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Dielectric behavior of indole in the GHz region using TDR

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ABSTRACT

The effect of microwave frequencies on the structural and dynamical properties of heterocyclic organic compound such as Indole in the surrounding of DMSO (Dimethyl sulphoxide) molecule has been studied over the temperature region 298.15 K to 273.15 K using Time Domain Reflectometry (TDR) in the frequency region of 10 MHz–50 GHz. Dielectric parameters including Static permittivity (ϵ'), Dielectric constant (ϵ_0), Relaxation time (τ) Kirkwood correlation factor (g) and dipole moment (μ) which is well supported by thermodynamic parameters such as activation and molal/M Free energy (ΔF), Entropy (ΔS) and Enthalpy (ΔH) have been calculated. The dielectric permittivity spectra and relaxation behavior of Indole in different concentrations with DMSO was analyzed using Debye model. Dielectric loss peak for all studied temperature observed to be shifted towards lower frequency side with increasing concentration. Also, it was observed that, Dielectric constant (ϵ_0) increases for lower concentration and then starts decreasing towards higher concentrations. Dielectric constant was also affected by temperature as, the value decreases for higher temperature. Dielectric relaxation time (τ) show increasing behavior with concentration C . However, relaxation time seems to be decreasing as we increase the temperature towards room temperature.

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1. Introduction

Spectroscopic techniques give vital information about structural and dynamical properties of all kinds of liquids including organic, polymeric, biomolecules etc. which can be useful for the development of new structure and can be extended to the need-based applications. Change in the structure changes dipole moment and other physical properties of a substance under study in its pure as well as in aqueous state. Thus, any change in the structure with concentration, temperature, pressure, magnetic field etc. directly affects their dipole moment and other physical properties which ultimately affects the structural properties, uses and applications.

DMSO is a highly polar organic liquid that is used widely as a chemical solvent and a free radical scavenger. It is having a range of pharmacological activity including analgesic and anti-inflammation, due to its ability to penetrate biological membranes. It is used as a vehicle for topical application of pharmaceuticals. It is also used to protect cells and tissues during cryopreservation and has been used to treat extravasation damage caused by anthracycline based chemotherapy. The unique capability of DMSO is to penetrate living tissues without causing significant damage is post probably related to its relatively polar nature, its capacity to accept h-bonds, this combination of properties of DMSO results in the ability of DMSO to associate with water, proteins, carbohydrates, nucleic acid, ionic substances and other constituents of living

systems. Therefore, it will be quite interesting to study its molecular behavior with heterocyclic organic compounds.

On the other hand, Indole an aromatic heterocyclic organic compound with molecular formula C_8H_7N has a bicyclic structure, consisting of a six-membered benzene ring fused to a five-membered pyrrole ring. It is widely distributed in the natural environment and can be produced by a variety of bacteria. It is a parent substance for a large no. of important molecules occurring in nature, having excellent pharmaceutical applications.

As an intercellular single molecule indole regulates various aspects of bacterial physiology including spore formation, plasma stability, resistance to drugs, biofilm formation and virulence. A number of indole derivatives have important cellular formations, including neurotransmitters such as serotonin [1].

Most heterocyclic compounds possess an uneven distribution of charges resulting in a permanent dipole moment. Typical dipole moments for most organic molecules are in the range between 0 and 12 D but there are some compounds such as polymethine dyes, which have dipole moments of 20 D or higher [2].

There are large numbers of spectroscopic techniques available such as NMR, FTIR, UV-Visible and dielectric spectroscopy. Dielectric spectroscopic technique is useful to understand the flexibility or rigidity of a molecule as to study the pharmacological/biological activity of the molecule. Dielectric absorption studies also provide useful information on the rotational energies of molecular systems in a given media. It was therefore considered interesting to investigate systematically the change in relaxation behaviour of heterocyclic molecules with the

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structural configuration and how a heterocyclic ring and phenyl ring affects the behaviour of the molecule. Time Domain Reflectometry (TDR) is used to evaluate the dielectric constant and loss factor of dielectric materials at microwave frequency, and is an important technique for studying the molecular behavior of liquids.

Many attempts have been made previously to study structural behavior of heterocyclic organic compounds through measuring their dielectric properties. N.K. Mehrotra et al. [3] studied temperature dependent dielectrical and thermodynamical properties of five heterocyclic compounds; Quinoline, Isoquinoline, Furane, Thiophene and Pyrrole. Rajni Mishra et al. [4] measured dielectric and thermodynamical properties for five heterocyclic compounds: pyrrolidine (5-membered ring); piperidine (6-membered ring); hexamethyleneimine (7-membered ring); 2-methyl piperidine (~CH 3 group attached to piperidine) and 2-acetyl pyridine (acetyl group attached to pyridine) to investigate the change in relaxation behaviour of heterocyclic molecules with the structural configuration and how a heterocyclic ring and phenyl ring affects the behaviour of the molecule in the non-polar solvent. Millich and Becker [5] synthesized several indole derivatives and measured their infrared spectra in the CH, NH and CO stretching regions and compared them to that of indole. Lautié et al. [6] studied both infrared and Raman spectra of indole and its deuterated derivatives. They also gave curves approximate assignments of the observed spectral bands. In 1986, Suwaiyan and Zwarich [7] presented the infrared and Raman spectra with approximate assignment but only for the parent compound. Takeuchi and Harada [8] carried out normal coordinate analysis of the indole molecule already in 1986, vibrational force constants were presented and the calculated vibrational frequencies were compared with the experimental ones of Lautié et al. [6]. Barstis et al. [9] observed the applicability of modern spectroscopic methods in the studies of the excited state vibrational spectra of indole. In recent years, dielectric investigations have found a large number of applications in characterizing thermodynamic properties of different biomolecules such as molecular motion and molecular interaction and their strength influenced by the concentrations of pure component and in mixture. Several attempts have been made to study the dynamics of polar solvents regarding the confirmation of their structural behavior, the dielectric behavior of a polar molecule is usually discussed in terms of its two molecular parameters, the electric dipole moment (m) and dielectric relaxation time (t) [10–21]. Mohan Hosamani, N.H. Ayachit and D.K. Deshpande studied dielectric behavior some substituted indole compounds, namely, 5-bromoindole, 5-methoxyindole, 5-fluoroindole, 2,3-dimethylindole, 2,5-dimethylindole at room temperature and at two frequencies 8.55 and 9.65 GHz using Roberts and Von Hippel standing wave method [22]. Earlier Cheolhwa Kang, Timothy M. Korter and David W. Pratt studied induced dipole moment of indole and indole-H₂O at ground and excited state using stark effect [23].

Though many attempts have been made to investigate large numbers of heterocyclic organic compounds but no study has found to glance through the structural behaviour of Indole molecule in DMSO. As mentioned, DMSO is an excellent solvent and is having a range of pharmacological activity and ability to penetrate biological membranes. Therefore, in the present study dielectric and thermodynamical properties of indole in DMSO were investigated using Time domain reflectometry technique in the frequency region of 10 MHz–50 GHz at different temperatures ranging from 298.15 K to 273.15 K which is still the subject of interest.

2. Experimental

2.1. Materials

Indole and DMSO were purchased from Hi Media Laboratories Pvt. Ltd. Mumbai, India and used without purification.

Concentration dependent dielectric permittivity ϵ' and dielectric loss ϵ'' of binary mixture of indole with DMSO at different temperature was measured using TDR (Time Domain Reflectometry) employed in the frequency region of 10 MHz to 50 GHz.

The detailed analysis and procedures of the TDR system were explained previously [24].

2.2. Measurements

The Tektronix Digital Serial Analyzer model no. DSA8300 sampling mainframe along with the sampling module 80E10B has been used for TDR. A sampling module provides 12 ps incident and 15 ps reflected rise time pulse was fed through a coaxial line system having 50 Ω impedance. Sampling oscilloscope monitors show change in step pulse after reflection from the end of line. The reflected pulse without sample $R_1(t)$ and with sample $R_x(t)$ were recorded in the time window of 5 ns and digitized in 2000 points. The Fourier transform of the pulse and data analysis was performed to determine complex permittivity spectra $\epsilon^*(\omega)$ using least square fit method [25–27].

2.3. Statistical analysis

Turbo Basic version 1.1 software by Borland International, Inc. (1987) was used to carry out statistical analysis of experimental data. It was further analyzed with Origin 7.5 software (Origin Lab Corporation, Northampton, MA, USA). Thermodynamic parameters were calculated using software written in C and MS Excel 2007.

3. Result and discussion

The calculated data and their interpretation are the subjects of the following sections. Temperature and Concentration dependent dielectric parameter of biomolecules was established by studying the variation of dielectric constant, dielectric loss, relaxation time, Kirkwood correlation factor and dipole moment as well as thermodynamic parameters such as molal free energy, molal entropy and molal enthalpy, entropy of activation and enthalpy of activation.

The values of complex permittivity $\epsilon^* = \epsilon' - j\epsilon''$ as a function of frequency for the indole have been calibrated and used for the evaluation of dielectric parameters at room temperature. Dielectric dispersion and absorption curves for the Indole-DMSO system at various temperature and concentration is depicted in Fig. 1. The spectra show that there is a gradual decrease in dielectric permittivity for all the studied concentrations. And the loss peaks shift towards lower frequency side. Only a relaxation process was apparently observed for each solution in the frequency range concerned. The process can be described by S. Havriliak-Negami equation [24] using least square fit method.

$$\epsilon^*(\omega) = \epsilon_\infty + \left[\frac{(\epsilon_0 - \epsilon_\infty)}{[1 + (j\omega\tau)^{1-\alpha}]^\beta} \right] \quad (1)$$

The parameters used in the Havriliak-Negami Eq. (4) are, ϵ_0 —the static permittivity ϵ_∞ —the high-frequency limiting static permittivity, ω is the angular frequency and τ_0 is the average relaxation time α and β are the distribution parameters. α ($0 < \alpha < 1$) indicates the broadness of the symmetric relaxation curve when the dielectric data are described by the Cole–Cole equation. The relaxation curve with ($0 < \beta < 1$) $\alpha = 1$ corresponds to Debye-type of relaxation and a smaller value of α gives the broader symmetric relaxation curve, whereas the relaxation curve with $\beta = 1$ corresponds to a non-Debye type of relaxation in which the asymmetric relaxation ($0 < \beta < 1$) $\alpha = 0$ is associated with the cooperative mechanics of dielectric relaxation. It has been found that the dielectric data for indole-DMSO obey the Debye dispersion model [28].

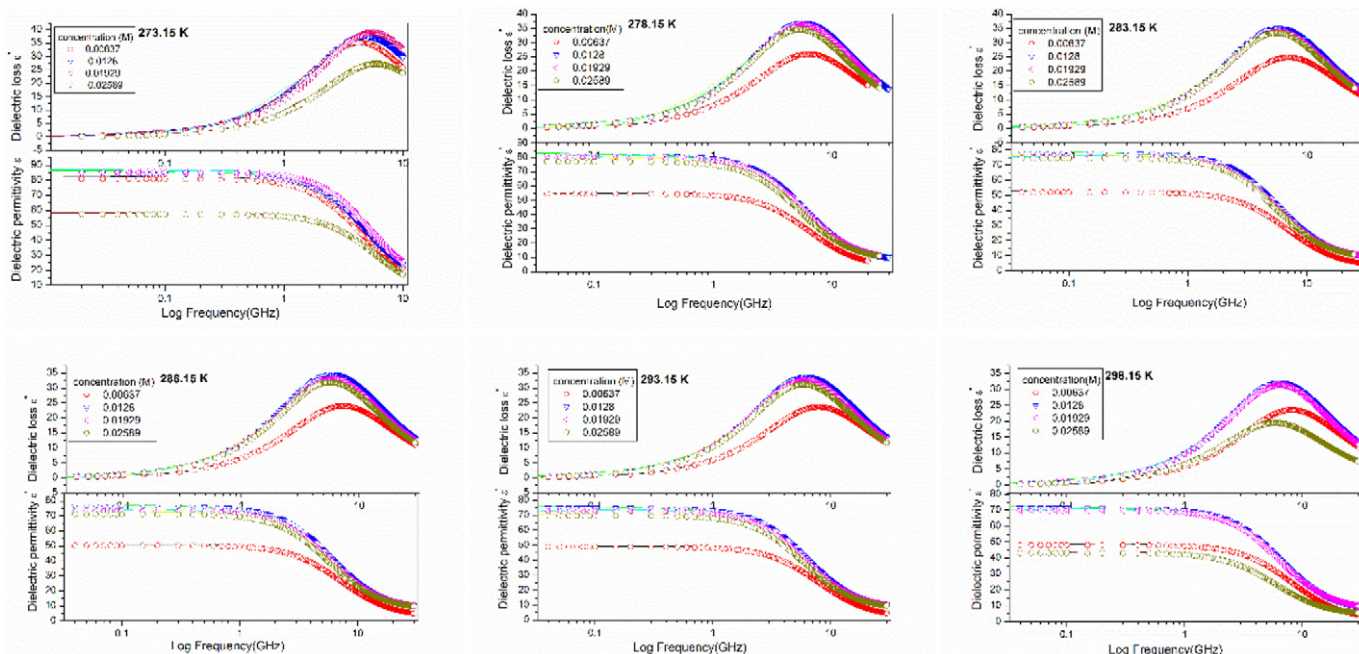


Fig. 1. Variation of complex permittivity spectra of Indole-DMSO with log frequency at different temperature and concentrations.

3.1. Dielectric constant

Variation of dielectric constant as a function of temperature and concentration of indole is shown in Fig. 2. For all the used concentrations; dielectric constant was observed to be increases at lower temperature and then starts decreasing towards higher temperature. At lower concentration i.e. 0.00637 M dielectric constant was 57.37. Further increase in the concentration results in sudden increase in the values of dielectric constant. But, for higher indole concentration dielectric constant was found to be decreasing. Similarly, for lower temperature the value of dielectric constant was found to be higher but fail to increase towards higher temperature. This behaviour is because at lower concentration of indole, dipole moment of DMSO aligned parallel to that of indole so that the resultant dielectric constant increases i.e. there may be association between solute and solvent molecules. Decrease in the values of

dielectric constant at higher concentrations may be due to decrease in the effective dipole moment as the alignment in the system is antiparallel.

3.2. Relaxation time (τ)

Fig. 3 shows temperature as well as concentration dependence of relaxation times for Indole-DMSO mixtures. For all the studied concentrations, Relaxation time was found to be increasing with increasing concentration but found to be decreasing towards high temperature. At lower temperature and higher concentrations relaxation time was found to be high. We inferred, from the increase in the value of τ_0 with increasing concentration of indole, that there is a less probability of reorientation at higher concentration and lower temperature. This may be due to large hindrance to the reorientation of indole molecule in the surrounding of DMSO molecule. It is also noticed, there may be

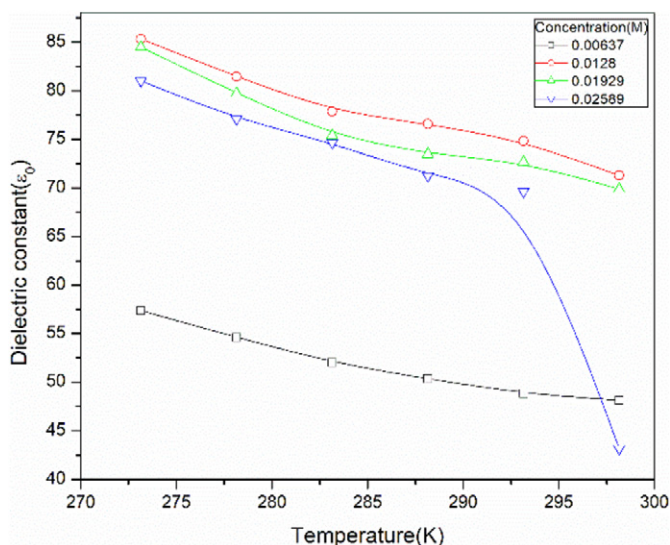


Fig. 2. Static dielectric constant vs temperature of Indole-DMSO solution.

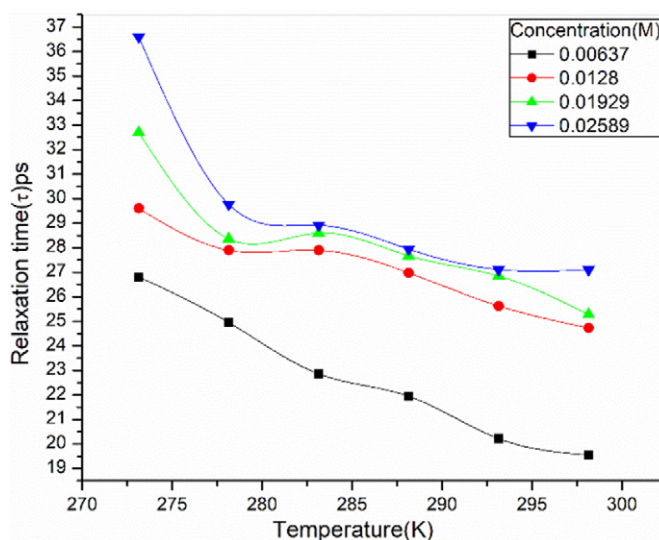


Fig. 3. Dielectric relaxation time τ_0 (ps) vs concentration of Indole-DMSO at different concentration.

very less rotation of indole molecules in vicinity of DMSO molecules. At low temperature relaxation time was higher compared with higher temperature; this may be due to the fact that there may be a formation of co-operative domains and the relaxation is co-operative relaxation as a result relaxation time increases at low temperature side. However, towards higher temperature hindrance to the molecular reorientation is less due to thermal energy which results in lowering the relaxation time.

3.3. Arrhenius plot

Fig. 4 shows a plot of $\log(\tau_0)$ against $1000/T$ for all indole-DMSO concentrations called Arrhenius plot.

The plot is almost linear.

And the free energy of activation ($\Delta F\tau$), enthalpy of activation ($\Delta H\tau$) and entropy of activation ($\Delta S\tau$) for dielectric relaxation as rate processes for the indole-DMSO under study were evaluated using Eyring's rate equations [29].

$$\tau_0 = \left(\frac{h}{kT}\right) \exp\left(\frac{\Delta f\tau}{RT}\right) \quad (2)$$

and

$$\Delta f\tau = \Delta H\tau - T\Delta s\tau \quad (3)$$

where $\Delta F\tau$, $\Delta H\tau$, $\Delta S\tau$ are the free energy, enthalpy, and entropy of activation for the dipolar orientation. Thermodynamic energy parameters $\Delta F\tau$, $\Delta H\tau$ and $\Delta S\tau$ for dielectric relaxation as rate processes were evaluated using Eyring's equation. On solving Eq. (2) and rearranging the terms, we get an equation for a straight line, so that a graph between $\log(\tau_0)$ and reciprocal of temperature has a slope equal to the activation enthalpy (ΔH). Using Eq. (3), the other thermodynamic energy parameters can be calculated.

3.4. Free energy

Thermodynamic energy parameters are macroscopic variables that describe the microstates of the systems. The order of magnitude of the enthalpy of activation and entropy of activation can give some clue to the molecular energy and order of molecules in the relaxation process. The free energy of activation ΔF at the measured low and high concentrations in the temperature range 298.15–273.15 K has been evaluated using dielectric relaxation as a rate process and is shown in Fig. 5. It

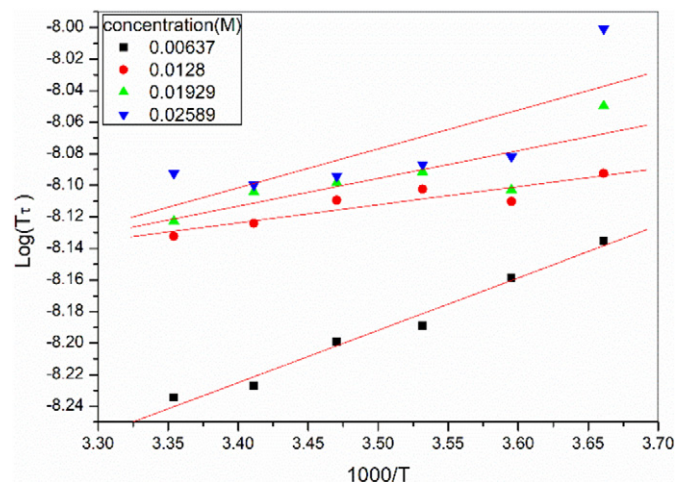


Fig. 4. Arrhenius plot of $\text{Log}(\tau_0)$ vs reciprocal of temperature (K^{-1}) of Indole-DMSO mixtures at different concentrations.

was found that the free energy was observed to be increasing with both increasing concentrations and towards the high temperature.

This increase in the value of free energy with rise in temperature may be due to induced intermolecular H-bond between indole and DMSO molecule which on bond formation increases the thermal agitation and therefore dipole requires more energy in order to attain equilibrium with the applied field. Free energy for the measured low concentration (0.00637 M) at 298.15 K was found higher by $0.114 \text{ kcal mol}^{-1}$ than the value at 273.15 K. This confirms that towards higher temperature, system requires $0.114 \text{ kcal mol}^{-1}$ more energy as compared to the value measured at low temperature; indicating $0.114 \text{ kcal mol}^{-1}$ more energy is required to lift the induced intermolecular H-bonded indole molecule over the potential barrier in comparison to the energy required for the reorientation of the molecules at low temperature.

Also, free energy ΔF_c at temperature 273.15 K was found more by $0.168 \text{ kcal mol}^{-1}$ for 0.02589 M (higher c) than that observed at 0.00637 M (lower c) for the same temperature. The value of free energy at temperature 298.15 K for 0.02589 M was found more by $0.194 \text{ kcal mol}^{-1}$ than the value measured for 0.00637 M. These higher values suggest more energy is required for the reorientation of intermolecular H-bonded indole molecules due to dipoles alignment oriented in antiparallel directions. The average free energy of activation $\Delta F\tau(273.15 \text{ k}-298.15 \text{ k})$ for the studied system was found to be $2.87 \text{ kcal mol}^{-1}$ is suggested for the reorientation of molecules in the indole-DMSO mixture. It has also been observed that molal free energy was found to be increasing with increasing concentration and free energy of activation was also found to be increasing towards higher temperature. This shows there is lower steric hindrance to the molecular motion of induced intermolecular H-bonded indole-DMSO molecules.

3.5. Entropy

Molal entropies for the studied systems were found to be negative. The values of the entropy vary significantly with a change in the concentration of the mixture constituents. Entropy (ΔS) for indole-DMSO system for all the used concentrations over the measured temperature range was observed to be independent of temperature and found negative. As shown in Fig. 6. This indicates that there are fewer configurations possible in dipolar orientation in the activated state than normal state. This may be due to the existence of dipole-dipole interactions, so that the molecules of indole-DMSO are more nearly aligned with each other in the activated state. From the observed values of entropies,

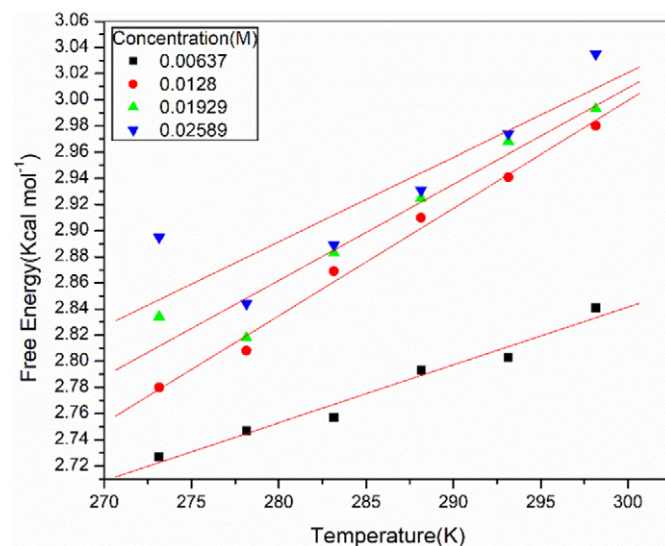


Fig. 5. free energy vs temperature (K) of Indole-DMSO mixtures at different concentrations.

there seems to be a strong possibility of dipole-dipole interaction between indole and DMSO molecules which results in more negative value of entropy for 0.0128 M concentration. However, higher concentrations found rearrangement of molecules and resume the configuration with dipole moment orientated in new direction (antiparallel orientation) so that entropy reduces to less negative values. This also indicates that the structure is more flexible and was almost independent upon temperature. Further increase in concentration reduces the flexibility therefore decrease in the values of entropy. The highly negative values of entropy in the concentration range of 0.00637 to 0.02589 also confirm that the Indole-DMSO structure is highly flexible in this range.

3.6. Enthalpy

Enthalpy ΔH is the energy required to achieve the group dipole re-orientation in the dielectric relaxation process. For the studied systems, the observed value of enthalpy was observed below 2 kcal mol⁻¹ over the used concentrations of indole in the temperature range 273.15–298.15 K. Enthalpy in the energy range 4–5 kcal mol⁻¹ is attributed to the rotation of —OH dipole governed by the breaking and reforming of H— bonds in dynamic equilibrium. However, lower values of enthalpy are the result of rotation of —OH dipole only.

Enthalpy at the measured lower concentration (0.00637 M) was found to be 1.517 kcal mol⁻¹ which was further decreased to 0.5256 kcal mol⁻¹ at 0.128 M. shown in Fig. 7. This clearly indicates that lower potential barrier offered for the dipolar reorientation of induced intermolecular H-bonded molecules. However, enthalpy at higher concentration was observed to be slightly increasing as more dipolar species are involved in the reorientation process which aligned the dipole moment oriented in antiparallel direction.

3.7. Relaxation strength

The relaxation strength i.e. $\Delta \varepsilon = \varepsilon_0 - \varepsilon_\infty$ for these polymers have also been obtained at the measured temperature values and was plotted as a function of w_c and temperature as shown in Fig. 8.

It is clear that $\Delta \varepsilon$ is almost temperature independent. A much stronger increase in $\Delta \varepsilon$ was found at lower concentrations up to 0.0128 which indicates a larger dipole moment reorientation in the low DMSO concentration range. At low DMSO concentration the relaxation strength seems to be almost independent upon both concentration

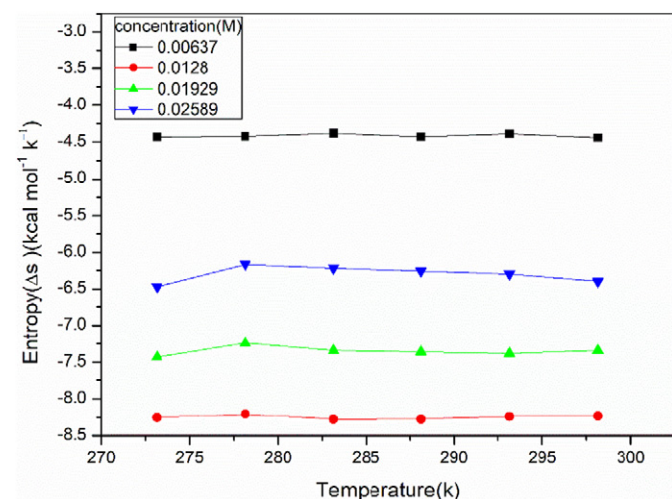


Fig. 6. Entropy (Δs) vs temperature (K) of Indole-DMSO mixtures at different concentration.

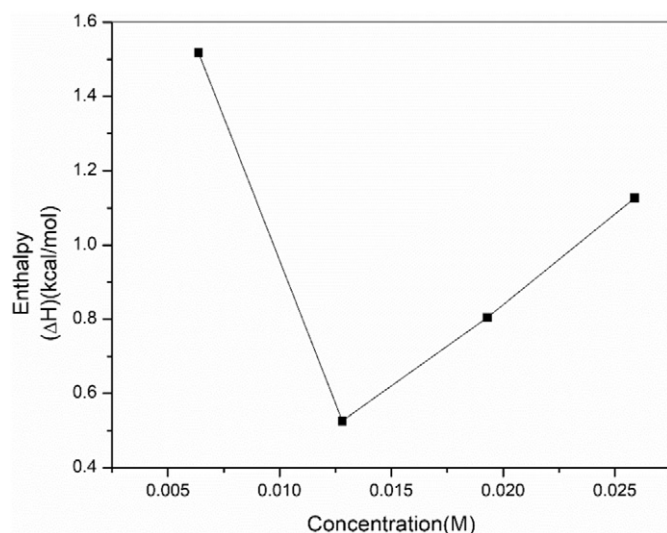


Fig. 7. Enthalpy vs temperature (K) of Indole-DMSO mixtures at different concentrations.

and temperature as there found a slight variation in $\Delta \varepsilon$ with increase in concentration and a slight decrease in $\Delta \varepsilon$ towards higher concentration. This indicates that the mobility of DMSO molecules is very small likely because at low water concentration they are strongly attached to indole.

3.8. Cole-Cole spectra

We use the Cole-Cole plot to inform our discussion of the symmetric or asymmetric nature of relaxation. Fig. 9 shows complex impedance or Cole-Cole plot for indole-DMSO mixtures at different temperatures and concentrations as a function of frequency. Cole-Cole plots are graphical representations, which show the variation in dielectric constant against dielectric loss in the material tested. The experimental data (ε'' versus ε') rarely fit to a Debye semicircle, which does indicate the relaxation process in indole-DMSO mixture and can be explained with a single relaxation time Studying several liquid samples [30], Cole and Cole found that the centers of the experimental arcs were displaced below the real axis, the experimental data thus having the shape of perfect semicircle.

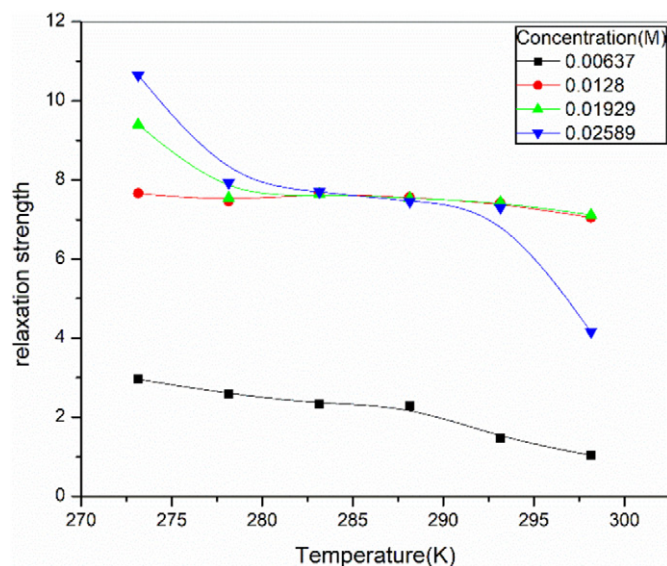


Fig. 8. Relaxation strength vs temperature (K) of Indole-DMSO mixtures at different concentrations.

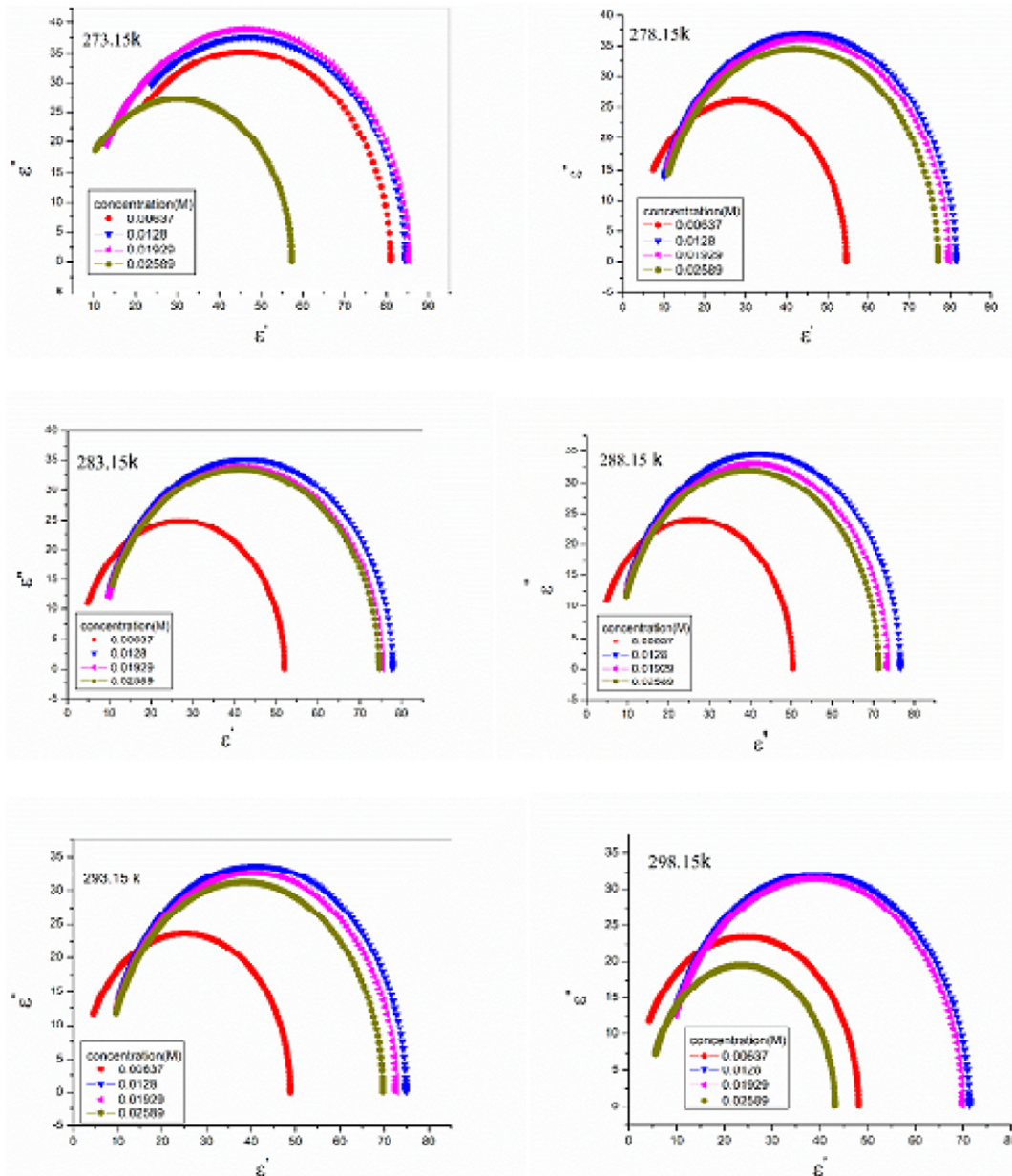


Fig. 9. Cole-Cole plots for Indole-DMSO solution at different concentration and temperature.

It is observed that the semicircles are shifting towards lower dielectric constant side with increasing temperature.

3.9. Dipole moment

In liquids, thermal motion continuously changes the orientation of dipoles, unlike solids where the crystal structure freezes the dipoles in a fixed geometric orientation, or in gases where the distance between the molecules is large and the interaction between dipoles is weak. Because of thermal motion and varying concentration, the orientation and movement of molecular dipoles present in the system cause dielectric changes in liquid. The determination of the dipole moments of indole in the surrounding of DMSO molecules is of interest because the values of dipole moments provide insight into the changes of electronic distribution upon changes in concentration and temperature (particularly the temperature below freezing point of the solvent) as well of these biologically important compounds. Relatively few papers have been devoted to the investigation of the dipole moments of indoles. To further analyze this effect, we used the Cavalle's equation [31]. The Cavell's

equation relates the observed relaxation strength $\Delta\epsilon$ with effective dipole moment μ_{eff} through,

$$\Delta\epsilon_j = \frac{\epsilon_s}{3(\epsilon_s + (1-\epsilon_s)A_j)} \frac{N_A}{k_B T \epsilon_0} \frac{\mu_{\text{eff},j}^2}{(1-\alpha_i f_i)^2} c_j \quad (4)$$

where ϵ_s is the static permittivity, N_A is Avogadro's Number k_B is Boltzmann constant and T is temperature A is shape parameter of the reaction field and accounts for the shape of the relaxing particle (for spheres, $A = 1/3$) [32,33] f is the so called reaction field factor [34] and α is the molecular polarizability. μ_{eff} (effective dipole moment) is connected to the 'gas-phase dipole moment' μ_0 (in the absence of orientational correlations) via

$$\mu_{\text{eff},j}^2 = g_j \mu_{0,j}^2 \quad (5)$$

where g is an empirical factor which accounts for correlations between dipoles. $g = 1$ means no orientational correlation.

Fig. 10 shows orientation of electric dipole moments of indole-DMSO at different concentrations.

In which Fig. 10.a shows dipole orientation of indole at lower concentration having dipole moment 2.9548 D. Fig. 10.b shows dipole orientation of indole at higher concentration with decrease in the value of dipole moment compared to lower concentration. This may be due to huge orientation of antiparallel alignment of the molecule.

Fig. 11 indicates dipole moment variation calculated using Cavell equation which was observed to be decreasing with increasing concentration. This is because at higher concentrations the molecules are so arranged that their dipole moment was aligned in such a way that the correlation between solute and solvent molecules get reduced Fig. 12 due to antiparallel alignment of the solute and solvent molecules; as a result, the resultant or effective dipole moment gets reduced.

Fig. 10 clearly indicates that the motion of DMSO dipole reorients when absorbs microwave frequency and this motion is a direct consequence of microwave induced changes in the distribution of electron density of the molecules. The dipoles of indole-DMSO are essentially parallel to each other at lower indole concentrations which are also clear from the values of correlation factor g (Fig. 11). It is the change in the orientation of the indole dipole that causes the DMSO to move.

As, we focused our study in the structural behavior of indole in the surrounding of solvent molecules having freezing point below room temperature, therefore, we have also attempted the temperature dependent variations in the dipole moment of the system under study. From Fig. 10, it has been observed that temperature has little effect on the dipole moment, even after lowering the temperature of the system below the freezing point of the solvent molecules. There was a slight variation in the values of dipole moments towards room temperature in the measured temperature range (298.15–273.15)°K. These variations in the values of dipole moment may be due to thermal energy which increases the freedom of molecules freezes at lower temperature. These free molecules towards room temperature gets aligned in the direction antiparallel to the direction of dipole moment of the indole molecules; which results in the slight decrease in the resultant dipole moments. This antiparallel orientation of DMSO molecules at lower concentration and higher temperature is the result of decreased correlation between solute-solvent molecules.

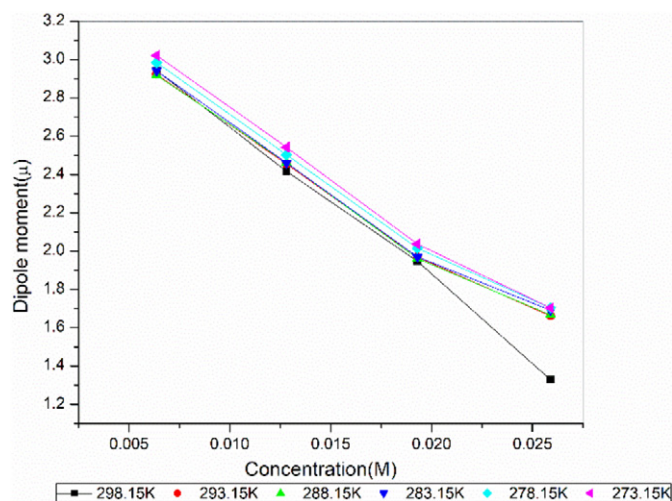


Fig. 11. Dipole moment vs Concentration (M) of Indole-DMSO mixtures at different temperatures.

