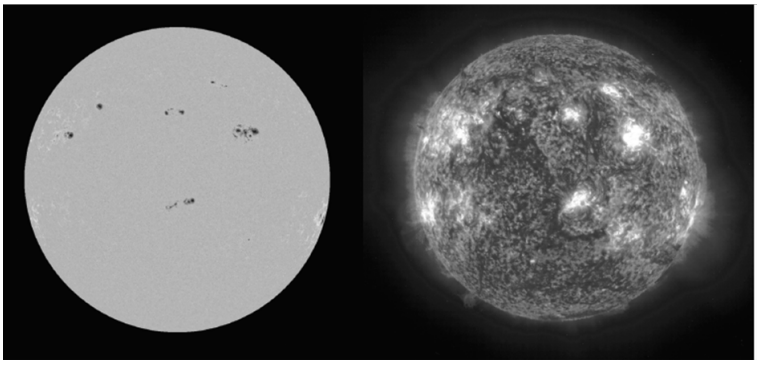

Fig (4)- The most recent activity of solar cycle.

A key concern of contemporary climate science is to attribute causes, including the contribution of solar variability to the observed variations in temperature. Many approaches have been used but the simplest is to calculate the correlation of the time series of the temperature with that of the factor of interest, another approach is that of multiple linear regression analysis which seeks to drive simultaneously the magnitudes of signals due to a number of pre-determined factors. If the known uncertainties in both the data and the forcing factors are taken into account the result can be improved.

(a) Millennial Time Scale-On long time scales changes in the earth's orbit as well as variations in solar activity must be considered. Fig. (4) shows how interglacial periods tend to be associated with higher irradiance in summer high latitudes and also how the recovery from a cold period proceeds much faster than the rate at which it originally developed. This is probably due to a feedback effect whereby an initial warming is amplified by the release of the natural greenhouse gases. In this case the initial warming is assumed due to an increase in solar irradiance.

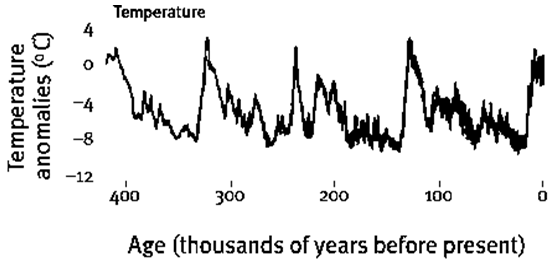

Fig-(5)Temperature deduced from18O records in air bubbles trapped in the Vostok ice core.

(b) Centennial Time Scale-On these timescales, long term changes in the Earth's orbit may be disregarded. Fig (5) presents reconstructions of the Northern Hemisphere surface temperature record over the past centuries. In long term variability, it is clear that current temperature is higher than the past two millennia climate change records suggests that the climate has been changing over the past century include the retreat of mountain glaciers, sea lever rise, thinner Arctic ice sheets and an increased frequency of extreme precipitation events.

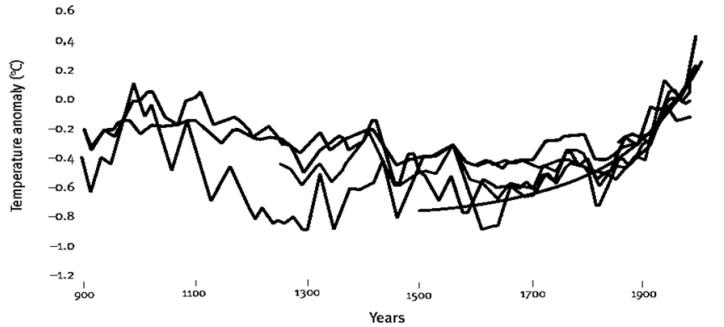

Figure 15. Northern Hemisphere or global surface temperature over the past millennium. The thick black curve (1856-present) is from measurements; the other curves are reconstructions based on climate proxy data[21].

Fig (6) Temperature change with the passing of years.

Different factors in the past century affecting the climate are represented in fig (2).

This suggests that the sun may have introducean overall global warming approximately 0.07^0 C before 1960 but had little effect, since than studies using other solar indices have produced a larger signal of temperature increase before mid-century and a better match between observations and regressions model during that period.

Confirmation of hypotheses and validation of models can only be obtained by the continuingacquisition of long term, well-calibrated measurements of atmospheric properties including temperature, cloud properties and ozone concentration with sufficient spatial and temporal resolution. These need to be acquired as along side properly calibrated solar spectral data.

Conclusion

Modern satellite observations revolutionized understanding of how the Sun and Earth are changing and the linkages between them. Recognition that Earth might be changing because of human activities galvanized the acquisition of sustained, coordinated, validated space-based observations of the Sun and the Earth that continues today.Attributing warming of the globe to increasing concentrations of greenhouse gases necessitates knowledge of the Sun's total radiative output, which heats the Earth, also changes. Detecting and understanding how chloro-fluorocarbons released into the atmosphere depute Earth's protective ozone layer which necessitates knowledge of how solar ultra violet irradiance, which both produces and destroys ozone also changes.

It is a challenge to communicate the simultaneous limitations and potential of the changing Sun to change Earth's climate and atmosphere and the complexity of the connection. Many researchers consider the sun to be a major cause of climate change while other insist that its influence is negligible. The most optimistic avenue for communicating connections between the changing Sun and Earth's climate and atmosphere is to observemodel and project the ongoing changes with sufficient fidelity to alleviate uncertainty as to their extent and impact.

Suggestions for the future Study

Understanding the role of solar variability in solar activity is essential to the interpretation of past climate and for the prediction of the future. Solar activities changes might also play an important role in regional climate that we need to understand in the context of informing climate adaptation efforts.

References

1. Lee and S.J Reid.in Encyclopedia of Earth (ed C.J. Cleveland) (Environmental Information Coalition, National Council for Science and Environment, Washington DC, (2010).

2. J.L. Lean and D. Rind. Climate forcing by changing solar radiation. Journal of climate 11,3069-3094 (1998).

3. Images form the SOHO satellite:http://sohowww.nascom.nasa.gov/

4. Data compiled by the Physikalisch-Meteorologists' Observatorium Davos,

Switzerland (http://www.pmodwrc.ch).
5. T. J. Crowley. Causes of climate change over the past 1000 Years. Science 289, 270-277 (2000).
6. J.L. Lean. Cycles and trends in solar irradiance and climate. Wiley Interdisciplinary Reviews: Climate Change 1,111-122 (2010).
7. H. Svensmark, Space Science Reviews 93, 155-166 (2000).
8. L. Ponte, The Cooling (Prentice-Hall, Inc., New Jersey 1976).
9. J.T. Houghton, G.J. Jenking and J.H. Ephraums (Editors), Climate Change: The IPCC Scientific Assessment (Cambridge University Press, Cambridge 1991), p. 52.
10. E. Friis-christensen and H. Svensmark, Adv. Space Res. 20,pp.913-912 (1997).
11. N.A. Kirova, L. Balmaceda , and S.k Solanki, Astronomy and Astrophysics 467, 335-340 (2007).
12. E.W. Clive, et al., Geophysics. Res. Lett. 25, 1035 (1998).
13. G.C. Reid, J. Geophysics. Res. 96, 2835 (1990).
14. Professor Joanna Haigh,Grantham Institute for Climate Change (Feb 2011).
15. Gerald E. Marsh, Climate Change: The Sun's Role. E-Mail: geraldemarsh63@yahoo.com.
16. Impact Due to Sunspot Activity on Climate Change: Some Salent Results by P R Reddy and D Venkat Reddy (Feb 2016).
17. Jesse L. Reynolds, Solar geoengineering to reduce climate change: a review of governance proposalshttps://doi.org/10.1098/rspa.2019.0255(Sept. 2019).
18. Seleshi G. Yalew,Impacts of climate change on energy systems in global and regional scenarios (Aug 2020).

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Innovation The Research Concept

Kanyadan: A Drama of Dalit Consciousness

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Abstract The play Kanyadan by Vijay Tendulkar depicts the hypocrisy of Indian people. The upper-caste people though pretend of their acceptance of Dalits but inwardly they have prejudice against them. The play through the character of Arun depicts how a victim himself becomes a victimizer when finds an opportunity, The play is a beautiful depiction of complex human nature.

Keywords Dalit, Untouchable, Untouchability, Hypocrisy, Violence.

Introduction

India is a multi-cultural country. We have people following different religions. Hinduism is one of the major religions of our nation. Each religion has its own beliefs, customs, traditions, and social norms. In the Hindu religion we have caste-division. The Aryans divided our society into four major castes-Brahmin, Kshatriya, Vaishya, and Shudras. It is believed that Brahmins are born from the head of Brahma, Kshatriyas from the shoulders, Vaishyas from the thighs and shudras from the feet. Shudras are also known as Dalits. In ancient time they had to serve the upper castes. They used to do menial jobs. They were considered polluted or impure. Thescavengers were untouchables. After independence, our government enacted untouchability act in 1955 and now untouchability is a legal offence.

Aim of study

The objective of this research paper is to attract the attention of the readers towards the hypocrisy of the people of Indian society. It also tries to depict the psychology of a victim of an under-privileged class.

Review of Literature

Caste system in India is an age-old system. Many writers before Vijay Tendulkar's *Kanyadan* have written about caste-system. One of the famous writers is Mulk Raj Anand ,who is known as a writer of downtrodden and under-privileged people. His *Untouchable*, published in 1935, portrays the life of a young Indian sweeper, Bakha. U.R Ananth Murthy's *Sankara: A Rite for a Dead Man* (1965) was translated by A.K Ramanujan. The book was written in Kannada.It is the study of the progressive dissolution of a respected Brahmin challenged in his orthodoxy. *The World of Premchand* (translated by David Rubin) was published in 1969.The story presents the thoughts and tragic exploitation of Dukhi, an untouchable by a Brahmin. Another book by Urmila Pawar, *The Weave of my Life: A Dalit Woman's Memoir* was published in 1988 in Marathi. The writer writes about the experiences of dalit women in this book.