3.10. Correlation factor (g)

The correlation factor g provides information regarding the orientation of the electric dipoles. For the pure liquid polymer, the Kirkwood correlation factor g can be obtained using the following expression [35].

$$g\mu^2 = \frac{9kTM}{4\pi N\rho} \left[\frac{(\epsilon_0 - \epsilon_\infty)(2\epsilon_0 + \epsilon_\infty)}{\epsilon_0(2 + \epsilon_\infty)^2} \right] \quad (5)$$

where μ is dipole moment, ρ is density at temperature T , M molecular weight, k is Boltzmann's constant, N is Avogadro's number, ϵ_0 is the static permittivity and ϵ_∞ is the dielectric permittivity at high frequency, often represented by the square of the refractive index ($\epsilon_\infty = n_D^2$). In associating molecules, the molecular relaxation time is affected by the intramolecular and intermolecular hydrogen bonding. The departure of g from unity is a measure of the extent of intermolecular hydrogen bonding. The values of g from unity are a measure of the extent of intermolecular hydrogen bonding. For molecules with parallel dipole

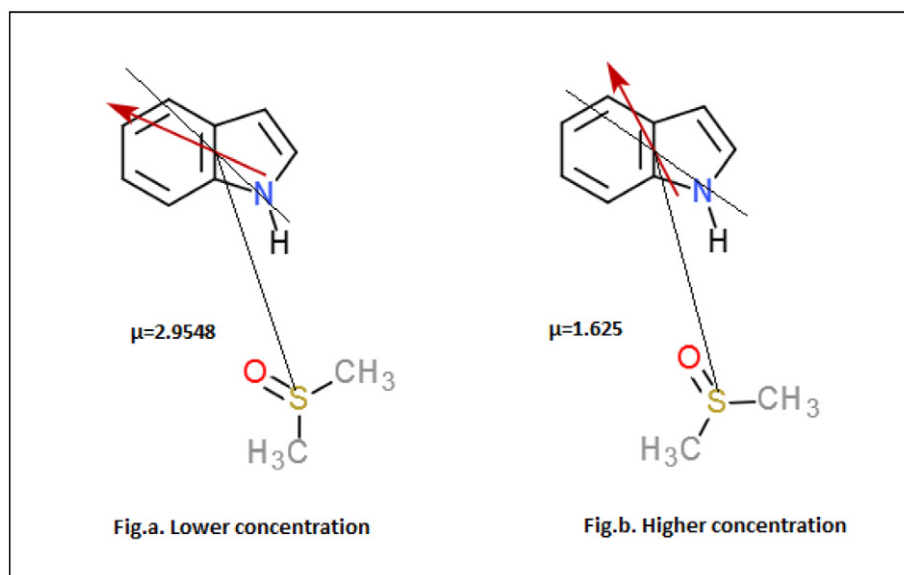


Fig. 10. Illustration of indole-DMSO showing its in-plane inertial axes and the orientation of its permanent electric dipole moments.

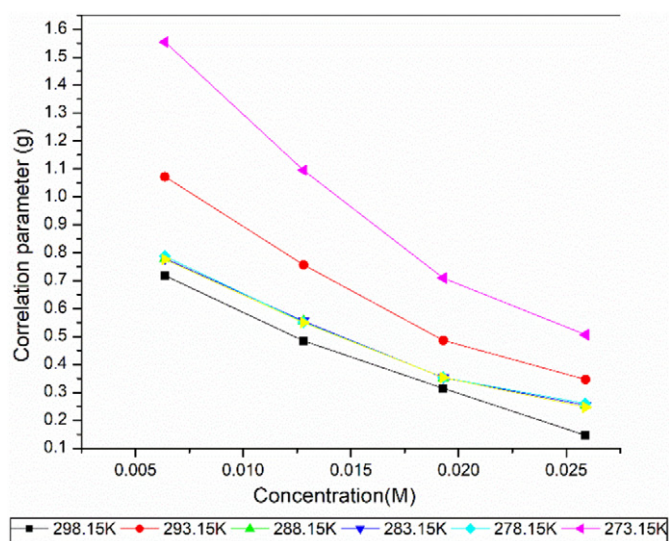


Fig. 12. Correlation factor (g) vs Concentration (M) of indole-DMSO mixtures at different temperatures.

moments g will be greater than unity while for antiparallel dipole alignment g will be smaller than unity. The values of g were determined to examine the effect of intermolecular association on the dielectric relaxation time of these molecules. In present system the value of g is <1 for all temperature as well as concentrations except for 273.15 k and 293.15 k for lower concentration it is >1 .

4. Conclusion

From the observed data it has been concluded that decreases in the values of dielectric constant at higher concentrations may be due to decrease in the effective dipole moment which can be attributed to the structural changes in the system. Such changes in the structural configuration increases hindrance for the rotational motion as a result relaxation time was also found to be increased with increasing concentration. However, increasing values of relaxation time towards lower temperature suggests strong steric hindrance for the rotational motion of the molecules. This will result in increasing the free energy with both increasing concentration and temperature.

Molal enthalpy at higher concentration was observed to be slightly increasing as more dipolar species are involved in the reorientation process which aligned the dipole moment oriented in antiparallel direction.

Dipole moment variation calculated using Cavell's equation which was observed to be decreasing with increasing concentration. The value of g is <1 for all temperatures as well as concentrations except at 273.15 K and 293.15 K it was greater than 1 for lower concentrations.

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Investigation of Molecular Interactions of Polyvinyl Pyrrolidone (PVP-40) with Water and DMSO using Acoustic Spectroscopic Technique

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ABSTRACT: This paper deals with investigating molecular interaction of Polyvinyl pyrrolidone polymer having molecular weight 40,000 (PVP-40) with water and Dimethyl Sulfoxide (DMSO). Ultrasonic velocity (u), density (ρ) and coefficient of viscosity (η) were measured for solutions of PVP-water and PVP-DMSO system for different concentrations with range 0-50 Wt%. Ultrasonic velocity measurements were done by pulse-echo technique at frequency 5 MHz. The measurements were made at atmospheric pressure and room temperature. The experimental results have been used to calculate various acoustical parameters such as adiabatic compressibility (β), acoustical impedance (Z) free length (L_f) and relaxation time (τ), absorption coefficient (α/f^2). The variations of these parameters under different conditions of concentration have been used to discuss the nature and extent of intermolecular interactions between the component molecules. The effect of polymer on solvent has also been studied.

Keywords: Acoustical parameters; Dimethyl Sulfoxide; Molecular interaction; Polyvinyl pyrrolidone; Ultrasonic velocity.

INTRODUCTION: Acoustic spectroscopy is one of the most widely used techniques to study the molecular interaction in polymer solutions. The information about different interactions involved among the various polymer-solvent systems and of the complex formation, association or dissociation, structural and destructural nature of the solvents can be directly given using Adiabatic compressibility, computed from ultrasonic velocity and density of the solution. The relationship between material properties and acoustic parameters has been studied for a long time. This technique has been employed as excellent tools for non-destructive testing and imaging¹. We can characterize the viscoelastic properties of polymer melts, as well as those of semicrystalline polymers. When propagated in polymeric materials, acoustic waves are influenced by the polymer structure and molecular relaxation process. Ultrasonic method has been successfully used to monitor polymer processing², chemical reactions such as polymerization or curing of thermo sets^{3,4}, film formation from aqueous polymer dispersions⁵, glue processes or crystallization in polymers⁶. Literature studies on polymer solutions revealed that ultrasonic velocity measurements are

used to understand the nature of polymer-solvent, polymer-polymer interactions in these systems.

Polyvinyl pyrrolidone (PVP) has many important applications in all the fields like medicine, industry, agriculture and so on. It is used as a binder in many pharmaceutical tablets. Polyvinyl pyrrolidone (PVP) having molecular formula $(C_6H_9NO)_n$ and used as binders for the formulation of pharmaceutical tablets, for moistening various personal care products, as food additives and adhesives, etc. It is readily soluble in water, physiologically compatible, non-toxic, essentially chemically inert, temperature-resistant, pH-stable, non-ionic, and colorless⁷.

Dimethyl Sulfoxide (DMSO) with molecular formula $(CH_3)_2SO$ is an important polar solvent that dissolves both polar and nonpolar compounds and miscible in water as well as different organic solvents. It is widely used in different fields as drug, solvent, extractant etc.

MATERIALS AND METHODS: The chemicals used for the present investigation were of analytical grade. The purity of these compounds was >99.8%. Polyvinyl pyrrolidone (PVP-40) and DMSO was ob-

tained from Sigma Aldrich. The mixtures were prepared by mixing known amount of polymer in HPLC grade water and DMSO in airtight bottles and adequate precautions were taken to minimize evaporation losses during the actual measurements.

The ultrasonic velocities in pure liquids and liquid mixtures were measured by pulse echo technique at 5MHz frequency using (UX 4400MV) Ultrasonic Flaw Detector, supplied by Roop Telsonic Ultrasonix Limited with an accuracy of $\pm 0.01\%$. The instrument was calibrated by measuring the velocity of triple distilled water, acetone and dimethyl sulfoxide. The densities of the were determined using a 10ml specific gravity bottle with a permissible error of $\pm 0.1^{\circ}\text{C}$ supplied by Jenkson and a digital balance of accuracy $\pm 10^{-6}$ kg. Viscosity measurements were made with an Ostwald's viscometer in which the flow time for solutions was measured through a digital stop clock of accuracy ± 0.01 s.

Acoustical Measurements: By using measured values of ultrasonic velocity (u), density (ρ) and coefficient of viscosity (η), various acoustical parameters were obtained from following equations⁸⁻¹⁰.

Adiabatic compressibility
 $\beta = 1/u^2 \rho$ (1)

Where, u = velocity & ρ = density

Intermolecular free length
 $L_f = K \beta^{1/2}$ (2)

Acoustic impedance
 $Z = u \rho$ (3)

The relaxation time
 $\tau = 4\eta/3\rho u^2$ (4)

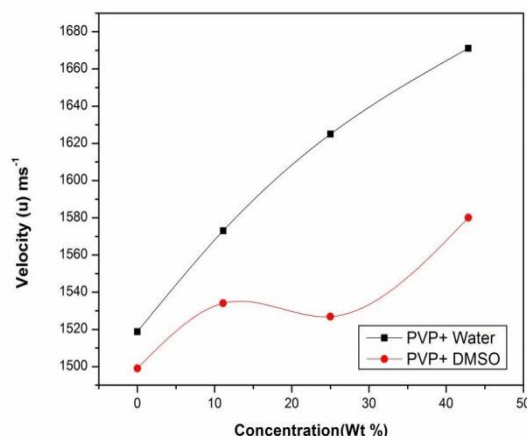
Absorption coefficient
 $\alpha/f^2 = 2\pi^2 \tau / u$ (5)

RESULTS AND DISCUSSION: The experimentally measured values of density, viscosity and velocity of sound and other related parameters such as adiabatic compressibility (β), acoustical impedance (Z) free length (L_f), free volume (V_f), relaxation time (τ), absorption coefficient (α/f^2) of the PVP-water and PVP-DMSO systems, as a function of concentration are obtained and graphs are plotted. The plotted graphs for different acoustical parameters, explains the interactions between polymer (PVP-40) and solvent (water and DMSO).

In fig.1, variations of ultrasonic velocity (u) in solution of PVP-water and PVP-DMSO for different concentrations are shown. Graph shows that ultrasonic velocity increases with increase in concentration of PVP in water and DMSO. For sound propagation, ultrasonic velocity increases on decrease of free

length¹¹. PVP-water system shows linear whereas PVP-DMSO system nonlinear increase in ultrasonic velocity. Variation in ultrasonic velocity explains interaction of PVP molecule with water and DMSO. The nonlinear behavior of PVP with DMSO may be due to presence of two methyl groups and double bonded oxygen which may interact complexly with polymer.

Figure.1: Plots of Ultrasonic velocity with increasing concentration of PVP-40 in water and DMSO.



The variation in adiabatic compressibility (β) in solution of PVP-water and PVP-DMSO for different concentrations is shown in fig. 2. The graph shows that, adiabatic compressibility decreases as concentration of PVP-40 in water increases. The higher compressibility value implies that the medium is loosely packed whereas the lower compressibility is an indication of maximum interaction. The gradual decreases in adiabatic compressibility with increase in concentration of polymer suggest that the medium become less and less compressible. The polymer in water tends to break the molecular clustering of water, which makes available dipoles for further interaction¹². Due to these dipole interactions, solute-solvent molecules are coming close to each other and the space between them is decreases with rise in concentration of polymer. This supports to the strong solute-solvent interaction in the solution¹³. But the variations in adiabatic compressibility for PVP-DMSO system are not continuous. The nonlinear behavior of compressibility implies that polymer molecules shows complex behavior with DMSO. The same results can be observed by variation in free length. In fig. 3 graph shows exactly same variations as adiabatic compressibility. A continuous decrease in compressibility means more compact and pack structure is formed which reduces free length of the molecule.

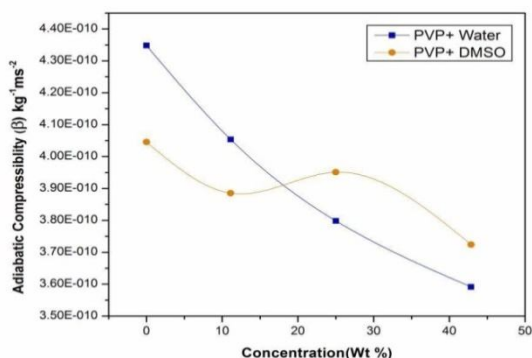


Figure.2: Plots of Adiabatic Compressibility with increasing concentration of PVP-40 in water and DMSO.

The variations in acoustic impedance for both the systems are shown in fig.4. It is observed from the graph that acoustic impedance of both the system increases with increase in concentration of polymer in solvent. PVP-DMSO shows nonlinear behaviour.

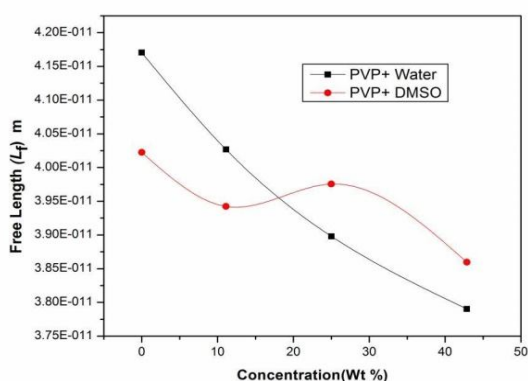
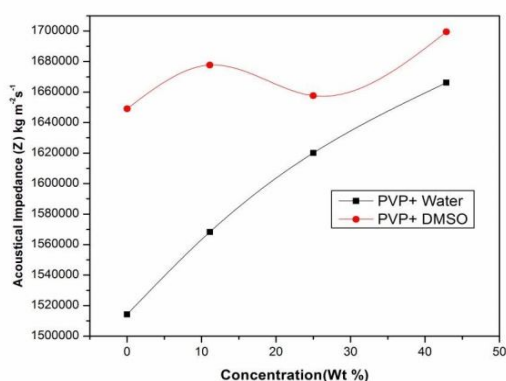


Figure.3: Plots of Free length with increasing con-



centration of PVP-40 in water and DMSO.

Figure.4: Plots of Acoustical Impedance with increasing concentration of PVP-40 in water and DMSO.

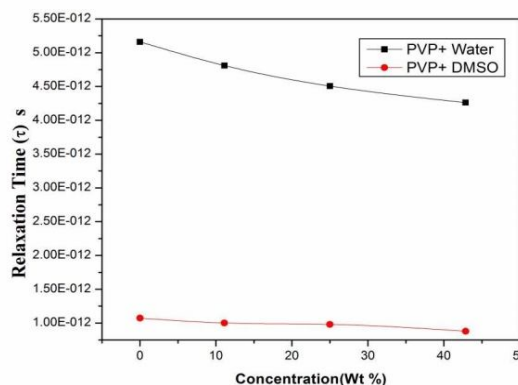


Figure.5: Plots of Relaxation Time with increasing concentration of PVP-40 in water and DMSO.

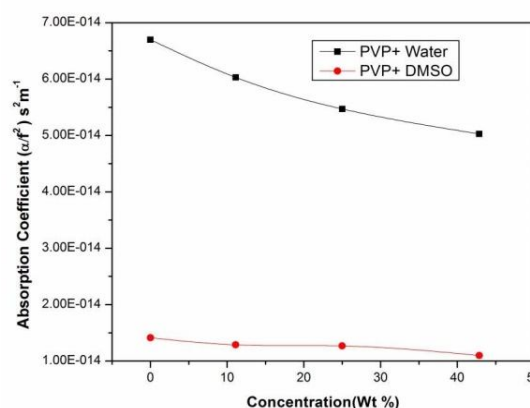


Figure.6: Plots of Absorption Coefficient with increasing concentration of PVP-40 in water and DMSO.

Acoustic impedance is a measure of opposition offered by the system to the acoustic flow. The increase in acoustic impedance shows that the molecular interactions in these solutions are associative^{14,15}. It means molecular association increases with increase in concentration of polymer in solvent.

Relaxation time and absorption coefficient is observed to be decreasing with increase in concentration of PVP in water and DMSO consistently which is shown in fig.5 and fig.6 respectively. This decrease is observed more on PVP-water system compared to PVP-DMSO system, which suggest breaking of water molecule is more than DMSO molecule.

CONCLUSION: Ultrasonic velocity, density and viscosity of solutions of PVP-water and PVP-DMSO system for different concentrations are measured and acoustical parameters are calculated. The variations in some acoustical parameters such as ultrasonic velocity, adiabatic compressibility (β), acoustical impedance (Z) free length (L_f), free volume (V_f), relaxation time

(τ), absorption coefficient (α/f^2) with increase in concentration shows that solute-solvent interaction are present in the solution. The addition of polymer will break the bonds of solvent molecule which provide the free ions to interact with polymer molecules. These free ions interact with the polymer molecules in which partially negatively charged Oxygen atom of PVP may be attracted towards partially positively charged Hydrogen atom of water and methyl group of DMSO. This will increase association in polymer and solvent molecule and complex formation takes place between them. Also polymer-polymer interaction is a present in the system. Behaviour of PVP with DMSO is complex compared to water.

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EFFECT OF NOISE POLLUTION IN INDIA

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ABSTRACT :

The noise from different normal and additionally manmade sources, especially movement. Truth be told, commotion has come to be related to the psychological, physical, passionate and mental prosperity of an individual, be it people or even creatures. From the conclusions to the investigations by the analyst, the approach to control the commotion contamination and the measures taken by the administration thus an endeavor has been made to give a review of the total situation of noise contamination laws and jurisdictions. The Noise as late has risen as one of the essential poisons of condition. Indeed, it needs to control the enactment and there are some local and state establishments that are directly or in a roundabout way of identifying the issue as it may, there is no particular enactment in India. It has achieved an expanding new mindfulness. About the commotion contamination, this has turned into a piece of our everyday lives.

KEYWORDS : Human, Noise, Pollution, Traffic

INTRODUCTION

The rapid urbanization and growth of urban population has led to many health challenges, including ambient air and noise pollution. Of all the projection problems, noise is considered as an important environmental environment. Motor vehicles are the main source of urban noise emissions in total vehicles. Increasing vehicle populations increase noise pollution and associated health and can lead to short-term and chronic mental and physical disorders. Noises are considered pollutants under India's Pollution Prevention and Control Act 1981. The World Health Organization estimates that noise pressure levels have risen to 10% of the global population, which could potentially reduce hearing loss. Environmental noise causes numerous psychological e-factors such as anxiety, anxiety, AT, depression and serious health, such as car-vascular disease. The voices were said to have a negative impact on children's blood pressure and mental health. Some studies show that those who are exposed to high-road troubles have a higher prevalence of hypertension sine. This is necessary for con- duct sound monitoring studies, especially for noise pets, to develop suit-able reduction mitigation measures to control the noise level and control the sound-pollution. For European Environment Noise, all member states must create sound transmissions, estimate the sound of the population, develop sound action plans and transmit sound information to the public. The study was



conducted to implement noise reduction measures to control and control the noise being monitored in different parts of the world. Also, validated Road Traffic-C noise models have been developed to estimate the traffic noise and sound mapping of cities.

Noise contamination is an undesirable or hostile sound that irreversibly interferes with your day to day activities. It has numerous resources, most of which are related to urban improvement such as roads, air, rail

transport, modern noise, neighbourhoods and recreational distress. Various factors add to the problem of high noise levels, including increasing the volume of people and disturbing levels in vehicles. The familiarity of environmental disturbance has increased and the region, state and surrounding governments have a strong desire to reduce the level of disturbance in India. A serious natural problem, it is usually difficult to assess the associated costs. The sound has developed into a serious poison in the recent past. Indeed, there is a need for legislation to regulate it, and there are some central and state authorities that can be identified in particular, or in a clever way, on the point that there is no specific law in India to address the issue, as some nations do developing noise pollution problems at the national level. Another issue of late noise contamination is the result of unexpected use of amplifiers. Its useless use and repetition in religious spots and religious functions and execution make it difficult for the common man to make maximum use of their basic resilience in human terms.

REVIEW OF LITERATURE:

Garg N. Sinha A.K. et. al. (2017), are concluded in their study 'Evaluation and Analysis of Environmental Noise Pollution in Seven Major Cities of India', that Annual Average L_{day} (0-22 h) and L_{night} (22-06 h) values in the year 2011-14 are located in 35 locations, including 5 zone locations in the commercial area, in industrial, residential and 9 silent zones. Long-term noise monitoring shows that there has been a slight increase in ambient noise levels for the past four years for 29 sites (82.9%) out of the 35 sites under consideration. The L_{day} and L_{night} levels observed for the 35 sites observed for 2014 this year showed that only 4 industrial sites (11.4%) met the ambient noise criteria. An analysis of all the zones ($L_{day} - L_{night}$) in the last four years showed that 53.6% Observations to shows the difference between 5 to 10 dB (A) and 33.5% observations. 5dB (A), which means adjusting the night time average sound level to 10dB at night, L_{dn} is expected to be less than night time, to notice the increased sensitivity to noise at night. In this case, obstruction sleep protection is not appropriate.

Garg N and Maji S. (2016), are concluded in their study 'A retrospective view of noise pollution control policy in India: status, proposed revisions and control measures' that It is proposed to revise sound policies and rules based on the preconceived view of India and the sound policies and regulations of other countries based on the available knowledge and the control of sound. The work focuses on working with home appliances and the National Building Code in addition to repeating noise limits for the construction area and ambient sound standards to enhance the sound insulation of building components to protect against noise pollution. The environment in India will be useful for controlling noise limits and noise pollution for household appliances, motor vehicles and construction equipment and construction equipment.

Brind Kumar, Oberoi S.V. and Goenka A. (2004), concluded in their study 'A Brief Review of the Legislative Aspects of Noise Pollution' that the insufficient to nationally control existing laws that directly or indirectly deal with noise pollution problems. Therefore, there is a need for certain and effective laws to control the noise pollution in the country which will suit the Indian culture and social establishment, Promotion of sound standards from various constituent sources at certain times of day by the government, identification of citizens' right to enjoy a noise-free environment through certain constitutional guarantees, declaration of voice as a crime on personal liberty and healthy living, creating separate courts for trial of voice cases. Write down the volume / pitch level for the soundtrack at religious venues, concerts / public meetings and festivals. Provide compensation for the disadvantaged person / people. Determine the responsibility of local bodies and administrative authorities as well as training on the process of dealing with noise crimes to monitor sound sources. Hire inspectors at local organizations to monitor the spread of noise due to social activities, removing the pressure horn from all vehicles, Provision of public grievances for the use of pressure horns by government vehicles, administrative officials, local bodies and affluent people. Ban industrial and noisy trade / activity in residential areas.

Singh Narendra and Davar S.C. (2004) are observed in their study 'Noise Pollution Sources, Effects and Control', that Vehicles and public address systems (loudspeakers) appear to be the main sources of

noise pollution. It seems that loudspeakers are frequently used for religious functions (and temple prayers). The noise caused by loudspeakers and automobiles is slightly lower than other groups in the age group of 20-40 years. At different ages, there is an almost equal proportion of neighbours, music and religion acts responding as sources of noise. There are no differences between the male and female populations. The proportion of the female population is equal to the male population for each source of noise.

MATERIAL AND METHODS:

The data has been collected from the various Books, Journal, and News Paper those are published in different publications and websites. The published Books and Journal article gives important messages of Noise pollution and its effects. The study has been totally depend on the secondary data sources.

EFFECTS OF NOISE POLLUTION:

1. **Deafness Effect or Hearing Effect:** These effects only get real importance if the sound is exceptionally high. Continuous exposure to sound levels greater than 100 dB can adversely affect the auditory in a very short time. Many workers who are exposed to the noise of jets or very noisy workshops in the short to medium term may soon find hearing impairments. Today, in these situations, they have become a staple for the ear protectors equipped with labour guards and provided that all these capabilities are not affected.
2. **Physiological or Mental Effects:** Many people complain that noise makes them mentally ill. Experiments have been conducted to try to confirm or deny these claims. According to H.M. Stationary Office Report Noise; the sound does not contribute to mental illness, at least. Doctors and scientists have now clinically confirmed that noise causes disturbances in biological organisms and human-related functions. Fireworks and other excessive and persistent explosions cause physical pain that reduces human life to neurosis, mental illness, cardiovascular diseases, stomach ulcers, and respiratory disorders. Recent research suggests that noise reduction can sometimes lead to impaired headaches, headaches and dizziness, abnormalities in the intestines, stomach problems, and the effects on eyesight.
3. **Effect on Communication:** External sounds can interfere with conversation and use of the telephone, as well as enjoy radio and television programs and spend time. It can thus affect performance in offices, schools and other places where communication is important. Maximum allowable level noise in such cases at 55 dB. 70 dB is considered very noisy, and serious interference with oral communication is inevitable.
4. **Effect on Working Efficiency:** Noise levels have a less physiological effect on biological performance, provided that noise levels are below 90 dB. If the level of continuous noise exceeds 100 dB, then the ear can be damaged, as has been seen by doctors due to physical illness. Recent research by psychiatrists and psychologists says that noise has some relation to physical health which causes stress which causes problems such as speech interference, distress, fatigue, sleep pane and emotional distress. Noise levels between industries interfere with efficiency and communication and increase the chance of accidents. The World Health Organization estimates a significant loss of industry annually.
5. **Effect on Non Living Things:** Intense noise levels also affect inanimate objects. The increase in sound causes cracks in national and archaeological structures, and high levels of noise are also the cause of cracks in the mountains. Explosions of magnitude can cause glass panes and vibrations to burst into buildings. In India and abroad, research is being done to reduce gravity on inanimate objects so that precautions can be taken to minimize its impact.

NOISE POLLUTION CONTROL:

1. **Indian Constitution:** Article 21 of the Constitution ensures the life and personal liberty of all people. It was satisfied by the Supreme Court's repeated declaration that the privilege of living in Article 2 was non-existent or non-existent. It ensures the privilege of the human being with human goodness. Anyone who wants to live in peace in their home has the right to peace and tranquillity in their home.


2. Procedure of Criminal Code and Control of Noise: Under Section 268 of the Indian Penal Code, sound is considered a public nuisance and, thus, a person has a criminal liability for the usual injury, danger or injury to a person in connection with his unlawful omission. Public misconduct The acts have been punished under section 290 of the Indian Penal Code, which provides that if anyone commits a public nuisance in this manner, otherwise the Code is not punishable, a fine of Rs. 200/-.

DISCUSSION / CONCLUSION:

Existing laws, whether directly or indirectly related to noise pollution, are insufficient to manage them at the national level. Therefore, there should be some specific and effective laws in place to manage the noise pollution in the country which will be conducive to Indian culture and social establishment. Announcement of sound standards from different parts sources at specific times of day by the government. Sources, effects and suggestions for controlling excessive noise, industry, highway traffic, airports, railways and public address systems appear to be major sources of noise pollution. There are every possibility in our lives for real-time control over acoustic pollution, consciously or unknowingly. This causes a slight decrease in the noise level on the source. Another issue of late noise contamination is the result of unexpected use of amplifiers. The purpose of implementing religious sites and religious functions, and now with no intention of speaking again, will be to take appropriate action to reduce noise levels and control pollution. Late noise has become one of the poisons needed for this condition. This law has to be enforced for control, and there are some central and state institutions that, in the straight-ahead or voice-over way, recognize that no specific law can be made in India. This is mainly in the direction of the crowd. Traffic areas, planned road network, one-way traffic reduction, construction of silence zones in urban areas, unplanned urban expansion etc...The noise level is high in most areas and averages more than 85 dB across the city. Many schools, hospitals in the centre of the city are also being affected by the noise pollution. Eliminate encroachments and ban the use of air horns within city limits.

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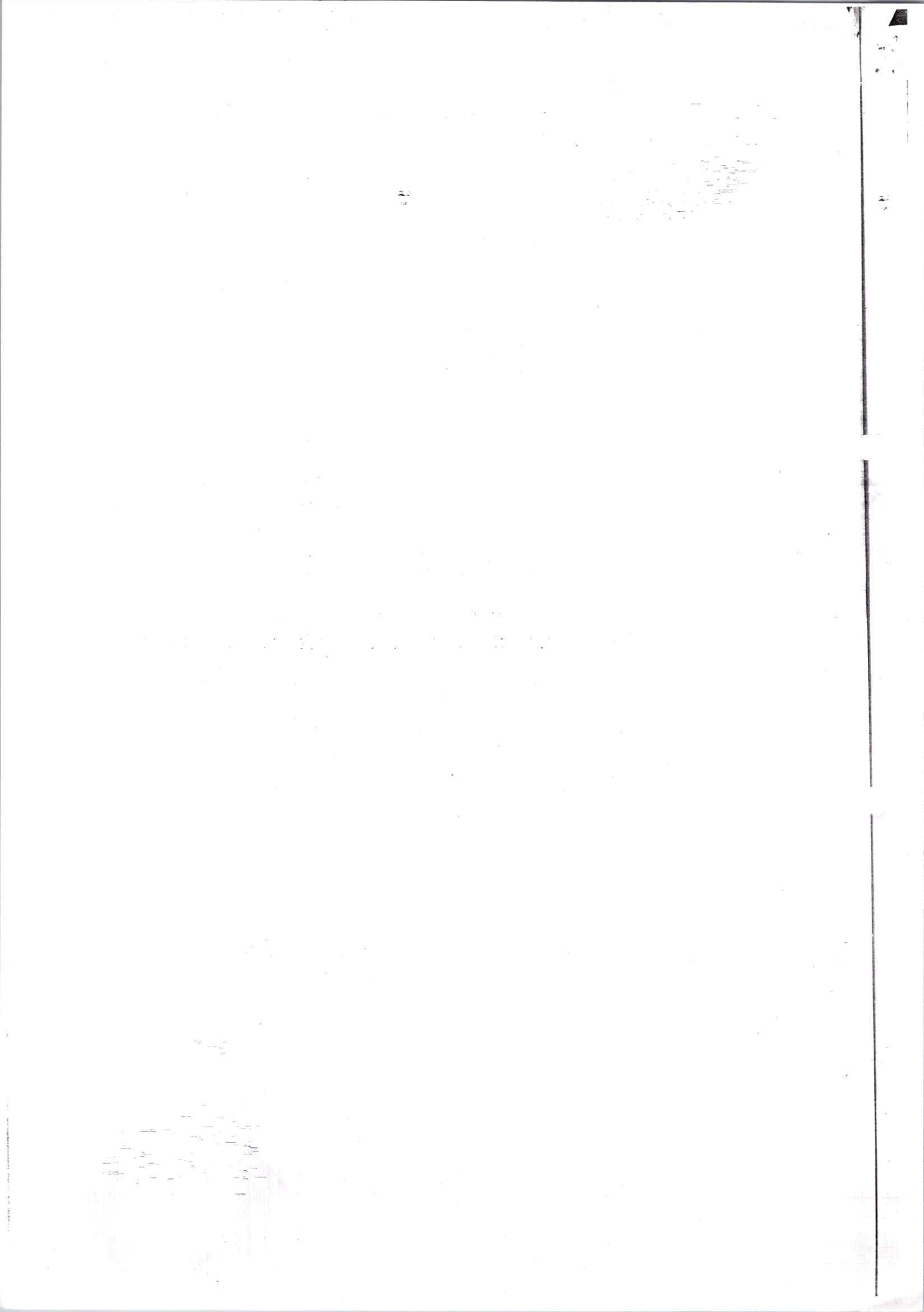
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हुंडा प्रथा : समाज आणि स्त्रीया

प्रा. उगीले माधव उत्तमराव

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घोषवारा :

हुंडा प्रथा ही भारतीय समाजाला लागलेली कीड आहे. कौटुंबिक जीवनाशी संबंधित असलेल्या हुंडा समस्याने आज भयानक स्वरूप धारण केले आहे. हुंडा पध्दतीचा व्यक्ती, कुटुंब व समाजजीवनावर विपरीत परिणाम होत आहे. हुंडा प्रथेला धर्माचा आधार जोडल्यामुळे हुंडा देणं अनिवार्य मानण्यात येऊ लागले. यातूनच हुंडा देऊन आपल्या मुलीचा विवाह उच्च कुळामध्ये करण्याची स्पर्धा वधु पित्यामध्ये सुरू झाली आणि हुंडा एक सामाजिक समस्या बनली. हुंड्यासाठी छळाच्या घटनांमध्ये वाढ झाली. वधुपित्यांना घ्यासाठी कर्ज काढावे लागते व कर्ज फेडण्यासाठी मुलीच्या वडिलांना आर्थिक ताणाखाली जगावे लागते. यामुळे कौटुंबिक स्वास्थ्य नष्ट होते. हुंडा पध्दतीमुळे मुलीवर विवाहापूर्वी व विवाहानंतर मोठ्या प्रमाणात अन्याय अत्याचार होतो. श्रीमंत, मध्यम व गरीब सर्व वर्गात हुंडा पध्दती अस्तित्वात असलेली दिसते. ज्यामुळे महिलांचे जीवन विघटित झाले आहे.

महत्त्वाचे शब्द : (Key words)

हुंडाप्रथा, हुंडाबळी, कर्जबाजारीपणा, विजोडविवाह, स्त्रीभ्रूणहत्या, घटस्फोट, बालविवाह, आत्महत्या, परित्याग.

प्रस्तावना :-

भारतीय समाज हा पुरुषप्रधान संस्कृतीचा समाज आहे. पुरातन काळापासून महत्त्वाचे निर्णय पुरुषच घेत असतो. स्त्रीयांना दुय्यम स्थान दिले आहे. त्यामुळे स्त्रीयांचे प्रश्न कितीही गंभीर असले तरी त्याकडे दुर्लक्ष झाले आहे. हुंड्यासाठी नववधुची हत्या ही भारतीय संस्कृतीला आतून पोखरलेली कीड आहे. पुर्वीच्या काळी स्त्रीधन ही संकल्पना आज हुंडा प्रथा बनून नव्या आक्राळ-विक्राळ रूपात आपल्या समोर उभी आहे. पुर्वीच्या काळी विवाह समारंभात स्त्री धन म्हणून सोने, चांदी, वस्तू, गोधन, मुली बरोबर तिच्या सासरी पाठवत असत. कन्यादानाच्या संकल्पनेमागे अनेक रूढी परंपरांचा आधार घालून त्यामध्ये धार्मिकता आणली. आनंदाने दिल्या जाणाऱ्या या वस्तूच्या देवाण घेवाणीवर अनिवार्यता येऊ लागली आणि आज स्वातंत्र्यानंतर ही प्रथा सामाजिक प्रतिष्ठेच्या नावाखाली टिकून आहे. खोट्या प्रतिष्ठेला टिकवण्यासाठी नववधुकडून वस्तू व पैशाची मागणी होऊ लागली त्या मागणीने आपल्या समोर हुंडा स्वरूपात रौद्र रूप धारण केले आहे.

शोध निबंधाची उद्दिष्टे :-

- १) हुंडा प्रथेचा अर्थ समजून घेणे.
- २) हुंडा प्रथेच्या कारणाचा शोध घेणे.
- ३) हुंडा प्रथेमुळे समाजावर होणाऱ्या दुष्परिणामाचा अभ्यास करणे.
- ४) हुंडा प्रथेला रोखण्यासाठी प्रभावी उपाय योजनाचा अभ्यास करणे.

संशोधन पध्दती :-

प्रस्तुत शोधनिबंधासाठी दुय्यम स्रोताचा उपयोग केला आहे. संदर्भग्रंथ, मासिके, वर्तमानपत्रातील लेख, इंटरनेट इत्यादी दुय्यम स्रोताचा उपयोग केला आहे.

हुंडा म्हणजे काय ?

- १) मॅक्स रॅडीन :- "विवाहाच्या वेळी पत्नीकडून किंवा पत्नीकडच्या कुटुंबाकडून जी संपत्ती प्राप्त होते त्यास हुंडा असे म्हणतात."
- २) १९६१ च्या हुंडा प्रतिबंधक कायद्यानुसार :- "विवाहापूर्वी किंवा विवाहानंतर कोणत्याही एका पक्षाने दुसऱ्या पक्षास प्रत्यक्ष अप्रत्यक्षपणे कबूल केलेली किंवा दिलेली संपत्ती, मौल्यवान वस्तू म्हणजे हुंडा होय."

हुंडा प्रथेची कारणे :-

१) सामाजिक प्रथा :-

काही प्रथा व परंपरा समाजात रूढ झालेल्या असतात. त्याला समाजाची संमती असते. त्या न पाळल्यास समाजात व्यक्तीची निंदा केली जाते. समाजाच्या रोषाला बळी न पडता नाईलाजाने लोक हुंडा पध्दती मान्य करतात व ती पाळतात.

२) नवीन संसाराची मांडणी :-

लग्नानंतर मुलीला तिच्या संसारात उणीव भासू नये म्हणून अलंकार, नगदी पैसे, गृहउपयोगी वस्तू देण्याची प्रथा रूढ झाली आहे.

३) प्रतिष्ठेची कल्पना :-

जास्तीत-जास्त हुंडा देणे ही प्रतिष्ठेची बाब समजली जाते. जास्त हुंडा दिल्यानंतर चांगला सधन, उच्चशिक्षित जावाई मिळतो असा लोकांना वाटते. आई-वडील पैसा देऊन चांगला वर मिळवण्याचा प्रयत्न करतात.

४) जाती व्यवस्था :-



भारतात जाती व्यवस्था असून मुला-मुलीचा विवाह आपल्याच जातीत किंवा उपजातीत करण्याचे सामाजिक नियम आहेत. आपल्याच जातीतून किंवा उपजातीतून जावाई निवडायचा असल्यामुळे निवडीचे क्षेत्र मर्यादीत होते. त्यामुळे जाई द्यावा हा प्रथा मुलीचा विवाह जुळवला जातो.

५) उच्च व श्रीमंत कुटुंबात विवाह करण्याची आकांक्षा :-

आई-वडील आणि नातेवाईकांना आपल्या कुटुंबातील मुलीचा विवाह उच्च व श्रीमंत कुटुंबात व्हावा असे वाटत असते. आपल्या मुलीचा जीवन सुखी व्हावे अशी आईवडिलांची इच्छा असते. त्यासाठी ते श्रीमंत मुलाच्या शोधात असतात. चांगला जावाई मिळवण्याची प्रथा वधुपित्यामध्ये लागते. त्यामुळे अधिकाधिक हुंडा दिला जातो.

६) दुष्टचक्र :-

मुलीच्या विवाह प्रसंगी हुंडा दयावा लागला म्हणून काही लोक मुलाच्या लग्नात हुंडा घेतात हे दुष्टचक्र सातत्याने समाजात चालूच असते.

७) कुरूप मुलीचा विवाह :-

समाजात रंगाणी काळी-सावळी किंवा सुंदर नसलेल्या मुलीचा विवाह होत नाही. अशावेळी पालकासमोर मोठा प्रश्न निर्माण होतो की मुलीचा विवाह कसा करायचा सावळ्या किंवा कुरूप मुलीचा विवाह व्हावा म्हणून पालक वरपक्षाला अधिक हुंडा देण्याचे प्रयत्न दाखवतात.

८) बदलती सामाजिक मूल्ये :-

समाजाच्या प्रगती व विकासाबरोबर हुंडा प्रथा नष्ट होण्याऐवजी तिला विकृत स्वरूप प्राप्त होत आहे. हुंड्याला सामाजिक मूल्य प्राप्त होत आहे. वराकडे किती संपत्ती व जमीन आहे यावरून हुंड्याची रक्कम ठरवली जाते. या बदलत्या सामाजिक मूल्यामुळे हुंडा प्रथेला खतपाणी मिळत आहे.

हुंडा प्रथेचे दुष्परिणाम :-

हुंडा प्रथेने अनेक सामाजिक समस्यांना जन्म दिला आहे. हुंडा प्रथेची जास्तीतजास्त दुष्परिणाम स्त्री जीवनावर झालेले दिसून येतात.

१) स्त्रीभूषण हत्या :-

मुलगी जन्माला आली म्हणजे तिला हुंडा दयावा लागतो. त्यामुळे जन्माला येण्यापूर्वीच गर्भजल परिक्षण करून गर्भातच तिची हत्या केली जाते. यातून अनेक सामाजिक प्रश्न निर्माण होत आहेत. समाजाचे संतुलन बिघडते हे प्रमाण असेच चालू राहिले तर भविष्यात काही पुरुषांना अविवाहीत रहावे लागेल. वारंवार गर्भपात केल्याने स्त्रीच्या आरोग्यावर दुष्परिणाम होतो.

२) हुंडाबळी :-

नवविवाहीत स्त्रीचा छळ सासरच्या मंडळीच्या आर्थिक गरजा पूर्ण करण्यासाठी माहेरहून हुंडा आणण्यासाठी आग्रह केला जातो. त्याची जर पुर्तता झाली नाही तर नवविवाहितेचा शारीरिक, मानसिक छळ केला जातो. त्यांना बंदी केले जाते, उपासमार केली जाते. यातून हुंडाबळीची समस्या निर्माण होते.

३) कर्जबाजारीपणा आर्थिक पिळवणूक :-

हुंडाप्रथा ही आर्थिक पिळवणूक करणारी आहे. मुलीच्या आई-वडिलांना हुंड्याची पुर्तता करण्यासाठी जमीन, सोने विकून गहाण ठेवून करावी लागते. जवळचा सर्व ऐवज पणाला लावल्याने त्यांच्यावर मजुरी करून पोट भरण्याची वेळ येते. हुंडा प्रथेने अनेक कुटुंब कर्जबाजारी झाले आहेत.

४) कौटुंबिक विघटन :-

मुलीच्या लग्नाकरिता कर्ज काढल्याने कुटुंबातील इतर महत्त्वाच्या बाबीकडे दुर्लक्ष होते. संयुक्त कुटुंबात भांडणे होतात व वेगळे होण्याची भाषा बोलली जाते. कर्जाचा बोजा कुटुंबातील सर्व सदस्यावर येत असल्याने कुटुंबाची वाटचाल विघटनाकडे होते.

५) विजोड विवाह :-

हुंडा देण्याची परिस्थिती नसल्याने मुलीच्या अनुरूप तिला पती मिळेलच असे सांगता येत नाही. अशा वेळेस बरेचदा मुलीला वयोवृद्ध पतीशी मुलीला विवाह करावा लागतो. कुरूप, व्यसनी, रोगी, दुराचारी पुरुषाशी विवाह लावून दिल्याने संपूर्ण आयुष्यभर मुलीला दुःख भोगावे लागते.

६) आत्महत्या :-

आई-वडिलांच्या आर्थिक परिस्थितीमुळे विवाह जुळून येत नसल्याकारणाने आपल्यामुळे आई वडिलांना मानसिक त्रास नको यातून अनेक मुली आत्महत्येचा मार्ग स्विकारतात. हुंड्यामुळे होणाऱ्या छळाला कंटाळून अनेक स्त्रीया आत्महत्या करतात.

७) बालविवाह :-

हुंड्याच्या अनिष्ट प्रथेपासून मुक्तता मिळवण्यासाठी अनेक पालक आपल्या मुलीचे लग्न बालवयात करून या जबाबदारीतून मुक्त होण्याचा प्रयत्न करतात.



८) उपवर मुलीचा प्रश्न :-

हुंडा देण्याची परिस्थिती नसल्याकारणाने उपवर मुलीचा लग्नाचा प्रश्न निर्माण होतो. पैशाअभावी मुलीचे लग्न होत नाही. परिणामी त्यांचे वय वाढते. अशा उपवर मुलीकडे समाजाचा पाहण्याचा दृष्टीकोण वाईट असल्या कारणाने नव-नवीन सामाजिक समस्या निर्माण होत आहेत.

९) घटस्फोट व परित्याग :-

हुंडा प्रथा घटस्फोटात कारणीभूत ठरली आहे. हुंडा मिळाला नाही म्हणून अनेकजण पत्नीशी घटस्फोट घेतात. माहेरहून पैसे घेऊन येण्यासाठी अनेक स्त्रीयांना घराबाहेर काढले जाते. माहेरी सोडून दिले जाते. मुला-बाळांना सोडून स्त्रीला एकाकी जीवन व्यतीत करावे लागते.

हुंडा प्रथेच्या निर्मूलनासाठी उपाययोजना :-

हुंडाप्रथा ही स्त्री पुरुष समानतेच्या तत्वाशी विसंगत आहे. आजही समाज स्त्रीयांना माणूसकीची वागणूक देत नाही. स्त्री ही उपभोगाची वस्तू मानली जाते. हुंडा प्रथा हे आपल्या समोरील एक आव्हान आहे. त्यासाठी काही उपाय सुचवले जावू शकतात.

१) हुंडा प्रथेच्या निर्मूलनासाठी हुंडाविरोधी जनजागृती करणे आवश्यक आहे.

२) समाजाची स्त्रीयाकडे पाहण्याचा दृष्टीकोण बदलणे आवश्यक आहे.

३) आंतरजातीय विवाहास व प्रेमविवाहास प्रोत्साहन दिल्यास व समाजमान्यता मिळाल्यास हुंडा प्रथा कमी होऊ शकते.

४) स्त्रीशिक्षण व आर्थिक स्वावलंबनाला महत्त्व देऊन स्त्रीयांना बंधनातून मुक्त करणे गरजेचे आहे. त्यामुळे हुंडा प्रथेची समस्या सोडविता येईल.

५) हुंडा प्रतिबंधक कायद्याची प्रभावी अंमलबजावणी केली पाहिजे.

६) ग्रामीण भागातील मुलीला उच्च शिक्षणास प्रोत्साहन देणे गरजेचे आहे.

७) मुलीला जीवनासाठी निवडण्याचे स्वातंत्र्य देणे गरजेचे आहे.

८) विवाह सोहळा साध्या पध्दतीने केल्यास हुंडाप्रथेस आळा बसेल.

९) हुंडाविरोधी चळवळीच्या माध्यमातून हुंडा प्रथेला पायबंद घालणे शक्य आहे.

निष्कर्ष :-

हुंडा प्रथा ही मानवी समाजाला लागलेल्या कलंक असून हुंडा प्रथा दिवसेंदिवस गतीमान बनत चालली आहे. हुंडा प्रथेमुळे समाजात आर्थिकदृष्ट्या कमकुवत असलेल्या कुटुंबाला अनेक समस्यांना सामोरे जावे लागत आहे. हुंडा प्रथेमुळे हुंडाबळी, आत्महत्या, स्त्रीयावरील अत्याचार, कुटुंबाचे विघटन यासारख्या समस्यांत वाढ होत आहे. हुंडा प्रथा स्त्रीयांला नव्हे तर तिच्या संपूर्ण कुटुंबाला उध्वस्त करत असते. समाजातील सर्व घटकांनी हुंडाप्रथेला विरोध करून ही विघातक प्रथा नष्ट करण्याकरिता कायदेशीर प्रयत्नांबरोबरच समाज प्रबोधन करणे गरजेचे आहे. आजच्या तरुण-तरुणींनी मी हुंडा घेणार नाही व देणार नाही या मतावर ठाम राहिले पाहिजे व आपल्या विचारसरणीचा जोडीदार निवडला तर हुंडाप्रथा कांही प्रमाणात कमी होण्यास नक्कीच मदत हेईल. तरुणांनी वधुपक्षाकडून हुंडा न घेता स्वकर्तृत्वावर स्वतःचे शिखर गाठावे.

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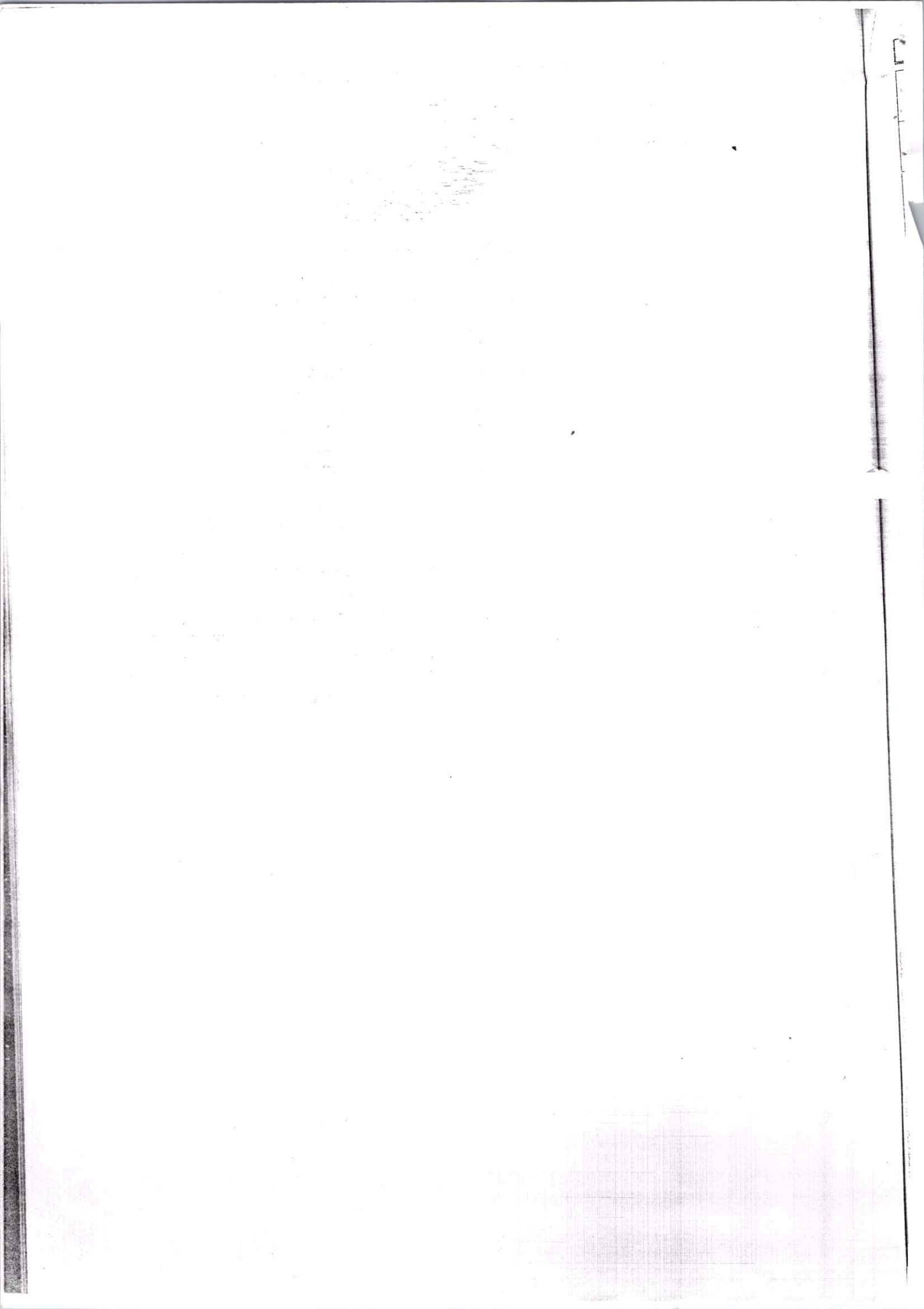
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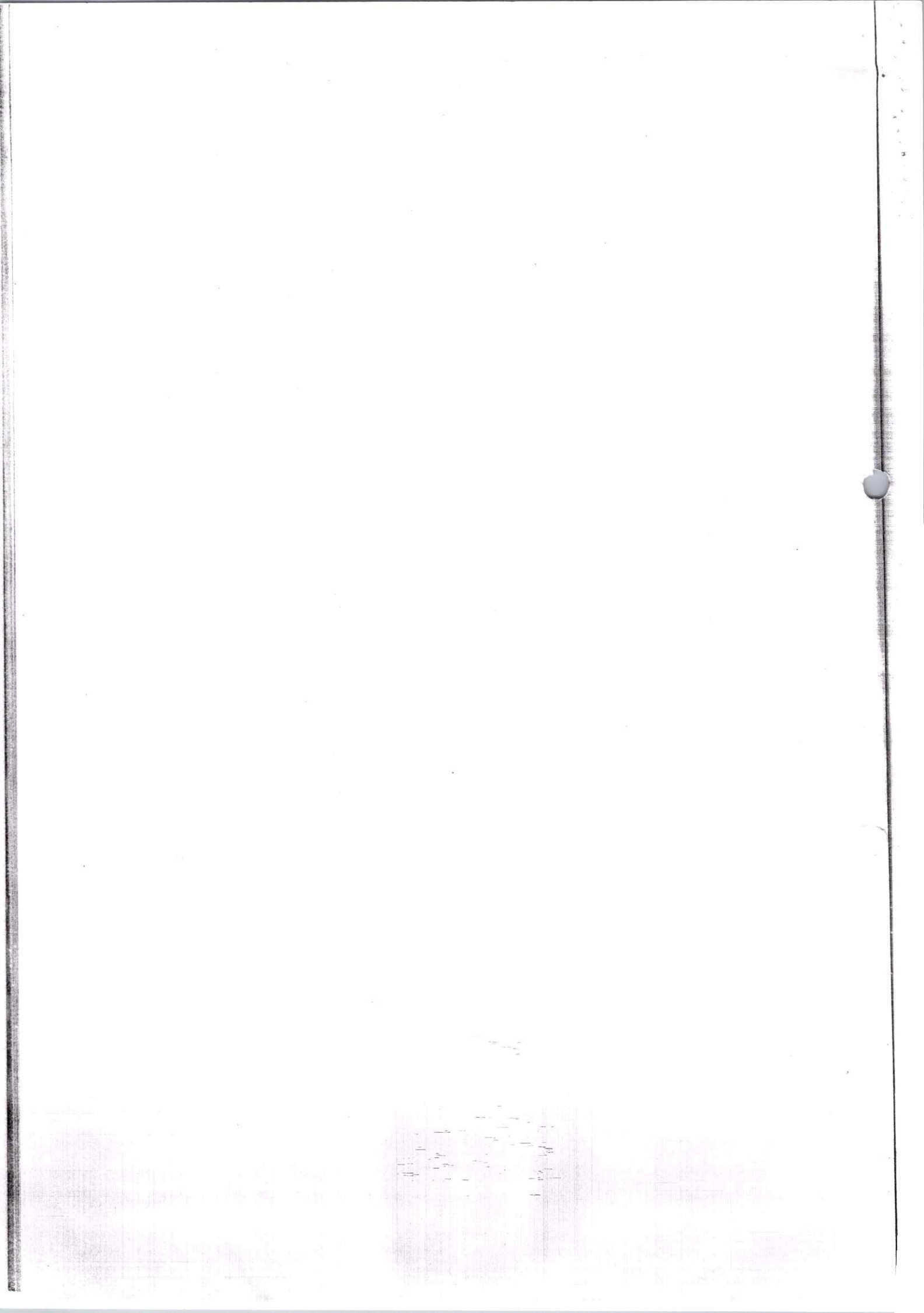
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SOCIOLOGY

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जागतिकीकरणानंतर कुटुंब व विवाहसंस्थेतील परिवर्तन

प्रा. माधव उत्तमराव उगीले

समाजशास्त्र विभाग

रामकृष्ण परमहंस महाविद्यालय, उस्मानाबाद

प्रस्तावना :-

जागतिकीकरण ही एक प्रक्रिया आहे. एखाद्या राष्ट्र राज्याची अर्थव्यवस्था जागतिक भांडवली अर्थव्यवस्थेशी क्रमाक्रमाने जोडली जाऊन बऱ्याच अंश विलीन होण्याच्या प्रक्रियेला स्थूलमानाने जागतिकीकरण म्हणता येईल. सर्व जगाची एक बाजारपेठ निर्माण करण्याचे धोरण म्हणजे जागतिकीकरण होय. जागतिकीकरण फक्त आर्थिक जीवनाशी संबंधित नाही तर सामाजिक व सांस्कृतिक जीवनाशीही तो संबंधित आहे. जागतिकीकरणाचे आर्थिक, सामाजिक, सांस्कृतिक, राजकीय इत्यादी क्षेत्रावर परिणाम झाले आहेत. जागतिकीकरणानंतर भारतीय समाजातील कुटुंब व विवाह संस्थेत परिवर्तन झालेले दिसून येते. मानवाच्या विविध गरजांचे पूर्तता ह्या सामाजिक संस्था करत असतात. भारतातील कुटुंब व विवाह संस्था ही पारंपारीक संस्कृतीला जोपासनाची व्यवस्था आहे. संस्कृतीचे जतन करणे हे कुटुंब संस्थेची महत्वाची भूमिका होती पण जागतिकीकरणानंतर या व्यवस्थेत परिवर्तन घडून आले आहे. कुटुंब व विवाह संस्थेत झालेल्या परिवर्तनाचा आढावा प्रस्तुत शोधनिबंधाने घेण्यात आला आहे.

संशोधनाचा उद्देश :-

- १) जागतिकीकरणाचा अर्थ समजून घेणे.
- २) जागतिकीकरणानंतर कुटुंब संस्थेत झालेले परिवर्तन समजून घेणे.
- ३) जागतिकीकरणानंतर विवाह संस्थेत झालेले परिवर्तन समजून घेणे.

संशोधन पद्धती :-

प्रस्तुत शोधनिबंध हा दुय्यम साधनसामग्रीवर आधारित आहे. यामाठी संदर्भग्रंथ मासिके, वर्तमानपत्रे, इंटरनेट या साधनांचा वापर करण्यात आला आहे.

जागतिकीकरण संकल्पना :-

जागतिकीकरण म्हणजे एखाद्या देशाची अर्थव्यवस्था जागतिक अर्थकारणाशी संलग्न करणे, जोडून देणे. जागतिकीकरण ही एक ठाणी प्रक्रिया आहे की जी देशाच्या अर्थव्यवस्थेला वैश्विक अर्थव्यवस्थेचा भाग बनवते. जसे की देशातील सर्व प्रकारचे उदा. वस्तुनि सेवांची उत्पादन घटकांची अगणे वित्तीय व्यवहार हे त्यापक जागतिक बाजारपेठेचा भाग बनवत आणि बाजारपेठेच्या बाबतीत आंतरराष्ट्रीय सरहद्दी कायम राहतात, त्यांना पार करणे सोपे नसते. -

जागतिकीकरणाच्या व्याख्या :-

१) रुसी मोदी :-

जागतिकीकरण म्हणजे खुले स्पर्धा आणि नवे तंत्रज्ञान यातून उत्पादकता आणि उत्पादन वाढवणे तसेच संपूर्ण जगाची एकच बाजारपेठ निर्माण करणे आणि वस्तु व सेवा यांची विक्री करणे होय.

२) सी. टी. कुरियन :-

विविधता असलेल्या अर्थव्यवस्थेचा समूह होय परस्परातील व्यवहारानून आणि वैयक्तिक उद्दिष्ट साध्य करण्याच्या प्रक्रियेतून कालांतराने एक वैशिष्टपूर्ण अर्थव्यवस्था अस्तोवात येते त्यास जागतिकीकरण किंवा जागतिक अर्थव्यवस्था म्हणतात.

३) शारदा कुमाणसिंग :-

जगातील सर्वच राष्ट्रांची एकच बाजारपेठ निर्माण करणे व त्यात जगातील साधनसामग्रीचे आणि भांडवलाचे सहजतेने परिचलन निर्माण करणे म्हणजे जागतिकीकरण होय.

जागतिकीकरणाची प्रक्रिया सुरु होऊन भारतात दोन दशके उलटली असले तरी जागतिकीकरणाच्या योग्य अयोग्य परिणामाची चर्चा सर्वत्र हातांना दिसून येते जागतिकीकरणानंतर भारतातील कुटुंब व विवाह संस्थेत परिवर्तन झाल्याचे आढळून येते.

कुटुंब संस्थेतील परिवर्तन :-

१) कुटुंबाच्या आकारातील परिवर्तन :-

ग्रामीण पारंपारीक कुटुंब ही मोठी होती. कुटुंबात तीन किंवा तीन पिढ्यापेक्षा जास्त लोक एकत्र राहत असत. परंतु त्याची जागा आज विभक्त कुटुंबाने घेतली आहे. पत्नी व मुलासहीत वंगळी चुल करणारी कुटुंबे ग्रामीण भागातही निर्माण झाली आहेत.

२) कुटुंब विषयक भावनेतील बदल :-

पारंपारीक समाजात कुटुंबाचे महत्त्व सामूहीक स्वरूपाचे होते. व्यक्ती हितापेक्षा कुटुंब हीत महत्त्वाचे मानले जाते. कुटुंबाचे सर्व अधिकार कुटुंब प्रमुखास होते. कुटुंब प्रमुखाबद्दल कमानोचा आदर होता. जागतिकीकरणानंतर कुटुंबाकडे पाहण्याचा पारंपारीक दृष्टीकोन संपुष्टात आला. आज कुटुंबापेक्षा व्यक्ती महत्त्वाची मानली जात आहे. कुटुंब संस्थेस सामूहीक स्वरूपाचे असलेले महत्त्व संपुष्टात आले आहे.

३) स्त्रीयांच्या दर्जात परिवर्तन :-

पारंपारीक समाजात स्त्रीयांना दुय्यम स्थान होते. समाजकारण, राजकारण, धर्मकारण इत्यादी बाबतीत तींला विशेष अधिकारापासून वंचित ठेवण्यात आले होते. केवळ चुल आणि मुल एवढेच तिचं कार्यक्षेत्र होतं. आज जागतिकीकरणानंतर स्त्रीयांचे

कार्यक्षेत्र विस्ताराले आहे. जीवनाच्या प्रत्येक क्षेत्रात स्त्रीया पुरुषाच्या बरोबरीने काम करीत आहेत. जागतिकीकरणानंतर स्त्रीयाच्या दर्जामध्ये परिवर्तन झाले आहे. स्त्रीया आर्थिकदृष्ट्या स्वावलंबी झाल्या आहेत.

४) कुटुंबिक नियंत्रणातील परिवर्तन :-

कुटुंबात व्यक्तीला औपचारिक नियंत्रण पध्दतीपेक्षा अनौपचारिक नियंत्रणाचा अधिक फायदा होत असतो. मात्र जागतिकीकरणानंतर कुटुंब आपल्या मदत्यावर अनौपचारिक नियंत्रण ठेवण्यास कमी पडत आहे. वाना-पित्याच्या प्रत्यक्ष शिकवणीपेक्षा बाह्य अनुकरणावर अधिक भर दिला जात आहे. मुलांवर नियंत्रण ठेवण्यास कुटुंब असमर्थ ठरत आहे. कुटुंबातील नियंत्रण शिथिल झाल्याने आपसातील प्रेम, सहकार्य, त्याग, संरक्षण इत्यादी बाबतीत निष्काळजोपणा सुरू झाला आहे.

५) मनोरंजनात्मक कार्यातील परिवर्तन :-

मनोरंजन हे मानवाला मानसिक समाधान प्राप्त करून देते. पारंपारीक समाजात मनोरंजनाचे कार्य कुटुंब संस्था पार पाडत असत. कुटुंबातील वृद्ध व्यक्तींकडून गाष्टी सांगणे, गाणो म्हणणे, सगडन्सव सावर करणे इत्यादींच्या माध्यमातून मनोरंजन होत असे. आज जागतिकीकरणानंतर मनोरंजनाच्या साधनात बदल झाला आहे. फेसबुक, इंटरनेट, व्हॉट्सअप इत्यादी साधनांचा वापर वाढला आहे. विवाह संस्थेतील परिवर्तन :-

१) विवाहाच्या संस्कारात्मक स्वरूपात परिवर्तन :-

पारंपारीक समाजव्यवस्थेत विवाह एक पवित्र संस्कार मानला जात होता. विवाहातील धार्मिक संस्काराचे महत्त्व कमी होत आहे. विवाह एक पवित्र संस्कार नसून तो दोन व्यक्तीतील करार आहे हा विचार पुढे येत आहे.

२) वधू-वर निवडीतील परिवर्तन :-

परंपरागत समाजात वधूवर निवडताना आपल्या पसंती आवडीपेक्षा कुटुंबातील व्यक्तींची पसंती महत्त्वाची मानली जाई. आज जागतिकीकरणानंतर वधू-वर निवडीचे स्वातंत्र्य मुला-मुलींना मिळाले आहे. वधू-वरांची निवड करताना शिक्षण व्यवसाय आवडी-निवडी इत्यादींना अधिक महत्त्व दिले जात आहे. वधू-वर परिचय मेळव्यातून वधू-वर सूचक पंडळाकडून वधू-वर निवडीचे प्रकार मोठ्या प्रमाणात सुरू आहेत.

३) विवाह विषयक निर्बंधात परिवर्तन :-

व्यक्ती ज्या जातीत आहे त्याच जातीत व्यक्तीने विवाह करावा असे निर्बंध होते. व्यक्तीस स्वतःच्या जातीबाहेर विवाह करण्याची परवानगी नव्हती. या नियमाचे उल्लंघन करणाऱ्यास समाज बहिष्कृत करीत असे. आज जागतिकीकरणानंतर स्वतःच्या जातीतच विवाह करावा असे बंधन राहिले नाही. आज मोठ्या प्रमाणात आंतरजातीय विवाह, आंतरधर्मीय विवाह, प्रेमविवाह होताना दिसून येत आहेत.

४) प्रेमविवाह संख्येत वाढ :-

जागतिकीकरणानंतर समाज व्यवस्थेत प्रेम विवाहाच्या संख्येत कमालीची वाढ झाली आहे. त्याचबरोबर विवाहाच्या वयात देखील वाढ झाली आहे.

जागतिकीकरण व आंतरजातीय अनुकरणांमुळे आज अनेक स्त्री पुरुष विवाह न करता एकत्रित राहू लागले आहेत. त्याला 'लिव्ह इन रिलेशन्शिप' म्हटले जाते.

निष्कर्ष :-

जागतिकीकरणामुळे भारतीय समाजातील कुटुंब व विवाह संस्थेत अमुलाग्र परिवर्तन झाले आहेत. जागतिकीकरणाने अनुकूल व प्रतिकूल परिणाम कुटुंब व विवाह संस्थेवर झाला आहे. माहिती तंत्रज्ञान, तांत्रिक देवाण घेवाण वाढणारे संपर्क यामुळे भारतीय समाजाच्या अभिवृत्तीत परिवर्तन झाल्याने कुटुंब व विवाह संस्थेत परिवर्तन होत आहे. जागतिकीकरणानंतर कुटुंबाच्या आकारात परिवर्तन झाले. संयुक्त कुटुंबाची जागा विभक्त कुटुंब पध्दतीने घेतली. कुटुंबातील स्त्रीयांच्या दर्जात परिवर्तन घडून आले. आज स्त्रीया पुरुषाच्या बरोबरीने प्रत्येक क्षेत्रात काम करत असताना दिसतात. स्त्री आर्थिकदृष्ट्या स्वावलंबी बनली. कुटुंब संस्थेत सामुदायीक स्वरूपाचे असलेले महत्त्व कमी झाले. कुटुंबातील व्यक्तीतील सहकार्य, त्याग, प्रेम या भावना कमी झाल्या. कुटुंबाच्या मनोरंजनाच्या साधनात बदल झाला.

जागतिकीकरणानंतर विवाह संस्थेत अमुलाग्र बदल झाले. विवाहाकडे पाहण्याचा दृष्टीकोन बदलला. विवाहाकडे धार्मिक संस्कार म्हणून न पाहता एक करार म्हणून बघण्याची प्रक्रिया सुरू झाली. प्रेमविवाह, आंतरजातीय विवाह, आंतरधर्मीय विवाह होत आहेत. घटस्फोटाचे प्रमाणही वाढले आहे.

एकदरीत जागतिकीकरणानंतर भारतीय समाजातील कुटुंब व विवाह संस्थेत परिवर्तन घडून येत आहे. कुटुंब व विवाहाची पारंपारीक मूल्य बाजूला झाली आहेत. तिथे नवीन मूल्य येत आहेत. त्यातील काही मूल्य ही उर्ध्वगामी स्वरूपाची आहेत. तर काही मूल्य मात्र समाजाला अधोगतीला घेऊन जाणारी आहेत.

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Influence of Sintering Temperature on Structural Behavior of Iron Doped TiO₂ Nanoparticles

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ABSTRACT: This investigation represents the notable influence of sintering time on the crystal phase development of iron doped TiO₂ nanoparticles synthesized using sol-gel method. Characterization of sintered materials were performed by X-ray diffraction technique and Fourier transform infrared (FTIR). The XRD analysis shows that iron doped TiO₂ nanoparticles show anatase crystal structure.

Keywords: Nanoparticles, sintering, structure.

INTRODUCTION: Nanotechnology incorporates fundamental study of the properties and nature of nanoparticles and nanostructures. Mainly nanotechnology concern with materials of the size 100 nanometer or smaller in dimensions and includes synthesizing materials in that size limit. In the case of metal oxide, the catalytic process is due to the ability of the lattice to gain or lose oxygen. The oxides thus, generally, facilitate those reactions which involve oxygen atom transfer. These oxides are ionic in character & large non stoichiometric. Whereas, oxides have covalent character are not capable of losing or gaining oxygen & always stoichiometric [1-4]. An oxide catalyst which loses oxygen is called n-type oxide (e.g. Fe₂O₃, ZnO etc) & one which gains is called p-type oxide (e.g. NiO, Cu₂O etc). These redox systems, typically, peroxide lattice oxygen in both partial & complete oxidation reactions, normally carried out at a few hundred degrees (573 K – 673 K). The effectiveness of these oxides as catalysts depends on the ease of release of lattice oxygen. The various physicochemical properties of oxides, such as, structural defects, non-stoichiometric generated in crystal lattice & oxygen ion mobility play a crucial role in their catalytic behavior. One of the difficulties faced by material researchers today is the preparation of materials with required structure, composition and properties for particular applications. The properties of Metal oxide materials mainly depends on the synthetic conditions such as sintering time, sintering temperature, concentration of dopant, pH etc. Various methods [5-9] can be used to synthesize iron doped TiO₂ nanoparticles such as solid state reaction technique, sol-gel, coprecipitation, reverse micelle, mechanical milling etc. Among the different crystal structures, anatase crystal structure have remarkable catalytic properties. Iron doped TiO₂ nanoparticles shows either anatase or rutile crystal structure depending upon the Fe²⁺ ion concentration and heat treatment. Anatase crystal structure of iron doped TiO₂ nanoparticles is distinctive from other crystal structures since it undergoes a structural phase transition due to the change in to the Jahn-Teller effect.

Materials and Methods: Nanocrystalline 5 mol % Iron doped titanium dioxide was synthesized by sol gel method. 5 ml Oleic acid was taken in 250 ml beaker & it was heated up to 393 K. 10 ml titanium (IV) tetra-isopropoxide was added drop wise into it with constant stirring. The whole solution was stirred for 5 min. After that, 200 ml distilled water was added and the slurry stirred for 60 min. Solution was filtered, slurred in 200 ml distilled water, filtered & reslurred in 200 ml distilled water. Using pH meter, the pH of the solution was adjusted to 10.00 by adding ammonia solution. The slurry again stirred at 333K for 180 min, cooled to 298K, filtered. 0.5910 gm of ferrous ammonium sulphate was taken 500 ml distilled water and a few drop of conc. HNO₃ also added. Residue was added in above 500 ml ferrous ammonium sulphate solution. The slurry again stirred at 333K for 180 min, cooled to 298K, filtered, and washed with 50 ml distilled water. Finally, we got slight yellowish residue. Residue was dried at 373K and calcined in air at 773K, 873K, 973K and 1073K for 300 min; which results brownish iron doped Titania nanoparticles.

RESULTS AND DISCUSSION: The crystal phase identification was performed on an X-ray diffraction technique (XRD). Figure shows the XRD patterns of iron doped TiO₂ nanoparticles sintered at 773K, 873K, 973K and 1073K for 300 min. Analyzing the X-ray pattern shows we found the formation of anatase and Rutile structure of iron doped TiO₂ nanoparticles. The sample sintered for 300 min. shows well formation of anatase crystal phase and no impurity phases were observed in the XRD pattern at 773K temperature. The well defined peak with (101) reflection appears to be the most intense indicating the predominant growth of crystallites in this direction. On the other hand, the samples sintered at 873K clearly shows the peaks with (101) and (110) reflections which defined formation of anatase and rutile crystal phases. At 973K and 1073K sintering temperature the peak of (101) reflection is disappeared and sharpen the peak of (110) reflection. The changes in structural peaks with increasing sharpness of reflections in the diffractograms suggest phase transformation of crystal structure from anatase to rutile. The values of lattice parameter varies slightly with sintering temperature (a = 5.83, c = 8.72 for sintering temperature 773K and a = 5.85, c = 8.78 for 1073K sintering temperature. The particle size of each samples were obtained by Scherrer's formula [10] and is in the range of 25 to 50 nm.

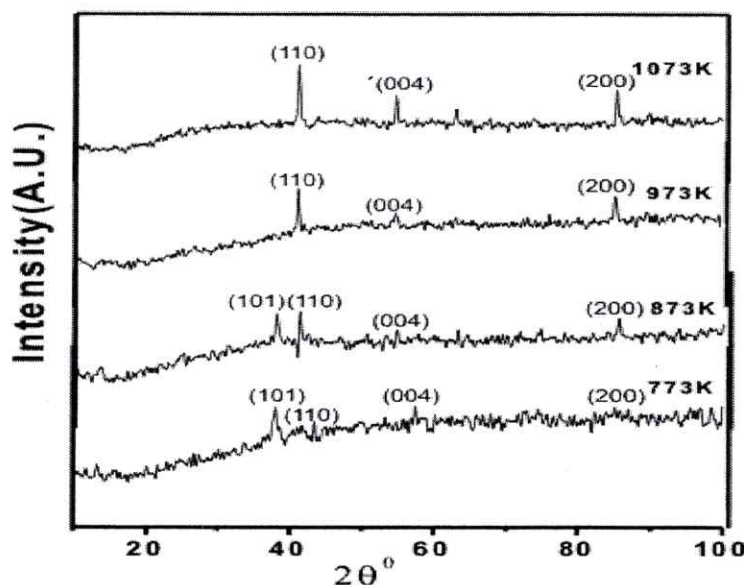


Figure pattern

2: X-ray diffraction of iron doped TiO₂ nanoparticles

sintered at 773K, 873K, 9973K and 1073K for 300min.

Figure 3 shows Fourier infrared spectra of iron doped TiO₂ nanoparticles sintered at 773K, 873K, 973K and 1073 K for 300 min. recorded in the range of 400-4000 cm⁻¹, reveals useful information about nature and structure of iron doped TiO₂ nanoparticles. The spectra of sample reveal the presence of two metal-

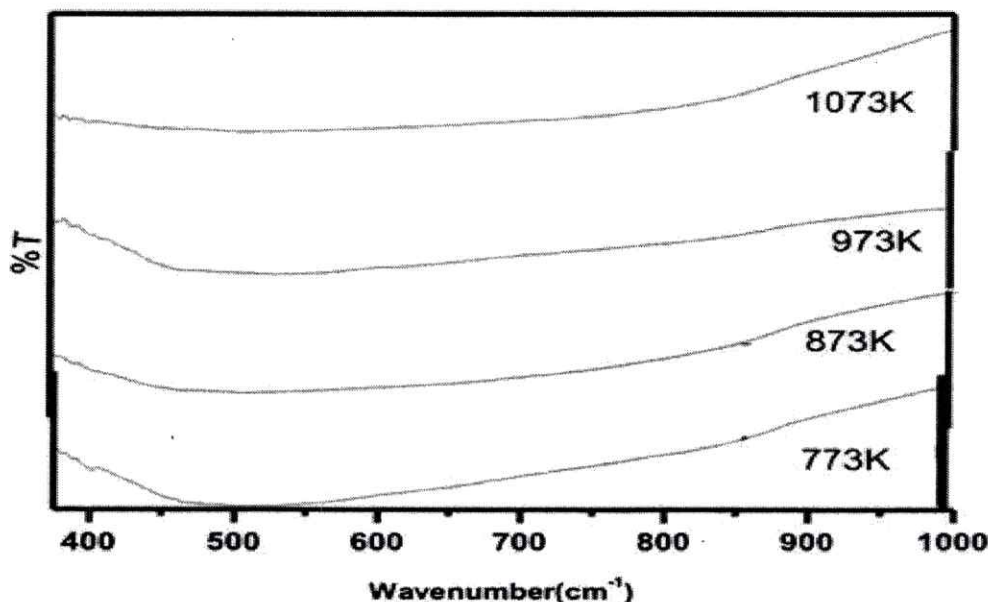


Figure 3: Fourier

infrared spectra of iron doped TiO₂ nanoparticles sintered at 773K, 873K, 973K and 1073K for 300min.

oxygen absorption band in the range of 400-600 cm⁻¹ [11]. The IR spectra of 773K sintered Fe doped TiO₂ samples, shows the peaks at ~460, ~515, ~694, ~778^{cm⁻¹}. These bands have been assigned to bending vibrations of the Ti-O-Ti bond of anatase Titania. The 773K sintered Fe doped TiO₂ sample shows the IR spectrum matches completely with that of anatase Titania. Phase transformation was observed Inthe IR spectra of 873K to 1073K sintered Fe doped TiO₂ nanoparticles. The peaks at ~460, ~515, ~694, ~778^{cm⁻¹} of the bending vibrations of the Ti-O-Ti bond of anatase Titania were start to disappeared in the samples sintered at 873K to 1073K.

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CONCLUSION:

Iron doped TiO₂ nanoparticles are synthesized by Sol-gel method. The X-ray diffraction pattern indicates the phase transformation of Iron doped TiO₂ nanoparticles by increasing sintering temperature. Pure anatase crystal structure changes into rutile. Fourier infrared spectra indicate small shift in absorption bands with sintering temperature.