This shows that there were many writers who had already written about this social ill. Vijay Tendulkar's *Kanyadan* is unique in the sense that it not only talks about the exploitation of the dalits but also shows how a victim of exploitation, himself becomes an exploiter when he gets an opportunity.

Main Text

Despite of strict laws untouchability persists in our society. Not only in rural areas but even in urban areas the attitude towards Dalits is not always positive. The educated people pretend that they are modern and do not follow caste system but when their children want to marry a dalit, theyrefuse. There is hypocrisy in our society regarding caste-system.

Vijay Tendulkar (1928-2008) was among the handful of playwrights along with Girish Karnard, Habib Tanwar and Badal Sircar, who gave a new dimension to Indian theatre. He wrote about the contemporary issues of our society. Through the play *Kanyadan*, Vijay Tendulkar exposes the hypocrisy of the modern people. *Kanyadan* was originally published in 1996.Vijay Tendulkar was awarded the

Saraswati Samman for this play. This play was critically acclaimed in the world of literature. In this play we find the protagonist Nath Devalikar is a M.L.A and his wife Seva, is a social worker, who works for the upliftment for the women and the downtrodden class. In the opening Act we see that Nath and Seva are busy in their political and social work. They do not have time to spend together. They have two children Jyoti and Jai Prakash. Jyoti is impressed by the poetry of a dalit boy, Arun Athawale and wants to marry him. When she discloses her wish in front of her parents, Seva is shocked while Nath rejoices. Nath is a man who lives in a world of idealism. He wants to eradicate the caste-system and has no objection of his daughter marrying a dalit. He thinks that this is the sole way of abolishing untouchability. He looks this marriage as an experiment. Seva is a realistic woman and understands the difference of the culture between Arun and Jyoti. She says to Jyoti:

> But your life is patterned in a specific culture. To erase or to
>
> change all this overnight is just not possible. He is different in
>
> every way. You may not be able to handle it.[1]

Seva works for Dalits, and she knows very well the environment in which they live. Domestic violence and abusing is a part of their life because they are brought up in such atmosphere. They do not get an opportunity to get education. Lack of education has made them uncivilized. Arun is doing B.A but his background is of a scavenger family where violence and abusing each other is normal. When Arun comes to Jyoti's house, isscared. He asks Jyoti to sit with him as he was feeling lonely in that big house. Arun is a real man who knows that it will be difficult for Jyoti to live with him aftermarriage. He tells her about the reality of his forefathers. Hesays:

> Our tongues always tasting the flesh of dead animals, and with relish!
>
> Surely, we can't fit into your unwrinkled Tinopal world. How can there
>
> be any give and take between our ways and your fragrant, ghee spread,
>
> wheat bread culture?[2]

He warns Jyoti before marriage. Arun feels himself a misfit in the high caste people. He knows that high-caste people look down scavenger caste in which Arun is born. He knows Jyoti will get fed up with her life with Arun because of their cultural differences.

Jyoti's parents and brother have different opinion about Arun. Nath is happy to meet Arun and agrees for the marriage. But Seva and Jai Prakash object the proposal. Arun has misbehaved with Jyoti and Seva.JaiPrakash and Seva realises that Arun is a frustrated man and Jyoti will not be happy with him. Arun is not only violent but arrogant also. He hates upper-caste, and it seems that Jyoti is a kind of trophy for her. When Seva complains against Arun, Nath says that Arun is born amid poverty and hatred, and it will take time to change Arun. He further adds that we should not judge Arun on this basis and should try to understand him though it is difficult. Seva is reluctant to marry her daughter to Arun. But Nath insists and supports the alliance saying that this marriage is an experiment.

> Look Seva, society cannot be transformed through words alone.
>
> We have to act as catalysts in this transformation. The old social
>
> reformers...Many of them actually married widows. That was also
>
> an experiment, a difficult experiment. But hey dared to risk it.[3]

This shows that Nath wants to risk the life of his daughter just to experiment. He encourages Jyoti to marry Arun despite of knowing about his violent nature.

In Act Two of the play, we find Jyoti is married. She is looking very weak and has become silent. There are also marks on her body that depicts the violence of Arun on her body. Jyotiis a working woman while Arun remains idle, He is not able to purchase one room set for them. Therefore, Jyoti lives with her parents. Nath proposes that Arun being Jyoti's husband should move with them but Seva objects. She does not want a man like Arun to stay with them. She knows his harsh behaviour towards her daughter. Jyoti also tells her father that she has left Arun. Onhearing this Nath feels his dreams to be shattered. When Jyoti forgives Arun and leaves her parents'house, Nath feels proud of his daughter.

Nath understands that his calculations about Arun has failed but he does not accept it. In scene Two of Act Two we find Nath reading the autobiography of Arun. He appreciates the style and language of the book. While Nath was appreciating the book Seva informs him that Jyoti has been admitted to hospital due to excessive bleeding. Jyoti is pregnant and she is in her sixth month. Nath asks the cause and Seva tells the reason is, Arun'sbeating. Arun kicked pregnant Jyoti on her belly. Nath is shocked to listen. He is not able to believe that a man who has beautifully written the story of is humiliation can torture his own pregnant wife. Seva gets irritated and states there is no use of wasting time but there is a time to take decisions. She is angry with her husband and speaks against Dalits. She says:

By now it is clear that this man doesn't want to work,

he wants to remain a burden on Jyoti. It is also obvious that

he will never feel grateful for her support. If you ask me,

I have my doubts as to whether these dalits understand

what gratitude means.[4]

Nath tries to pacify her and stop her speaking against dalits, but Seva does not stop. She says that after marriage with Arun their daughter has completely changed. She has refused to come to their house instead she intends to go back to Arun's house.Nath becomesdistressed. Suddenly a phone rings and someone invites him to speak for Arun's book, but he refuses. Seva further tells her that the neighbours told her that Arun teases Jyoti for being born in a high caste, and he speaks against her parents. Jai Prakash enters while Seva and Nath were discussing the character of Arun.Jai Prakash is reading news of Israeli forces against Palestian.Through this news he speaks a truth.

But this means that the very victims of violence may go on to

perpetrate the same brutal violence upon others. Perhaps they

get a peculiar enjoyment out of it.Perhaps those who are hunted

derive great pleasure in hunting others when they get an opportunity

to do so.[5]

In other words, yesterday's victim is today's victimizer. The words are perfectly applicable to Arun. Arun belongs to a scavenger family. He and his forefathers have been oppressed by upper -caste people. He has a rage and hatred against them. He was a victim but when he is married to Jyoti, a high caste girl, he becomes a victimizer. He beats and abuses Jyoti and thus take a revenge for the oppression done to him by the high caste people. He torments her, abuses her

parents and thus vent his feelings towards upper- caste. Arun is a hypocrite. In his autobiography he presents himself as a victim and talks about the hardships and humiliation for being born as a scavenger. The same Arun victimizes his pregnant wife by beating her. He has a dual personality. In his book he writes about his own sorrow and at the same time give sorrow to his wife. A victim should understand and feel the sorrow of other person, but Arun has a different nature. He is a violent person. After the success of his book his arroganceincreases, and he comes to Nath's house with two other people. They invite him to speak about Arun's book. When Arun arrives Nath's house, he boasts of his success and indirectly threatens Nath so that he cannot refuse the invitation. Nath is very much upset on the behaviour of Arun towards his daughter. He was the person who had advocated Jyoti's marriage with Arun. But now all his hopes of Jyoti's future seemfutile. His age-old hatred towards dalit is roused and he starts shouting after Arun leaves the room. He in an anger says that the whole room is stinking, and he wants the room, furniture, and floor to be cleaned.Seva tries to control his anger and suggests him to preside over the function and speak about Arun'sbook. Seva is worried about Jyoti. Shesays that Arun will punish Jyoti if you refuse Nath speaks about Arun's book. Thespeech of Nath is hollow. Though he appreciates the book Infront of everyone but he himself is not satisfied. Nath has started hating Arun but for the sake of his daughter, he pretends to be happy. Jyoti is also present in the speech. She understands that her father has unwillingly delivered the lecture. After the function when Nath returns home, he feels guilty of letting his daughter to marry a dalit. He repents that his daughter sacrificed her life to fulfil his whims. While Nath and Seva were discussing Arun, Jyoti enters the house. She seems to be weary and weak. She behaves in a formal way as if she has visited a stranger's house. She comes to talk to Nath. Shemakes Nath realize his hypocrisy towards Arun. Jyoti says that Nath has always showed them the world of idealism and not reality. He is faced with reality after marriage. She came to know about the reality of struggle after marriage. She now realises how a man with beastly side can have a soft heart to write poetry and love. She confesses that Arun is both a beast and a poet and both are inseparable. Nath is perplexed to listen to Jyoti'sstatement, but she was right. The world of reality is different from the world of idealism.

In the end of the play, she asks her family not to visit her home. Jyotirealises that her family does not like Arun. When her parents ask her for support, she says that she is married and now she is not Jyoti Devalikar but Jyoti Athavale.