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ORGANISATION STRUCTURE OF POLICE DEPARTMENT IN MAHARASHTRA

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ABSTRACT

The Chief Director General of the State is the best place in all the states of the state. It is also considered an important person in which there are various categories from top to bottom. The state's police activities are according to their authority and category. When we reach from the top to the bottom, their rights decrease. The Inspector General of Police is a special area or range in their area, and therefore they are head of the area. The District Superintendent of the District is the District Chief and his responsibility is to be responsible for that district. Police personnel are working at the lowest level

Keyword: Police, Organisation and District Superintendent of Police

INTRODUCTION

The Chief Director General of Police of the state is the best place in all the states of that state. It is also considered as an important person in whom there are various categories from top to bottom. The policing activities of the state are as per their authority and category. As we move from the top position to the lower position, their rights decrease. The Inspector General of Police is a special region or range in his field, and so he is the head of the field. The Superintendent of Police of the district is the head of the district and its responsibility is considered to be responsible for that district. Police personnel are seen working at the lowest level.

1. Director General of Police (DGP)

In particular, the highest authority of any state in the Police is DGP (Director General of Police). In India, the Director General of Police (DGP) is a three-star rank and is the highest quality police officer in the Indian State and Union Territory. All the DGP officers are Indian Police Service (IPS) officers. DGP is generally the head of state police force in every Indian state. Additional officers in the state also hold the post of DGP. General appointments for such officers include the Directorate of Vigilance and Anti-Corruption Bureau, Prison Inspector General, Fire Brigade and Civil Defense, Crime Investigation Department (CID), Police Housing Society etc. Besides, officers of the Directorate holding the post of DGP, Central Investigation Agency (CBI), DG Central Reserve Police Force (CRPF) etc. are regularly appointed in Central Government institutions. The Police Inspector General or the Additional Director General or Police Commissioner (State) is a national symbol of the sword and baton over.

2. Additional Director General Of Police (ADGP)

The Additional Inspector General of Police (ADG) in India is ranked 3 stars, the highest quality police officer in the Indian state and the region. All ADGs are Indian Police Service (IPS) officers. The equivalent position or title for a state government or federal government is the commissioner of police, special or additional secretary and cabinet secretariat. An icon showing ADG status is the national symbol on sword and baton.

3. Inspector General Of Police/ Special Inspector General Of Police (IGP/SIGP)

The Inspector General of Police or the Inspector General of Police is a senior police officer or a senior police officer of many countries. Rank usually refers to the head of the larger regional command under police service and in most countries, it refers to the senior officers of the entire National Police.

4. Deputy Inspector General Of Police (DIGP)

Police Sub-Inspector (DIG) or Additional Commissioner of Police (IPS) is one-star rank. The officer holding this position is subject to the Senior Superintendent of Police or Police Deputy Commissioner and Police Inspector General or Police Commissioner. It is approximately equal to the security of the commander of the UK Police Service and the Assistant Chief Constable. Aspire Protocol Police rank DIG rank of Lieutenant Colonel and below Army Colonel's rank.

5. Superintendent of Police/Deputy Commissioner Of Police (SP/DCP)

In India, the District Superintendent of Police (SP) or the Deputy Commissioner of Police (DCP) is the district police force. The Superintendent of Police is the officer of the Indian Police Service. They have been entrusted with the responsibility to comply with the law and order and related issues of the state or a Union Territory. They have been assisted by the State Police Service and other state police officers. Their rank badge is more than a star sign, but people selected for a higher category or fifteen or more years of service serve the state

symbol than two stars. The following posts are Additional Police Deputy Commissioner (ADLDCP) or Additional Superintendent of Police (ASP), the above posts are Superintendent of Police (SSP) or Additional Commissioner (ACP). The post of the Superintendent of Police is equivalent to the rank of lieutenant colonel of the Indian Army.

6. Superintendent of Police/Deputy Commissioner of Police (Junior Management Level)

District Superintendent of Police (SP) or the Deputy Commissioner of Police (DCP) is the district police force. The Superintendent of Police is the officer of the Indian Police Service. They have been entrusted with the responsibility to comply with the law and order and related issues of the state or a Union Territory. They have been assisted by the State Police Service and other state police officers. Their rank badge is more than a star sign, but people selected for a higher category or fifteen or more years of service serve the state symbol than two stars.

7. Additional Superintendent of Police/Deputy Commissioner of Police (ASP/DCP) [Less than 10 years of service]

Additional Superintendent of Police or Additional Deputy Superintendent of Police (Additional SP or ADLDCP) is still being used in India where the officer holding the post, Indian Police Service or West Bengal Police Service (WBPS), Odisha Police Service (OPS), Maharashtra Police Service (MPS) etc. The above posts are either the Superintendent of Police (SP) or the Police Deputy Commissioner (DCP), and under the posts below, the Deputy Commissioner (Deputy SP / DSP) or ACP (Police Assistant Commissioner)

8. Deputy Superintendent of Police/Assistant Commissioner Of Police (DSP/ACP)

In India, senior Assistant Superintendent / Assistant Commissioner or senior officials of the above posts may have National Indian Police Service or State Police Service, whereas the Indian Inspector and Constable are from the independent Provincial Police Force. The Assistant Commissioner's status was also used by Indian Income Tax, Customs, Central Product and Service Tax Administration as the Revenue Service Officer.

9. Police Inspector (P.I.)

The observer is both a rank and an administrative post, used in both contexts. However, not every police force has an equivalent status. He is the head of that Police station.

10. Assistant Police Inspector (A.P.I.)

The observer is both a rank and an administrative post, used in both contexts. However, not every police force has an equivalent status.

11. Police Sub-Inspector (SI)

Sub-inspector (SI) usually has a shortage of police personnel (head constable, equivalent to corporations, with police outposts). They are the lowest ranking officers whose Indian police can be charged in court according to the rules and regulations, and in general it was the first investigating officer. The officers under him cannot file charge sheets, but they can inspect the cases on their behalf.

12. Assistant Police Sub-Inspector (ASI)

A police sub-inspector (ASI) is one of the main constables in the police force of India, under the sub-inspector. Rank mark for AS is one star and there is a red and blue ribbon on the outer shore of the shoulder belt.

13. Head Constable (HC)

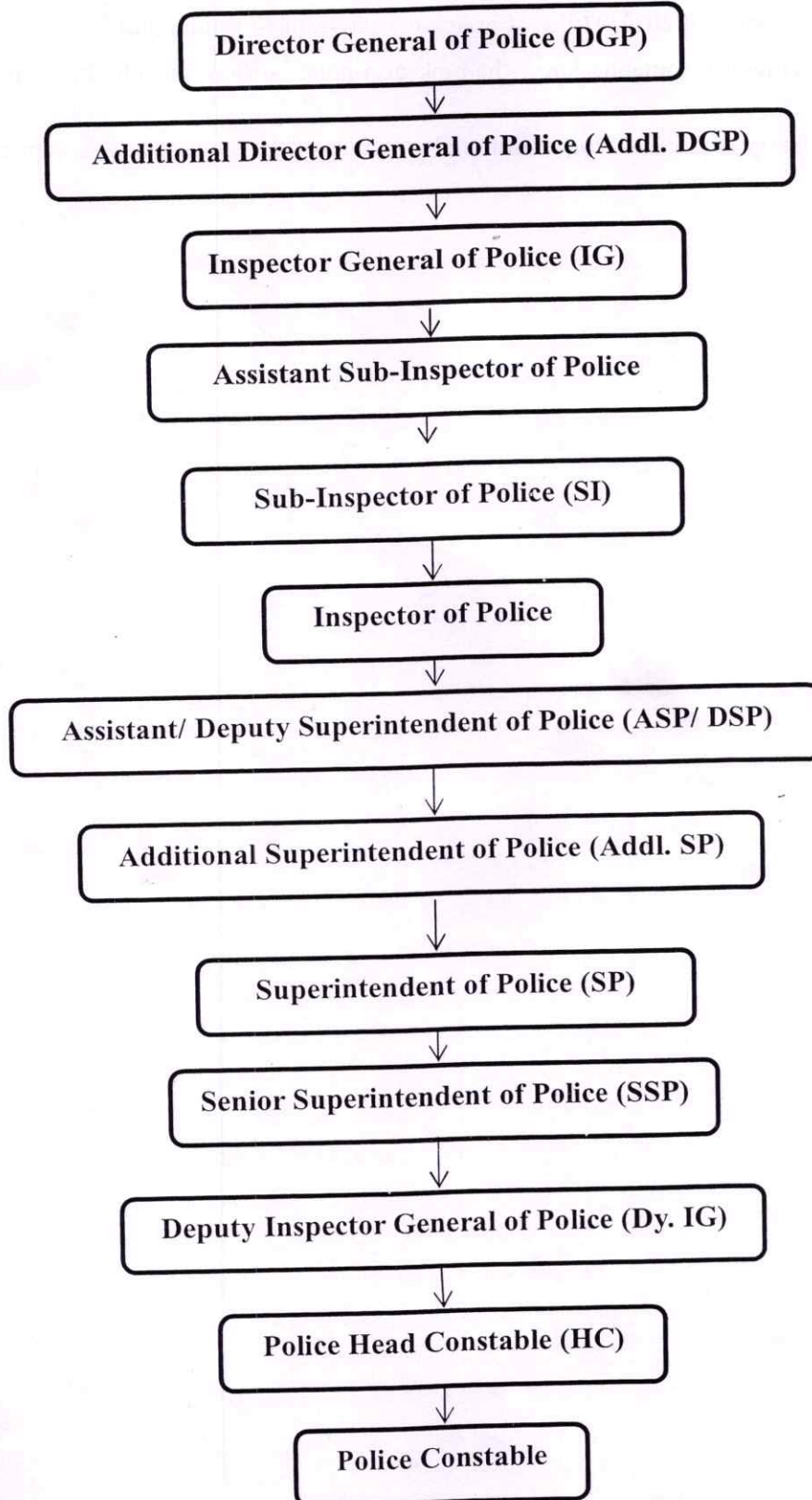
Head Constable of Indian Police is like a sergeant in police forces in other countries. Head constable puts three point-down shavings on their pool or three times on their applets.

14. Police Constable (PC)

Police Constable (Compress PC) is the lowest police rank in India, followed by Head Constable. Since the general law and order is the political subject of India, every State Government recruits the Police Constable. If a police constable has no shoulder signs, the head constable has a bar or a chevron state. All senior officials are the Indian Police Service Officers appointed by the Civil Services Examination. Since each state has its own police force, the uniforms and uniforms of the police are different, however, the structure has a uniform design. Central paramilitary forces also reserve the same state of state under the Central Executive, even if their jurisdiction is very different. All the Police Constable Wear (Khaki) colored uniforms which shows that he / she is a police officer. Police constables in India have been under the custody of the gun, but the ability to use them is considered to be the authorization passed by the order of the police command.

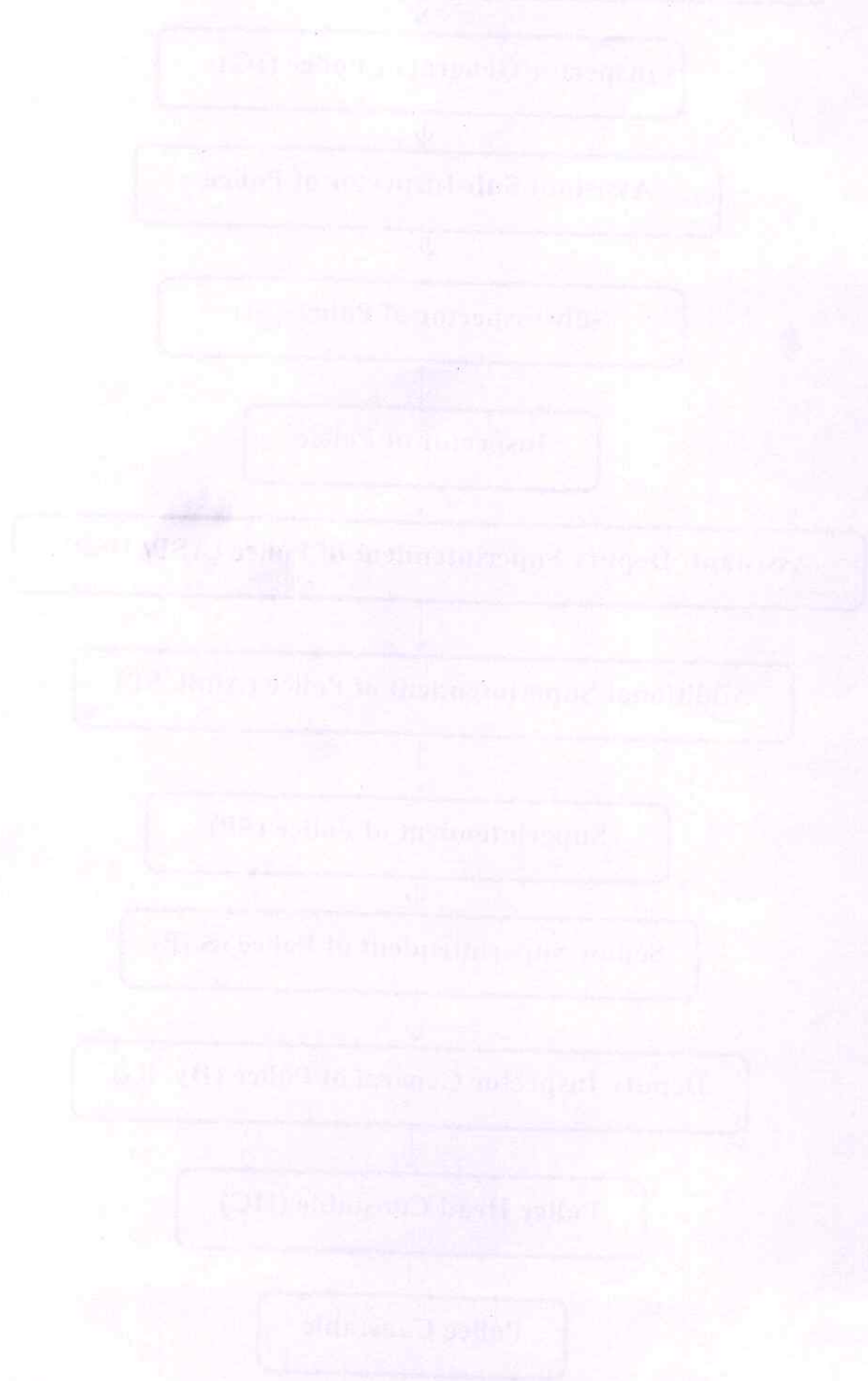
ORGANIZATIONAL STRUCTURE OF POLICE DEPARTMENT

Organizational Structure Each states of India has a police force. The superintendence over it is exercised by each State Government. The head of the police force in the State is known as Director General of Police (DGP). The DGP is responsible to the State Government for the administration of the police force in the State and for advising the government on the police matters. State Police Organizations in India are structurally organized into various formations. The rank and hierarchical structure of the police organization is as following:



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भारतातील बालकामगार समस्या निर्मूलनासाठी कायदेशीर उपाययोजना

प्रा. माधव उत्तमराव उगीले

समाजशास्त्र विभाग, रामकृष्ण परमहंस महाविद्यालय, उस्मानाबाद

प्रस्तावना :-

बालकामगारांची समस्या ही विश्वव्यापी समस्या आहे. विकसित देशापेक्षा विकसनशील देशात या समस्येने उग्र रूप धारण केले आहे. बालकामगार रोजगाराकडे खुशीने नव्हे तर नाईलाजाने वळतात कारण दारिद्र्यामुळे उद्भवलेल्या भिषण वास्तवाला सामोरे जाण्यासाठी या बालकाकडे दुसरा पर्याय नसतो जे वय खेळण्या बागडण्याचे असते, जे वय शिक्षण घेण्याचे आहे त्या वयात आईवडिलांच्या प्रेमाच्या छायेखाली निर्धास्त जगायचे आहे त्या वयात अनेक मुले बालकामगार म्हणून जीवन जगत असतात अशा लहान मुलांना-कष्टाची कामे करावी लागत असतात. मुलांचा शिक्षणाचा, खेळण्याचा जन्मसिद्ध अधिकार असतो. या लहान मुलांना काम करताना पाहून मानवी हक्काचे उल्लंघन होत आहे असे वाटते. ही गोष्ट विकासाचा सर्वांगीण विचार करणाऱ्या कोणत्याही समाजाला शोभणारी नाही. आंतरराष्ट्रीय श्रम संघटनेने १९९२ साली प्रकाशित केलेल्या जागतिक कामगार अहवालामध्ये सर्वात जास्त बालकामगार भारतात आहेत असे मत मांडले आहे. भारतातील एकूण बालकामगारांपैकी ६०% बालकामगार शेती व्यवसायाशी निगडित आहेत. शहरातील बालकामगार वेगवेगळ्या पध्दतीचे कामे करतात. हॉटेल, भोजनालय, बाजार, रस्त्यावर छोटे स्टॉल टाकून माल विकणे, बुट पॉलीश करणे, रस्त्यावरचा कचरा, भंगार माल जमा करणे ते विकणे, वर्तमानपत्रे विकणे इत्यादी स्वरूपाची कामे ते करतात त्याचप्रमाणे मोठ्या उद्योगात कारखान्यात बाल मजूर काम करतात.

आज आंतरराष्ट्रीय पातळीवर बालकामगारांच्या समस्येची गांभीर्याने जाणीव निर्माण झाली. त्यातून बालकामगार समस्येच्या निर्मूलनासाठी कायदेशीर उपाययोजना करण्यात आल्या. प्रस्तुत शोध निबंधात बालकामगारांच्या समस्येच्या निर्मूलनासाठी करण्यात आलेल्या कायदेशीर उपाय योजनाचा आढावा घेण्यात आला आहे.

संशोधनाचा उद्देश :-

- १) बालकामगारांच्या समस्येचे स्वरूप समजून घेणे.
- २) बालकामगार समस्येची कारणे समजून घेणे.
- ३) बालकामगार समस्येच्या निर्मूलनासाठी करण्यात आलेल्या कायद्याचा अभ्यास करणे.

संशोधन पध्दती :-

प्रस्तुत शोधनिबंधासाठी दुय्यम स्रोताचा उपयोग करण्यात आला आहे. त्यामध्ये संदर्भग्रंथ, मासिके, वर्तमानपत्रातील लेख, इंटरनेट इत्यादीचा उपयोग करण्यात आला आहे.

विषय विश्लेषण :-

बालकामगार व्याख्या :-

१) होमरफोक :-

“बालकामगार म्हणजे मुलांनी केलेले असे कोणतेही काम की ज्यामुळे त्यांच्या पुर्ण शारीरिक विकासांमध्ये, किमान शैक्षणिक पातळी गाठण्याच्या संधीमध्ये किंवा आवश्यक मनोरंजनामध्ये बाधा उत्पन्न होते.”

२) दि कमिटी ऑफ चाईल्ड लेबर :-

“बाल लोकसंख्येतील असा भाग की जो सवेतन किंवा विनावेतन काम करतो त्याला बालकामगार म्हणावे.”

३) कामगार चौकशी समिती :-

“भारतीय कामगारांच्या व्यवस्थेवरील एक काळा डाग म्हणजे काही उद्योगधंद्यात बेकायदेशीररित्या नेमण्यात आलेली मुले होय.”

४) आंतरराष्ट्रीय भ्रमिक संघटना :-

“ज्या मुलांवर सतत प्रौढ व्यक्तीची जबाबदारी असते, जी मुले त्यांच्या शारीरिक, मानसिक विकासाला मारक ठरेल अशा वातावरणात कमी मोबदल्यात काम करतात, जी मुले आपल्या कुटुंबाला दुरावलेली असतात. जी मुले रत्तःच्या उज्वल भवितव्यासाठी आवश्यक ठरेल अशा शिक्षण व प्रशिक्षणाला पारखी झालेली असतात अशा सर्व मुलांना आंतरराष्ट्रीय श्रमीक संघटनेने बालकामगार संबोधले आहे.”

बालकामगार या संकल्पनेत अशा मुलांचा समावेश करण्यात येतो की, ज्यांना कुटुंबाच्या उत्पन्नात काही तरी भर पडावी म्हणून त्यांच्या मातापित्याकडून एखादे लाभदायक काम करावयाला भाग पाडले जाते किंवा एखादा उद्योजक आपल्या फायद्यासाठी कायद्याने निश्चित केलेल्या वयापेक्षा कमी वयाच्या मुलांना बेकायदेशीररित्या आपल्या उद्योगात सवेतन अगर विनावेतन काम करायला भाग पाडतो. ज्यामुळे त्यांच्या शिक्षणाच्या विकासाच्या संधी त्यांच्याकडून हिरावून घेतल्या जातात अशा कामाचे त्यांच्या आरोग्यावर विघातक परिणाम होतात.

बालकामगार समस्येची कारणे :-

खेळण्या-वागडण्याच्या अगर शिक्षण घेऊन भावी आयुष्याची सुखस्वप्ने पाहण्याच्या काळात भारतातील लाखो मुले असंख्य उद्योगात अगर कामात स्वतःला नेममकी का झोकून देतात हे जाणुन घेणे आवश्यक आहे.

१) दारिद्र्य :-

भारतात आजही बरेच लोक दारिद्र्य रेषेखाली जीवन जगताना आढळतात. त्यामुळे बालमजुरी एक जटील समस्या निर्माण झाली आहे. अशा कुटुंबातील पालक दारिद्र्यामुळे मुलांनी कोणता तरी उद्योग अगर काम करून आपल्या कुटुंबाच्या चरितार्थाला हातभार लावावा या अपेक्षेने मुलांना काम करायला भाग पाडतात तर काही दारिद्र्यातील कुटुंबात मुले हीच कमावती असतात. प्रचंड प्रमाणात असलेल्या दारिद्र्यामुळे बालमजुरीची समस्या वाढीस लागली.

२) कामगारांना मिळणारे निम्न वेतन:-

प्रौढ कामगारांना देण्यात येणारे निम्न वेतन व बालकामगारांची समस्या यामध्ये अत्यंत जवळचा संबंध आहे. आज प्रौढ कामगारांना त्यांना मिळणाऱ्या वेतनात त्यांना आपल्या कुटुंबीयांच्या गरजांची पूर्तता करणे अशक्य होते. परिणामी या गरजांची पूर्तता करण्यासाठी मुलांना देखील कोणते तरी वेतन मिळवून देणारे काम करणे भाग पडते. आपल्या कुटुंबीयांच्या मुलभूत गरजांची पूर्तता करण्याइतपत किमान वेतन प्रौढ कामगारांना न मिळणे हे बालकामगार निर्मितीचे कारण बनते.

३) प्रचंड प्रमाणात वाढत असणारी बेकारी व तेजी मंदी :-

वाढती बेकारी व उद्योग व्यापार जगतातील तेजी मंदीमुळे असंख्य समस्या वाढत चाललेल्या आहेत. पालक बेकार असतील तर तेजीमंदीच्या फटक्यात त्यांच्यावर बेकारीची कुऱ्हाड कधी कोसळेल त्याची खात्री नसेल तर या अनिश्चिततेला पर्याय म्हणून त्यांच्या कोवळ्या मुलांना कामाला लावले जाते आणि आपल्या उदरनिर्वाहासाठी पालकांनाच मुलांवर अवलंबून रहावे लागते.

४) झोपडपट्ट्या :-

झोपडपट्ट्या अगर गलिच्छ वस्त्यात वास्तव्य करणारे लोक रात्रंदिवस आपल्या चरितार्थासाठी झगडत असतात. अशा परिस्थितीत या झोपडपट्ट्यात वाढणारी मुले-मुली कचरा गोळा करण्याचे काम करत असतात. परिणामी झोपडपट्ट्या बालकामगारांच्या निर्मितीची केंद्रे असतात.

५) मालक लोकांचे हितसंबंध :-

बाल मजुराकडून अत्यंत कमी मोबदल्यात जास्तीत जास्त काम करवून घेता येते. त्यांना फारशा सुविधा द्याव्या लागत नाहीत. बालमजूर १४-१४ तास कोणतीही तक्रार न करता काम करत असतात. ते स्वतःच्या संघटना बांधून मालकाबरोबर संघर्ष करत नाहीत याची मालकांना खात्री असते. बालमजुरांना कामावर नेमून घेण्यात मालक लोकांचे हितसंबंध हे बालकामगारांच्या संख्येत होणाऱ्या वाढीचे महत्त्वाचे कारण आहे.

६) शासनाचे अक्षय्य दुर्लक्ष :-

बालमजुरांना कायद्यातील तरतूदीचा भंग करून नेमून घेणाऱ्या उद्योजकावर कठोर कारवाई शासन करत नाही. परिणामी अत्यल्प असणारा दंड भरून उद्योजक बालकामगारांना मोठ्या प्रमाणात उद्योगात नेमून घेताना आढळतात.

या सर्व कारणाबरोबरच शिक्षणाच्या सुविधा जवळ अंतरावर उपलब्ध नसणे, उपभोगवादी संस्कृतीचा वाढता प्रसार. आधुनिकीकरणाचा मुलांवर पडणारा प्रभाव ही कारणेही काही प्रमाणात बालकामगारांच्या निर्मितीला कारणीभूत ठरतात.

बालकामगारांच्या समस्येवरील कायदेशीर उपाययोजना :- इ.स.१९८१ साली संमत करण्यात आलेला कारखाना विषयक कायदा हा मुलांना नोकरीवर ठेवण्यावर व त्यांच्या कामाच्या तासावर नियंत्रण ठेवणारा पहिला कायदा ठरला आहे.

१) बालश्रम अनुबध्द कायदा, १९३३ :- आर्थिक दुरावस्थामुळे कामगारांनी कर्ज मिळवण्यासाठी आपल्या मुलाचे श्रम कारखानदाराकडे गहाण ठेवण्याची प्रथा सतराव्या विणणे, बिड्या वळवणे इत्यादी उद्योगात प्रचलित होती. ही बाब रॉयल कमिशनने केलेल्या पाहणीत उघडकीस आली. परिणामी या कमिशनच्या शिफारशीनुसार १९३३ साली बालश्रम अनुबध्द कायदा करण्यात आला.

या कायदानुसार कर्ज राशी मिळवण्याच्या हेतूने बालकामगारांचे श्रम गहाण ठेवून नंतर कारखानदारांनी बालकामगाराकडून काम करून घेण्याच्या प्रथेला बेकायदेशीर ठरविण्यात आले. या कायदानुसार १५ वर्षाखालील व्यक्तीला बालक मानले जाईल. कायद्यातील तरतूदीचा भंग केल्यास बालकामगारांच्या आई-वडिलांना ५० रूपयापर्यंत आणि सेवायोजकांना २०० रूपयांपर्यंत दंड केला जाऊ शकतो.

२) बालरोजगार कायदा, १९३८ :- बालकामगारांना संरक्षण मिळवून देण्याच्या दृष्टीने हा कायदा महत्त्वाचा आहे. या कायद्यातील तरतूदी-

१) १५ वर्षांपेक्षा कमी वय असणाऱ्या कोणत्याही बालकाला रेल्वे प्रवासी किंवा माल वाहतुकीशी संबंधित इतर व्यवसायामध्ये तसेच बंदराच्या सिमेच्या आत माल उचलणे ह्या कामावर लावता येणार नाही.

२) या कायदान्वये पुढील २० उद्योगात १४ वर्षाखालील मुलांनी काम करू नये किंवा त्यांना या उद्योगामध्ये काम देण्यात येऊ नये. बिड्या तयार करणे, गालिचे विणणे, सिमेंट तयार करणे व पोती भरणे, रंग तयार करणे व विणकाम, आगकाड्या तयार करणे, स्फोटक-दारु गोळा, मायका कटिंग व लाकूड कटाई, साबण, अॅसिड तयार करणे व लोकर स्वच्छ करणे.

३) कारखाना कायदा, १९४८ :-

१९४८ भारतीय कारखाना कायदान्वये आपल्या वयाची १५ वर्ष पूर्ण न केलेल्या कोणत्याही व्यक्तीला बालक मानले जाते. वयाची १४ वर्ष पूर्ण न झालेल्या बालकांना या कायदान्वये कोणत्याही कारखान्यात काम करता येत नाही. बालकामगारांना कोणत्याही

दिवशी साडेचार तासापेक्षा जास्त मुदतीसाठी काम देता येणार नाही. तसेच कोणत्याही कारखान्यात त्यांना रात्री १० वाजलेपासून सकाळी ६ वाजेपर्यंत कामावर घेता येणार नाही. बालकामगारांना कामावर ठेवणाऱ्या प्रत्येक कारखान्याच्या मॅनेजरला त्यांच्याबद्दल एक रजिस्टर ठेवणे आवश्यक असून त्यामध्ये सर्व बालकामगारांची माहिती अद्ययावत स्वरूपात लिहिण्याची जबाबदारी या कायदाने निश्चित करण्यात आली. या कायदान्वये कोणत्याही कारखान्यात बालकामगारांना यंत्राचा गतिशील भाग स्वच्छ करण्यासाठी, तेल देण्यासाठी किंवा फिरत्या यंत्रावर काम करण्यासाठी रोजगार देता येणार नाही.

४) मळे कामगार कायदा, १९५१ :-

या कायदान्वये १२ वर्षांपेक्षा कमी वय असलेल्या व्यक्तीला मळ्यामध्ये कोणत्याही प्रकारचे काम करता येणार नाही.

५) खाण कायदा, १९५२ :-

या कायदान्वये १५ वर्षांपेक्षा कमी वय असलेल्या कोणत्याही व्यक्तीला खाणीमध्ये कुठेही व कोणत्याही प्रकारचे काम देता येणार नाही.

अशाप्रकारे विविध कायदे बालकामगारांच्या संरक्षणासाठी करण्यात आले.

सारांश :-

बालकामगारांच्या संरक्षणासाठी विविध कायदे करण्यात आले असले तरी शासनाने केलेल्या कायदेशीर तरतूदीचे योग्य प्रकारे पालन झाले तरच कायद्याच्या माध्यातून बालकामगार समस्येची तिव्रता कमी करता येऊ शकते. त्यासाठी कायद्याची अत्यंत काटेकोरपणे अंमलबजावणी होणे गरजेचे आहे. समाजातील सर्व घटकांनी बालकामगारांच्या समस्येच्या निर्मूलनातील आपली जबाबदारी ओळखून योग्य दिशेने प्रयत्नाची पराकाष्ठा केली तरच या समस्येची तिव्रता कमी होऊ शकते. बालकामगारांची समस्या सोडवण्यासाठी बालकाच्या पालकात जागृती घडून आणावी लागले. या समस्येच्या निर्मूलनासाठी कायदेशीर तरतूदीबरोबरच लोक जागृती सुध्दा तितकीच महत्त्वाची आहे.

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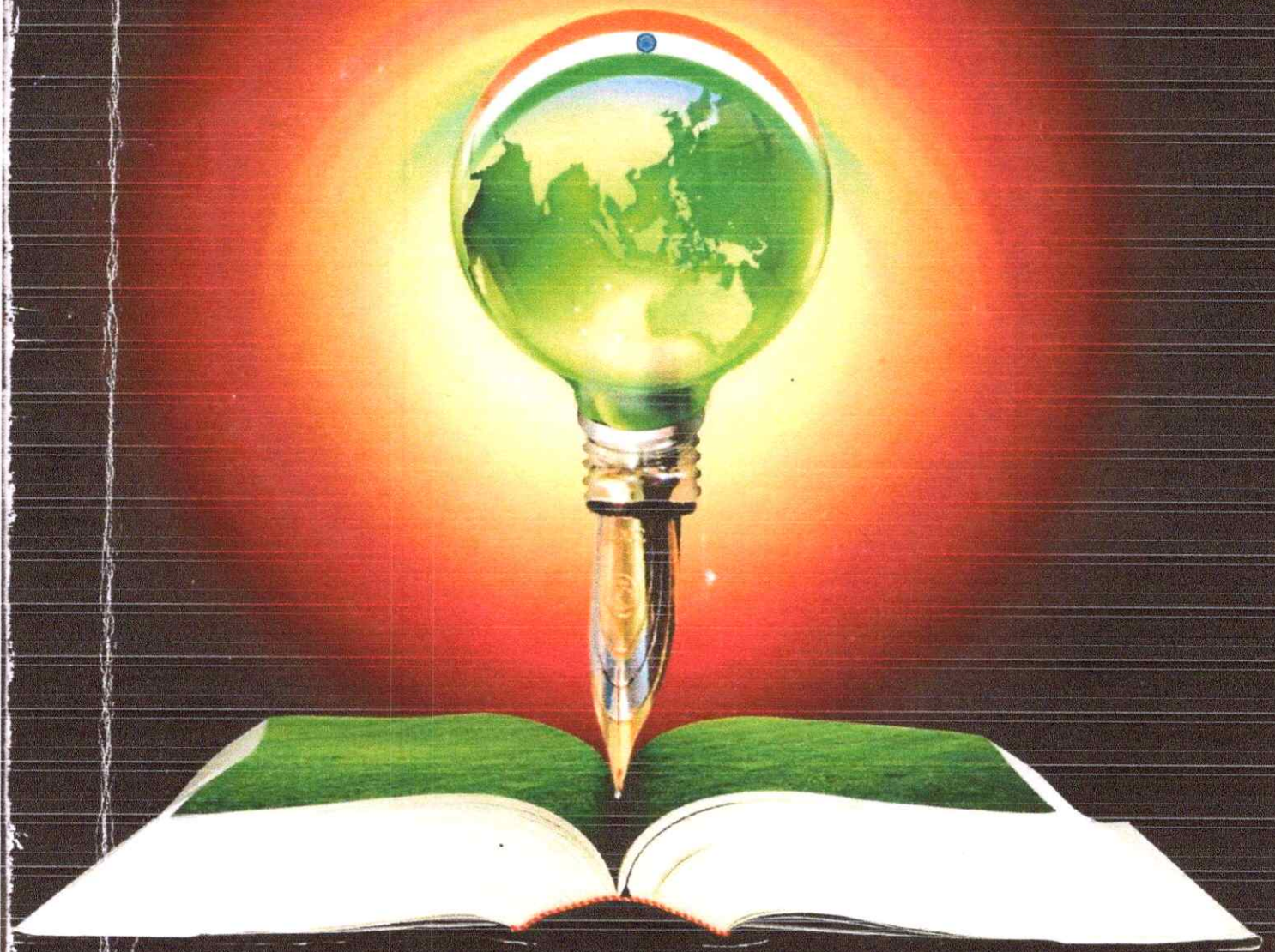
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Future Prospects of Co-operative Dairies in Osmanabad District

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1.1. INTRODUCTION:-

In the process of liberalization, privatization, globalization and market oriented economy livestock is an important source of income for a nation. In fact, pastoral production is far more resilient than crop production and more remunerative too. The share of livestock production in the aggregate agricultural output in some of the West European countries is about 60% to 80% percent in recent years. In India, however, the gross value of output from livestock sector i.e. animal husbandry and dairy development is placed at 6.5 percent of India's GDP (in 2002-03) at current prices. The value of output from livestock is showing an increasing trend in India. The value of output of livestock was estimated at Rs. 1,73,350 crores during 2004-05 at current prices which is about 36 per cent of the total value of output of agriculture and allied sectors. The contribution of milk alone (valued at Rs. 1,15,970 crores in 2004-05) was higher than paddy (Rs. 70,462 crores), wheat (Rs. 48,050 crores) and sugarcane (Rs. 23,167 crores).

The significance of livestock sector in the Indian economy arises also because of its assistance to tackle the serious problems of unemployment and under employment for weaker section in the country and for providing subsidiary occupation for income generation. It also plays a dominant role in dry-land agriculture particularly in the semi-arid and arid areas of the country. Animal husbandry and dairy development are being used as poverty - eradication measures, i.e., to provide additional employment and increase family income of the rural poor.

Livestock provides regular employment to about 11 million in principal status. It is equally interesting to note that women constitute 69 percent of the labor force in livestock sector as against 35 percent in crop farming. Finally, export earnings from livestock related product were Rs. 8,200 crores in 2002-2003. Thus, the livestock sector plays an important role in India's economy and in the socio-economic development of the country. India is at the top of world having 17 percent of the total livestock population less than one-fifth of cattle, half of buffaloes, and over one-fifth of goats and sheep. China comes second with only 10 percent. Countries which have well developed livestock based industries like Australia, Belgium, Denmark, Finland, Ireland, Italy, Norway, the Netherlands, Sweden, Switzerland, etc., have only small herds that is less than 1 percent of the total.

Livestock requires sufficient land area for their sustenance, particularly grazing land, consisting of permanent meadows and pastures. India has the lowest per unit amount of grazing land; even densely populated countries of Europe have much higher amount of grazing land per unit of livestock. India has too many units of livestock depending upon too

small a patch of land. The poor yield of Indian cows is proverbial. It is estimated that the average yield of cows in India is 220 liters per year, as compared to 3,000 to 5,000 liters per year in Western countries. As regards meat, about three-fourths of the meat produced in India is from goats and sheep's. Beef accounted for only 6 percent. Thus through cattle accounted for the largest proportion of livestock in India, their contribution to the national income of India was insignificant. The contribution of livestock to income from agriculture has been more than 50 percent in all the advanced countries of the world. This is exceptionally high in some countries (75 to 85 percent) - such as Denmark, Sweden, Norway, etc. for they enjoy exceptional environmental advantages for rearing quality livestock.

It has been observed that in advanced countries like the United States of America, West Germany, England, etc., the share of livestock in the gross agricultural income has remained steady since the 1930s and at every high levels. On the other hand, in India, the share of livestock in the gross agricultural income in the total income of the country declines but the share of livestock income in the gross agricultural income increases. Today India has the fastest growing dairy industry in the World. In fact as Vergees Kurien, Chairman of the National Dairy Development Board, correctly put it: "Dairying in India has come of age." In "Operation Flood" the role of Co-operative dairy that is Anand Co-operative Model was very important.

Maharashtra is one of the highly reputed states in India. Agriculture is the main occupation of this state. Near about 62 % per cent of the state population is engaged in agriculture sector. In the economy of Maharashtra the share of agriculture sector is 34 % as one of the highly milk producer state in India. In the development of dairy sector in Maharashtra the role of co-operative dairies is very important. At present there are 23 Co-operative Union and 29 cooperative Dairy Plants in Maharashtra having 3,820 thousand liters per day milk capacity. Maharashtra's Co-operative dairy model is famous in the World. Co-operative dairies probably highly succeed through the Kolhapur, Sangali, Satara, Ahmednagar, Nashik and Pune District in Maharashtra. Vikas, Mahanand, Gokul, Dhawal, Duddh Pandri, Warna, Rajhansa, Koyrna and Shivamrit are foremost milk product brands of Maharashtra.

Osmanabad is one of the district of Marathwada regions in Maharashtra. Major population of this district is engaged in agriculture sector. High portion of land of this district is fertile and here is huge potential for the development of dairy farming. Agriculture with dairy farming is only one source of economic development of this district. Farmers economic condition is also depend upon the development of dairy farming and the development of dairy farming in this district is depend upon the development of co-operative dairies web.

Milk production and the number of cows have been increased since last few years. Couples of co-operative dairies are existed in this district but their performance is not so good because they are facing so many problems and difficulties. But, there is no drought

that, in future these co-operative dairies will have good future prospects because here is high potential for dairy farming and with the connectivity of new railway lines from Osmanabad to Solapur, Aurangabad, Pune, Mumbai. Its demand etc. nearest markets will be available which will bring out change in demand of milk and its by-product. In respect of future prospects co-operative dairies in Osmanabad District will have to take some necessary strong steps means required measures on various ground today.

1.2. HISTORICAL BACKGROUND OF CO-OPERATIVE DAIRIES:-

The principles of co-operation are not in any way new to India. Co-operation has been known and practiced in this country in various forms since ancient times. The joint family system which is very old and exists till today is one instance of indigenous co-operation. Under this system, the land is owned and cultivated in common, while all adult members have to share the duties of the family engaged in occupations other than agriculture. Members of the family live in a common house and the household expenses are met from the income of the joint property. The institution is based on a feeling of brotherhood and mutual help.

Another form of co-operation is panchayat which is based on the principle of community self-help. Although the system has fallen somewhat into decay, panchayats are still common and in all States they have been revived. The main functions of these organizations are to deal with the question relating to the economic and social welfare of the community. Disputes among the members are also referred to them for decision. The decisions of the panchayats are enforced under the penalty of social boycott.

Then there are "Chief funds" commonly found in South India, which are based on the principles of mutual association. Under this system a number of persons join together and each member agrees to pay every month for a specified period a fixed sum. Every month when the sub scrip tions are realized, lots are drawn and the person drawing the lot is paid the total monthly subscrip tion. The whole system of the "Chief funds" depends upon mutual confidence and honest de

pendent which are the main essentials of co-operation. The history of Dairy Development Movement in India is a new one. During the pre-independence period this movement was limited to a few pockets of Calcutta, Madras, Bangalore, some part of Maharashtra and Gujarat. The most notable of this venture was Kaira District Co-operative Milk Producers' Union Limited of Anand, Gujarat. But after independence the National Government took great initiative in setting up new Dairy Co-operatives in many parts of the country. The National Dairy Development Board was set up to make the ambitious project a success.

The importance of co-operative dairies came to know the farmers of Osmanabad district last two decade and since then the process of development of cooperative dairies took place in

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this district. Now, it is known as first milk producer co-operative dairy in this part of Maharashtra.

1.3. OBJECTIVES:-

- To find out the present position of co-operative dairies in Osmanabad District.
- To find out the importance of the development of co-operative dairies in this District.
- To find out whether there is scope for the development of co-operative dairies in Osmanabad District or not.
- To find out how far there is potential for the development of co-operative dairies in Osmanabad District.
- To search out existing obstacles and problems in the development of co-operative dairies in Osmanabad District.
- To search out what types of measures will have capacity to bring out notable development of co-operative dairies through Osmanabad District in future.

1.4. HYPOTHESES:-

- The role of co-operative dairies is very important in the development of agricultural sector.
- Even though the main co-operation of Osmanabad District and Kaira dairies will have capacity to become best complementary co-operation.
- All people from all the districts of cow have been increased and they are in the district.
- Dairy dairies are widely produced in this District.
- There are some serious obstacles and problems in the development of co-operative dairies in Osmanabad District and that is why it is not developed.
- The role of co-operative dairies is very important in the development of agricultural sector.

will run out remarkable rate and which will bring out notable change in the economic condition of farmers in this District

1.5. RESEARCH METHODOLOGY:-

Comparative research method has been used for the analysis of present research topic. Compression has made among co - operative dairies in Osmanabad District and highly developed co- operative dairies in other districts in Maharashtra as well as in India

1.6. COLLECTION OF DATA:-

Primary and secondary data has been used for present research. Primary data has been collected through the questionnaires and interview. For to search out real findings and to come certain conclusion questioner was prepared in that sense and it has been filled up by selected farmers, members and officers of co-operative dairies in Osmanabad District and of some selected districts in Maharashtra and in rest of India. Direct personal interview has been taken of selected farmers, members and officers of co- operative dairies in Osmanabad and some selected districts in Maharashtra and in rest of India. Direct personal interview has been taken of social reformers, brilliant personalities, public representatives and of political leader of different parties in Osmanabad District.

While the selection of farmers, members and officers of co- operative dairies in the context of filling questioner and taking their personal interviews, selection method has been used with certain criteria. Secondary data has been collected through the various concern Government Office, certain state and national levels committees, institutions published reports and also from the reference Books, Journals, Magazine etc

1.7. SIGNIFICANCE OF THE STUDY:-

- > It has cleared the exact picture of present position of co- operative dairies in Osmanabad District.
- > It has cleared the importance of well developed co- operative dairies in Osmanabad District.
- > It has been find out the various obstacles in the development of co- operative dairies in Osmanabad District.
- > It has been find out that there is potential for the development of co- operative dairies in Osmanabad District.
- > It has been searched out that what types of measures are required for the better performance of co- operative dairies in Osmanabad District.
- > It will give broad guideline to the runner of co- operative dairies.

- > It will also helpful to those persons who have responsibility of the development of this district

1.8. CONCLUSION:-

Activities of a group can be directed, organized, controlled and unified through an able and efficient managerial skills . Every kind of organization whether it can be a business organization or social, political, educational, Religious, military or government, requires some form of management for the achievement of its goals. With this certain truth for to find out the difficulties and problems in the Co-operative Dairies in Osmanabad District and to suggest the important measures for the better performance of Co- operative Dairies in Osmanabad District. Thus this chapter speaks about the general guideline of present research topic.

1.9. REFERENCES:-

For this present research concerned reference books and state, national, international institutions reports as well as Journals, Magazines has been used and their list will be provided at the end of research project.

- > Co-operation in Foreign Lands :- Dr. C. B. Mamoria & Dr. R.D. Saksena
- > Theories & Practice of co-operation I India & abroad :- Prof. K. R. Kulkarni.
- > Commercialization of Agriculture in Maharashtra :- Dr. Ram Sable
- > Indian Economy :- K. P. Sundaram
- > Indian Economy :- Agrawal

Currency Risk Management Practices in India – Evidence from the Textile Sector

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1. Introduction:-

The has been a tremendous growth in international trade after World War-II. During this period, efforts were made to facilitate free flow of goods and services across the world. As a result, world, trade grew at a faster rate. When a company has multinational operations, its receivables and payables are denominated in a foreign currency, which is subject to currency exposure. It is currency risk management, which helps to hedge foreign currency receivables and payables. Currency risk management involves using both internal techniques such as selection of the right currency for invoicing, prepayment and delayed payments of payables, and post payment of receivables, and external techniques such as forward exports, and external techniques such as forward calls as currency derivatives. The firms with financial constraints are more inclined to use currency derivatives. The firms with prefer OTC instruments like swaps, options, and the latter is used more in the export sector. The textile sector is one of the prominent economy dating back centuries. India's textile exports, especially cotton, contribute to the production (GDP). The textile sector is one of the major contributors to the Indian textile production is valued at US 108 billion in 2021. The textile sector consists of disorganized segments comprising of handloom, power looms, and sericulture, which are worked on a minor scale and through old-fashioned methods and structured segment comprising spinning, apparel, and garment sector, which apply contemporary machinery and work on large economies of scale.

2. Review of Literature :-

Markar and Huffman (1997) examined the use of currency derivatives by U.S. multinationals for hedging currency exposure. It was observed in the study that the firms had practice of using multiple hedging techniques. Abor (2005) found that the Ghanaian firms managed foreign exchange risk mainly by adjusting prices to reflect changes in import prices resulting from currency fluctuation and also by buying foreign currency in advance. The main problems the firms faced were the frequent appreciation of foreign currencies against the domestic currency and the difficulty in retaining domestic customers because of the high cost of imported inputs, which tend to affect the prices of the final products sold locally.

Yazid and Muda (2006) conducted a study on risk management practices followed by Malaysian multinationals and found that the Malaysian multinationals were involved in foreign exchange risk management primarily because they sought to minimize the losses on operational cash flows, which were affected by currency volatility. And Kaushik (2008) examined the reason for using foreign currency derivatives in corporate India and found that reducing fluctuations in profit after tax, cash flows, and the cost of capital, and thus increasing value of the firm were the major reasons motivating the firms to use foreign currency derivatives. It was also observed that the firms with a high degree of debt-equity ratio were more likely to use foreign currency derivatives. It was further with a high degree of debt-equity ratio were more likely to use foreign currency derivatives. It was further observed that transaction exposure was more critical to the firms followed by translation exposure manifested by a moderate degree of risk and economic exposure manifested by a low degree of risk.

Al – Momani and Gharraibeh (2009) conducted a study on the foreign exchange risk management practices of Jordanian firms and observed the relationship between numerous aspects that were assumed to affect the implementation of foreign exchange risk management techniques, namely firm size, sector, international business involvement, and legal structure. The study also focused on transaction and economic exposures as the dimensions of foreign exchange risk management techniques. A connection between a

firm's sector and international involvement with the management practices was found in the transnational exposure aspect and a relationship between all the features and the managerial techniques was found in the economic exposure dimension. Dash, Babu, Reddy, and Vivekandanda (2008) observed in their study that in the world of globalization and international business, firms are performing one or the other kind of international activity like selling their products abroad, sourcing raw materials from abroad, raising funds abroad, or investing in international markets and have to deal with many currencies for making or receiving payments. This exposes them to foreign exchange risk where an appreciation or depreciation in the currency they are dealing with may erode away their profits thereby making it necessary to manage foreign exchange risk.

Jaiswal and Saha (2009) observed in their study that financial intermediaries abroad have created new varieties of instruments and transactions called derivatives and risk management tools such as options, futures, and swaps, which were used to transform one or more properties of an asset or liability. Financial liberalization brought inherent risk and as a result, corporate and institutional investors were looking towards derivatives for hedging the risk. Since the volume of international trade and capital flows are rising, more banks are exposed to various currencies and the emerging derivatives in foreign countries are increasingly used by banks to bring variations in the sensitivity of their funds and also the underlying portfolio.

Vasumatthy (2015) analyzed the hedging techniques adopted, examined the attitude of the firms towards derivatives usage, and so forth. The results indicated extensive usage of forward contracts, existence of risk management systems in some firms, comparatively less awareness about derivatives, and employing a formal risk management system to monitor exchange rates was neutral as they perceived that these were meant only for multinational. The study recommended increasing the awareness of derivatives among the firms as the firms did not have the means to adopt alternate techniques like neutral and operational hedges. It also insisted that the firms should monitor exchange rates on a regular basis in the forthcoming years as the economic policies are edging towards stabilizing the economy.

After going through an exhaustive review of literature, it is found that there is a little research on finding whether or not currency derivatives are being used and which currency derivatives are being used by Indian business firms. In the light of this gap, we felt the need of research to be undertaken on this topic.

3. Objective of the Study :-

- We have set the following objectives to fill the existing research gaps:
- (i) To examine whether foreign exchange exposure among the companies remains uniform or not irrespective of size of the firm
- (ii) To examine whether foreign exchange exposure, exchange inflows and outflows wholly have an impact on exchange gain/losses.
- (iii) To examine whether choice of currency derivatives is independent of factors like exchange gain/losses, exchange inflows and outflows, net exposure, revenue, net profit, and number of currencies exposed to.
- (iv) To examine whether foreign exchange losses can be substantially minimized through currency derivatives and multiple currency investments.

4. Research methodology :

The current study follows a descriptive design that analyzes the causes of foreign exchange losses encountered in textile exchange losses. The current study is based on secondary data collected from the annual reports and official websites of the companies. In the study, the data consists of foreign exchange cash flows, average of export and import and profitability of the companies during 2010-11 to 2016-17. The study is carried out in a time-series manner on the basis of market capitalization. Firms were categorized into small cap, These are (A) Arvind Ltd, (B) Bombay Feinm & Mills Co Ltd, (C) Century Textiles and Industries Ltd, (d) Haryana Spinning & Textile Mills, (e) Indraprastha Textiles and Industries, (f) J. B. Chemicals and Pharmaceuticals Ltd, (g) Jindal Kanya Synthetics, (h) J. B. Chemicals and Pharmaceuticals Ltd, (i) Haryana Feinm & Mills Co Ltd.

(1) **Statistical Tools Used :** We used various statically techniques such as ANOVA, multiple regression based predictive analysis model, 'F' test, descriptive statistics tools, etc. ANOVA was used to verify whether the exchange exposure remained uniform or different across the companies chosen for the study. Multiple regression analysis was used to examine whether the choice of derivative instrument is the function of exchange losses, currency denominated, exchange exposure, etc. to examine whether the derivative usage and multiple currency invoicing have reduced the exchange.

(2) **Hypotheses :** We have set four hypotheses, as given below, in below, in line with objectives designed for the current study:

H₁ : foreign exchange exposure among the companies in textile sector remains uniform irrespective of size of the firm.

H₂ : Foreign exchange exposure has a bearing on the exchange gain/losses of the companies to a greater extent.

H₃ : Choice of currency derivatives derivative is independent of factors like exchanges losses, inflows, exchange outflows, net exposure, revenue, net profit, and number of currency exposed to.

H₄ : Foreign exchange losses can be substantially minimized through currency derivatives and multiple currency invoicing.

Analysis and Results

In this section, revenues, foreign exchange inflows and outflows and net exposure, and its impact on exchange gain/losses and profitability of the companies chosen for the current study is analyzed. Table 1. Statistical Results of Foreign Exchange Operations of Arvind Ltd.

Total	exchange	exchange	net	Exchange	net Profit
% of exchange Revenue	Inflows	Outflows	Exposure	Gain/Loss	
Difference on					
Net Profit					

Some Total	41261.7	11204	2936.27	8268.11	-71.22	2042.7	-16.27
Mean	5894.52	1600.6	419.47	1181.16	-10.17	291.82	-2.32
SD	1966.86	434.31	165.62	295.64	21.49	111.34	9.12
Range	5264.13	1084.5	468.45	662.62	56.34	300	27.85
Min	3282.69	1061.4	194.97	866.43	-40.83	135.87	-16.44
Max	8546.82	2145.9	663.42	1529.05	15.51	435.87	11.42
Derivatives used Swaps							
Currencies of Operations							

USD, EUR, JPY, CHF, and HKD

Source: Compiled from Annual Reports of Arvind Ltd.

Arvind Ltd. Is a flagship company Group formerly known as Arvind Mills headquartered in Ahmedabad, Gujarat. It is one of the largest manufacturers and exporters of denim. It also manufactures cotton shirting, knits, Khaki fabrics, etc. and has international operations denominated in USD, EUR, JPY, CHF, and HKD. The Table 1 exhibits statistical results of foreign exchange operation of Arvind Ltd. During the study period from 2010-2017. The total exchange inflows and outflows of the company for the selected period were Rupees 11204 cores and Rupees 2936.27 caror, respectively and total revenue of the company was Rupees 41261.7 Caror. This resulted in a favorable net exposure of Rupees 8268.11 caror, which was 20% of total revenue earned by the company. The total exchange loss was reported at Rupees 71.22 caror and average net exchange loss was Rupees 10.17 caror, which was just 3.49% of the net profit. Since the currency exposure was substantial, the company used forward options, and currency swaps to hedge the exposure.

Bombay Dyeing and manufacturing Co. Ltd. Is India's largest textile manufacturer belonging to Wadia Group. The company was ranked 68 in the Business India super 100 list in 1997 and was ranked 300 in the ET list in 2010. The company has international operation denominated in USD, EUR. And GBP. The Table 2 exhibits statistical results of foreign

exchange operations of Bombay Dyeing during the study period from 2010-2017. The total exchange inflows and outflows of the company for the selected period were Rupees 1949.2 caors and Rupees 5635.67 crores, respectively and total earned by the company was Rupees 1813 crores. This resulted an adverse net exposure, of Rupees 3686.45 crores. Which was 23.31% of the total revenue. The total exchange loss was reported at Rupees 44.62 crores and the average net exchange loss reported at only Rupees 6.37 crores during the period, which was 34.71% of net profit. The company used only forward contracts to hedge the currency expose Century Textiles and Industries Ltd. Is a Mumbai based IS/ISO 9001 : 200 and ISO 14001 certified textile manufacturer. It manufactures yarn, denim, viscose filament rayon yarn, tire cords, etc. And exports to more than 45 countries across the globe. It was awarded 'Three Star Export House' status by the Government of India has international operation denominated in USD, EUR, GBP, CAD, JPY, and CHF. The Table 3 exhibits statistical results of foreign exchange operations of Century Textiles and Industries Ltd. During the study period from 2010-2017. The total exchange inflows and outflows of the company for the selected period were Rupees 3141.66 crores and Rupees 3774.08 crores, respectively and total revenue was Rupees 42561.6 crores. This resulted in an adverse net exposure of Rupees 632.52 crores. Which was just 1.49% of the total revenue earned by the company? The total exchange gain

Table 2. Statistical Result of Foreign Exchange Operation of Bombay Dyeing & Mfg.Co.Ltd

	Total exchange	exchange net	Exchange	net Profit	% of exchange		
Revenue	Inflows	Outflows	Exposure	Gain/Loss	Difference on Net Profit		
Sum Total	15813	1949.2	5635.67	-3686.45	-44.62	128.46	-225.34
Mean	2259	278.46	805.1	-526.64	-6.37	18.35	-32.19
SD	387.49	44.66	231.21	197.14	18.37	53.22	35.99
Range	1090.64	132.53	743.97	611.44	57.6	166.7	102.79

(R in cr.)

Min	1732.04	202.44	426.27	-835.27	-36.54	-91.09	-74.97
Max	2822.68	334.97	1170.24	-223.83	21.06	75.5	27.82
Derivatives used	Forwards,						
Contracts	• • •						
Currencies of Operations	USD, EUR, and GBP						

Source: Compiled from Annual Reports of Bombay Dyeing & Mfg.co.Ltd.

Table 3. Statistical Results of Foreign Exchange operations of Century Textiles and Industries Ltd.

	Total exchange	exchange net	Exchange	net Profit	% of exchange		
Revenue	Inflows	Outflows	Exposure	Gain/Loss	Difference on Net Profit		
Sum Total	42561.6	3141.6	3774.08	-632.52	28.91	544.98	271.92
Mean	6080.23	448.79	539.15	-90.36	4.13	77.85	38.85
SD	1409.11	91.21	166.31	188.35	-13.9	155.84	84.61
Range	3486.87	223.33	511.2	530.15	39.22	410.68	209.01
Min	4547.57	365.51	371.97	-511.54	-11.49	-54.52	-29.99
Max	8034.44	588.84	6883.17	18.61	27.73	356.16	179.02
Derivatives used	Forwards, Options, and Currency						
Swaps							
Currencies of Operations	USD, EUR, GBP, CAD, JPY, and						
CHF							

Source: Compiled from Annual Reports of Century Textiles and Industries Ltd.

Table 4. Statistical Results of Foreign Exchange Operation of Himatsingka Seide Ltd.

(Rin cr.)		Total exchange	exchange	net Exchange	net Profit	% of exchange
Revenue	Inflows	Outflows	Exposure	Gain/Los	Difference on Net Profit	
Sum Total	11357.8	4956.3	1767.22	3189.08	10.64	412.67
Mean	11622.55	252.46	455.58	1.52	58.95	-25.25
SD	375.2	224.4	108.04	152.74	11.68	59369
Range	949.57	515.58	311.54	409.2	34.76	182.39
Min	1083.31	443.64	142.64	275.36	-19.73	-15.78
Max	2032.88	959.22	454.18	684.56	166.61	166.61
Derivatives used						14.52
Options, and Currency Swaps						Forwards,
Currencies of Operations						
	USD, EUR, GBP, CAD, JPY, and CHF					

Source: Compiled form Annual Reports of Himatsingka Seide Ltd.

Table 5. Statistical Results of Foreign Exchange Operation of Indo Count Industries Ltd

(Rin cr.)		Total exchange	exchange	net Exchange	Exchange	net Profit	% of exchange
Revenue	Inflows	Outflows	Exposure	Gain/Loss	Difference on	Net Profit	
Sum Total	3472	2259.8	346.77	1912.98	42.39	141.75	2074.05

Mean	496.05	322.82	49.54	273.28	6.06	20.25	296.29
SD	153.05	100.52	30.95	87.85	3.25	19.2	553.75
Range	466.3	327.47	71.61	278.18	9	43.85	1501.29
Min	301.28	177.07	16.17	153.12	2.69	0.31	11.62
Max	767.58	504.54	87.78	431.3	11.69	44.16	1512.9
Derivatives used							
Forwards, Options,							
Currencies of Operations							
	USD, EUR, GBP, and CHF						

Source: Compiled form Annual Reports of Indo Count Industries Ltd.

Was reported at R28.91 crores and average net exchange gain was R4.13 crores, which was 5.31% of the net profit. The company only used forward contracts to hedge the currency exposure.

Himatsingka Seeds Ltd. Is an India based global textile manufacturer. It manufactures silk blended fabrics, spun silk blended yarn, baced lined fabric, and bed linen sets and exports to Germany, France, England, Italy, South America, Australia, and USA. The company has international operations denominated in USD, EUR, GBP, SGD, AED, JPY, AND CHF. The Table 4 exhibits statistical results of foreign exchange operation of Himatsingka Seeds Ltd. During the study period form 2010-2017. The total revenue of the company was R 11357.8 crores, out of which R4956.3 crores was exchange inflows and R1767.22 crores was exchange outflows. This resulted in a favorable exposure of R3189.08 crores, which was 28.08% of the total revenue earned by the company. Total exchange gain was reported at just R1064 crores, and average net exchange gain was R1.52 crores, which

was 2.58% of net profit. The company used both forward contracts and currency swaps to hedge its currency risk.

Indo Count Industries Ltd. I a specialized end-to-end bedding provider solely focused on creating all encompassing sleep experiences. Boutique Living is a premium brand offering high quality bed lined in a variety

Table 6. Statistical Results of Foreign Exchange Operation of Indo Rama synthetics (India) Ltd.

	Total	exchange	exchange	net	Exchange	net	Profit	% of exchange
Revenue	Inflows	Outflows	Exposure	Gain/Loss	Difference	Net Profit		
Summe Total	19999.5	5193.7	10042.4	-4848.7	-204.1	240.66	447.25	
Mean	2857.07	741.96	1434.63	-629.67	-29.16	34.38	63.89	
SD	247.25	245.83	352.95	264.03	42.07	54.19	312.47	
Range	619.49	624.07	1081.58	758.05	114.53	160.19	938.47	
Min	2556.57	417.6	693.75	-1034.2	-99.51	-20.69	-204.16	
Max	3176.06	1041.1775.33	-276.15	15.02	139.41	734.39		
Derivatives used								Forwards, Options,
Currencies of Operations								USD, EUR, AED, and JPY

Source: Compiled form Annual Reports of Indo Rama Synthetics (India) Ltd.

Table 7. Statistical Results of Foreign Exchange Operation of Raymond Ltd. (Rin cr.)

	Total	exchange	exchange	net	Exchange			
net Profit	% of exchange	Revenue	inflows	Outflows	Net Profit			
Summe Total	29338.3	1211.2	1778.03	-556.8	0.36	504.74	-35.97	
Mean	4191.18	173.03	254	-80.97	0.05	72.11	-5.14	
SD	1146.45	24.21	113.94	131.6	8.42	66.43	10.96	
Range	3095.53	69.68	225.66	287.28	28.05	201.72	30.02	
Min	2606.06	126.02	128.34	-227.98	-16.49	-45.94	-25.16	
Max	5701.59	195.7	354	59.3	11.56	155.78	4.86	
Derivatives used								Forwards,
Options,								
Currencies of Operations								
USD, EUR, GBP, CHF, AUD, RMB, and AED								

Source: Compiled form Annual Reports of Raymond Ltd

Of rich designs. It has partnership with some of the best-known retail, hospitality, and fashion brands in the world. The company has international operation denominated in USD, EUR, and CHF. The Table 5 exhibits statistical results of foreign exchange operations of Indo Count Industries Ltd. During the study period from 2010-2017. Total exchange inflows and outflows of the company for the selected period were R.2259.8 crores and R. 346.77 crores, respectively and total revenue was R 3472.35 crores. This resulted in a favorable net exposure of R.1912.98 crores. Which was as high as 55.09% of the total revenue earned by the company? During the period, it posted total exchange gain of R42.39 crores and average exchange gain was R6.06 crores, which was 29.23% of the net profit. Since the company has operation in multi currencies, it used both forward and option contracts to hedge its currency exposure.

Indo Rama Synthetics (India) Ltd. Is a leading manufacturer and supplier of polyester products in India existing for the last two decades. The company has international operations denominated in USD, EUR, AED, and JPY. The Table 6 exhibits statistical results of foreign exchange operation of the Indo Rama Synthetics (India) Ltd. During the study period from 2010-2017. Total exchange inflows and outflows of the company for the selected period were R. 5193.7 crores and R. 10042.4 crores, respectively and total revenue was R. 19999.5 crores. This resulted in unfavorable net exposure of R. 4848.7 crores, which was 24.24% of the total revenue earned by the company. During the period, it posted total exchange loss of R 204.1 crore. And average exchange loss was R.29.16 crore, which was 84.82% of the net profit. The company used only forward contract to hedge its currency exposure.

Raymond Ltd. Is a Mumbai based company and is India's largest woolen fabric maker and world's largest integrated manufacturer of worsted fabric. The textile division of the company has a distribution network of more than 4,000 multi-brand outlets and over 637 exclusive retail shops in the domestic market. It exports to more than 55 countries and has more than 20,000 design and colours suiting fabrics. The company has international operation denominated in USD, EUR, GBP, AUD, RMB, and AED. The Table 7 exhibits statistical results of foreign exchange operation of Raymond Ltd. During the study period from 2010-2017. The total exchange inflows and outflows of the company for the selected period, were R 1211.2 crores, and R 1778.03 crores, respectively and total revenue was R 29338.3 crores. This resulted in unfavorable net exposure of of R 566.8 crores, which was 1.93% of total revenue earned by the company. During the period, it posted total exchange gain of R.0.36 crores and average exchange gain was R 0.05 crores, which was just 0.07% of the net profit. Since the company had sustainable amount of adverse net exposure, it used forward contract, options and currency swap.

Trident Ltd, is a flagship company if \$1 billion conglomerate. Trident Group headquartered in Ludhiana, Punjab. The company is one of the largest manufacturers of yarn spin, terry towel, and wheat straw based paper in having its operation in more than 100

countries across six continents. The company has international operation denominated in USD, EUR, and CHF. The Table 8 exhibits statistical results of foreign exchange operations of Trident Ltd. During the study period from 2010-2017. The total exchange inflows and outflows of the company for the selected period were R 11300 crores and R 1280.12 respectively and total revenue was R. 21841.1 crores. This resulted in favorable net exposure of R. 10019.59 crores, which is as high as 45.87% of total revenue earned by the company. During the period, it posted total exchange loss of R. 59.39 crores and average exchange loss was R. 8.48 crores, which was 8.86% of the net profit. The company used both forward and option contracts to hedge its currency exposure.

Wels pun India Ltd. Is a Mumbai based Asia's largest manufacturer of textile and the second largest terry towel producer in the world. It exports more than 94% of its towels to more than 34 countries and has international operation denominated in USD, EUR, GBP, and JPY. The Table 9 exhibits statistical results of foreign exchange

Table 8. Statistical Result of Foreign Exchange Operation of Trident Ltd.

	Total	exchange	Exchange net	Exchange net profit	% of Exchange		
	Revenue Inflows	Outflows	Exposure Gain/Loss	Difference on	Net Profit		
Sum Total	21841.1	11300	1280.12	10019.59	-59.39	670.06	182.93
Mean	3120.15	1614.2	182.87	1431.37	-8.48	95.72	26.13
SD	780.41	496.25	148.83	457.09	27.12	93.01	56.35
Range	2081.9	1341.8	405.93	1351.23	82.03	272.84	157.25
Min	1803.37	839.48	95.04	715.97	-65.93	-43.74	-51
Max	3885.27	2181.3	500.97	2067.2	16.1	229.1	150.73

Derivatives Used Forwards and Options
Currencies USD, EUR, and CHF

Source : Compiled form Annual Reports of Trident Ltd.

Table 9. Statistical Result of Foreign Exchange Operation of Welspun India Ltd.

Total	exchange	Exchange net	Exchange net profit	% of Exchange	(R. in Cr.)	
					Revenue Inflows	Outflows Exposure Gain/Loss
					Difference on	Net Profit
Sum Total	27236.2	137.95	2275.67	-2137.72	-291.38	1708.4
Mean	1546.5	38.02	306.11	-321.17	-47.73	274.93
SD	39994.37	104.44	836.09	930.61	141.61	716.24
Rang	2076.6	0	12.62	-840.23	-129.02	-13.37
Min	6070.97	104.44	848.71	90.38	12.59	702.87
Max						434.48

Derivatives Used Forwards and Currency swap

Currencies of operations USD, EUR, and CHF

Source : Compiled form Annual Reports of Welspun India Ltd.

Operation of Welspun India Ltd. During the study period from 2010-2017. Total exchange inflows of the company for the selected period were R.137,95 crores and R. 2275.67 crores. Respectively and total revenue was R. 27236.2 crores. This resulted in unfavorable net exposure of R. 2137.72 crores. Which was 7.85% of the total revenue earned by the company? During the period, it posted total exchange loss of R 291.38 crores and average

exchange loss was R. 47.73 crores, which 17.36% of the net profit. Since the company substantial amount of adverse net exposure, it used both forward contract and currency swap.

5. Hypotheses Testing

In this section, the four hypotheses are tested using various statistical techniques such as ANOVA, multiple regression based predictive analysis model, 'F' test, descriptive statistics tools, etc.

H₁ : Foreign exchange exposure among the selected companies remains uniform irrespective of size of the firm.

The Table 10 represents summary results of ANOVA for testing hypothesis H₁. It is observed from the table that the p-value obtained is 0.0386265, which is less than 0.05 and the 'F' value obtained is 1.086325, which is lower than the table value of 2.11. Hence, the hypothesis H₁ is accepted. It is therefore inferred from the results that foreign exchange exposure among the selected companies remains uniform irrespective of size of the firm.

H₂ : Foreign exchange exposure has a bearing on exchange gain/losses of the companies to the greater extent.

Table 10. ANOVA Results of Selected Companies

ANOVA						
Source of Variation	Sum of Squares	df	MS	'F' Value	'P' Value	'F' critical value
Between Groups	4.33E+09	9	4.82E+08	1.086325	0.0386265	2.040098
Within Group	2.66E+10	60	4.43E+08			
Total	3.09E+10	69				

Table 11. Summary Results of Multiple Regression Test

Summary Result of Regression	
'R' Value	0.045246
'R' Square Value	0.002047
Adjusted 'R' Square Value	-0.04267
Standard Error Value	28.64153

Summary Results of Coefficient and 'p' Values of Regression Test				
Df	Sum of Squares	MS	'F' Value	Significance 'F' Value
Regression 3	112.7507	37.58357	0.068722	0.976386854
Residual	67	54962.61	820.3375	
Total	70	55075.36		

Summary Results of Coefficient and 'p' Values of Regression Test				
Coefficients	Standard Error	't' Value	'p' Value	
Intercept	-89962618	5.222662331	-1.7225433	0.089584
Foreign Exchange Inflows (in Cr. R.)	0.00186483	0.005771643	0.32310274	0.747624
Foreign Exchange Outflows (In Cr. R)	0	0	0	65353
Net Exposure (in Cr. R)	-3.042E-05	0.000162857	-0.1867984	0

To test the hypothesis H₂. The impact of net exposure (i.e. exchange inflows – exchange outflows) on exchange gain/ losses of the sample companies is considered and tested through multiple regression test and the test results are presented in the Table 11.

It is observed from the Table 11 That 'R' value is obtained (0.45246) which indicates low degree (ie.4%) of correlation between exchange exposure and exchange gain/losses and the 'R' Square Value (0.002047) implies that the probable exchange gain losses can be estimated only to the extent of 0.2% of foreign exchange exposure of the textile sector. It is further observed that p- value of intercept obtained is 0.089584 and 0.747624 for exchange inflows and zero for both exchange outflows and for net exposure. Since p- value is more than 0.05 for intercept, it implies that the test is significant in the context of exchange exposure having impact on exchange gain/losses of the companies. Hence, the alternative hypothesis H_{2a} is rejected. It is, therefore, inferred that foreign exchange exposure does not have a subsoil Bering on profitability of the companies. Form the values obtained in the analysis, the following equation can be derived:

$$Y = a + b_1X_1 + b_2X_2$$

Exchange Losses = -8,9962618 + Exchange Exposure (-3.042E-05) + Foreign Exchange Outflows (0) + Foreign Exchange Inflows (0.00186483)

H₃ : Choice of currency derivative is independent of the exchange of the exchange inflows, net exposure, and number of currency exposed to.

To test the hypothesis H₃, multiple regression test is used and the results are presented in the Table 12. It is observed from the Table that the 'R' Value obtained is 0.922986, which indicates high (ie.92%) degree of correlation between net exposure and exchange gain/losses and the 'R' square value obtained is 0.851904, which implies that the probable exchange gain/losses can be estimated to the extent of as high as 85% of net exposure of the exited sector. It is also observed from the table that the p-value obtained is zero form intercept, 0.0000177 for net exposure, 1.03E-17 for number of currencies, and 0.00890981 for exchange gain/loss which are less than 0.05. Since p- value is less than 0.05 for intercept, the alternative hypothesis H_{3a} accepted. Hence, it is inferred from the result that the net exposure, exchange gain/losses and number of currencies involved in international operation are independent of the choice of currency derivative. Based on the analysis a model of predictive analysis can be developed as follows:

$$Y = a + b_1X_1 + b_2X_2 +$$

and multiple currency invoicing.

To test the hypothesis H_{a4} , multiple regression test ios used and the results are presented in the Table13. It is observed from the table that 'R' value obtained is 0.12676129, which implies that lower degree (i.e. 13%) of correlation exists between number of currencies and number of derivatives. R square value obtained is 0.016068425, which implies that exchange losses can be minimized through currency derivatives and multiple currency usage only to the extent of 2%. It is also observed from the table that p - value obtained is 0.112222 for intercept, 0.898409 for number of currencies, and 0.342648 for number of derivatives, which is more than 0.05. Since p- value is more than 0.05 for intercept, the null hypothesis H_{a4} is accepted. Hence, it is inferred from the results that foreign exchange losses cannot be substantially minimized through currency derivatives and multiple currency invoicing. From the values obtained, the following equation can be derived:

$$y = a + b_1x_1 + b_2x_2 +$$

Exchange Gain/Losses = -17.46389063 + No. of Derivatives used(4.384367679) + No. of Currencies used (0.232147016)

Findings and Suggestions

Based on the above analysis, the following findings have been observed and suggestions are given accordingly:

From the above analysis, it is observed that in total, 11 currencies (USD, EUR, GBP, HPY, CHF, HKD, CAD, SGD, AED, AUD, RMB) are denominated by the nine sample companies. However, all nine companies have two common currencies, that is, USD and EUR and six companies use GBP. Thus, USD and EUR hold command in the fore market and other currencies are being used minimally. Hence, it is inferred that the companies operating at the global level have to be prepared to handle any threat arising on account of fluctuations in the USD-INR parity.

Out of nine companies chosen for the study in the textile sector, all nine companies used forward contracts to mitigate foreign exchange risk, options contract and currency swaps were used only by four companies, and no company used currency futures

The foreign exchange exposure among the selected companies in the textile sector remained uniform-irrespective of size of the company.

The foreign exchange exposure did not have substantial bearing on profitability of the companies in the textile sector

The net exposure, exchange gain/losses, and number of currencies involved in international operation are independent of the choice of currency derivative.

It is also observed that the foreign exchange losses cannot be substantially minimized through currency derivatives and multiple currency invoicing.

6. Implication and Conclusion :-

The current study would benefit the companies having foreign operation in mitigating the currency exposures. It would also be useful to the other participants in the fore market such as bankers to devise innovative currency derivative instruments and would also help the government and policy makers to find out loopholes in the current derivative instruments and modify the same accordingly. The uniqueness of the current study is that it identifies the type of currency derivatives and currencies used by the corporate for their day to day international business transactions.

As evidenced from the study, there are several currency derivatives available to the business firms such as forwards, futures, options, swaps, etc. for hedging currency exposure. However, among all these techniques, forward contract is considered to be an effective and widely used hedging tool and easier to understand followed by currency swap and option. Most of the commercial banks in the private sector provide only forward contract form hedging currency exposure but not other derivatives like futures and option contracts.

Bankers are suggested to popularize derivatives in their cities, particularly option contracts by educating and creating awareness regarding the same.

7. Limitations of the study and Scope for Further Research

The current study is subject to the following limitations:

- The current study is confined to secondary data obtained from annual reports of the respective companies.
- Only the companies listed on BSE and NSE are considered for the current study.
- The current study period pertains to 7 years commencing from FY 2010 to FY 2017.
- Only external techniques of currency derivatives used by the companies were considered for the analysis.

The current study is restricted to the textile sector and that too to nine selected companies. The study can be extended to other companies in the same sector and also to other sectors.

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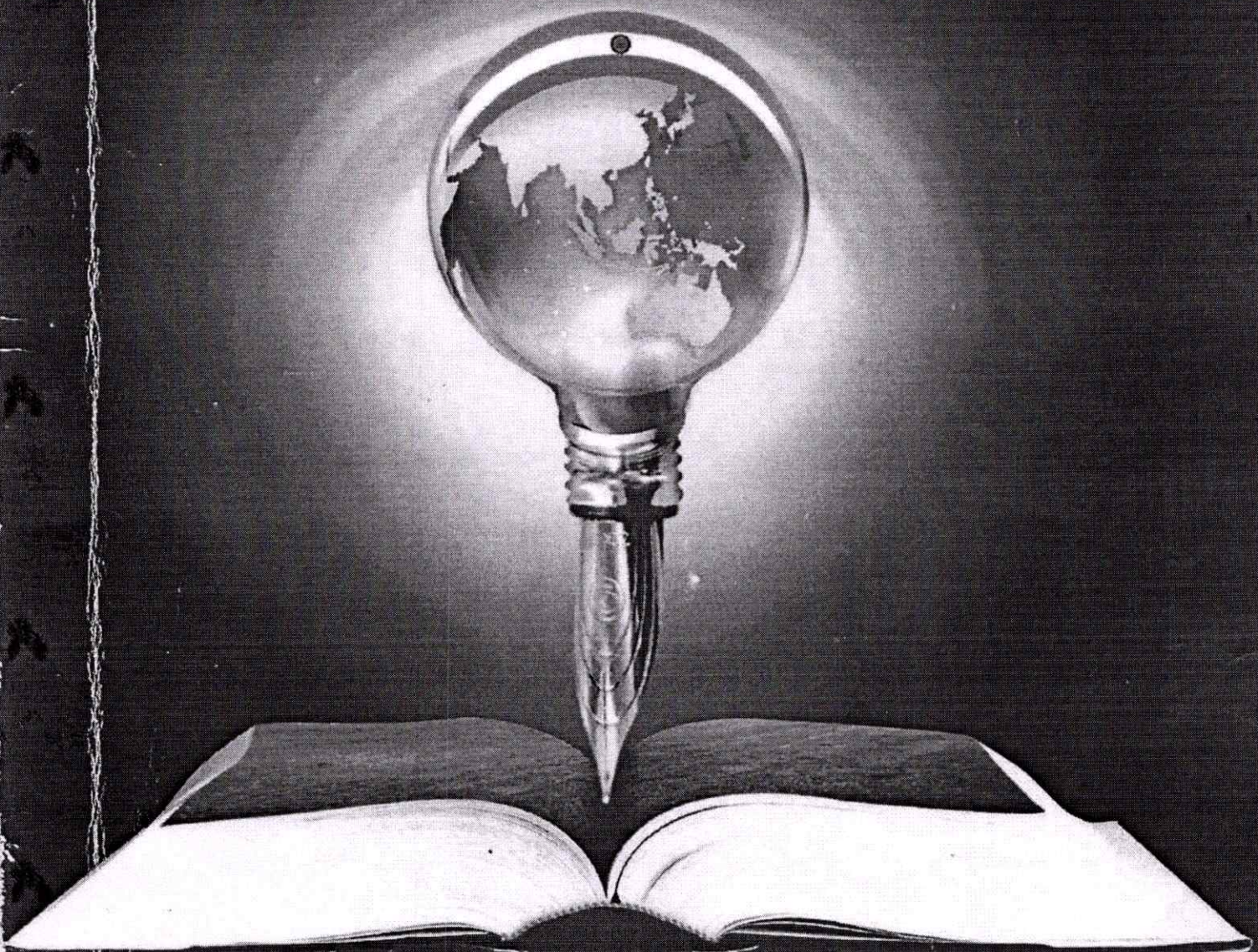
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Future Prospects of Co – operative Dairies in Osmanabad District

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1.1. INTRODUCTION:-

In the process of liberalization, privaterization, globalization and market oriented economy livestock is an important source of income for a nation. In fact, pastoral production is far more resilient than crop production and more remunerative too. The share of livestock production in the aggregate agricultural output in some of the West European countries is about 60% to 80% percent in recent years. In India, however, the gross value of output from livestock sector i.e. animal husbandry and dairy development is placed at 6.5.percent of India's GDP (in 2002-03) at current prices. The value of output from livestock is showing an increasing trend in India. The value of output of livestock was estimated at Rs. 1, 73,350 crores during 2004-05 at current prices which is about 36 per cent of the total value of output of agriculture and allied sectors. The contribution of milk alone (valued at Rs. 1,15,970 crores in 2004-05) was higher than paddy (Rs. 70,462 crores), wheat (Rs. 48,050 crores) and sugarcane (Rs. 23,167 crores).