> I am Jyoti Arun Athavale, ascavenger. I don't say harijan.
>
> I despise the term. I am an untouchable, ascavenger. I am one
>
> of them. Don't touch me. Fly from my shadow, otherwise my fire
>
> will scorch your comfortable values.[6]

The conclusion of the play proves the significance of the title*Kanyadan*. In Hindu tradition a girl adopts her husband's surname. Thus, according to Jyoti, her parents have given her to Arun so she has also become an untouchable and her presence will pollute the atmosphere of her parents' house. Vijay Tendulkar through his play *Kanyadan* has been successful in portraying the situation of dalits in our society and the attitude of people towards them.To quote Gawri Ramnarayan:

> He has been criticized for exaggerating the spiritual bankrupty
>
> of the degenerate socio-cultural milieu in which we live. He has
>
> been accused of non-realistic projections of squalor, poverty, crime,
>
> disorder and mental perversions to titillate the viewer/reader and

worse of promoting defeatist apathy. But he has also been acclaimed

as one of India's best living playwrights.[7]

Conclusion

Despite of strict laws untouchability persists in our society. Not only in rural areas but even in urban areas the attitude towards Dalits is not always positive. The educated people pretend that they are modern and do not follow caste system but when their children want to marry a dalit, theyrefuse. There is hypocrisy in our society regarding caste-system.

References

1. Tendulkar, Vijay. Kanyadan, Translated by Gowri Ramnarayan, New Delhi: Oxford University Press, p.13.
2. Ibid., p.17.
3. Ibid., p.28.
4. Ibid., p.47.
5. Ibid., p.51.
6. Ibid., p.70.
7. Interview, Vijay Tendulkar in conversation with Gowri Ramnarayan,Vijay Tendulkar's Plays, An Anthology of Recent Criticism Madge,NewDelhi: Pencraft International ,2007,p.168.

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Innovation The Research Concept

Ultrasonic Study of Molecular Interaction in Binary Liquid Mixture of Benzonitrile with Butanol-1 at 298.15K, 303.15K, 308.15K

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Abstract Ultrasonic velocity and density are experimented for organic binary liquid mixture of Benzonitrile with Butanol - 1 at T= (298.15, 303.15 and 308.15) k across the wide range of composition.

The experimented data have been used to calculate isentropic compressibility (βs), intermolecular free length (Lf), molar sound velocity (Rm), specific acoustic independence (Z) and molar volume (Vm).

Excess values of isentropic compressibility (βsE), intermolecular free length (LfE) and molar volume (VmE) and values of ultrasonic velocity (V) are plotted against the mole fraction of Benzonitrile across the entire range of composition. The variation of these properties is discussed in terms of intermolecular interactions.

Keywords Ultrasonic velocity, Intermolecular interaction, Binary mixtures, Density.

Introduction

Vibrational waves of a frequency above the hearing rangeof the normal ear, i.e. 16 to 20,000 cycles per second are referred to as ultrasonics.

Curie brothers (1880)discovered the phenomenon of “piezoelectric effect” which is the development of electric charges on the definite faces of some crystals like quartz. Since quartz crystals possess the piezoelectric property to a greater extent, they are highly stable. I.e. strong, hard and have low temperature and used as transducer for the purpose of research work in ultrasonics.

Aim of study

High amplitude vibrations in ultrasonic study causes the permanent change in the medium while the low amplitude vibrations in the ultrasonic study do not cause permanent change in the medium. The present study is based on low amplitude vibrations.

Review of Literature

Ultrasonic velocity measurements play an important role to detect weak and strong molecular interaction in liquid mixtures[1-2]. [Thermodynamic properties obtained from the ultrasonic velocity and density such as isentropic compressibility, intermolecular free length and molar volume provide useful information to understand the nature and type of interaction in the liquid mixture.

Thermodynamic studies for liquid mixtures are useful to understand the different type of interactions, i.e.- dipole - dipole[3-6] and dipole induced dipole[7-10] between polar-polar[11-12] and nonpolar system[13-16]

Ultrasonic velocity and density in fourteen binary liquid mixtures studies by Fort and Moore17 representing different types and degree of interaction.

Main Text

Experimental Details

The ultrasonic velocities is measured by using a single crystal ultrasonic interferometer (M/S Mittal Enterprises, New Delhi) operating at 2 MHz frequency with an accuracy of ±0.05%(Model F-81), which is calibrated with water and benzene. The temperature stability is maintained within 0.1K by circulating

thermostated water around interferometer cell that contains the liquid with a circulating pump. In order to minimize the error of measurements several maxima of ultrasonic velocity are allowed to pass and their number n is counted. All maxima are recorded with highest swing of the needle on the micrometer scale of the interferometer. The total distance d moved by the reflector of the interferometer cell is given by

$d = n \lambda/2$ ----------(1)

Where λ is wavelength of ultrasonic wave. The frequency v of the interferometer crystal is accurately known (2 MHz) and using λ from eq1 , the ultrasonic velocity v m/s is calculated by the relation

$v = v \lambda$---------- (2)

Employing the measurement values of velocity (v) and density (ρ) some thermodynamic properties such as isentropic compressibility (βs), intermolecular free length (L_f) and molar volume (V_m) have been computed through the following expressions[18-19].

Molar volume

…… (1)

$V_m = [M^-/e]$

Isentropic compressibility

…… (2)

$\beta s = 1/V^2\rho$

Intermolecular free length

…… (3)

$Lf = [K \sqrt{\beta_S}]$

High purity chemicals (E. Merck and S.D. fine) are used and purified by the standard methods[20].

Excess values of various parameters are computed using the following relation:-

$A^E = (A) exp - (X_1A_1 + X_2A_2)$ where A^E is excess function (A) exp is experimental value of the mixture, A_1 and A_2 are the values for the pure components 1 and 2 whose mole fractions are X_1 and X_2.

The results obtained from these investigations have been incorporated in Table (1-3) and in Graph (1-4).

Result and Discussion

Experimental results are given in table 1,2 and 3. Ultrasonic velocity and density decreases when temperature increases (from 298.15k, 303.15k, 308.15k) whereas isentropic compressibility and molar volume increases when temperature increases.

Table 1–Experimentally determined ultrasonic velocity, density, calculated excess values of isentropic compressibility, intermolecular free length and molar volume for Benzonitrile with Butanol-1 at 298.15K

Mole fraction X_1	Ultrasonic velocity (u) ms^{-1}	Density (ρ) gml^{-1}	Excess isentropic Compressibility (B_S^E) $cm^2\ dyne^{-1}$ $X10^{12}$	Excess intermolecular freelength (L_f^E) A^o	Excess molar volume (V_m^E) ml $mole^{-1}$
1.0000	1416	1.0012	0.0000	0.0000	0.0000
0.8894	1402	0.9862	-1.4770	-0.0050	-0.4706
0.7894	1388	0.9698	-2.7149	-0.0090	-0.8008
0.6758	1372	0.9531	-3.6002	-0.0118	-1.1038
0.5726	1360	0.9340	-4.4821	-0.0148	-1.1619
0.4718	1344	0.9147	-4.8067	-0.0157	-1.2007
0.3733	1328	0.8945	-4.8353	-0.0156	-1.1454
0.2769	1310	0.8744	-4.4156	-0.0141	-1.1001
0.1826	1292	0.8529	-3.5888	-0.0114	-0.9017
0.0903	1268	0.8305	-1.6482	-0.0049	-0.5980
0.0000	1252	0.8056	0.0000	-0.0000	0.0000

Table 2–Experimentally determined ultrasonic velocity, density, calculated excess values of isentropic compressibility, intermolecular free length and molar volume for Benzonitrile with Butanol-1 at 303.15K

Mole	Ultrasonic	Density	Excess isentropic	Excess	Excess

fraction X_1	velocity (u) ms^{-1}	(ρ) gml^{-1}	Compressibility(B_S^E) $cm^2\ dyne^{-1}$ $X10^{12}$	intermolecular freelength (L_f^E) A^o	molar volume (V_m^E) ml $mole^{-1}$
1.0000	1400	0.9964	0.0000	0.0000	0.0000
0.8893	1392	0.9810	-1.9621	-0.0070	-0.4212
0.7813	1376	0.9667	-3.2219	-0.0111	-0.9598
0.6757	1360	0.9496	-4.1323	-0.0138	-1.2120
0.5726	1344	0.9321	-4.8113	-0.0159	-1.4261
0.4717	1328	0.9132	-5.1789	-0.0169	-1.4969
0.3732	1312	0.8932	-5.2285	-0.0169	-1.4528
0.2768	1292	0.8727	-4.5553	-0.0145	-1.3545
0.1825	1276	0.8521	-3.9889	-0.0127	-1.2435
0.0903	1260	0.8295	-2.9381	-0.0095	-0.9071
0.0000	1236	0.8020	0.0000	-0.0000	0.0000

Table 3–Experimentally determined ultrasonic velocity, density, calculated excess values of isentropic compressibility, intermolecular free length and molar volume for Benzonitrile with Butanol-1 at 308.15K

Mole fraction X_1	Ultrasonic velocity (u) ms^{-1}	Density (ρ) gml^{-1}	Excess isentropic Compressibility (B_S^E) $cm^2\ dyne^{-1}$ $X10^{12}$	Excess intermolecular freelength (L_f^E) A^o	Excess molar volume (V_m^E) ml $mole^{-1}$
1.0000	1382	0.9918	0.0000	0.0000	0.0000
0.8893	1368	0.9817	-1.8271	-0.0063	-0.9628
0.7812	1358	0.9667	-3.5513	-0.0123	-1.4178
0.6756	1342	0.9500	-4.5032	-0.0152	-1.7006
0.5724	1328	0.9317	-5.3230	-0.0178	-1.8205
0.4716	1310	0.9130	-5.5156	-0.0180	-1.9011
0.3730	1294	0.8939	-5.6164	-0.0182	-1.9416
0.2767	1280	0.8731	-5.5383	-0.0180	-1.8010
0.1824	1264	0.8518	-4.9163	-0.0160	-1.6031
0.0902	1244	0.8297	-3.4014	-0.0110	-1.3114
0.0000	1220	0.7988	0.0000	-0.0000	0.0000

Excess values of isentropic compressibility (Fig-2), intermolecular free length (Fig-3) and molar volume(Fig-4) show negative deviations. While density decreases with the increase in concentration of Butanol-1.