The significance of livestock sector in the Indian economy arises also because of its assistance to tackle the serious problems of unemployment and under employment for weaker section in the country and for providing subsidiary occupation for income generation. It also plays a dominant role in dry-land agriculture particularly in the semi-arid and arid areas of the country. Animal husbandry and dairy development are being used as poverty – eradication measures, i.e., to provide additional employment and increase family income of the rural poor.

Livestock provides regular employment to about 11 million in principal status. It is equally interesting to note that women constitute 69 percent of the labor force in livestock sector as against 35 percent in crop farming. Finally, export earnings from livestock related product were Rs. 8,200 crores in 2002-2003. Thus, the livestock sector plays an important role in India's economy and in the socio-economic development of the country. India is at the top of world having 17 percent of the total livestock population less than one- fifth of cattle, half of buffaloes, and over one- fifth of goats and sheep. China comes second with only 10 percent. Countries which have well developed livestock based industries like Australia, Belgium, Denmark, Finland, Ireland, Italy, Norway, the Netherlands, Sweden, Switzerland, etc., have only small herds that is less than 1 percent of the total.

Livestock requires sufficient land area for their sustenance, particularly grazing land, consisting of permanent meadows and pastures. India has the lowest per unit amount of grazing land; even densely populated countries of Europe have much higher amount of

small a patch of land. The poor yield of Indian cows is proverbial. It is estimated that the average yield of cows in India is 220 liters per year, as compared to 3,000 to 5,000 liters per year in Western countries. As regards meat, about three – fourths of the meat produced in India is from goats and sheep's. Beef accounted for only 6 percent. Thus through cattle accounted for the largest proportion of livestock in India, their contribution to the national income of India was insignificant. The contribution of livestock to income from agriculture has been more than 50 percent in all the advanced countries of the world. This is exceptionally high in some countries (75 to 85 percent) – such as Denmark, Sweden, Norway, etc. for they enjoy exceptional environmental advantages for rearing quality livestock.

It has been observed that in advanced countries like the United States of America, West Germany, England, etc, the share of livestock in the gross agricultural income has remained steady since the 1930s and at every high levels. On the other hand, in India, the share of livestock in the gross agricultural income in the total income of the country declines but the share of livestock income in the gross agricultural income increases.. Today India has the fastest growing dairy industry In the World. In fact as Vergees Kurien, Chairman of the National Dairy Development Board, correctly put it: "Dairying in India has come of age." In "Operation Flood" the role of Co-operative dairy that is Anand Co- operative Model was very important.

Maharashtra is one of the highly reputed states in India. Agriculture is the main occupation of this state. Near about 62 % per cent of the state population is engaged in agriculture sector. In the economy of Maharashtra the share of agriculture sector is 34 % per cent in 2006-07. Dairy farming is highly developed in Maharashtra therefore it is known as one of the highly milk producer state in India. In the development of dairy sector in Maharashtra the role of co- operative dairies is very important. At present there are 23 Cooperative Union and 29 cooperative Dairy Plants in Maharashtra having 3,820 thousand liters per day milk capacity. Maharashtra's Co- operative dairy model is famous in the World. Co-operative dairies probably highly succeed through the Kolhapur, Sangali, Satara, Ahmadanagar, Nashik and Pune District in Maharashtra. Vikas, Mahanand, Gokul, Dhawal, Dudh Pandri, Warna , Rajhansa, Koyna and shivamrut are foremost milk product brands of Maharashtra.

Osmanabad is one of the district of Marathwada regions in Maharashtra. Major population of this district is engaged in agriculture sector. High portion of land of this district is fertile and here is huge potential for the development of dairy farming. Agriculture with dairy farming is only one source of economic development of this district. Farmers economic condition is also depend upon the development of dairy farming and the development of dairy farming in this district is depend upon the development of co- operative dairies web.

Milk production and the number of cows have been increased since last few years. Couples of co-operative dairies are existed in this district but their performance is not so good because they are facing so many problems and difficulties. But, there is no drought

that, in future these co- operative dairies will have good future prospects because here is high potential for dairy farming and with the connectivity of new railway lines from Osmanabad to Solapur, Aurangabad, Pune, Mumbai, Hyderabad etc. nearest markets will be available which will bring out change in demand of milk and its bio-product. In respect of future prospects co- operative dairies in Osmanabad District will have to take some necessary strong steps means required measures on various ground today.

1.2. HISTORICAL BACKGROUND OF CO-OPERATIVE DAIRIES:-

The principles of co-operation are not in any way new to India. Co-operation has been known and practiced in this country in various forms since ancient times. The joint family system which is very old and exists till to-day is one instance of indigenous co-operation. Under this system, the land is owned and cultivated in common, while all adult members have to share the duties of the family engaged in occupations other than agriculture. Members of the family live in a common house and the household expenses are met from the income of the joint property. The institution is based on a feeling of brotherhood and mutual help.

Another form of co-operation is panchayat which is based on the principle of community self-help. Although the system has fallen somewhat into decay, panchayats are still common and in all States they have been revived. The main functions of these organizations are to deal with the question relating to the economic and social welfare of the community. Disputes among the members are also referred to them for decision. The decisions of the panchayats are enforced under the penalty of social boycott.

Then there are "Chief funds" commonly found in South India, which are based on the principles of mutual association. Under this system a number of persons join together and each member agrees to pay every month for a specified period a fixed sum. Every month when the subscriptions are realized, lots are drawn and the person drawing the lot is paid the total monthly subscription. The whole system of the "Chief funds" depends upon mutual confidence and honest dealing which are the main essentials of co-operation.

The history of Dairy Development Movement in India is a new one. During the pre-independence period this movement was limited to a few pockets of Calcutta, Madras, Bangalore, some part of Maharashtra and Gujarat. The most notable of this venture was Kaira District Co-operative Milk Producers' Union Limited of Anand, Gujarat. But after independence the National Government took great initiative in setting up new Dairy Co-operatives in many parts of the country. The National Dairy Development Board was set up to make the ambitious project a success.

The importance of cooperative dairies came to know the farmers of Osmanabad district last two decades and since then the process of development of cooperative dairies took place in

this district. Now, it is known as largest milk producer district in Marathawada part of Maharashtra.

1.3. OBJECTIVES:-

- To find out the present position of co – operative dairies in Osmanabad district.
- To find out the importance of the development of co – operative dairies in this District.
- To find out whether there is scope for the development of co – operative dairies in Osmanabad District or not.
- To find out how far there is potential for the development of co – operative dairies in Osmanabad District.
- To search out existing obstacles and problems in the development of co – operative dairies in Osmanabad District.
- To search out what types of measures will have capacity to bring out notable development of co – operative dairies through Osmanabad District in future.

1.4. HYPOTHESIS:-

- The role of co- operative dairies is very important in the development of agriculture sector.
- Agriculture is the main occupation of Osmanabad District and dairy farming will have capacity to become best complimentary occupations.
- Milk production and the number of cows have been increased since last few years in this district.
- Dairy farming has highly potential in this District.
- There are so many certain obstacles and problems in the development of co – operative dairies in Osmanabad District due to that they are not running properly.
- With the help of some administrative, managerial, market oriented, and infrastructural measures co – operative dairies

will run out remarkable rate and which will bring out notable change in the economic condition of farmers in this District.

1.5. RESEARCH METHODOLOGY:-

Comparative research method has been used for the analysis of present research topic. Comparison has been made among co – operative dairies in Osmanabad District and highly developed co- operative dairies in other districts in Maharashtra as well as in India.

1.6. COLLECTION OF DATA:-

Primary and secondary data has been used for present research. Primary data has been collected through the questionnaires and interview. For to search out real findings and to come certain conclusion questioner was prepared in that sense and it has been filled up by selected farmers, members and officers of co-operative dairies in Osmanabad District and of some selected districts in Maharashtra and in rest of India. Direct personal interview has been taken of selected farmers, members and officers of co- operative dairies in Osmanabad and some selected districts in Maharashtra and in rest of India. Direct personal interview has been taken of social reformers, brilliant personalities, public representatives and of political leader of different parties in Osmanabad District.

While the selection of farmers, members and officers of co- operative dairies in the context of filling questioner and taking their personal interviews selection method has been used with certain criteria. Secondary data has been collected through the various concern Government Office, certain state and national levels committees, institutions published reports and also from the reference Books, Journals, Magazine etc

1.7. SIGNIFICANCE OF THE STUDY:-

- It has cleared the exact picture of present position of co- operative dairies in Osmanabad District.
- It has cleared the importance of well developed co- operative dairies in Osmanabad District.
- It has been find out the various obstacles in the development of co- operative dairies in Osmanabad District.
- It has been find out that there is potential for the development of co- operative dairies in Osmanabad District.
- It has been searched out that what types of measures are required for the better performance of co- operative dairies in Osmanabad District.

- It will also helpful to those persons who have responsibility of the development of this district

1.8. CONCLUSION:-

Activities of a group can be directed, organized, controlled and unified through an able and efficient managerial skills . Every kind of organization whether it can be a business organization or social, political, educational. Religious, military or government, requires some form of management for the achievement of its goals. With this certain truth for to find out the difficulties and problems in the Co-operative Dairies in Osmanabad District and to suggest the important measures for the better performance of Co-operative Dairies in Osmanabad District. Thus this chapter speaks about the general guideline of present research topic.

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For this present research concerned reference books and state, national, international institutions reports as well as Journals, Magazines has been used and their list will be provided at the end of research project.

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REVIEW OF RESEARCH



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CHEMISTRY IN COSMETICS

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ABSTRACT:

Beautifiers are care substances used to improve the appearance or scent of the human body. They are for the most part blends of substance exacerbates, some being gotten from regular sources and many being synthetics.

Beauty care products are planned to be applied to the human body for purifying, embellishing, advancing allure, or changing the appearance without influencing the body's structure or capacities.

Beauty care products incorporate healthy skin creams, moisturizers, powder, fragrance, lipsticks, fingernail and toe nail clean, eye and facial cosmetics, lasting waves, shaded contact focal point, hair hues, hair splashes and gels, hand sanitizer, child items, shower oils and numerous different kinds of items. A subset of beautifiers is classified "make-up," which alludes basically to shading items expected to modify the client's appearance.

KEYWORDS: *human body, toe nail clean, eye and facial cosmetics.*

INTRODUCTION:

The principle fixings in mineral cosmetics are typically inclusion colors, for example, zinc oxide and titanium dioxide, the two of which are likewise physical sunscreens. Other principle fixings incorporate mica and pigmenting minerals, for example, iron oxide, tin oxide and magnesium myristate. Mineral cosmetics for the most part doesn't contain manufactured aromas, additives, parabens, mineral oil, and compound colors. Consequently, numerous dermatologists believe mineral cosmetics to be cleaner and kinder to the skin than cosmetics that contains those fixings. Be that as it may, some mineral cosmetics contain bismuth oxychloride, which can be disturbing to the skin of touchy people. Others likewise contain powder, over which there is some discussion in light of its comedogenic inclinations (propensity to stop up pores and in this manner cause skin break out) and in light of the fact that a few people are touchy to powder.

The Chemistry of Cosmetics

Beauty care products are an incredible case of how disclosures in science are a piece of our everyday lives. Truth be told, simply perusing the creation of any regular corrective can turn into a science class: water, emulsifiers, additives, thickeners, pH stabilizers, colors and aromas, joined in various proportions, for various purposes.

The utilization of beauty care products - that is, concoction mixes to improve our appearance - is definitely not an ongoing wonder. It is said that the Egyptian sovereign Cleopatra washed in milk, as an approach to keep her skin wonderful and delicate. Which most likely really worked in light of the fact

that it is demonstrated that lactic corrosive – one of milk's concoction compound – follows up on the more profound layers of the epidermis, advancing the expulsion of dead cells and skin recharging.

In antiquated Greece, 3,000 years before Christ, ladies utilized powdered lead carbonate to make their faces paler. Shockingly, we currently realize that lead carbonate is harmful and it is conceivable that the quest for excellence cost the lives of a portion of these ladies.

Much of the time, these diverse restorative items have a solid part of logical advancement, created in current inquire about research facilities. Get the job done to say that the beauty care products industry was among the first to adjust the new highlights of nanotechnology using nanoparticles to improve the nature of their items and fulfill the wants of its clients.

Nanoparticles are particles of middle of the road size on the scale among iotas and perceptible materials. Something like a thousand times more prominent than the measurement of an iota or a great many occasions littler than the thickness of a hair.

This gives them the unique properties, which can be modulated by changing its size.

Regular instances of the use of nanotechnology in beauty care products are dioxide titanium nanoparticles in sunscreens (that give total assurance without the impact of a white layer on the skin), the utilization of strong lipid nanoparticles for moderate arrival of aroma in fragrances, or making nanovesicles as bearers to give a superior infiltration of the dynamic fixings on the skin.

Furthermore, in the event that I've figured out how to stir in you the enthusiasm for the science of magnificence, presently you can keep on getting a charge out of the excellence of the science of things

Cosmetic Chemistry

The worldwide market for skincare and shading beauty care products surpassed 53 billion dollars in 2002. The quantity of new items brought to showcase keeps on growing exponentially. Corrective scientific experts are continually searching for intriguing and fascinating fixings that improve skin's appearance and wellbeing. An immense range of mixes is required to supply these items. The most recent release of the Cosmetics Toiletries and Fragrance Association (CTFA) Dictionary records in excess of 10,000 crude materials. Consistently several new fixings are added to the rundown of those that have been utilized for quite a long time. A few materials utilized today can be followed to 11,000 B.C.E. in the creature drawings from the caverns of Altimira.

History

The presence of healthy skin plan dates to around 3000 B.C.E. in antiquated Egypt. Most creations were set up from normal materials. Cleopatra is said to have washed in jackasses' milk to keep her skin smooth and supple. One normally happening material utilized by the people of old was red ochre, or iron oxide. Chunks of red metal were shaped when iron oxidized or rusted. The red iron oxide was found in entombment tombs in stylized lip tints and rouge arrangements. It was additionally used to draw the old cavern pictures of creatures, as observed in Altimira, is as yet utilized in numerous cosmetics details today. Eye paints have additionally been found at old gravesites. These paints comprised basically of a copper-based green mineral considered malachite that was mined from close by quarries. Creature fat was joined with fragrant substances, for example, frankincense and myrrh to deliver early skin salves. Increasingly refined creams and moisturizers were adjusted through experimentation and disregarded down numerous ages.

Emulsions

Most of creams and salves are emulsions. An emulsion can be characterized just as two immiscible liquids in which one fluid is scattered as fine beads in the other. Homogenized milk is a case of an ordinary oil-in-water (o/w) emulsion. Milk fat (oil) is scattered in water as fine beads by the homogenization procedure. The explanation the fat doesn't buoy to the top quickly is because of the nearness of emulsifiers; for this situation, a milk protein called sodium caseinate just as a few phospholipids. On account of water-in-oil (w/o) emulsions, water is scattered as beads and suspended in the oil stage. The nondispersed fluid or outer suspending stage is likewise called the consistent stage.

Mayonnaise, vinegar water scattered as fine beads in a ceaseless period of soybean oil, is a case of a water-in-oil emulsion. Lecithin from eggs settles the mayonnaise emulsion.

Surfactants

Most emulsifiers can be viewed as surfactants or surface-dynamic specialists. These materials can diminish the surface strain of water. What makes an emulsifier surface dynamic is identified with its HLB, or hydrophile-lipophile balance. HLB is controlled by the size of the hydrophilic (water-cherishing or polar) part of an atom when contrasted with the size of the lipophilic (oil-loving or nonpolar) divide. The HLB framework was made to rank the overall extremity of materials. The most polar, water solvent, materials are at the highest point of the twenty-point scale with more non-polar, oil dissolvable, materials more like zero. The HLB of sodium caseinate is doled out an estimation of around fourteen due to it's high solvency in water. Lecithin, being inadequately solvent in water, has a HLB estimation of around six. Both have polar gatherings. The polar gathering in the milk protein is sodium. Lecithin's surface-dynamic part is an atom called phosphotidylcholine or PC (See Figure 1). The polar, or water dissolvable piece of PC is the phosphate useful gathering. The emulsifiers' polar gatherings situate toward the polar water stage. Their lipophilic, nonpolar gatherings arranged toward the oil stage to shape micelles (see Figure 2). These circular structures give steadiness to the emulsion through Hydrogen holding and powerless electrical powers.

Healthy skin emulsifiers can be partitioned into two bunches dependent on ionic charge (See Figure 3). Materials that can separate into charged species are viewed as ionic while those that don't are called nonionic. Ionic emulsifiers can be additionally characterized by kind of charge. Anionics are adversely charged when solvated as in sodium stearate or cleanser.

At the point when unsaturated fats are responded with salt they structure cleansers. The procedure of cleanser arrangement is called saponification. The adversely charged stearic corrosive gathering is the primary emulsifying unit of the cleanser, giving it the anionic arrangement. Decidedly charged emulsifiers are called cationic. Quaternium24's emulsifying unit separates into the emphatically charged ammonium gathering. Amphoteric are exacerbates that express both negative and positive charges.

Nonionic emulsifiers are regularly utilized in healthy skin emulsion for their wellbeing and low reactivity. They are commonly arranged by synthetic similitude. Glycerin, usually added to corrective emulsions for its humectant properties, is the foundation of a class of emulsifiers called Glyceryl esters. Glyceryl monostearate, or GMS, is known as a monoester in light of its sole ester linkage (see Figure 4). The diester is set up by esterifying two particles of stearic corrosive for each atom of glycerin. Glyceryl mono-and diesters are extremely viable emulsifiers since they contain both polar hydroxyl (OH) bunches just as non-polar unsaturated fats. On the off chance that every one of the three of Glycerin's hydroxyl bunches are responded, the subsequent triester will have small emulsifying capacity.

Stearic corrosive is called C18 unsaturated fat. The unsaturated fats, present in fats and oils, are grouped by their carbon-chain lengths. Since stearic corrosive is a significant segment of a significant number of the fats and oils utilized in magnificence medicines, stearate-based emulsifiers are especially helpful. Unsaturated fats are key parts of numerous corrective emulsifiers due their miscibility in an assortment of regular and manufactured oils.

Esters polyethylene glycol or ethylene glycol are called PEG esters. A PEG ester's dissolvability is controlled by the quantity of PEG atoms responded per particle of corrosive. PEG 6 oleate for example has six particles of PEG responded with one atom of oleic corrosive. As the quantity of polar, PEG particles per corrosive atom builds the water dissolvability/HLB is expanded; PEG 8 oleate is more solvent than PEG 6 oleate. The restorative scientific expert will regularly utilize mixes of glyceryl esters and a PEG ester with high and low HLB qualities to decide the necessary extremity to emulsify different fats and oils. The numerous sorts of emulsifiers are too various to even consider listing here, anyway McCutcheon's Emulsifiers and Detergents is an incredible hotspot for an increasingly complete posting.

Emollients

Most of emollients utilized in close to home care and magnificence things are fats and oils, likewise called lipids. Creature fat or fat is made fundamentally out of stearic and palmitic acids with carbon chains lengths of 18 and 16 separately. A large number of the significant corrective organizations are moving ceaselessly from creature based materials like fat to inexhaustible vegetable-based materials. Coconut oil and palm piece oil are regularly utilized. A portion of the key qualities required in great emollients are great spreading properties, low harmfulness/skin bothering and great oxidative soundness. Oleic corrosive, a significant constituent of olive oil has poor oxidative strength because of the nearness of its twofold bond. Fats and oils are viewed as soaked on the off chance that they don't have twofold bonds. Unsaturated oils like olive oil have twofold securities that can respond with oxygen, particularly when warmed. The oxidation procedure can create off hues and smells in lipids making them go rotten and unusable.

Oil based emollients, for example, oil jam and mineral oil are found in numerous definitions since they don't contain twofold bonds or responsive useful gatherings. Silicone oils, for example, cyclomethicone, dimethicone are frequently added to build slip and emolliency (See Figure 5).

Oils that contain elevated levels of fundamental unsaturated fats, EFAs, are prized for their capacity to recharge lipids (oils) that are found normally inside the skin layers. Linoleic corrosive is a case of an EFA. Long-chain alcohols, likewise called greasy alcohols, are valuable as emollients and emulsion stabilizers. Their polar hydroxyl bunches arrange to the water stage with their greasy chains situated towards the oil stage. Esters of greasy alcohols and unsaturated fats make superb emollients in view of their low reactivity and great strength.

Lanolin, got from sheep's fleece, is frequently called fleece oil. Lanolin has been utilized for quite a long time because of it's one of a kind creation of complex sterols, greasy alcohols, and unsaturated fats. Cholesterol, a cyclic atom called a sterol, is a significant part. The polar hydroxyl gatherings of sterols and alcohols empower the oil to assimilate and hold water. Skin is basically made out of water, innumerable oils and emollients are utilized to feed and ensure it.

Moisturizers

The principle qualification among lotions and emollients is their dissolvability in water. Sound skin requires dampness. Creams are commonly polar materials that are hygroscopic in nature; they clutch water. A significant device to evaluate the proficiency of lotions is the high scope. It measures transepidermal water misfortune or TEWL. After a cream is applied to the skin, the dampness level is recorded. Following a few minutes the dampness level will be decreased because of the common propensity of the skin to discharge dampness after some time. Fixings that can keep up an elevated level of dampness in the upper layers of the skin for a few hours can lessen the rate at which water is lost. Glycerin is a very financially savvy fixing used to help lessen TEWL. Sorbitol, sucrose, glucose, and different sugars are likewise ordinarily used to hydrate the skin. Aloe, which contains a blend of polysaccharides, sugars, and minerals, is a fantastic cream. As skin gets drier in the winter months, it might be important to fuse materials that better seal the dampness in the skin.

Waxes

Waxes are made basically out of long-chain esters that are strong at room temperature. Any individual who has ever plunged a finger in liquid wax has encountered its fixing properties. Some regular waxes utilized in makeup are beeswax, candelilla, carnauba, polyethylene, and paraffin. The liquefying purposes of waxes fluctuate generally relying upon their interesting structure and chain lengths. Ordinarily utilized in lip salves and sticks, waxes work as organizing operators, giving the stick enough unbending nature to stand up without anyone else, just as obstruction properties. By consolidating waxes with various properties, for example, high sparkle, adaptability, and fragility, ideal restorative execution can be accomplished. Regularly waxes are joined with perfect oils to accomplish the ideal non-abrasiveness. Similarity is commonly controlled by measuring the turbidity and level of

detachment of two materials combined over their dissolve focuses. Waxes are especially valuable close by creams and mascara emulsions for their thickening and waterproofing properties.

Thickeners

By fusing enough wax into a slim salve, a thick cream can be shaped. Numerous thickeners are polymers. Cellulose, a fine powder polymer of rehashing

D-glucose units, expands in high temp water making a gel arrange. Carbopol, a polyacrylic corrosive, swells when killed (See Figure 6). Bentone dirt swells when their structure, looking like a heap of cards, is opened up through mechanical shear. Carrageenan, gelatin, and beetle bean gum are for the most part instances of restorative thickeners that are additionally utilized in a portion of our preferred nourishments, for example, jams, plate of mixed greens dressings, and pie fillings.

Active Ingredients

Materials that work physiologically inside the skin or help in shielding the skin from affront are additionally called dynamic fixings. The expression "cosmeceuticals" authored by popular dermatologist Dr. Albert Kligman, alludes to an item that is in the middle of a restorative and a medication. Albeit a restorative, by legitimate definition, can just serve to enhance and ensure the outside of the skin, numerous corrective items can be appeared to enter the dermal layers of the skin to correct a physiological change.

Organic product acids are a case of a functioning material. Additionally called alpha hydroxyacids or AHAs, they can enter the skin, where they can build the generation of collagen, elastin, and intracellular substances in this way improving the presence of the skin. A large number of corrective actives are utilized to influence the skin in an assortment of ways. They are utilized to help, fix, and firm the skin. They can be utilized to smother sweat as on account of aluminum chlorohydrate. Salicylic corrosive and benzoyl peroxide are significant fixings on account of their enemy of skin break out movement (See Figure 7). Some dynamic materials are added to skin medicines to shield the skin from the earth. Dimethicone and petrolatum are instances of skin protectants.

Sunscreens

Sunscreens are a class of exacerbates that shield the skin from bright radiation. Wavelengths somewhere in the range of 290nm and 400nm are especially harming to the skin. Sunscreens' capacity to assimilate or mirror these harming wavelengths are evaluated by their SPF or sun-insurance factor. For example an individual ensured with a factor-15 sunscreen will have the option to remain in the sun multiple times longer than if unprotected. Octyl methoxycinnamate, octyl salicylate, titanium dioxide, and avobenzene are some significant topical sunscreens. They can be delegated either UVA or UVB sunscreens depending the wavelengths they retain. Benzophenone 4, a water-dissolvable UV channel, is generally used to secure the shade of corrective items.

Color

Shades and colors are utilized in items to give a shading. Titanium dioxide (TiO_2) is a white shade that is mined. In blend with normal mined and engineered iron oxides, which run in shading from red, yellow, dark and darker, contingent on the level of oxidation and hydration, a scope of shading can be created that will be reasonable for pretty much every skin tone. Face powders are created by mixing inorganic oxides and fillers. Fillers are idle, by and large economical materials, for example, kaolin, powder, silica, and mica that are utilized to expand and completely create hues. Squeezed powders like eyeshadows and blushers are set up by mixing extra restricting fixings, for example, oils and zinc stearate and squeezing the blend into skillet.

Eyeshadows and lipsticks regularly contain pearlescent colors normally called pearls. Pearls shimmer and reflect light to deliver a huge number of hues. They are set up by encouraging a slender layer of shading on slim platelets of mica. Fluctuating the thickness of the shading stored changes the point of light refracted however the composite, making various hues.

Natural shades are utilized to shading lipsticks and eyeshadows. At the point when organics are hastened on a substrate they are called lake shades. The term lake alludes to the laking or hastening of the natural salt onto a metal substrate, for example, aluminum, calcium, or barium. They are called D&C (medication and restorative) and FD&C (nourishment, medication and corrective) hues. A few models are D&C Red#7 calcium lake and FD&C Yellow #5 aluminum lake. Colors, for example, FD&C Blue#1 and D&C Yellow #10 are promptly solvent rather than shades, which are insoluble. Colors are valuable in giving tints to creams, oils, and shampoos.

Preservatives

Most corrective items require the expansion of additive to counteract microbial tainting and rancidity. Parabens and ester of parabenzoic corrosive are by a wide margin the most generally utilized on account of their viability against gram-positive microscopic organisms. Phenoxyethanol is utilized to ensure against gramnegative strains. The restorative scientist will for the most part utilize a blend of additives to secure against various bacterial strains just as yeasts and molds. Cell reinforcements, for example, tocopherol (nutrient E) and BHT are likewise added to counteract oxidation of delicate fixings just as shield the skin from free-radical harm.

Testing

One of the most significant strides in delivering cosmetics nowadays is something the Romans presumably never did: Testing.

Before beauty care products organizations can sell new items, they put them through a wide range of brutal preliminaries—warming, solidifying, and keeping them at high elevations to perceive how they hold up, for instance. The organizations likewise enlist individuals to wear the cosmetics for some time to ensure it collaborates with skin in the manner it should. At times, beautifying agents are tried on creatures to ensure they are alright for individuals.

What's more, despite the fact that cosmetics is only for appearance, cosmetics researchers draw from revelations in different fields, Hasher says.

At Estee Lauder, specialists work with organizations that review road sign innovation, for instance, to discover better approaches to make splendid hues that shine around evening time even in diminish light. They converse with individuals in the vehicle business about the science behind paint hues. Also, they pursue explore on the eye, to all the more likely see how individuals see cosmetics on others.

In any case, notwithstanding every one of the advances that have changed cosmetics equations during the most recent 2,000 years, a few things haven't changed. Much the same as in Roman times, numerous individuals today imagine that covering their appearances with creams and hues will make them look better. At last, however, the familiar aphorism is most likely evident: It's what within that truly checks.

CONCLUSION

For whatever length of time that society keeps on putting incredible accentuation on looking youthful and lovely corrective science will keep on prospering. A decent comprehension of the essentials of emulsion science and skin physiology are requirements, while defining individual care items. A decent corrective scientist must have the option to consolidate science and workmanship to make items with the vibe and look that purchasers want.

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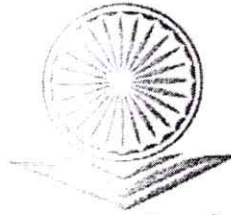
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भूमिका

हिंदी साहित्य की समय विकास प्रक्रिया में धर्मस्रोतों का विशेष, महत्वपूर्ण और उल्लेखनीय योगदान रहा है। 'धर्म' इस शब्द में जाति - विशेष की सम्भ्रता, संस्कृति, आचार - विचार, रहन - सहन, खान - पान, रीति - रिवाज तथा जीवन प्रणाली की प्रक्रिया तथा विभिन्न प्रस्तुत होता है। 'धारणाद धर्म इत्याहु' के अनुसार धर्म भारतीय जीवन - धारा का मूलधार है। इसी से अनुभूति को जीवन जीने की प्रेरणा और प्रकाश मिलता रहा है। किसी भी धर्म में चाहे वह हिन्दू, मुस्लिम, ख्रिश्च, बौद्ध या जैन कोई भी धर्म क्यों न हो उसमें मूलतः एक उदात्त भावना छिपी रहती है। बौद्धधारा अपनी उत्पत्ति के पश्चात् सदैव विद्यमान रही, हीनयान से महायान, सिद्ध, नाथ एवं संत परंपरा में बुद्ध की शिक्षा अतिसार रूप से प्रसारित होती रही। पुनः आधुनिक नव जागरण के काल में बौद्ध धर्म का जो नया पुनरुत्थान हुआ, उससे हिंदी साहित्य भी अत्यंत प्रभावित हुआ। हिंदी साहित्य की जगभग सभी विधाओं - काव्य, नाटक, उपन्यासों आदि में बौद्ध धर्मों, घटना क्रमों एवं उनके उपदेशों के आधारपर नई - नई रचनाओं का सृजन कार्य चलता ही रहा।

साहित्य जाति के उच्चतम विचारों का समय संकलन होता है, भारतवर्ष के इतिहास में महात्मा भगवान गौतम बुद्ध और बुद्धयुग का बहुत ही महत्वपूर्ण योगदान रहा है। सामाजिक और धार्मिक जनचेतना के इस युग में बुद्ध तथा महावीर जैसे महापुरुषों का इस देश में प्रवेश हुआ, जिन्होंने संसार को सत्य और अहिंसा, करुणा एवं मैत्री का महत्वपूर्ण कालजयी संदेश दिया, जो पूरे विश्व में एक शांति का संदेश लेकर आया। आधुनिक काल में लगभग सभी विद्वान विविध दृष्टिकोणों से पालि, अपभ्रंश व संधा भाषा का हिंदी के विकास में महत्वपूर्ण योगदान स्वीकार करते हैं।

विषय वस्तु : - काव्य यही है जो उपर्युक्त तृप्ति दे, बौद्ध - सिद्ध कवियों ने परमानंद की स्थिति एवं उस मार्ग की साधना का योग्यरूप वर्णन अपनी प्रतीक भाषा के माध्यम से समाज के सामने रखा और तत्कालीन समाज की कुरीतियों, कालबाध सामाजिक रूढ़ियों का विनाश की है एवं धर्म के आडम्बरों का भंडाफोड़ संधा भाषा के साहित्य के माध्यम से किया जो भाषा संशोधन के लिए सहज बोधगम्य थी। इस संदर्भ में विश्वनाथ त्रिपाठी एक जगह कहते हैं - "आधुनिक हिंदी साहित्य का विधिवत शुरुआत 19 वीं शताब्दी के उत्तरार्ध से हुई है और लगभग यही समय भारत में सुतप्रयास बौद्ध धर्म के पुनर्जागरण - काल का भी रहा है। इस समय जेम्स प्रिंसेप और अलेक्जेंडर कनिंघम जैसे पुरातत्त्वविदों और जेम्स एनर जैसे उदभट संस्कृत विद्वानों के सत्प्रयास से बौद्ध धर्म के तीर्थस्थलों, स्मारकों व पालि एवं संस्कृत बौद्ध साहित्य का पुनरुद्धार हुआ है।" १ भारत में भी बौद्ध धर्म के इस पुनर्जागरण का श्रेय कुछ रूप तक पाश्चात्य - साहित्य को जाता है जिसने इसमें रुचि ली और बौद्ध धर्म से सम्बन्धित स्थलों व साहित्य का परिष्कार किया। एक ओर बौद्ध धर्म के प्रोटेस्टेंट मत वाले ब्रिटेन ने बौद्ध धर्म के 'सुधारवादी

रूप', स्थायिरवाद (थेस्वाद) में अपनी कवि-रचनाएँ हुए अपने अधीनस्थ श्रीलंका के स्थायिरवाद बौद्ध धर्म के पाली ग्रंथों को प्रकाशित किया तो दूसरी ओर वैश्वभूषण मतानुयायी फ्रांस एवं इटली के विद्वानों ने चीन, जापान एवं तिब्बत में उपलब्ध महाप्राण सूत्रों और भाषाओं में अपनी रूचि दिखायी। ओल्डेन बर्ग, रिज डेविडस, स्टचेरवातस्की जैसे बौद्ध विद्वानों के फलनों से सम्बन्धित ग्रंथों के अंग्रेजी अनुवाद प्रकाशित हुए तथा बौद्ध धर्म के महत्वपूर्ण तथ्यों और साहित्य से गहरा ज्ञान को अन्वयित किया। एडविन आर्नाल्ड, सोपेनहायर तथा हर्मन हेमे जैसे दार्शनिकों और साहित्यकारों अपनी रचनाओं के विषय-वस्तु के रूप में बुद्ध और बौद्ध दर्शन को ग्रहण कर उसकी मुक्तकंठ से पशंसा की।

मुख्य अंश :- बौद्ध धर्म के इस परभावपूर्ण ने हिंदी ज्ञान - मानस को भी प्रभावित किया। इस संदर्भ में हिंदी साहित्य कोश नामक ऐ विचार में श्रीबुद्ध वर्मा जी लिखते हैं - "ईश्वरवाद और आत्मवाद के अनिच्छुक इस धर्म दर्शन के समतलवादी रूप ने आधुनिक हिंदी साहित्य को एक नयी स्फूर्ति और चेतना दी लेकिन फिर भी एक बात स्पष्ट है कि आरंभिक दौर के आधुनिक हिंदी युग के कवि और रचनाकार भले ही अपनी रचनाओं की पृष्ठभूमि के रूप में कुछ पेरणा ली हो पर उनकी रचनाओं पर बौद्ध दर्शन के मूलभूत दार्शनिक सिद्धान्तों का प्रभाव अत्यंत अल्प था और जो कुछ भी दासी कि पृष्ठभूमि इनके रचनाओं में परिलक्षित हुई वह बौद्ध धर्म के तुलना में बौद्ध दर्शन से कुछ हद तक साम्यता रखने वाले औपनिषदिक दर्शन के अधिक निकट थी। इसका एक प्रत्यक्ष कारण तो यह था कि उस समय में बौद्ध दर्शन के मूलभूत ग्रंथों की अनुपलब्धता थी।" २ वस्तुतः बौद्ध धर्म और दर्शन से संबंधित अधिकांश प्रामाणिक साहित्य के शोध ग्रंथों का प्रकाशन पिछले चार - पाँच दशकों में ही संभव हो सका है, संभवतः उनमें से अधिकांश बाद धर्म के सैद्धांतिक स्वरूप से उस स्तर पर परिचित नहीं हो पाये थे जिस स्तर पर आज हुआ जा सकता है। कुछ अपवादों को छोड़कर, इन रचनाकारों की कृतियाँ मुख्यतः बौद्ध धर्म के उस स्वरूप से अनुप्राणित हैं जो बौद्ध धर्म का औपनिषदिक दर्शन से विरासत में मिली हुई हैं।

आधुनिक हिंदी साहित्यकारों में संपूर्ण विधिलीशरण गुप्त, आचार्य रामचंद्र शुक्ल, जयशंकर प्रसाद, महाप्राण सूर्यकांत त्रिपाठी 'निराला', सुमित्रा नंदन वर्मा, महादेवी वर्मा, हजारी प्रसाद द्विवेदी, चतुरसेन शास्त्री, राहुल सांकृत्यायन, 'अज्ञेय', यशपाल, रामेश शर्मा और मोहन राकेश की कुछ रचनाएँ बौद्ध दर्शन से प्रत्यक्षतः संबंध रखती हैं।

वरिष्ठ आलोचक रामचंद्र शुक्ल जी एडविन आर्नाल्ड द्वारा रचित 'द लाइट आफ एशिया' का अनुवाद 'बुद्धचरित' नाम से किया है जो मूलतः बुद्ध के जीवन की एक रूप - रेखा प्रस्तुत करती है। बौद्ध धर्म से संबंधित प्रारंभिक रचनाओं में गुप्त जी की 'अज्ञेय' एक प्रमुख कृति है जो बुद्ध की पत्नी यशोधरा के नारी मन की सविस्तार कल्पना - गायन है।

छायावादी चिंतनधारा के अग्रणी रसिक जयशंकर प्रसाद द्वारा रचित नाटक - राजश्री, विशाखा, अजातशत्रु, स्कंदगुप्त, बंदरगुप्त तथा रामाट कनिष्क के घटनाक्रम उन सम्राटों से संबंधित हैं जिन्होंने बौद्ध धर्म को राज्यालय दिया। इन्होंने जोर देकर बताया है कि बौद्ध धर्म के सिद्धान्त यत्र - तत्र मिलते हैं। स्कंदगुप्त में वे स्वयं एक जगह लिखते हैं - "यद्यपि वे प्रतीति प्रतीक्षा समष्टि हित पर अधिक बल देकर इन्होंने बौद्ध धर्म के महायान परंपरा वाले दर्शन को अपनाया है परंतु इनकी रचनाओं में संसार के संघर्षों से विरक्त होकर संसार त्याग का उपदेश न होकर निष्काय भाव से कर्मकाण्ड की प्रेरणा है। महादेवी वर्मा जी के साहित्य के संदर्भ में इंद्रनाथ

मदान लिखते हैं - "महादेवी की रचनाओं में बौद्ध धर्म के दुखवाद और करुणा के सिद्धांत का प्रभाव स्पष्ट रूप में देखा जा सकता है।" ४ 'गामा' की रचनाओं में बौद्ध धर्म स्पष्ट झलक मिल जाती है। इसी तरह छायावाद के एक अन्य स्तंभ निराला की रचनाओं में बौद्ध धर्म के अतिरिक्त शब्दावली का प्रयोग दिखता है। यद्यपि निराला बुद्ध की कठिन साधना व उनके आध्यात्मिक सिद्धांतों से प्रभावित तो लगते हैं पर वे उनके मध्यम मार्ग के दर्शन की चर्चा नहीं करते। सुमित्रा तंदन पंत ने भी अपनी किशुम सुजन में 'बुद्ध के प्रति' एक छोटी कविता लिखकर अपनी श्रद्धा व्यक्त की है।

चिंतन और सुजन के विस्तारण प्रतिभा वाले हजारी प्रसाद द्विवेदी के दो उपन्यासों, 'बाणभट्ट की आत्मकथा' और 'चारु चंद्रसेखा' की कथा - वस्तु बौद्ध धर्म के तांत्रिक रूप से संबंधित है। बाणभट्ट की आत्मकथा के अंतिम भाग में द्विवेदी जी ने बौद्ध आचार्य बुद्धिवाद के वार्तालाप के माध्यम से तत्कालीन बौद्ध धर्म का तंत्रोन्नतमुखी रूप दिखलाया है। 'चारु चंद्रसेखा' की कथा - वस्तु का काल 'बाणभट्ट की आत्मकथा' के परवर्ती युग का है जब बौद्ध धर्म का तांत्रिक संप्रदाय चर्चोत्कर्ष में था, जो इस उपन्यास की कथा - वस्तु का एक बड़ा भाग है। तांत्रिक बौद्ध दर्शन के साथ किंचित्प्रतिष्ठा की विचारों से द्विवेदी जी ने बौद्ध धर्म में आयी विकृतियों को भी दर्शाने की कोशिश की है। ५ 'अदंत अजीववर्णन' में द्विवेदी जी ने बौद्ध दर्शन के महायान संप्रदाय की प्रासंगिकता को उजागर किया है जिसमें बौद्ध धर्म की जगह समष्टि के चित के परिष्कार की श्रेष्ठता स्थापित की गयी है, जो बुद्ध के विचारों से पूरी तरह प्रेरित होता है।

"सचचीदानंद हीरानंद वाल्म्यायन 'अजय' के एक हिंदी साहित्य के उन चंद रचनाकारों में से हैं जिन्होंने बौद्ध धर्म के दार्शनिक सिद्धान्तों को गहराई से समझा है।" ६ 'असाध्य वीणा' और 'आंगन के पार - द्वार' की रचनाओं पर बौद्ध दर्शन का स्पष्ट रूप से प्रभाव दिखता है। इन्होंने 'उत्तरप्रियदर्शी' नामक एक काव्य नाटक की रचना भी की है जो अशोक के कलिंग विजय के बाद की घटना क्रमों पर आधारित है। महापंडित राहुल सांकृत्यायन ने अपने दो उपन्यासों 'सिंह सेनापति' तथा 'जय यौधेय' की कथावस्तु में बौद्ध मतों का साम्यवादी विचारधारा के साथ समन्वय किया है। 'सिंह सेनापति' में कलिंग के प्रजातंत्र के सामाजिक विशेषताओं का चित्रण अत्यंत बारिकी से किया गया है। इसमें बाणभट्ट की कथा बुद्ध और संघ की शरण में चला जाता है। 'जय यौधेय' जो गुप्तकाल की घटनाओं पर आधारित है, में अनात्मवाद और अनात्मवाद आदि बौद्ध सिद्धांतों की पुष्टि की गयी है। ऐतिहासिक उपन्यासकार पदुरसेन शारंग की रचना 'यौधेयवृक्ष की छाया' में बौद्ध धर्म के तीन शलाका पुरुष बुद्ध, अशोक और हर्षवर्धन के जीवन - मुक्तियों का चित्रण करती है। 'वैशाली की नगरवधु' इनकी एक अन्य रचना है जिसका कथानक बौद्ध की समकालीन राजनीति की प्रभावशाली पर आधारित है। जो बुद्ध के विचारों से प्रेरित होकर अपना समग्र जीवन व्यतीत करती है।

क्रांतिकारी एवं गणतंत्रवादी चिंतक यशपाल ने ऐतिहासिक उपन्यास 'दिव्या' की कथा - वस्तु हर्षवर्धन काल से संबंधित है। भौतिकवादी दर्शन पर आधारित उपन्यास में पतनोन्नतमुख बौद्धकालीन समाज का चित्रण है। 'अमिता' यशपाल का दूसरा ऐतिहासिक उपन्यास है जो अशोक के कलिंग विजय पर आधारित है। इसमें अशोक के मानसिक परिवर्तन की बात को प्रमुखता से चित्रित करने की पूरी कोशिश की गयी है, कलिंग विजय के बाद हुए नर संहार से प्रभावित होकर अशोक का चित्त अतृप्त हो जाता है और वह वैराग्य की ओर झुकने लगते हैं और अपने संपूर्ण राज्य में बुद्ध के उपदेशों के सिद्धांतों को प्रकाश देते हैं। यशपाल ने अपने इन दोनों उपन्यासों में मूलतः

अतियों को नकार कर स्वयं-मार्ग को अपना है। यह दर्शन मानव को आत्मग्राही दृष्टि ओर आत्मकेंद्रितता से मुक्त कर, उसे परार्थ हित में समर्पित कर, जीवन को एक नया अर्थ देने का है। बौद्ध धर्म के इस पक्ष की ओर अभी हिंदी साहित्यकारों की दृष्टि सामान्यता नहीं गया है।

संदर्भ

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A STUDY OF ATMOSPHERIC POLLEN IN OSMANABAD



H. A. Kamble

Department of Botany K. J. Somaiya College of science & commerce
Vidyavihar, Mumbai.