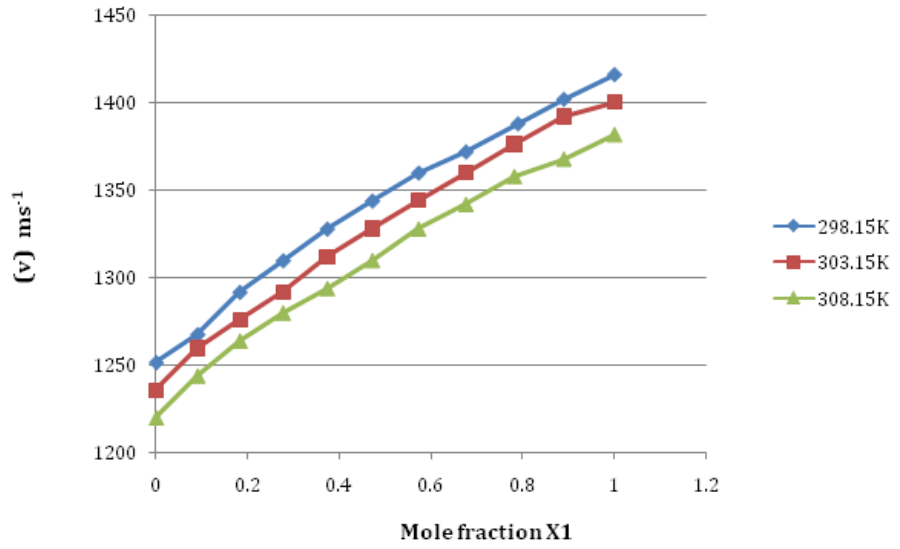

Fig-1 Mole fraction vs Ultrasonic velocity for Benzonitrile with Butanol-1

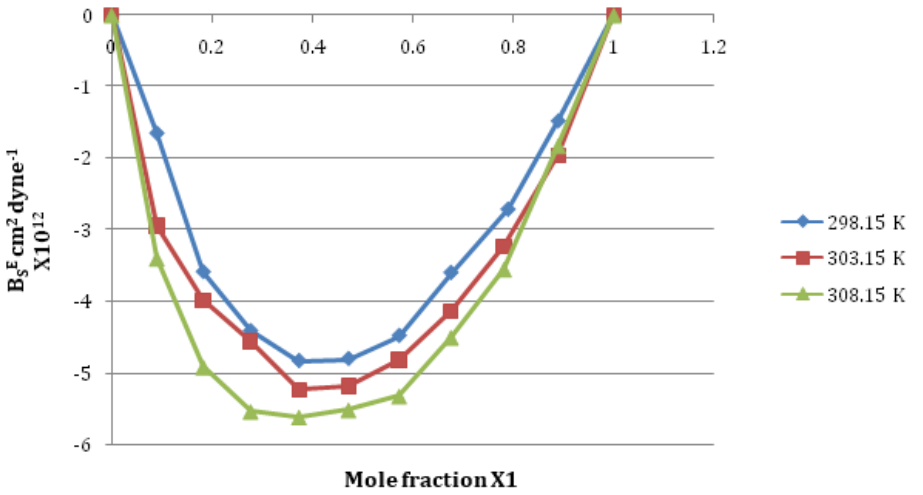

Fig-2 Mole fraction vs Isentropic compressibility for Benzonitrile with Butanol-1

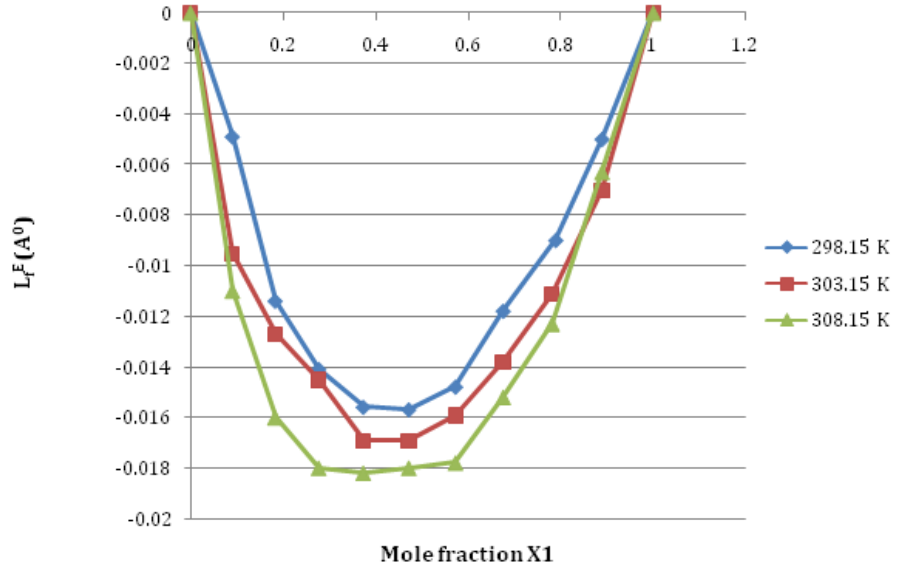

Fig-3 Mole fraction vs Excess intermolecular free length for Benzonitrile with Butanol -1

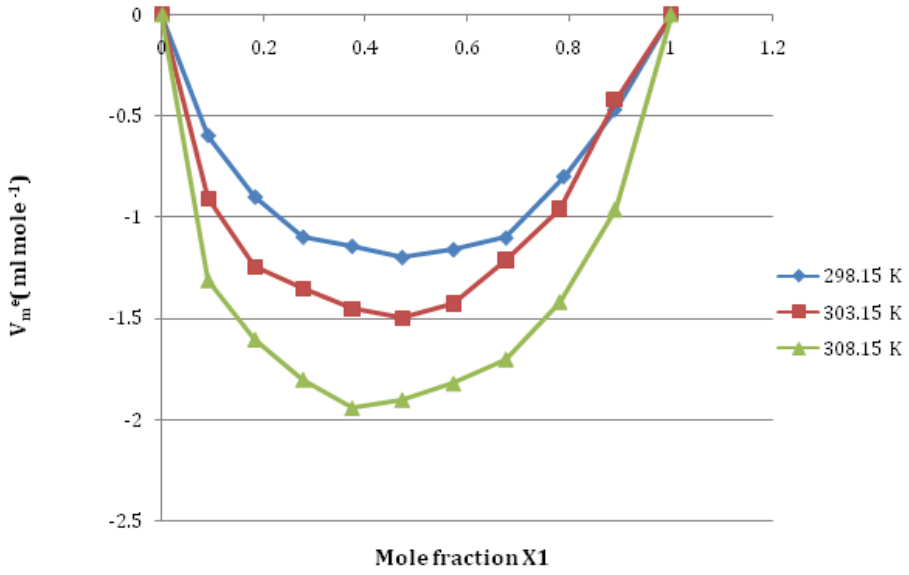

Fig -4 Mole fraction vs Excess molar volume for Benzonitrile with Butanol-1

Conclusion

In the present study βsE, LfE and VmE all have been found to be negative. This indicates that specific interaction is taking place between the components of mixtures.

References

1. Joykumar S, Karunanithi N &Kannappan V, Indian J. Pure Appl. Phys., 34(1996)761.
2. Kannappan V, Xavier Jesu Raja S & Jaya Santhi R, Indian J. Pure Appl. Phys., 41(2003)690.
3. Mozo I, Fuente I G, Gonzalez J A &Cobos J C, J. Chem. Thermodyn., 42(2010)17.
4. Kumar R, Mahesh R, Shanmugapriyan B &Kannappan V, Indian J. Pure Appl.

Phys., 50(2010)633.
5. Iloukhani H &Samiey B, Phys. Chem. Liq., 45(2007)571.
6. Mehra R & Gaur A K, J. Chem. Engg. Data, 53(2008)863.
7. Sastry N V, Thakor R R& Patel M C, J. Mol. Liq., 114(2009)13.
8. Treszczanowicz A J &Treszczanowicz T, Fluid Phase Equilib., 135(1997)179.
9. Mehra R &Israni R, Indian J. Pure Appl. Phys., 38(2000)341.
10. Dean R, Moulins J, MacInnis A &Palepu R M, Phys. Chem. Liq., 47(2009)302.
11. Mehra R & Gaur A K, J. Ind. Council Chem., 26(2009)85.
12. Kubendran1 R, Khan F L A, Asghar J, Aravinthraj M &Udayaseelan J, Arch. Appl. Sci. Res., 3(2011)568.
13. Mehra R &Israni R, Indian J. Chem. Technol., 9(2002)341.
14. Mehra R &Israni R, J. Indian Chem. Soc., 81(2004)227.
15. Mehra R Z, Phys. Chem., 219(2005)425.
16. Mehra R & Gaur A K, J. Modern Chemistry & Chemical Technology, 2(2011)24.
17. Fort R J and Moore W R, Trans Faraday Soc., 61(1965)2102.
18. Subramaniyam Naidu P &Ravindra Prasad K, Indian J. Pure Appl. Phys., 42(2004)512.
19. EzhilPavai R, Vasantharani P &KannappanA ,Indian J. Pure Appl. Phys., 42(2004)934.
20.Vogel A I, A textbook of practical Organic Chemistry, 5thEdn (Jhon Willey, New York) 1989.