ABSTRACT: The present research paper deals with the study of atmospheric pollen at Osmanabad (MS). The investigation was carried out.....

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H. A. Kamble



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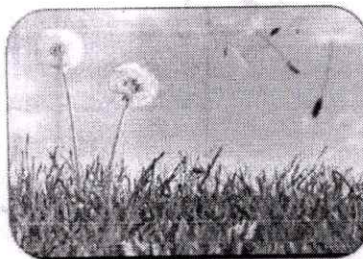
A STUDY OF ATMOSPHERIC POLLEN IN OSMANABAD

H. A. Kamble and S. S. Yeragi

Department of Botany K. J. Somaiya College of science & commerce Vidyavihar, Mumbai.

ABSTRACT:

The present research paper deals with the study of atmospheric pollen at Osmanabad (MS). The investigation was carried out from 1st January 2017 to 31st December 2017. The systematic atmospheric study was conducted by using volumetric Tilak air sampler. In the present investigation total 26 pollen types were found. Grass pollen was dominant in all season. Pollen calendar shows seasonal variation and flowering period of local vegetation [Osmanabad].



KEYWORDS: atmospheric pollen , Grass pollen , systematic atmospheric.

INTRODUCTION:

Air pollution occurs when excessive quantities of substances including pollen grains, fungal spores, bacteria, algal cells and other particles are introduced into the air. Pollen grains are produced by flowering plants. The size, shape, colour and ornamentation of pollen grains are variable according to species to species. Pollen grains are most common triggers for seasonal allergy. To determine the allergic properties many aeropalynological survey and investigations were carried out by many aerobiologists such as Kasliwal [1958], Chanda and Sarkar [1972], Tilak and Vishwe [1979], Shivpuri [1964], Roopashree [2015] etc.

MATERIAL AND METHOD:

In the present investigation was carried out with the help of volumetric Tilak air sampler (Tilak and Kulkarni, 1970).

SAMPLING METHODS :

Sampling was carried out by operating continuously the Tilak air sampler, with its orifice kept at constant height of 1.5-2 meters above ground level. Air was sampled at the rate of 5 liters/ min. and the transparent cello tape coated with adhesive petroleum jelly was changed every eight days at about 5.00 p.m. The exposed tape was cut into eight equal parts each parts representing 24 hrs. trace area. These 8 parts of tape were again cut into two parts, each representing 12 hrs. trace area of day and night accordingly. The tape pieces were mounted on

slides, using glycerine jelly as a mountant.

SCANNING :

Scanning was done regularly Scanned under 10 x 45 eye pieces objectives combination of the microscope. The identification of the trapped pollen types was based on a) Morphological characters b) Visual identification by comparison with reference slides.

STUDY SITE:

Pollen studies were carried out at Osmanabad a district of Maharashtra State, India. Osmanabad is located at 76°4'25"E longitude and 18°19'10"N latitude and situated at 652 meters above sea level.

CLIMATIC CONDITION:

An analysis of weather data of



Intramural Investigation of Pollen in Osmanabad

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ABSTRACT

A present investigation deals with the monthly frequency of pollen in the intramural environment of cattle shed. A systematic aeropalinological investigation was carried out from 01 January 2017 to 31 December 2017. This investigation was conducted by using volumetric Tilak air sampler in the intramural environment of cattle shed.

In the present investigation 26 pollen types were found. The Grass pollen contribute highest percentage (41.54%), *Cyperus rotundus* (15.33%), *Moringa oleifera* (8.62%), Poaceae (7.71%), *Parthenium hysterophorus* (6.22%). Frequency of pollen grains shows seasonal variation.

KEYWORDS: Pollen, Intramural environment, Grass pollen.

I. INTRODUCTION

Pollen grains are produced by flowering plants and found in the air. Pollen grains are male gametophytes of Angiosperms. Pollen grains are of variable in size, ranging from 3 μ m to 250 μ m. Wind borne pollen range from 10 μ m to 100 μ m⁽¹⁾. 'Palynology' is a science for pollen and spore studies and its application⁽²⁾. Pollen grains are widely known to be the cause of various allergic complaints like hay fever, eczema, asthma and urticaria⁽³⁾. So it is important to monitor airborne pollen, their emission patterns through systematic air sampling.

II. MATERIAL AND METHOD

In the present investigation was carried out with the help of volumetric air sampler⁽⁴⁾.

SAMPLING METHOD:

Samples were collected by using continuously operating Tilak air sampler. Sampler was kept at constant height of 2 meters above ground level. Air was sampled at the rate of 5 liters per minute and inside placed transparent cello tape coated with adhesive petroleum jelly was collected and changed every 8 days at about 6 p.m. The exposed transparent cello tape was cut into 8 equal parts each parts representing 24 hrs. trace area. These eight parts of tape were again cut into 2 parts, each representing 12 hrs. trace area of day and night



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Ashok Yakkaldevi
Editor-in-Chief

Study of *Eimeria ajantai* in Sheep from Beed, Maharashtra State India

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Department of Botany, Ramkrishna Paramhansa Mahavidyalaya, Osmanabad, Maharashtra, India

Abstract: During the study ten species of *Eimeria* from sheep and twelve species of *Eimeria* from goats were found. Out of these, five species of *Eimeria* were common to both the hosts, and seven different species only in goats and five different species only in sheep. The relative abundance of sheep and goats are analysed.

Keywords: *Eimeria*, Coccidia, Oocyst, Sporocyst, Sporozoite

I. INTRODUCTION

Coccidian parasites infect the intestinal tracts of animals, and are largest group of protozoa. *Eimeria* is a genus of apicomplexan parasites that includes various species responsible for the disease coccidiosis. These species cause pathological damage and mortality in poultry, cattle, sheep, goat, pig, rabbit and other animals. The genus *Eimeria* Schneider, 1975, with more than 1300 species described to date, is the largest genus, and may be the most specious genus of all animal genera. Sporulated oocyst of *Eimeria* contain four sporocysts, each with two sporozoites. Coccidia have a complex life cycle and other unusual characteristics which have stimulated investigations by increasing number of biologists.

II. MATERIAL AND METHODS

The material for the study of coccidia of goats and sheep was obtained from various slaughter houses as well as from different fields in and around Beed (M.S.). Different parts of the intestine of slaughtered goats were examined and processed within 4-5 hours after collection.

The faecal contents were diluted with distilled water and sieved to remove the large faecal debris. After repeated washing the oocysts were concentrated by centrifugation at 3000 rpm for 10 minutes. The oocysts were then spread out in shallow petri dishes and covered with 2.5% solution of potassium dichromate for sporulation.

III. OBSERVATION AND RESULTS

During the study ten species of *Eimeria* are found in sheep, eight species are redescribed and two are new species. *Eimeria crandallii* was the most frequent, being found in 108 out of 594 positive samples (18.18%) or 4.38% of the total samples. *Eimeria parva* was the second common species found in 90 out of 594 positive samples, representing 15.15% of the positive samples and 3.65% of the total samples examined. *Eimeria ajantai* was the eighth species found in 34 out of 594 positive samples, representing 5.72% of the positive samples and 1.38% of the total samples examined.

3.1 Description of the oocyst of *Eimeria ajantai*

The species was found only in sheep. The oocysts are generally bottle shaped or ovoidal in shape with micropyle and micropylar cap. Oocysts are covered with two layered wall which is 2.6µm thick. The outer layer is yellowish brown in colour and 1.5µm thick while inner layer is light brown in colour and 1.0µm thick. The micropyle is 6 to 10µm wide, covered with micropylar cap which is flattened, with its ends drawn out over the oocyst wall. Its lower edge is thickened, giving the characteristic appearance and measures 5 to 8.2µm wide and 2.2 to 4.0µm high. Polar granule and oocystic residuum are absent.

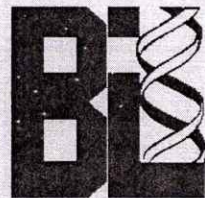
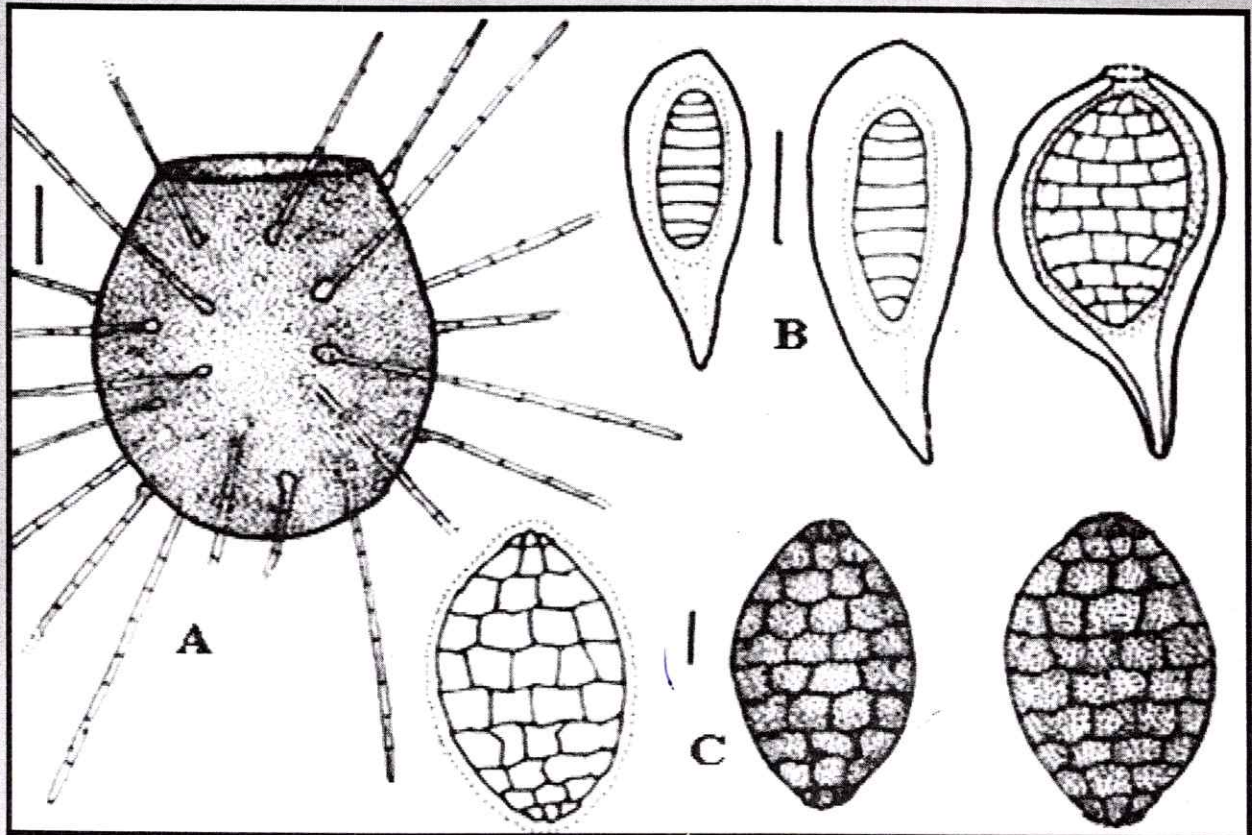
The unsporulated oocysts consist of spherical sporoblast which measures about 10 to 20µm in diameter. The sporulated oocyst consists of four sporocysts which are elongate and ovoid in shape with stieda body. Sporozoites lie head to tail

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DESCRIPTION OF *EIMERIA PARBHANIENSIS*, INSIDE GOAT AT BEED, MAHARASHTRA STATE, INDIA.

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ABSTRACT

Nine species of *Eimeria* obtained from goats have been re-described, along with newly described three species. The relative prevalence of those have also been analysed.

Key Words: *Eimeria*, Coccidia, oocyst, sporocyst, sporozoite

Introduction:

Coccidiosis is a parasitic disease affecting variety of animals, especially mammals and birds. The causal organism of coccidiosis is a microscopic, spore forming, single-cell protozoa called Coccidia, belonging to class Sporozoa.

In case of sheep and goats, coccidiosis is caused by the genus *Eimeria*. Within this genus, more than ten species of coccidia have been included, which are known to infect sheep and goats, though all of the species are not pathogenic. Only few species are responsible for disease outbreak.

Material and Methods

The coccidia of goats and sheep were obtained from slaughter houses in and around Beed (M.S.). Different parts of intestine of goats were examined within 4-5 hours after collection.

The faecal contents were diluted with distilled water and sieved to remove large faecal debris. After repeated washing it was centrifuged at 3000 rpm for 10 minutes. The oocysts were then spread out in shallow petri dishes and covered with 2.5% solution of potassium dichromate for sporulation.

Results and Discussion

Twelve species of *Eimeria* were found in goats. Out of them, nine species have been re-described, while three species were new.

E.arloingi, was found in 80, out of 528 positive samples, showing 15.15 % prevalence in positive samples, while 3.03% in total samples examined.

E.crandallis was second common species found in 72 samples, representing 13.63 and 2.73% prevalence in positive and total samples respectively.

E. parbhaniensis was, however, the ninth species found in 30 positives samples.

Oocyst of *Eimeria parbhaniensis*

The prevalence of species was found in goats only. The oocysts was typically large in size and egg shaped or elongate, ovoid with micropyle and micropylar cap. The oocysts were covered with 2.0 to 2.8 μ m thick two layered wall, the outer being thick while inner thin. Both layers were smooth and yellowish green in colour. The micropyle was 8.0 to 12.2 μ m wide, covered with well developed micropylar cap which was flattened at the apex, having the shape of an inverted bowl. It measured 7.2 to 14 μ m in width and 4.2 to



6.3µm in height. The cap was yellowish green in colour or in some cases colourless and transparent. Though polar granule was present, oocystic residuum was absent. The un-sporulated oocyst contained a large spherical sporoblast, filling the central portion with 20.2 to 24.2µm diameter. The sporulated oocysts contained four sporocysts each with two sporozoites. The sporocysts are ovoid in shape and carrying a small stieda body. The sporocystic residuum is in the form of two rows of spherical granules lying in between two sporozoites. The sporozoites lied transversely and occupying entire space within the sporocyst. One refractive globule was usually visible. The dimensions of the sporulated oocysts have been summarised in Table 1. The sporulation time of the oocysts was 96 hours, while the species was found in 1.13 % of the 2636 goats examined from Beed district.

The species was earlier described by Kshirsagar (1976). While comparing the dimensions reported by various workers, it was observed that the oocysts described during present investigation were comparatively smaller in size measuring 42.82 x 29.57µm, as against 51.0 x 30.0µm recorded by Kshirsagar (1976); but those were slightly larger than those recorded by Nikam (1983) and Jadhav (2002). In spite of these differences, because of its conspicuous micropyle, large size, and smooth wall it resembles with *E. parbhaniensis*, and therefore it was considered as *Eimeria parbhaniensis* and re-described in present communication.

Table 1 :Sporulated oocysts of *Eimeriaparbhaniensis*from goats.

Particulars	Oocyst (µm)	Average oocyst in(µm)
Length of the oocyst	(42.82)
Width of the oocyst	28.2 – 40.1	(31.57)
Length width ratio of the oocyst	1.2 – 1.5	(1.35)
Length of the sporocyst	8.2 – 10.2	(14.23)
Width of the sporocyst	5.2 – 7.3	(10.19)
Length width ratio of the sporocyst	1.3 – 1.5	(1.39)

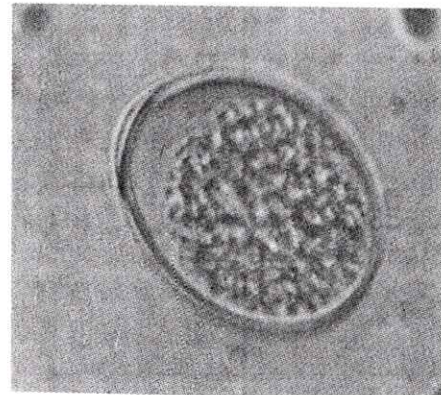


Fig.1.Unsporulated oocyst of *Eimeria Parbhaniensis*

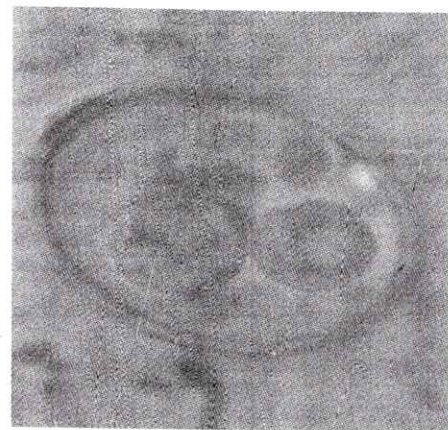


Fig.2. Sporulated oocyst of *Eimeria Parbhaniensis*

Table 2 :Dimensions of *Eimeria parbhaniensis* oocystsfrom goats

Authors	Length of the oocyst	Width of the oocyst	Average
Kshirsagar (1976)	45.6 – 55.1	26.6 – 32.3	51.0 x 30.0
Nikam (1983)	31.0 – 46.0	26.0 – 32.0	36.75 x 26.15
Jadhav (2002)	33.0 – 47.0	26.0 – 32.3	39.28 x 29.31
Present author	35.2 – 52.4	28.2 – 40.1	42.82 x 29.57

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Research Article

EFFECT OF PHYSICAL FACTORS ON FUNGI CAUSING CROWN ROT OF BANANA

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Banana, crown rot, physical factors

ABSTRACT

Banana is a most popular fruit due to its nutritive value. During storage and marketing banana deteriorate through microbial attack. A survey of post harvest diseases of banana was carried from different localities of Maharashtra. Predominant disease was crown rot. In fungal pathogens *Fusariumoxysporum* was very common. Fungicide application programme has influenced resistance in pathogens. Some of the isolates of *Fusariumoxysporum* were sensitive to benomyl whereas others were resistant. Physical factors influence the growth of fungi. It was seen that growth of resistant isolate was higher than sensitive one.

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INTRODUCTION

Banana (*Musa paradisiac* L.) fruit is one of the most important commercial fruit. Banana is a popular fruit due to its nutritive value. It is the cheapest source of carbohydrates, rich in vitamins particularly vitamin B. It is also a good source of K, P, Ca and Mg. At the stage of storage and marketing banana suffers from many diseases. Mostly in storage banana are deteriorated by fungal pathogens. Earlier reports indicate that there are 106 post harvest diseases of banana from different parts of the world. (Bilgrami, 1976, Knight 1982, Harnandez, 1984). Among these crown rot caused by *Fusariumoxysporum* is very common. Number of fungicidal and chemical compounds belonging to different trades have been tried to manage these diseases. Among the fungicides benzimidazoles have been commonly used. However this group of fungicides are known to cause resistance in the pathogen because of their wide use in management of many diseases of various crops. Present paper deals with the effect of physical factors on benomyl sensitive and resistant *Fusariumoxysporum* causing crown rot of banana.

MATERIAL AND METHODS

The diseased samples of banana were collected from localities/markets in Maharashtra state. The pathogen *Fusariumoxysporum* was isolated from the infected tissue by using CzapekDox agar medium. Sensitivity of the isolates against benomyl was determined by food poisoning test

Induction of benomyl resistance was also done by treating spores through UV and EMS. Horsten (1979). EMS 4 strain was used for further study. (Gangawane and Shaikh 1988). Various temperatures were arranged in BOD incubator. The pathogen was inoculated at centre on CzapekDox agar medium. These agar plates were placed in incubator at different temperatures for a week. The growth was recorded every day. The CzapekDox agar medium was adjusted to different pH by adding 0.1N HCL and 0.1N NaOH. The pathogen was inoculated at the centre of the agar plates. The plates were incubated and growth was recorded every day up to a week. For different light sources the coloured polythene sheets were covered to petriplates containing CzapekDox agar medium inoculated with resistant and sensitive isolate. Growth was recorded every day up to a week.

RESULT AND DISCUSSION

Effect of pH

Both the sensitive (FO6) and resistant (EMS FO4) were cultured on CzapekDox medium at different pH levels. The pH was adjusted with 1N HCL and 1N NaOH. Results indicate that (Table No 1) growth of the resistant mutant was always higher than that of the sensitive isolate at all pH levels pH 5 appeared to be more favorable for the growth of both strains. Growth was reduced below and higher pH levels in both the cases.

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Table 1 Effect of different pH on the linear growth(mm) of *Fusariumoxysporum* isolates sensitive and resistant to benomyl on CzapekDox agar medium

Sr.No.	pH levels	Sensitive (Fo6)							Resistant (EMS FO4)						
		Days							Days						
		3	4	5	6	7	8	Average	3	4	5	6	7	8	Average
1	3	10	12	16	20	22	22	17.0	15	30	35	42	46	52	36.6
2	4	11	13	15	21	22	26	18.0	16	22	38	45	55	60	39.3
3	5	10	14	20	28	35	45	25.3	18	25	36	52	62	75	44.6
4	6	12	16	25	35	38	40	27.6	14	20	32	40	55	65	37.6
5	7	10	18	26	32	38	42	27.6	15	22	38	46	50	55	37.6
6	8	11	20	25	35	35	35	26.8	10	22	32	36	40	40	30.0

C.D.P0.05=3.97 C.D0.05=3.97
P 0.01= 6.56
P 0.01 = 7.96

Effect of Temperature

The plates were incubated at temperature ranging from 5 to 45 C. Again the growth was found to be higher in case of resistant mutant at different temperatures(Table No2) .The temperature 25 to 35 C was appeared to be favorable for the growth of both strains. However sensitive isolate showed its higher growth at 35 C and resistant mutant showed its higher growth at 25 C. Temperatures 5 C and 45 C were found to be unfavorable for growth of both the strains.

Table 2 Effect of temperature on the linear growth (mm) of *Fusariumoxysporum* isolates sensitive and resistant to benomyl on CzapekDox agar medium.

Sr.No.	Temp C	Sensitive (Fo6)							Resistant (EMS FO4)						
		Days							Days						
		3	4	5	6	7	8	Average	3	4	5	6	7	8	Average
1	5	6	8	9	9	11	11	9	6	8	10	10	11	12	9.5
2	10	9	13	14	16	16	17	14.1	10	12	16	16	18	20	15.3
3	25	10	15	24	30	32	35	24.3	18	32	38	41	52	62	40.5
4	35	12	20	30	35	45	55	27.0	20	22	35	42	55	60	39.3
5	45	4	6	6	8	8	8	6.0	7	8	8	9	9	9	8.3

C.D.P0.05=6.13
C.D0.05=7.38 P 0.01= 10.13
P 0.01 = 12.19

Effect of light spectra

Plates were covered with different colour gelatin papers and incubated for 8 days. Here also (Table No.3) growth of resistant mutant was higher than the benomyl sensitive isolate. There was quite large variation in the growth of both strains under different light spectra. The growth of sensitive isolate was maximum under the red light spectra while growth of the resistant mutant was higher under red, green and yellow light spectra.

Table 3 Effect of different light spectra on the linear growth (mm) of *Fusariumoxysporum* isolates sensitive and resistant to benomyl on CzapekDox agar medium

Sr.No.	Light Spectra	Sensitive (Fo6)							Resistant (EMS FO4)						
		Days							Days						
		3	4	5	6	7	8	Average	3	4	5	6	7	8	Average
1	Normal	12	20	30	35	38	45	30.0	18	32	38	41	52	65	41.0
2	Red	12	18	20	24	25	30	21.5	18	30	35	50	62	70	44.1
3	Green	10	12	14	20	25	28	18.1	17	32	40	45	60	68	43.6
4	Yellow	10	12	16	18	20	22	16.3	18	20	45	50	65	68	44.3
5	Blue	10	12	16	20	22	32	18.6	20	25	38	42	60	72	42.8

C.D.P0.05=3.00
C.D0.05=3.00 P 0.01=4.95
P 0.01 = 6.17

CONCLUSION

Crown rot of banana was a major post harvest disease and *Fusariumoxysporum* was prevalent in fungal pathogens . Temperatures 5 C and 45 C were found to be unfavorable for growth of both the strains. pH 5 appeared to be more favorable for the growth of both strains. Growth was reduced below and higher pH levels in both the cases. Sensitive isolate showed maximum growth in red spectra while growth of the resistant mutant was higher under red, green and yellow light spectra.

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Electrical Properties Of Cd-Ti Substituted Li-Mn Ferrites

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Abstract

The electrical properties of Li ferrite can be modified by substitution of Cd, Ti & Mn to make them suitable for microwave applications. Cd-Ti substituted Li-Mn ferrites with the chemical composition $Li_{0.5}Cd_xTi_xMn_{0.1}Fe_{2.4-2x}O_4$ were prepared by standard ceramic technique. The single phase cubic spinel structure of the ferrites was confirmed by X-ray diffraction analysis. The two probe method was used to measure the dc conductivity of the ferrite sample. Resistivity studies show that resistivity ρ_{dc} and ρ_{ac} of the samples in the compositions increases as Cd^{2+} , Ti^{4+} concentration increases.

Introduction

Lithium ferrites and substituted Li ferrites have become most attractive materials for microwave applications rather than garnets. The Li ferrite $LiFe_5O_8$ has attractive electrical and magnetic properties for microwave and memory-core applications [1-4]. These properties can be modified by substitution of Fe^{3+} on either tetrahedral (A) or octahedral (B) sublattices, thus allowing the material to be tailored for specific applications [1,5]. It has been reported that the substitution of Ti^{4+} ion in Li ferrite has some remarkable influence on magnetic properties [6]. One can even predict the same for electric properties. In this view, a composite non-magnetic ion (Cd and Ti ions) substitution in Li-Mn ferrite can emerge out with much better electric as well as magnetic properties. Moreover, Li ferrite is popular for its application as thermistor, but sometimes as reported earlier the resistivity is low [7]. Hence non-magnetic ion substitution can lead to increase in resistivity [6]. In addition to this, numbers of researchers have discussed charge transport phenomenon in Li ferrite [8-10], Li-Ti [11] and Mn-Cd ferrite [7] but hitherto no attempt has been made to report composite non-magnetic ions substitution in Li-Mn ferrite. The present work is therefore communicated.

Experimental

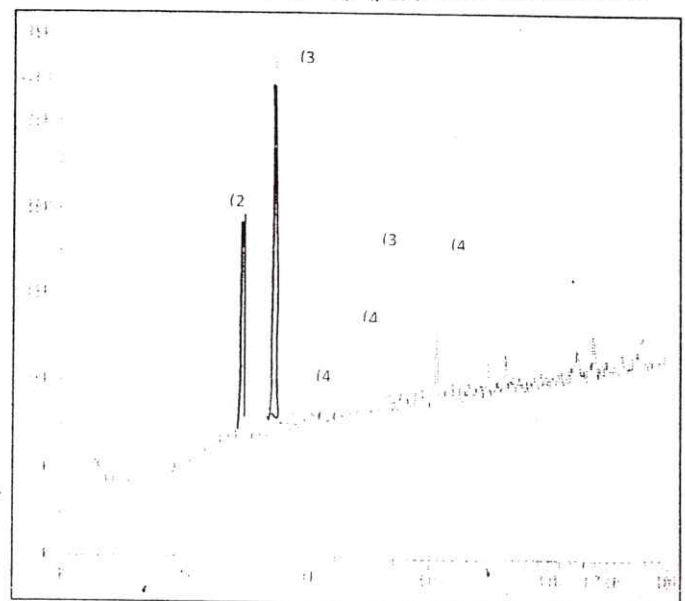
Mixed Cd and Ti substituted Li-Mn ferrites with compositional formula $Li_{0.5}Cd_xTi_xMn_{0.1}Fe_{2.4-2x}O_4$ where x varies as 0 to 0.5 in step of 0.1, were prepared by conventional ceramic method. These samples were sintered at $1000^\circ C$. DC resistivity was measured using two probe method. Dielectric

measurements were studied using LCR meter HP4284A model.

Result and Discussion

X-ray diffractograms (XRD) for all the ferrites under investigation obtained using Phillips Diffractometer PW1710 model. The XRD for higher resistivity is shown in figure 1. The XRD examinations of samples reveal that all the samples exhibit single-phase spinel structure. No secondary phases are detected in the XRD patterns of samples.

Compositional variation of resistivity as seen in Figure 2 & 3 indicate increase in resistivity with increase in Cd & Ti content. Cd^{2+} , Ti^{4+} being composite ion, together localize Fe^{2+} ions in the system and tunneling of electrons by transfer mechanism is retarded due to reduction of Fe^{3+} ions. Hence, increase in resistivity (ρ_{dc}) with increase in x.

Fig 1. XRD pattern of $Li_{0.5}Cd_{0.5}Ti_{0.5}$

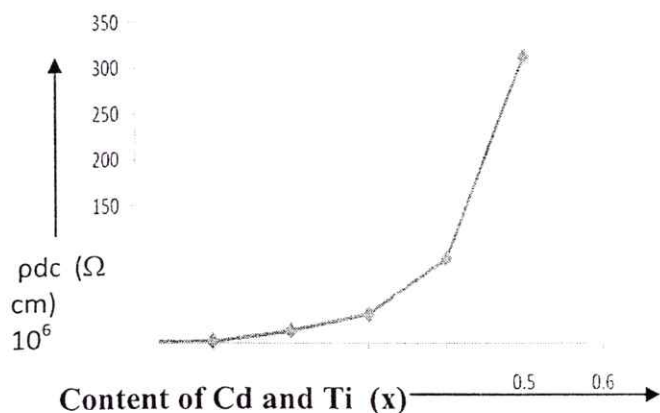


Fig 2. Variation of ρ_{dc} vs Cd and Ti content (x)

The ac resistivity (ρ_{ac}) increase with increase in Cd Ti content. It is obvious as polaron hopping mechanism responsible for conduction in ferrites also explains polarization in ferrites [12]. As increasing X decreases Fe ion concentration there by retarding polaron hopping mechanism resulting in decrease in values of permittivity. The ac resistivity is inversely proportional to either of the permittivity [12-14] and hence it increase with increase in x content.

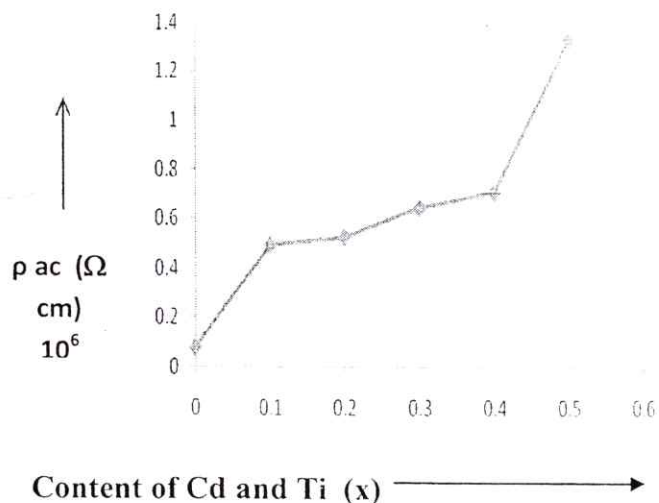


Fig 3. Variation of ρ_{ac} vs Cd and Ti content (x)

Conclusion

The composite non- magnetic ion substitution especially in Li-Mn ferrite is reported for the first time. Mixed Li-Mn ferrites were ignored for the last 3 decades inspite of their application at microwave frequencies as stated before. Therefore

the study on preparation and electrical characterization of such materials is essential. The present work has made an attempt and observations reported are increase of composite ion content has an effect of reducing the Fe ion responsible for conduction and polarization in ferrites. Hence increase in dc and ac resistivity with content of x is observed.

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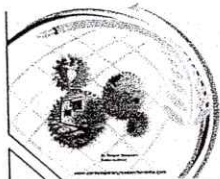
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REMARKABLE INFLUENCE ON MAGNETIC BEHAVIOR OF Ni²⁺ DOPED Cu-Zn FERRITE

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Abstract: Ni²⁺ substituted Cu-Zn spinel ferrite with chemical formula Ni_xCu_{0.5-x}Zn_{0.5}Fe₂O₄ were synthesized by the chemical method. The stoichiometric amounts of pure elements were used for synthesis. The magnetic behavior of materials were examined at room temperature and liquid nitrogen (L.N.). The magnetic moment was calculated from magnetization data.

Keywords: ferrite, magnetic.

1. Introduction

Magnetic nanoparticles and nano assemblies with uniform size distribution are currently of emerging interest because of their extensive applications in memory storage devices, catalysis, sensors, MRI, magnetically controlled drug delivery, hyperthermia treatment of tumor cells [1-3]. Among the materials explored so far, spinel ferrites MFe₂O₄ (M=Co, Mn, Ni) are emerging as promising materials especially for biomedical applications. Compared with iron oxides, spinel ferrites provide flexibility to control both crystal structures and magnetic properties by choosing different non-iron metals in spinel ferrite backbone and controlling their molar concentrations. Hence it is possible to obtain great tenability in chemical composition and bonding through the variation of chemistry at the atomic level [4].

Anderson Dias et al. [5] have carried out magnetic properties of sintered Ni_{0.34}Zn_{0.60}Fe_{2.06}O₄ form hydrothermal powders. The results form hysteresis magnetic loops showed high saturation magnetization (5000 < 4πMs < 7000G), low remanence (160 < 4πMr < 300G) and corecivity (22 < Hc < 35 Oe)

values as expected for soft ferrites. The microstructural evolution was correlated to the magnetic parameters and the relations between them were discussed.

O.G. Mundada et al. [6] have reported that as the doping concentration of Ti⁴⁺ ions in Ni-Zn ferrite increases, the saturation magnetization of and nB at 80k gradually decreases. D.N. Bhosale et al. [7] have measured magnetization values of Cu-Mg-Zn ferrite by SQUID technique and the saturation magnetization (MS) versus temperature curves revealed the curve to be of type Q. The monotonic increase in Hc with grain diameter for ferrite compositions under investigation leads Hc ∝ D⁻¹.