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Innovation The Research Concept

Synthesis and Physicochemical studies on Bidentate copper (II), nickel (II) and Cobalt (II) Metal Complexes of (E)-2-((3-hydroxy-1H-inden-1-yl) methyl

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Abstract Transition metal complexes containing the general composition [M(HMHC)2Cl2] and [Cu(HMHC)2] Cl2, [where M= Co (II), and Ni (II), HMHC= (E)-2-((3-hydroxy-1H-inden-1-yl)methylene)-N-((E)-prop-1-en-1-yl)hydrazine-1-carbothioamide] have been synthesized and characterized by elemental analysis, molar conductance measurement, magnetic susceptibility measurement, molecular weight determination and spectral (FTIR, UV-visible and 1H & 13C NMR) techniques. Their results suggests that [Co/Ni(HMHC)2Cl2] were in the form of octahedral geometry except [Cu(HMHC)2]Cl2, which has square planner geometry. For [Cu(HMHC)2] has also been recorded the cyclic voltammetry data. All the newly compounds were tested antimicrobial activity against bacterial and fungal species.

Keywords Thiosemicarbazone; Metal complexes; Spectral studies; electrochemical and biological properties.

Introduction

Thiosemicarbazone are very versatile ligands. They can coordinate to metals as neutral molecules or after deprotonation, as anionic ligands, and can adopt a variety of different coordination modes. These derivatives are widely used in medicine for treating various diseases. [1–3] All of them possess a broad set of donor atoms and may react with metal ions to form coordination compounds of varied structure and composition. [4–6] It is established [7–10] that in many cases the biological activity of the above-mentioned drugs correlates with their ability to complex formation. Little class of coordination compounds has been subjected to as much attention as amino-complexes [11] formed by the amines with carbonyl derivatives. They constitute an interested family of ligands for bioinorganic chemistry purposes, mainly for medicinal inorganic chemistry research. Thiosemicarbazones are of considerable interest because of their chemistry and potentially beneficial biological activities, [12] such as antitumor,[13] antibacterial,[14, 15] antiviral [16] and antimalarial activities.[17, 18]

Aim of study

All the chemicals used in the present investigations were of the analytical reagent grade (AR). (E)-N-(prop-1-en-1-yl)hydrazinecarbothioamide (BDH), 3-hydroxy-1H-indene-1-carbaldehyde (Sigma), metal salts and solvents were purchased from Qualigens Chemicals Company. They were used as received. The elemental analysis (C, H, N) were performed using a Carlo–Erba 1106 Elemental Analyzer, IR spectra were recorded on a Shimadzu-160 Spectrometer using KBr discs in the range 4000–400 cm–1. Electronic spectra were recorded on a Shimadzu-160 Spectrometer. The 1H NMR spectra were obtained on a Bruker DPX-400 Spectrometer using DMSO-d6 solvent and TMS as the internal reference at room temperature. The EPR spectra of the complexes were recorded as polycrystalline sample on a Varian E–4 EPR Spectrometer. The mass losses were measured in nitrogen atmosphere from ambient temperature up to 800 0C at a heating rate of

10 0C min-1. Molar conductivities in DMF or DMSO at 25 0C were measured using a model CM-1K-TOA company conductivity meter. Magnetic moments at 25 0C were determined using the Gouy method with Hg[Co(SCN)4] as calibrant.

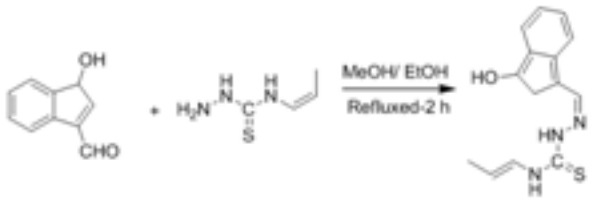
Review of Literature

The biological activities of thiosemicarbazones are considered to be due to their ability to form chelates with metals.[19] The biological activities of such ligands are related to its chelating ability with transition metal ions, bonding through nitrogen-nitrogen-sulfur or oxygen-nitrogen-sulfur atoms. The presence of hard O- and N- and soft S-donor atoms in the backbones of these ligands enable them to react readily with both transition group and main group metal ions, yielding stable metal complexes, some of which have been shown to exhibit interesting physico-chemical properties and significant biological activities.[20-25] Transition metal complexes are powerful catalysts for organic reactions when suitable ligands are associated with the metal center, they can offer chemio, regio, or stereo selectivity under mild conditions. In view of above application, the present work relates to the Synthesis and physicochemical studies on bidentate copper (II), nickel (II) and cobalt (II) metal complexes of (E)-2-((3-hydroxy-1H-inden-1-yl)methylene)-N-((E)-prop-1-en-1-yl)hydrazine-1-carbothioamide.

Main Text

1.1 Synthesis of the ligand

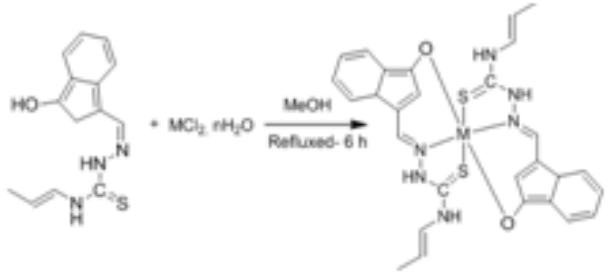
In a round bottom flask, a hot methanolic solution (25 ml) of 3-hydroxy-1H-indene-1-carbaldehyde (1.25 mL, 0.01 m mol) was added to a 5% acetic acid (0.32 g, 0.01 mmol) in water solution (20 mL) of (E)-N-(prop-1-en-1-yl)hydrazinecarbothioamide (1.31g, 0.01 m mol) methanol (15mL) and the reaction mixture was refluxed for about 2h. Still over the two nights at 4 ^{0}C, yellowish product was obtained. After that the product was re-crystallized in the hot methanol and washed several times with diethyl ether and then evaporates the solvent under reduced pressure to afford the product. (**Scheme 1**)



Scheme 1 Synthesis of the 2,4-[(allyl)iminobenzyl] thiosemicarbazone

1.1 Synthesis of cobalt and nickel metal complex

An ethanolic solution of ligand (0.002 m mol, 0.05g) was added drop wise to a 0.001 m mol methanolic solution of metal chloride (cobalt and nickel) salts and refluxed at 55 ^{0}C for 6 h. One-two nights standing; colored compounds are obtained as shown as in **scheme 2**, the reaction mixture was monitored by thin layer chromatography. The organic layers were collected and were taken in hot methanol and washed with diethyl ether and then evaporate the solvent under reduced pressure to afford the product.

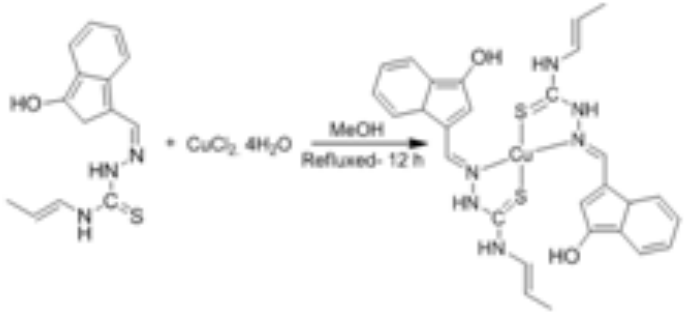


Scheme 2 Route for the synthesis of the metal complexes

1.1 Synthesis of copper complex

A quantity of (0.002 m mol, 0.05 g) of ligand was dissolved in 100 mL methanol and a solution of copper chloride (0.001 m mol, 0.017 g) in 25 mL methanol was added drop wise with continuous stirring about 12h; dark bluish single crystals appeared after one night standing (**scheme 3**). The resulting precipitates were filtered and washed with

acetone, methanol and dried over anhydrous calcium chloride in desicator.



Scheme 3 Route for the synthesis of the copper complex

Analysis

Analytical data of ligand and their metal complex

Yield: 60%; M.P. 240 ^{0}C, Mol. wt. 273, color: yellow; analytical data for $C_{14}H_{15}N_3OS$ found (calc.): C, 61.70 (61.99); H, 5.22 (5.91); N, 15.42 (15.97). IR (KBr): cm^{-1} 1637 ν_{C-NH}, 1690 $\nu_{C=O}$, 1298 ν_{NH-NH}. ESI-MS, m/z Data found (calc.): 241 (240), ^{1}H NMR (DMSO-d_6) δ ppm: 7.1 (m, 8H, HC-Ar), 3.8 (s, 2H, NH-NH). ^{13}C NMR (DMSO-d_6) δ ppm: 117.53-121.07 (10C, CH-Ar.), 143.23 (1C, C-N), 153.88 (2C, C=O).

Cobalt complex

Yield: 28%; M.P.: 285˚C; Mol. wt. 789; color: dirty brownish; analytical data for $[Co(C_{28}H_{30}N_6O_2)Cl_2]$ found (calc.): C, 42.58 (42.15); H, 3. 80 (3.55); N, 10.64 (10.47); IR (KBr cm^{-1}) 3412 ν_{NH}, 1690 $\nu_{C=O}$, 3015 ν_{C-H}, 2220 ν_{C-N}, 519 ν_{M-N}, 380 ν_{M-Cl}; ^{1}H NMR (DMSO-d_6) δ ppm: 7.3 (m, 16H, HC-Ar), 3.2 (s, 4H, NH-NH). ^{13}C NMR (DMSO-d_6) δ ppm: 117.53-121.07 (16C, CH-Ar.), 140.20 (4C, C-N), 153.21 (4C, C=O).

Nickel complex

Yield: 38%; M.P.: 260 ˚C; Mol. wt. 720; color: dark greenish; analytical data for $[Ni(C_{28}H_{30}N_6O_2)]Cl_2$ found (calc.): C, 46.66 (46.15), H, 4.16 (4.11), N, 11.66 (11.47). IR (KBr, cm^{-1}) 3402 ν_{NH}, 1690 $\nu_{C=O}$, 3015 ν_{C-H}, 2210 ν_{C-N}, 511 ν_{M-N}, 395 ν_{M-Cl}. ^{1}H NMR (DMSO-d_6) δ ppm: 7.1 (m, 16H, HC-Ar), 3.8 (s, 4H, NH-NH). ^{13}C NMR (DMSO-d_6) δ ppm: 117.53-121.07 (16C, CH-Ar.), 143.23 (4C, C-N), 153.88 (4C, C=O).

Copper complex

Yield: 38%; M.P.: 260 ˚C; Mol. wt. 720; color: dark bluish; analytical data for $[Cu(C_{28}H_{30}N_6O_2)]Cl_2$ found (calc.): C, 46.66 (46.15), H, 4.16 (4.11), N, 11.66 (11.47). IR (KBr, cm^{-1}) 3402 ν_{NH}, 1690 $\nu_{C=O}$, 3015 ν_{C-H}, 2210 ν_{C-N}, 511 ν_{M-N}, 395 ν_{M-Cl}. ^{1}H NMR (DMSO-d_6) δ ppm: 7.1 (m, 16H, HC-Ar), 3.8 (s, 4H, NH-NH). ^{13}C NMR (DMSO-d_6) δ ppm: 117.53-121.07 (16C, CH-Ar.), 143.23 (4C, C-N), 153.88 (4C, C=O).

Result and Discussion

The analytical data indicate that all the nickel and cobalt complexes have the general composition $[Co/Ni(MIBTS)_2\ Cl_2]$ and $[Cu(MIBTS)_2]\ Cl_2$. All the complexes are stable in air and soluble in methanol, ethanol chloroform, and DMSO/ DMF solution at room temperature. The value of molar conductance of complexes in DMSO indicates that the $[Cu(MIBTS)_2]Cl_2$ complexes are non electrolytes and $[Cu(MIBTS)_2]Cl_2$ are electrolyte. Magnetic moments lie in the range 5.01-5.08 B.M., 2.82-2.93 B.M. and 1.82-1.91 B.M. for Co(II), Ni(II) and Cu(II) complexes,

respectively. The Infrared spectra of the complexes were obtained in the range 4000- 400cm^{-1} region (as shown as **fig. 1**). Several important observations concerning the mode of coordination in these complexes are possible from these data. These are: (a) the carbonyl stretching frequencies provide a very important clue in the elucidation of structures. In a unionized carboxylate group, the C=O stretching vibration appears at 1680-1700 cm^{-1}. It is a well known fact that when (i) Infrared spectra of a large number of amine and ammine complexes have been examined by several authors, generally with satisfactory agreement as to exact frequencies in a given compound. The assignment of absorption in the 3000-3300 cm^{-1} region to N-H stretching frequencies is beyond doubt. It is apparent from the available data that coordination of amines lowers the N-H stretching frequencies by 100-150 cm^{-1}. It has been proposed that the major cause of this lowering is the drainage of electronic from the nitrogen atom which, in turn, weakens the N-H bond. In the absence of these data on some of the free ligands or their salts we compare the spectral band especially above 3000 cm^{-1} in the metal complexes with their corresponding ligands. Almost all the absorption bands observed above 3000 cm^{-1}, assigned to N-H or NH_2 stretching vibrations, are shifted to lower wave numbers in the complexes as compared to the corresponding free ligands. We interpret the observed shifts to lower energy in the complexes as arising from nitrogen coordination to the metal ions. (ii) N-N stretching vibration can be assigned on the basis of preceding work. It has been shown that if the ligands radical is attached with a conjugated system then N-N stretching occurs at about 1000 cm^{-1} , either if the resulting group is chelated or not. The distinctions between chelated and non-chelated ligands have been made only by broadening of this band in the chelates. In all our complexes ν (N-N) vibration appears in the 1030-950 cm^{-1} region. The slightly broad character of this band in all complexes may be taken as evidence for the nitrogen involvement in the bond formation. The IR spectra of the free ligand shows medium band at 3,253 cm^{-1} due to υ (NHR) vibrational modes. This band very similar in the spectra of complexes suggested non participating in the coordination. A strong bands observed at 1,177 – 1,196 cm^{-1}are assigned to υ (C=S) band and a new band is observed at 332 – 336 cm^{-1}, indicating the bond formation between metal ions and sulphur atom.[26] The strong band is observed at 1,544 – 1,590 cm^{-1} due to υ (>C=N-) in the free ligand is shifted to lower frequency in the complexes suggested the involvement of azomethine nitrogen in chelation. The non-ligand bands at 521 – 578, 322 – 336 and 255 – 278 cm^{-1} are tentatively assigned to υ (M – N),[26] υ (M – S)[27] and υ (M – Cl),[28] respectively. [26] ^{1}H NMR spectra of the ligand, the signals of the –NH protons were observed as singlets at δ 11.42 –11.83. These signals also appeared in the ^{1}H NMR spectra of the metal complexes indicating non coordinating the metal ions. The signals of the –CH=N proton which appears as singlets at δ 8.03 – 8.17 in the ligand show a shift to downfield in δ 0.03 – 0.08 after complexation. The shift indicates the coordination of the imine nitrogen [29] to the metal center. The signals of the aromatic protons of the ligand appeared at δ 7.21 – 7.91, and the resonance lines found correspond to the calculated multiplicity. These signals do not suffer relevant changes in the chemicals shifts for the metal complexes. The signals of the $-C_3H_5$ proton appears at δ 2.34 – 2.48 in the spectrum of ligand and complexes. The –CH=CH protons signals appears at δ 1.02 – 1.09 in the ligand and metal complexes spectra. The Ni(II) and Co(II) complexes are non-electrolytic and , Cu(II) complex electrolyte in nature by their molar conductivity (Λm) as measured in DMSO in the range 96–104 Ω^{-1} cm^2 mol^{-1} and 93 Ω^{-1} cm^2 mol^{-1}, respectively.[30] Mass spectra provide a vital clue for elucidating the structure of compounds. The spectrum shows the molecular ion peak at m/z = 245 ($C_{13}H_{15}N_3S$, calculated atomic mass 244 amu due to ^{13}C and ^{15}N isotopes) and other peaks like 44, 60, 78, 88, 91,

119, and 177 may be due to different fragments. The different competitive fragmentation pathways of ligand give the peaks at different mass numbers at 245. The intensity of these peaks reflects the stability and abundance of the ions. The weak peak described at 135 amu is assigned to the fragment $[C_6H_8N_4]^+$, corresponding to the loss of CS group. A very weak peak at 119 amu is assigned to the fragment $[C_6H_6N_3]^+$, corresponding to the loss of $CSNH_2$ group. The most intense peak at 91 corresponding to the fragment $[C_6H_5N]^+$. Other peak at 88, 78, 60, and 44 correspond to fragments $[CH_3N_3S]^+$, $[C_5H_4N]^+$, $[CSNH_2]^+$, and $[CS]^+$, respectively. The intensity of theses peaks gives an idea of the stability of these fragments. The EPR spectra of the Cu (II) complexes were recorded as polycrystalline sample at LNT since the rapid spin lattic relaxtion of Cu (II) broaden the lines at higher temperature. The g_{II} value for metal complexes is less than 2.3 suggesting a small amount of ionic character of the metal-ligand bond. The trend $g_{II} > g_{\perp} > 2.0023$, suggests that the unpair electron lie predominantly in the $dx^2–y^2$ orbital characteristic of octahedral geometry [31] in Cu (II) complexes. The electronic spectra of the complexes recorded in MeOH solution are given table 1. The electronic spectra of the cobalt(II) complex showed three bands at 8780-8810, 17475-17775 and 30235-30270 cm^{-1}, which may be assigned to $^4T_{1g} \rightarrow {}^4T_{2g}$ (F), $^4T_{1g} \rightarrow {}^4T_{1g}$(P), and $^4T_{1g} \rightarrow {}^3A_{2g}$ (F) transitions and suggested octahedral geometry around the cobalt ion.[32] The cobalt complexes showed magnetic moment values 4.70-490 B.M. at room temperature. These high values of the magnetic moments and the stoichiometries suggest a coordination number of six for the central cobalt ions and an octahedral geometry. The magnetic properties of copper complex may be divided into broad classes. First, are those having essentially temperature independent magnetic moments in rang 2.20 BM. Those exhibiting such moments are mononuclear complexes having no major interaction between the unpaired electrons on different copper ion. The moments in such complex, as in apparent, lie appreciably above the spine-only value (1.73 BM), but as the electronic ground states are non-degenerate this cannot arise from inherent angular momentum in the ground state. It arises due to mixing in of some orbital angular momentum from excited states via spin orbit coupling. The copper (II) complexes exhibit magnetic moments of 1.70-1.75 B.M., respectively, at room temperature. These values are quite close to the spin-allowed values expected for an S= 1/2 system and may be indicative of a square planner geometries around copper (II) ions. The electronic spectra of the copper(II) complexes display a broad band at 14220-14918 cm^{-1} due to $^2B_{1g} \rightarrow {}^2E_g$ and two bands at 16390-16550 and 27250-27350 cm^{-1} assigned to d–d transitions and a charge transfer band respectively, of square planner environment.[33] The observed magnetic moment of the copper complexes are 1.75 -180 BM. The nickel (II) complexes exhibited three bands 9960-10565, 15850-17155, and 24200-29985 cm^{-1} assignable to the transitions $^3A_{2g}$ (F) $\rightarrow {}^3T_{2g}$ (F) (v_1), $^3A_{2g}$ (F) $\rightarrow {}^3T_{1g}$ (F) (v_2) and $^3A_{2g}$ (F) $\rightarrow {}^3T_{1g}$ (P) (v_3), respectively which are characteristic of nickel (II) in octahedral geometry.[34] The magnetic moment of the nickel complexes are 3.20-3.25BM, were lay in the range of octahedral geometries.

Table 1 Electronic spectral data (nm) of the metal complexes

Complexes	λ_{max} (nm)	Assignments
[Co (MIBTS)2 Cl_2]	211,283, 333, 399, 457, 643	n–π*, π–π*, d–d
[Cu (MIBTS)2 Cl_2]	236, 275, 335, 366, 425, 580	n–π*, π–π*, d–d
[Ni (MIBTS)2 Cl_2]	270, 330, 350, 375, 610	n–π*, π–π*, d–d

On the basis of the above observations, it is tentatively suggested that all of the complexes show an octahedral geometry in which the two ligand act as bidentates. These possibly accommodate them selves around the metal atom in such a way that a stable chelate ring is formed giving, in turn, stability to the formed metal complexes.

Microbiology Essay

For the antibacterial and antifungal assays, the compounds were dissolved in dimethylformamide. Further dilutions of the compounds and standard drugs in the test medium were prepared at the required quantities of 500 and 1000 ppm concentrations with dextrose broth. The minimum inhibitory concentrations (MIC) were determined using the two fold serial dilution technique.[35] A control test was also performed containing inoculated broth supplemented at the same dilutions used in our experiments and found inactive in the culture medium. All the compounds were tested for their in vitro growth inhibitory activity against different bacteria and the fungus. Origins of bacterial strains are S. aureus ATCC 29253, S. aureus ATCC 3160, as Gram-positive. Gentamycin and Amphotericin B were used as control drugs. The data on the antimicrobial activity of the compounds and the control drugs as MIC values are given in **table 2**.The cultures were obtained from SRL broth for all the bacterial strains after 24 h of incubation at 37 ^{0}C. *C. albicans* were maintained in dextrose broth after incubation for 24 h at 25 ^{0}C. Testing was carried out in dextrose broth at pH 7.4 and the two fold serial dilution technique was applied. A set of tubes containing only inoculated broth was used as controls. For the antibacterial assay after incubation for 24 h at 37 ^{0}C and after incubation for 48 h at 25 ^{0}C for the antifungal assay, the last tube with no growth of microorganism and/or yeast was recorded to represent the MIC expressed in ppm. Every experiment in the antibacterial and antifungal assays was replicated twice and the data is given in **table 2**. The observation on the biological assay indicate that the antibacterial action due to all compounds have NOS group which is of considerable chemotherapeutic interest. From the table 2 fig. 2 (a), (b)and bar graphs it is evidence that among all the newly synthesize compounds tested for their antibacterial and antifungal activities against *Staphylococcus aureus* (ATCC 25923), *Staphylococcus aureus* (ATCC 3160), *Cabdida albicans* (227) and *Staphylococcus cereviscae* (361) were

determined as MIC values.

All the investigated compounds showed good activity against *S. aureus*. The zone of inhibition in ml of the test compounds against the micro-organism *Staphylococcus aureus* (ATCC 25923), *Staphylococcus aureus* (ATCC 3160), *Cabdida albicans* (227) and *Staphylococcus cereviscae* (361). the data indicate that among the bacterias employed, *S. aureus* is found to be more sensitive to these compounds where as the gram negative bacteria, *E. coli* shows resistance to most of the compounds. [34, 35] The zone of inhibition tabulated reveal that the antibacterial activity of the compounds is specific to the microorganism examined. Analysis of the data showed that the general the fungi *C. albicans* (227) was more susceptible to the irreversible toxic effects of screened compounds than *S. cereviscae* (361). Variation in the response of fungi studies to chemical screened may be attributed to the tolerance of them by test fungi. The effects of assayed chemicals on test fungi differed in accordance with the concentrations used. Generally fungi toxicity enhanced with the increase in the dose of compounds. Higher the concentration longer was the persistence of chemicals.

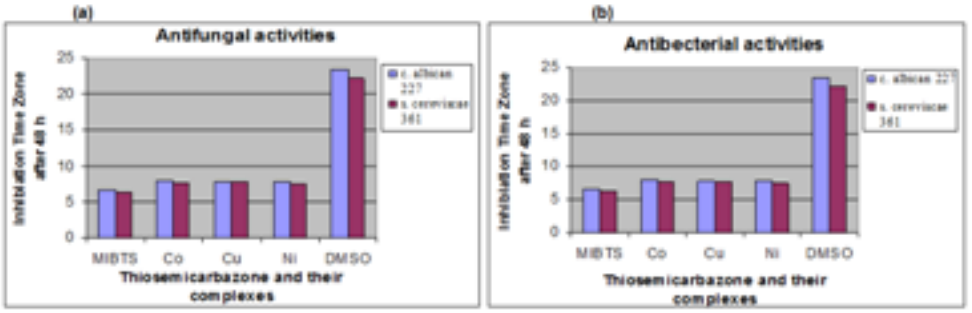


Figure 3 Showing the bar graph antibacterial (a) and antifungal activities (b) at 1000 ppm concentration after 48

Conclusion

In this article we have described that the all the synthesized transition nickel and cobalt complexes of thiosemicarbazone have octahedral geometry but the copper complex has square planner geometry. The behaviors of antimicrobial activities showed that the metal-complexes exhibit antimicrobial properties and it is important to note that they show enhanced inhibitory activity compared to parent ligand. All the investigated compounds showed less to good activity against S. aureus. It is noteworthy that compounds.

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References

1. BA Gingras, RI Somorjai, CH Bayley, Canadian J. Chem.; 1961, 39, 973-979.
2. JD Patel; Russian J Chem., 2010, 3(4), 625-630.
3. N Murthy, TS Dharmarajan; Asian J. Chem., 2002, 14(3), 1325–1330.
4. MR Taylor, JP Glusker, EJ Grabe, JA Minkin, Bioinorg. Chem., 1974, 3(3), 189–205.
5. N.V. Gerbeleu, V.B. Arion, and J. Burges; Templ. Synth. Macrocy. Comp., Weinheim: Wiley, 1999.
6. A.M. Akber, and S.E. Livingstron; Coord. Chem. Rev., 13, 101, 1974.
7. N.K. Zelenin, O.B. Kusnetsova, A.G. Saminskaya, V.V. Alekseeva, Z.T. Karimov, E.P. Sivolodskii, G.A. Sofronov, N.I. Novikov and T.N. Preobrazhenskaya; Khim – Farm.Zh, 31(2), 34, 1994.
8. T.R. Ovsepyan, G.E. Gabrielyan, G.K. Simonyan, F.G. Arsenyan, G.M. Stepanyan and B.T. Garibjanyan; Khim-Farm. Zh, 34(5), 21, 2000.
9. N.M. Samus, V.I. Prisakar, V.I. Tsapkov, S.A. Buracheva and A.P. Gulya; Khim.-Farm. Zh, 7, 27, 2004.
10. W.J.Geary; Coord. Chem.Rev., 7(1), 81, 1971.

11. S. Chandra and L.K. Gupta; Spectrochim. Acta Part A, 62(4-5), 1089, 2005.
12. G. Atassi, P. Dumout and J.C. Harteel; Europ. J. cancer, 15(4), 451, 1989.
13. E.W. Ainscough, A.M. Brodie, W.A. Demy, G.J. Finlay and J.D. Ranford; J. Inorg. Biochem. 70 (3-4), 175, 1998.
14. G. Aguirre, L. Boiani, H. Cerecetto et al; Bioorg. Med. Chem., 121(8), 4885, 2004.
15. K. Hussain, A.R. Bhat and A. Azam; Europ. J. Med. Chem., 43(9), 2016, 2008.
16. X. Du, C .Guo, E. Hansell, et al; J. Medi. Chem., 45(13), 2695, 2002.
17. X. Du, E. Hansell, J.C. Engal, C.R. Caffrey, F.E. Cohen and J.H. Mckerow; Chem. and Bio. 7(9), 733, 2000.
18. K.S .Aboumelh; J. Enzy. Inhibi. Med. Chem., 23(4), 493, 2008.
19. S. Chandra and U. Kumar; Spectrochim. Acta part A, 60(12), 2825, 2004.
20. S. Guveli, T.B. Demirci, N. Ozdemir and B. Ulkuseven; Transition. Met. Chem., 34, 383, 2009.
21. V.K. Bhardwaj, N.A. Alcalde, M. Corbella and G. Hundal; Inorg. Chim. Acta 363, 97, 2010.
22. A.D. Gonzalez and A.K. Yatsimisky; Inorg. Chim. Acta, 363, 270, 2010.
23. N. Raman, J. Joesph, S.M. Kumar, S. Sujatha and K. Sahayaraj; J. Bio. Pesti., 1(2), 206, 2008.
24. H.S. Seleem, A.A. Emara, and M. Shebl; J. Coord. Chem., 58(12), 1003, 2005.
25. S. El-Tabl and M. I. Ayad; Synth. React. Inorg. Met.-Org. Chem., 33, 369, 2003.
26. AT Vogel; A Text Book of Quantitative Analysis, London, UK: Green; 1961.
27. B. Singh, B.P. Yadav, and R.C. Agarwal; Indian J. Chem., 23A, 441, 1961.
28. G. Speie, J. Csihony, A.M. Whalen, and C.G. Pie; Inorg. Chem., 35, 3519, 1996.
29. K. Nakamoto; IR Spectra of Inog. Bioinog. Chem., 5th Edn., Wiley, New York, 1997.
30. V.P. Singh and K.K. Narang; Synth. React. Inorg. Met.-Org. Chem., 23, 971: N.S. Bhave, P.J. Bahad, P.M. Sonparote and A.S. Aswar; J. Indian Chem., Soc., 79, 342, 1993.
31. S.Y. Ucan and M. Ucan; Synth. React. Inorg. Met.-Org. and Nano-Met. Chem., 35, 417, 2005.
32. L.M. Fostiak, L. Garcia, J.K. Sweeringen, E. Bermejo, A. Castinieiras, and D.X. West; Polyhedron 22, 83, 2002.
33. M.A. Ali, A.H. Miraza, A.M.S. Hossain, M. Nazimudin; Polyhedron, 20, 1045, 2001.
34. B Singh, H Mishra; J Indian Chem. Soc., 1986, 63, 692–694.
35. MC Cardia, M Begala, A Delogu, E Maccioni, A Plumitallo; J Pharm., 2000, 55, 93-98.

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Innovation The Research Concept

Using Deep Learning to Classify Waste Using Image Data

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Abstract This research aimed to create a Machine Learning model to classify waste as either organic or recyclable based on image data. It uses an artificial neural network and a convolutionalneural network to achieve this. The final ANN model has an accuracy of 86% while the CNN model has an accuracy of 83%.

Keywords Machine Learning, Image Recognition, Waste Segregation, Deep Learning, ANN, CNN.

Introduction The waste management sector is perennially in need of technological innovation and improvement. The machines created for the purpose of waste segregation are either highly expensive or highly inaccessible for the general public. Hence, this research project aims to contribute to this cause by creating technology that can classify waste materials to be organic or recyclable, making the waste management process more efficient.

Aim of study The study aims to create a Machine Learning model that accurately recognises organic and recyclable waste using images, and helps in waste segregation by making it more accurate and efficient.

Review of Literature Using AI to help with waste management has been a point of discussion for many years. There have been many researches who have worked on models to detect or classify waste in order to help with waste management. Here are some prominent research papers on the topic :-

EfficientDet-D2 and EfficientNet-B2 - The researchers for this paper have created a model to localize litter, and then another one to classify it as one of bio, glass, metal and plastic, non-recyclable, other, paper, or unknown. The model has achieved an accuracy of 70% on waste detection and 75% on its test Dataset.

Olugboja Adedeji and Zenghui Wang's model - This model uses the ResNet- 50 Convolutional Neural Network model and Support Vector Machine (SVM) which is used to classify the waste into different groups. The model has achieved an impressive accuracy of 87% being tested on a trash image dataset.

Review of Research on AI applications in Waste Management - This research paper is a review of 85 studies published between 2004 and 2019 about the use of AI in Waste Management. The paper provides analysis of many of the AI models that have been used in waste management, and also discusses the challenges and insights of applying AI techniques in waste management. Other than researchers, there have also been a lot of tech companies have found innovative ways to help segregate and manage waste with the help of machines. The best example of a company like this is Greyparrot, which is a tech company whose AI automatically identifies different types of waste, providing composition information and analytics to help facilities increase recycling rates.

Main Text The data was collected from a dataset on Kaggle containing 22,500 images of organic and recyclable objects. These images were used to train the model to classify waste as either organic or recyclable based on its image. Hence, this is an image recognition project.

The dataset was split into 80% testing and 20% training. The ANN network had 4 dense layers, and the CNN network had 6 dense layers and 8 convolutional layers. The models contain the activation functions relu, selu, and softmax. For ANN, regularization is used for its construction to prevent overfitting.

Two types of Machine Learning models are used:

Artificial Neural Network

The study of complexity is achieved by ANNs' capacity to replicate the dynamic interaction of several components at once. ANNs also have the ability to make individual judgments

rather than generalisations. Compared to traditional statistical procedures, these tools may have some distinct advantages. When properly chosen and applied, the family of ANNs enables the maximising of what can be inferred from the data at hand as well as from complex, dynamic, and multidimensional occurrences, which are frequently difficult to forecast using the conventional ”cause and effect” concept.

Artificial neurons constitute ANNs. Each artificial neuron in the figure has a processing node, along with connections to other neurons, or ”dendrites” and ”axons,” from other artificial neurons. The multilayer perceptron, a popular ANN architecture, organises the neurons in layers. The input layer is given an ordered set (a vector) of predictor variables.Each input layer neuron shares its value with every neuron in the middle layer. There is a connection weight along each connection between the input and middle neurons, and the middle neuron receives the product of the value from the input neuron and the connection weight.

Each intermediate layer neuron adds up its weighted inputs before applying a non-linear (often logistic) function. The output from that specific middle neuron is the result of the function. The output neuron is connected to each middle neuron. There is a connection weight along each link between a middle neuron and the output neuron. The output neuron then applies the non-linear function to the weighted sum of its inputs as the last step. The output of the entire ANN is the outcome of this function.

Convolutional Neural Network

Convolutional Neural Network (CNN) architecture is one of the most impressive types of ANN architecture. CNNs are primarily used to tackle complex image-driven pattern recognition problems and, thanks to their accurate yet simplistic architecture, provide a streamlined way to get started with ANNs.

The overall architecture of the Convolutional Neural Network (CNN) includes an input layer, multiple alternating convolution and max-pooling layers, one fully-connected layer and one classification layer. The traditional CNN structure is mainly composed of convolution layers, pooling layers, fully connected layers, and some activation functions. Each convolution kernel is connected to the part of feature maps. The input is connected to all of the output elements in the fully connected layer.

Multiple convolutional networks will be blended with nonlinear and pooling layers in the network. The output of the first convolution layer becomes the input for the second layer after the image has gone through one convolution layer. Additionally, this occurs with each additional convolutional layer. After each convolution operation, the nonlinear layer is introduced. It has a function called activation that adds nonlinear properties. Without this characteristic, a network would not be strong enough to model the response variable (as a class label).

The nonlinear layer is followed by the pooling layer. The image's width and height are used as input, and a downsampling process is carried out on them. The image

volume is consequently decreased. As a result, if certain features (such as boundaries, for example), have already been recognised in the previous convolution operation, a detailed image is no longer required for further processing and is compressed into less detailed images.

It is important to attach a fully connected layer once a series of convolutional, nonlinear, and pooling layers have been finished. Convolutional networks' output data are used in this layer. An N-dimensional vector, where N is the number of classes the model was built from, is produced by adding a fully linked layer to the network's end. The number of classes from which the model chooses the desired class, N, is produced when a completely linked layer is attached to the network's end.

Conclusion

The results were somewhat surprising. The ANN network achieved an accuracy of 86% while the CNN network, which is supposed to perform better, achieved an accuracy of only 83%.
This indicates that perhaps there may have been overfitting in the CNN network, something to improve upon in the model.

The problem of effective waste management is a plaguing issue of our times. As an increasing number of professions move toward automation, waste management should also be a part of the movement. The model that has been created is satisfactorily accurate, but still has room to be worked upon. The convolutional neural network needs to be tuned more to prevent overfitting. The artificial neural network, is a promising model to implement in the field of waste management. The researchers hope that this paper incites further research in this field that is helpful to the technological advancement in waste management.

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References

1. Grossi, Enzo Buscema, Massimo. (2008). Introduction to artificial neural networks. European journal of gastroenterology hepatology. 19. 1046-54. 10.1097/MEG.0b013e3282f198a0.
2. Tangri, Navdeep Ansell, David Naimark, David. (2008). Predicting technique survival in peritoneal dialysis patients: Comparing artificial neural networks and logistic regression. Nephrology, dialysis, transplantation : official publication of the European Dialysis and Transplant Association - European Renal Association. 23. 2972-81. 10.1093/ndt/gfn187.
3. Raschka, Sebastian. (2019). BogoToBogo. https://www.bogotobogo.com/python /scikit-learn/Artificial-Neural-Network-ANN-7-Overfitting-Regularization.php
4. O'Shea, Keiron Nash, Ryan. (2015). An Introduction to Convolutional Neural Networks. ArXiv e-prints.
5. A State-of-the-Art Survey on Deep Learning Theory and Architectures - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net /figure/The-overall-architecture-of-the-Convolutional-Neural-Network-CNN-includes-an-input_fig4_331540139.
6 Kang, Xu Song, Bin Sun, Fengyao. (2019). A Deep Similarity Metric Method Based
on Incomplete Data for Traffic Anomaly Detection in IoT. Applied Sciences. 9. 135. 10.3390/app9010135.
7. Sorokina, K. (2019, February 26). Image classification with Convolutional Neural Networks. Medium. Retrieved July 22, 2022, from https://medium.com /@ksusorokina/image-classification-with-convolutional-neural-networks-496815db12a8 .
8. Choubey, V. (2020, July 22). Text classification using CNN. Medium. Retrieved July 22, 2022, from https://medium.com/voice-tech-podcast/text-classification-using-cnn-9ade8155dfb9.
9. Yann, L., Bengio, Y., Hinton, G. (2015). Deep learning. Nature, 521(7553), 436–444. https://s3.us-east-2.amazonaws.com/hkg-website-assets/static/pages /files/DeepLearning.pdf.
10 . Sashaank Sekar. (2019). Waste Classification Dataset. https://www.kaggle.com/datasets/techsash/waste-classification-data