Woo Chul Kim et al. [8] have investigated magnetic and structural properties of ultrafine Ni-Zn-Cu ferrite by Sol-gel method. The magnetic behavior of Ni-Zn-Cu ferrite powders fired at and above 623K showed that an increase of the annealing magnetization. The maximum coercivity and saturation magnetization of Ni-Zn-Cu ferrite power were Hc = 96 Oe and MS = 68 emu / g.

Tatsuya Nakamura [9] reported that in Ni-Zn-Cu ferrite ($\text{Ni}_x\text{Zn}_{0.8-x}\text{Cu}_{0.2}\text{Fe}_2\text{O}_4$). As x increase, the magnetization value increased reached maximum around a certain x ($x = 0.4$ for Ni-Zn-Cu ferrite) and then decreased. These results are similar to that of Ni-Zn ferrite. Both the spine structure change from the Neel collinear structure to the Yafet- Kittle canted spin structure and the Neel temperature variation are attributed to the tetrahedral site preference of nonmagnetic Zn^{2+} ions [10] which cause a reduction of the A-B intersublattice super exchange interaction.

In the present study I report the magnetic results obtained at room temperature and in liquid nitrogen on Ni^{2+} doped Cu-Zn ferrites.

2. Experimental

The oxalates have been prepared by a method suggested by Wickham [11] and subsequently modified by Bremer et al [12] for the preparation of Mn-Zn ferrites. The method has an advantage over the conventional metal oxide process in which acetic acid is obtained as an important by product resulting from the synthesis of oxalates using respective metal acetate [13].

The chemical used in synthesis of Ni substituted Cu-Zn ferrites were reagent grade. The chemicals used for synthesis were as follows:

- 1) Iron reduced metal powder Electrolytic Extra Pure (99%) (Loba Chemie, India)

- 2) Zinc acetate A. R. (S. D. fine, India) (99.5%)
- 3) Cupric acetate L. R. (S. D. fine India) (98%)
- 4) Nickel acetate (Loba Chemie, India) (98%)
- 5) Oxalic acid A. R. (S. D. fine, India)
- 6) Glacial acetic acid A. R. (S. D. fine, India)

The balance used for weighing the chemicals was a single pan balance having least count 10^{-5} g. the solutions were prepared in doubly distilled water.

The magnetization measurements were carried out using EG and G Princeton Applied Research Model 4500 Vibrating Sample Magnetometer. The EG and G PARC VSM is operable over sample temperature range form 2.0 K 1000 C. Measurements of moments as small as 1×10^{-5} Emu are possible in magnetic field ranging from zero to 2T with conventional laboratory electromagnets or 12T with superconductivity solenoids.

Results and discussion:

Field dependent magnetization curves of all typical samples recorded at room temperature and in liquid nitrogen are illustrated in Fig. 1. The variation in $4\pi\text{Ms}$ with Ni^{2+} concentration are given in table 1 and from table it is observed that the values of magnetization recorded at room temperature and LN increases with increase in Ni^{2+} concentration.

Table 1: Compositional variation of $4\pi\text{Ms}$, n_B and porosity for the ferrite system $\text{Ni}_x\text{Cu}_{0.5-x}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ at R. T. (300K) and L. N. (77K)

x	Mol. Wt.	$4\pi\text{Ms}(300\text{K})$ Gauss	$n_B(300\text{K})$ emu	$4\pi\text{Ms}(77\text{K})$ Gauss	$n_B(77\text{K})$ emu	Porosity
0.00	240.16	3640	2.34	6663	4.29	10
0.05	239.91	3886	2.50	6915	4.45	10
0.10	239.67	3601	2.30	6960	4.45	12
0.15	239.43	4348	2.78	6860	4.39	6
0.20	239.18	4424	2.83	7482	4.78	14
0.30	238.70	4539	2.90	7370	4.20	8
0.40	238.22	4850	3.09	6927	4.42	2
0.50	237.74	4756	3.01	7599	4.81	3

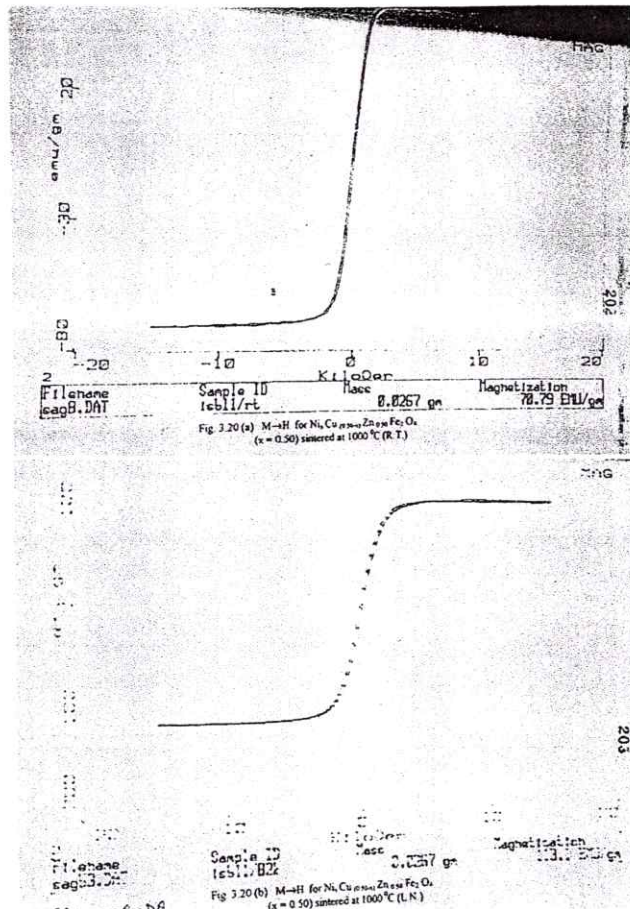


Fig. 1 Saturation magnetization for Ni_xCu_{0.5-x}Zn_{0.5}Fe₂O₄ sintered at 1000 C recorded at room temperature and L.N.

Compositional variation of magnetic moment n_B

The compositional variation of saturation magnetization with field are shown in figures. The figure (a) denotes M→H variation at room temperature (300K) and figure (b) denotes M→H variation at liquid nitrogen (77K).

From the values of M_s at R. T. (300K) and at liquid nitrogen (77K) the magnetic moment " n_B " have been calculated using the formula

$$n_B = \frac{(\text{Molecular weight}) \times M_s}{5585 \times d_s}$$

Where d_s is density of sample

$$M_s = (1-P) \sigma_s d_s$$

Where σ_s = saturation magnetization (emu/g.)

P = porosity

From the values of saturation magnetization in emu/gm the actual values of n_B and the values of Ni_xCu_{0.5-x}Zn_{0.5}Fe₂O₄ where X = 0.00, 0.05, 0.10, 0.15, 0.20 0.30, 0.40, 0.50, have been calculated for the two temperatures namely 300k, 77k. Data on molecular weight $4\pi M_s$, n_B and porosity have been tabulated for various values of x in given table.

Form above table it is observed that the values of $4\pi M_s$ and n_B increase with addition of Ni²⁺ ions. This increase in magnetization with addition of Ni²⁺ can be explain on the basis of magnetic moments of Cu²⁺ and Ni²⁺.

Ni²⁺ (2.3 μ_B) has greater magnetic moment as compared to Cu²⁺ (1.3 μ_B) and both the ions

occupy B-sites. Also with addition of Ni^{2+} ions the concentration of Cu^{2+} ions decreases which results in increase in magnetization due to increase in magnetic moment at B-sub lattice.

The variation in magnetization M_s is attributable to the density of the sample. The

following table 2 is given in justification to the above statement. It is observed that the sample, which has minimum porosity i. e. high density, shows greater magnetization or magnetic moment. While the sample with low magnetization has maximum porosity.

Compositional variation of x (Ni^{2+}), t (Zn^{2+}), $4\pi M_s$ and porosity.

x (Ni^{2+})	t (Zn^{2+})	$4\pi M_s$	Porosity %
0.50	0.45	4880	1
0.05	0.45	3997	10
0.4	0.50	4850	2
0.00	0.50	3640	10
0.40	0.55	422	1
0.05	0.55	3207	14

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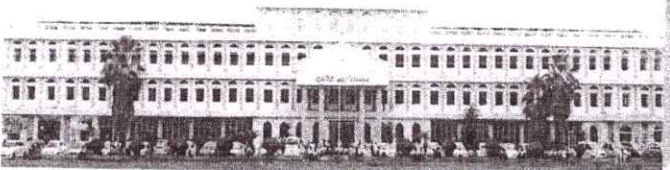
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Study Of Phyllosphere Fungi Of Some Ornamental Plants

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Abstract – The present investigation was performed to observe the phyllosphere fungi of some ornamental plants. The leaf surface is exposed to air currents. With the air currents certain microscopic objects are carried to leaf surface. Ornamental plants are commercially important grown in either open field or under glass house condition. Fungi are found every where. Leaf surface provides a suitable environment for microbial growth. Phyllosphere fungi were isolated from *Hibiscus rosa sinensis* and *Ixora coccinea*, fungal species isolated were *Aspergillus*, *Curvularia* and *Fusarium*.

Key words – Ornamental plants, phyllosphere, fungi

Introduction –

The term phyllosphere was introduced by Last (1955) to denote the leaf surface environment. Leaf surface provides a suitable habitat for the growth, reproduction and multiplication of microorganism because the surface medium of leaf comprises of exudates, chemical compounds resulting from biological activity of various microbes. (Deepika Chauhan et al 2014). Fungi are found everywhere such as in water, air and soil. The causal organisms responsible for various plant diseases comes through different agencies. Lot of investigations have been carried out on phylloplane flora of leaf surfaces of plants grown for various purposes. (Abdul latief Abadi, 1990, Bharat Rai et al 1980, Kiss 2003, Steven E. et al 2003, Sandeep Shukla, R.B. Sharma 2016). Ornamental plants make environment beautiful and keeps it refreshing. Many physical, chemical and biological factors brings various changes in population of fungi and due this fungi shows variation in their occurrence. Microbial communities of leaves are diverse and include many different genera of microbes. Interactions between microorganisms, are antibiosis and parasitism etc. which protect plant from pathogenic fungi (Chakraborty et al 1994).

Material and Methods –

Sample Collection : The fresh leaves of China rose and Ixora were collected from various localities and brought to laboratory.

Isolation of Phyllosphere fungi :

Phyllosphere fungi were isolated from leaves of test plants through leaf washing technique

(Aneja 2003). The collected leaf samples were placed in 250 ml conical flasks containing 100 ml sterilized distilled water. The conical flask was hand shaken for homogenous suspension for about 30 minutes. This suspension was used for further study. One ml of suspension was poured in to

petriplates containing sterilized PDA medium. Incubated for Then petriplates for seven days. After incubation fungi were observed and recorded,

Result and Discussion :

Fungal Species from both leaf surface of plants

Sr.No.	Name of the plant	Surface of the leaf	Fungi	Season	Colonies
1	<i>Hibiscus rosa sinensis</i>	Dorsal	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 	Rainy	12 3 7
		Ventral	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 		7 4 9
		Dorsal	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 	Winter	7 4 3
		Ventral	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 		5 3 3

		Dorsal	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 	Summer	3 2 4
		Ventral	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 		3 2 4
2	<i>Ixora coccinea</i>	Dorsal	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> • 	Rainy	7 6 10
		Ventral	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 		8 7 12
		Dorsal	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 	Winter	5 4 5
		Ventral	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 		6 7 9



Gupta(1972) observed the effect of extracts of *Phormidium foveolarum* on Maize seedlings. Mehata et.al.(1999) studied impact of extracts of higher plants and algae on rice seedlings. Shakuntala (1991) observed effect of algal extracts on crop seedlings. Fayza and Zenaib (2008) observed increase in germination and growth parameters of Lettuce plant by *Chlorella vulgaris* as biofertilizer.

Effect of different extracts of *Phormidium mucosum* on seed germination of three legume crop plants showed results in table 1, table 2 and table 3. In control, the germination was recorded similar 65% in legumes in Chickpea with 5.6cm shoot length and 4.4cm root length, 5.5cm shoot length and 4.6cm root lengths in Green-gram and with 5.5cm shoot length and 4.2cm root lengths in Black-gram.

The three legume crop seeds germinated with cold water, methanol, and ethanol shows similar percentage of germination (75%) with moderate shoot and root lengths. Ethanol extract shown 75% seed germination in Chickpea with 5.8cm shoot length and 4.8cm root length, 6.2cm shoot length and 4.8cm root lengths in Green-gram and with 6.7cm shoot length and 4.6cm root lengths in Black-gram and followed by methanol in Chickpea with 4.6cm shoot length and 4.5cm root length, 4.8cm shoot length and 4.6cm root lengths in Green-gram and with 4.6cm shoot length and 4.3cm root lengths in Black-gram (table 1, table 2 and table 3) Similar types of observations were recorded by Kamble (2008) while studying effects of *Hydrodictyon reticulatum* and *Spirogyra plena* on Moth bean.

From the above results it was observed that, blue green alga *Phormidium mucosum* contains growth promoting substances which gave promotive effects in germination of legume seeds.

CONCLUSION:

From the present investigation it is concluded that, legume seeds treated with extracts of alga *Phormidium mucosum* shows enhancement in germination, shoot length and root length. The algal extracts prepared in hot water, chloroform and petroleum ether also shows stimulatory effect on legume seeds followed by cold water, methanol and ethanol. The present investigation reveals that blue green alga *Phormidium mucosum* contains certain growth promoting substances which enhances seed germination.



		Dorsal	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 	Summer	3 - 4
		Ventral	<ul style="list-style-type: none"> • <i>Aspergillus species</i> • <i>Curvularia Species</i> • <i>Fusarium species</i> 		3 - 2

During the present investigation ,it was reported that the species of *Fusarium* and *Aspergillus* were frequently seen on dorsal and ventral surface of both test plants. Remarkable variation was seen in summer ,may be due to fluctuations in the temperature.

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Structural and magnetic studies on Cu substituted Co-Zn ferrites

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Abstract : Cu substituted Co-Zn ferrite were successfully synthesized by Sol-gel combustion route. Structural parameters like lattice parameter of crystalline unit cell, grain size, micro-structural strain revealed a random variation with Cu content unlike to that reported earlier. The magnetic parameters measured from VSM studies also showed unusual variation, which is again not observed till date. It is explained in terms of lattice distortion caused due to Cu substitution. The lattice distortion on Cu substitution is due to Jahn Teller effect. The magnetic parameters namely retentivity and coercivity show variation with magnetic field suggests that these materials can be used for stress sensing application.

Keywords: Magnetic materials; Ferrites; Sol-Gel route; Magnetostriction; Hysteresis.

Introduction

The general formula of spinel ferrites is MFe_2O_4 having $Fd3m$ space group. These materials are technologically important due to their interesting applications in many electronic devices, biomedicines, magnetic recording media, magnetic storage memory devices, magnetic fluids for storage, magnetically guided drug delivery, biosensor, magnetic resonance imaging etc [1-5].

The $CoFe_2O_4$ has been extensively investigated because of its superior properties like high chemical stability, cubic magneto crystalline anisotropy, magnetostriction, coercivity as well as strong electrical insulation in comparison to other ferrites [6-8]. Moreover, significant mechanical hardness and moderate saturation magnetization at room temperature, high sensitivity of magnetic induction to applied stress makes it popular as Stress Sensor [9-12].

These properties of CoFe_2O_4 are important for its use in magneto elastic sensors [13] and as the magneto elastic component in oxide based “multiferroic” composites.

Cobalt ferrite has a partially inverse spinel structure in which both sites i.e tetrahedral (A site) and octahedral (B site) containing a fraction of Co^{2+} and Fe^{3+} cations. It is generally accepted that a large fraction of Co^{2+} ions are on the B- site and the remaining are on the A- site, which usually depends on the synthesis method as well as on the heating rate and time [7]. The magnetic property of cobalt ferrite depends upon concentration of Co^{2+} at B-site of the spinel structure. Therefore discrepancy in the cation distribution of Co^{2+} ions in CoFe_2O_4 caused due to structural changes can affect the physical properties like temperature dependence of magnetic susceptibility, permeability and magneto- mechanical hysteresis.

Co-Zn Fe_2O_4 is hard magnetic material and is known for its good chemical stability and high curie temperature, high electrical resistivity, very low eddy current losses which are essential for high frequency magnetic application, stress sensing and magnetic recording [14-15]. Co ferrite has inverse spinel structure where as Zn ferrite has normal spinel structure [16]. A number of papers have reported cation distribution especially for Co and Zn ions at either A or B sites depending upon site preference energies [17-19]. Zn substitution in place of Co is expected to show tunable changes in magnetic properties, which has been already reported and it is due to non-magnetic ions substitution in place of magnetic ions. They do form different magnetic structure with cluster spin glass like behavior [20]. The Co-Zn ferrite is already studied by different researcher who has reported decrease in magnetization with increase in Zn concentration [21]. It was also noticed by some other co-workers that Zn substitution reduces the curie temperature of ferrite [22-24].

Cu substitution in Co-Zn ferrite enhances the magnetic properties was already reported by mane et.al [25]. Cu when substituted in place of Co can exhibit different properties was also reported in literature [26-28]. It is also known that there are number advantages in substituting Cu in place of other metallic cations especially in spinel ferrites[29].

1. High mobility of Cu ions during diffusion when green powder are being sintered leads to higher densification at relatively lower temperature [29].
2. O.F. Caltun et al., 2001 [30] also found improved electromagnetic properties at $x = 0.2$ and suggested that the specific amount of Cu substitution ($x = 0.2$) was favourable for the grain growth of $\text{Ni}_{0.8-x}\text{Cu}_x\text{Zn}_{0.2}\text{Fe}_2\text{O}_4$ ferrite. Rahman et al.[31] worked in the

same composition range and stated that the partial substitution of Ni²⁺ with Cu²⁺ (up to $x = 0.25$) influenced the magnetic parameters due to the modification by cation redistribution.

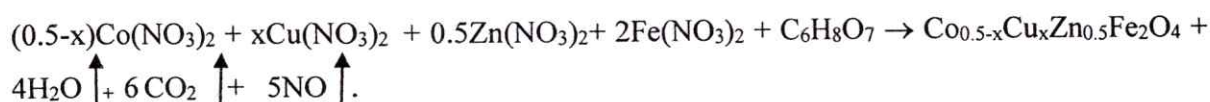
3. Hsu et al. [32] Cu substitution for Ni in Ni-Zn ferrite would enhance the densification of the ferrite and subsequently increase the permeability value as well as saturation magnetization value and decrease the coercivity of the sintered ferrite. Su et al. [33] stated that the presence of Cu ion up to 4 mol% activated the sintering process leading to increase in density and decrease in magneto crystalline anisotropy constant of Ni-Cu-Zn ferrite.

With these different views, the present paper communicates Cu substitution in hard core ferrite like Co-Zn with a view to explore its applications in electronic materials, Co-Cu-Zn ferrite was prepared via sol-gel combustion method. Sol-gel combustion route is adopted because it is rapid, one step and low cost method for preparation of ferrites.

Experimental:

The spinel ferrite system were prepared from solution combustion technique. Highly pure AR grade (99.9%) materials like Cobalt nitrate $\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$, Copper nitrate trihydrate $\text{Cu}(\text{NO}_3)_2 \cdot \text{H}_2\text{O}$, Zinc nitrate $\text{Zn}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$, Ferric nitrate $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ were used as starting materials. Copper substituted Co-Zn Fe_2O_4 nano-particles with generic formula $\text{Co}_{0.5-x}\text{Cu}_x\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ (where $x = 0.00, 0.05, 0.1, 0.15, 0.2, 0.25$) were synthesized. Fuel used was citric acid ($\text{C}_6\text{H}_8\text{O}_7$). It was preferred because of its better complexing ability and low ignition temperature (200–250°C) when compared with other fuels commonly used in wet chemical methods. A proper oxide to fuel ratio was maintained for initiating the combustion mechanism. The stoichiometric proportion of metal nitrates was added to 100ml de-ionized distilled water to form a homogeneous solution. Then the entire solution was maintained at pH 7 and thereafter it was stirred magnetically in the temperature range of 80 – 100°C until the entire mixture turned into viscous dry gel. The dried gel was then transferred to a hot plate for ignition by citric acid assisted self-propagating combustion reaction. The gel was burn out completely to form a fluffy loose powder of nanoparticles of Cu substituted Co-Zn ferrite.

The following chemical reaction explains the product formed.



The ash like powder was grinded and pelletized into a disc of 1cm diameter and 2-3 mm in thickness. Finally, the pellets were final sintered at 1200°C for 20 hrs to obtain the final product. To understand the kinetics of the solid state reaction, Degree of transformation (α) in solid state reaction was calculated from qualitative XRD analysis Structural and magnetic characterization of the samples was carried out using XRD, SEM and VSM.

Results and Discussions:

The X-ray diffractograms of X= 0 to 0.25 compositions are shown in the Fig.1. The XRD reveals single phase Cubic spinel type of crystal structure in every composition. The reflection planes are indexed and are pertinent to the cubic FCC type of structure normally exhibited by the ferrites [1-4]. The lattice parameter calculated using Bragg's Law show random variation with variation in Cu content (Fig.2). This is unlike to those reported earlier for other Cu based mixed ferrites [34-36]. However there is one evidence of nonlinear variation with Cu content as reported by D Ravinder (37) but lacks in explanation of the variation. Generally, in a solid solution of mixed cations, the lattice constant either linearly increases or decreases depending upon the miscibility range with composition [34]. However, in the present case, a total deviation from the general rule can be associated with various parameters like microstructural strain [35] developed during sintering, difference in diffusion coefficients of cations [29] as well as Jahn teller effect exhibited by Cu ions [38].

The random variation in lattice constants are not reflected in the variation of X-ray density with composition[Fig.3]. In fact, it increases with increase in Cu content. The hopping length between cations at A and B sites calculated using the formulae given in references [39,40] vary randomly with Cu substitution[fig.4]. This is again unlike to that reported earlier[39]. Hopping lengths in tetrahedral sites (LA) and in octahedral sites (LB) is the distance between the magnetic ions at the respective sites and can be calculated using the following relation,

$$LA = (a/4) * 1.732 \quad \text{and} \quad LB = (a/4) * 1.414 \quad \text{-----(1)}$$

This random variation of hoping lengths at tetrahedral and octahedral sites can be attributed to Jahn teller effect due to Jahn teller Cu ion substitution. This is schematically shown in Fig.5. Cu^{+2} has 9 electrons in its d orbital. It exhibits degeneracy. For removing the

degeneracy and to lower the crystal field energy it distorts itself to remove the degeneracy. This is Jahn teller effect.

The Crystal field view depicting the splitting of the d-orbitals is shown in Fig.5 The levels aligned with the two more distant donor atoms like Cu ion along the z-coordinate experience less repulsion and so drop in energy (dxz , dyz , and dz^2), while those closer to the in-plane donor atoms (dxy , dx^2-y^2) rise in energy (Fig.5). The Metal- Oxygen view of the splitting is that the dx^2-y^2 in particular overlaps more strongly with the ligand donor orbitals, and so is raised in energy. Note that all d-orbitals with a 'z' in the subscript drop in energy. Splitting of the d-subshell by JahnTeller distortion eg t_{2g} energy dxz dx^2-y^2 dyz dxy dz^2 Cu(II) in regular octahedral environment Cu(II) after J-T distortion is shown clearly in the fig.5.

Thus, lattice distortion has relevance to the anomalous lattice parameter variation and even for hopping lengths with Cu substitution in these particular mixed Fe=Zn--Co ferrite series [41].

The result of kinetic curve for the representative sample i.e. $Co_{0.3}Cu_{0.2}Zn_{0.5}Fe_2O_4$ is shown in Fig.6.. It is clear from the fig.6 that the degree of transformation in the reaction after 1 hour reaches 0.98 at 900°C where as reaches 0.93 at 1000°C.. The reaction rate was found in close agreement with Jander model [42.] .

The SEM images for the present ferrite series is shown in the figure 7. It is clear from the micrographs that the grain size increases with increase in Cu content. However, well stacked uniform grains are reflected only in $x = 0.15$ and $x = 0.2$ compositions. There is a evidence of dense samples formed without inter and intra granular pores. This can be co-related with increase in X-ray density with increase in composition. The physical density also has increased with increased in composition.

The Hysteresis of the entire ferrite series is shown in the figure 8 with retentivity and coercive field variation with Cu content (x) shown in the insets. The results are unlike to those reported earlier for other Cu substituted ferrites or for those prepared by some other routes [32, 33]. It is seen clearly that the Retentivity and Coercivity is minimum for $x = 0.15$. This can be co-related to structural changes as seen in Fig.4. The hopping length within cation at both A and B sites is maximum for $x = 0.15$ Cu content. The increase in length decreases the interaction between magnetic spins and thereby reducing the residual magnetization and Coercivity in this particular composition. This can also be co-related to decrease in magnetization for $x = 0.15$ Cu content. Despite the well stacked grains in $x = 0.15$ composition as seen from fig.7, the vital magnetic parameter are reduced to minimum. This anomaly is again explained in the light of

Jahn teller distortion [Fig.5] reflected in compositional variation of lattice parameter and hopping lengths [Figures 2 and 4].

Conclusions: XRD confirms single phase formation in ferrites. Distortion in the lattice despite due to Cu doping accounting for random variation in lattice parameter. Kinetics of the solid state reaction is in conformity with Jander's model. Hopping length variations also asserts the distortion of the host lattice. The magnetic parameters show minimum values for $x = 0.15$ composition.

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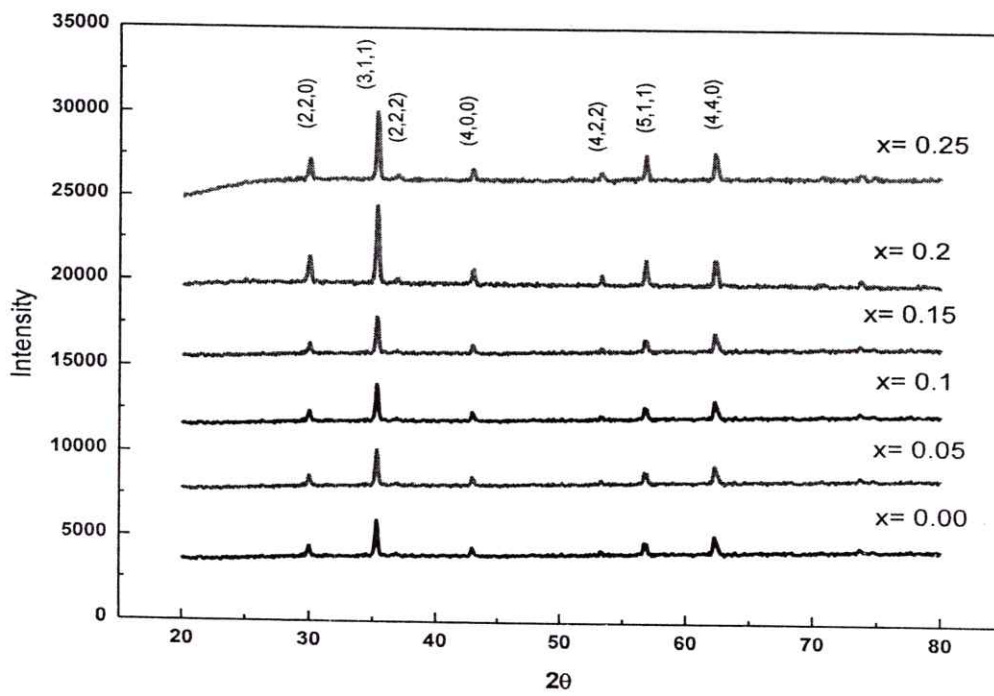


Fig.1 XRD of $\text{Co}_{0.5-x}\text{Cu}_x\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ ferrite series

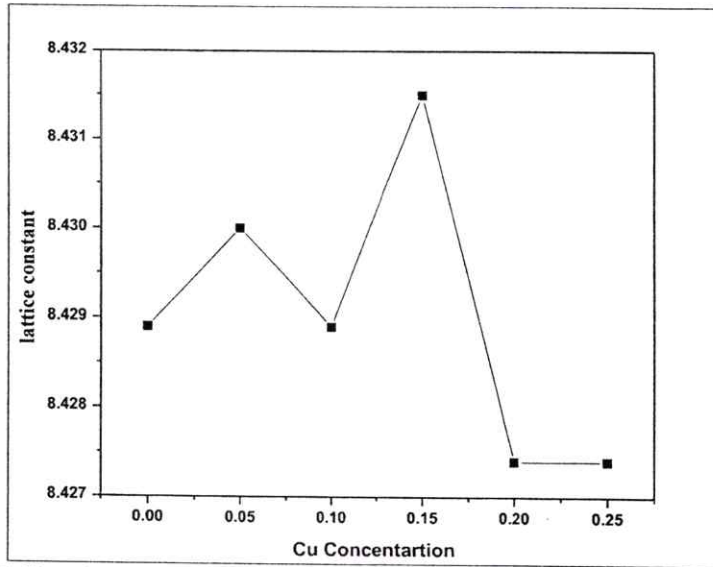


Fig.2 Lattice constant Versus Cu content in $Co_{0.5-x}Cu_xZn_{0.5}Fe_2O_4$ ferrite.

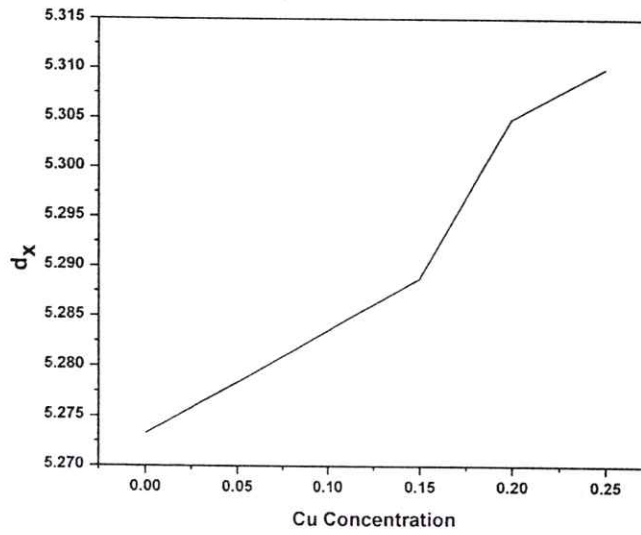


Fig.3 X-ray density Variation with Cu content

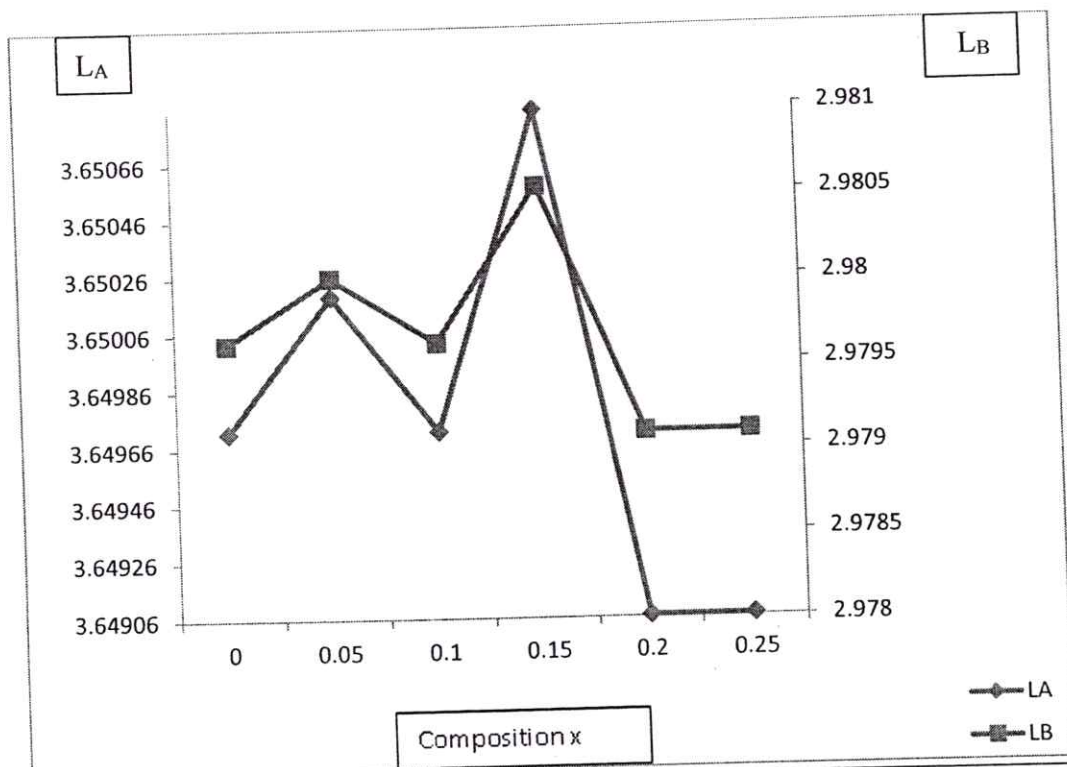
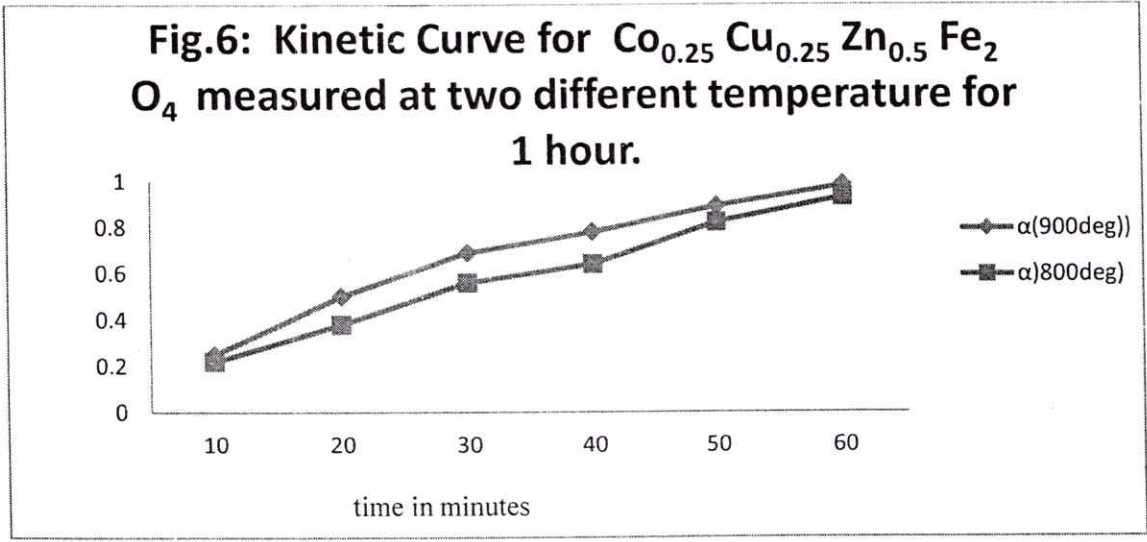
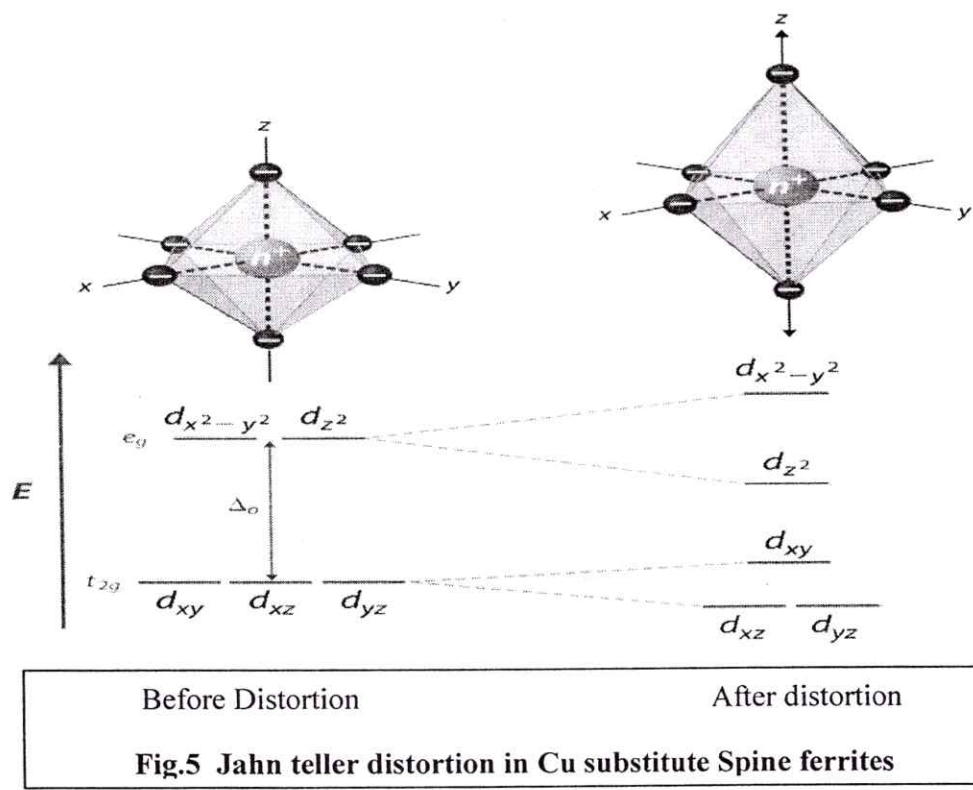


Fig.4 Variation of Hopping lengths L_A and L_B with composition x



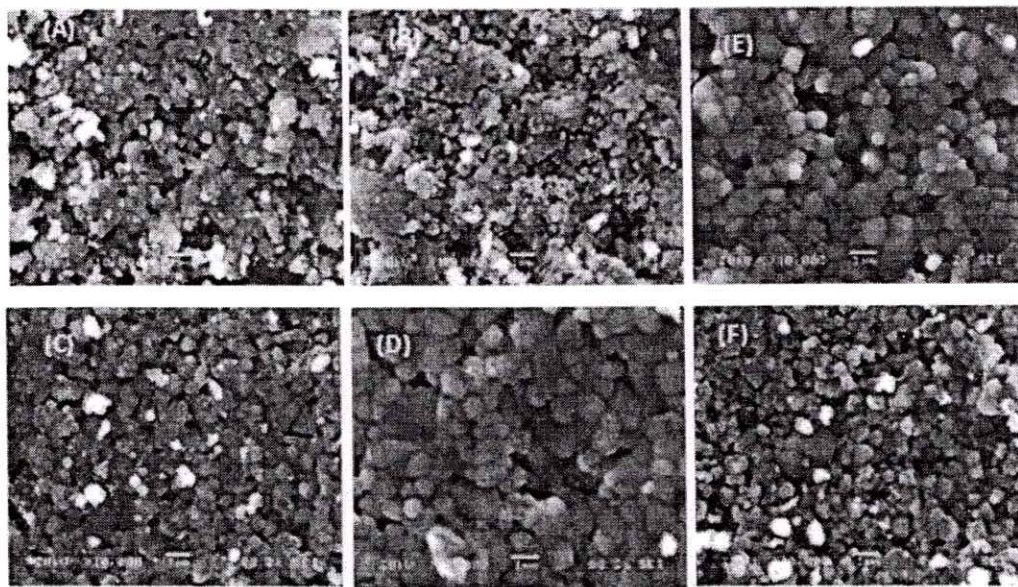


Fig.7 SEM Images of $\text{Co}_{0.5-x}\text{Cu}_x\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ where Fig. A ($x=0.00$), B ($x=0.05$), C ($x=0.1$), D ($x=0.15$), E ($x=0.2$), F($x=0.25$) Composition

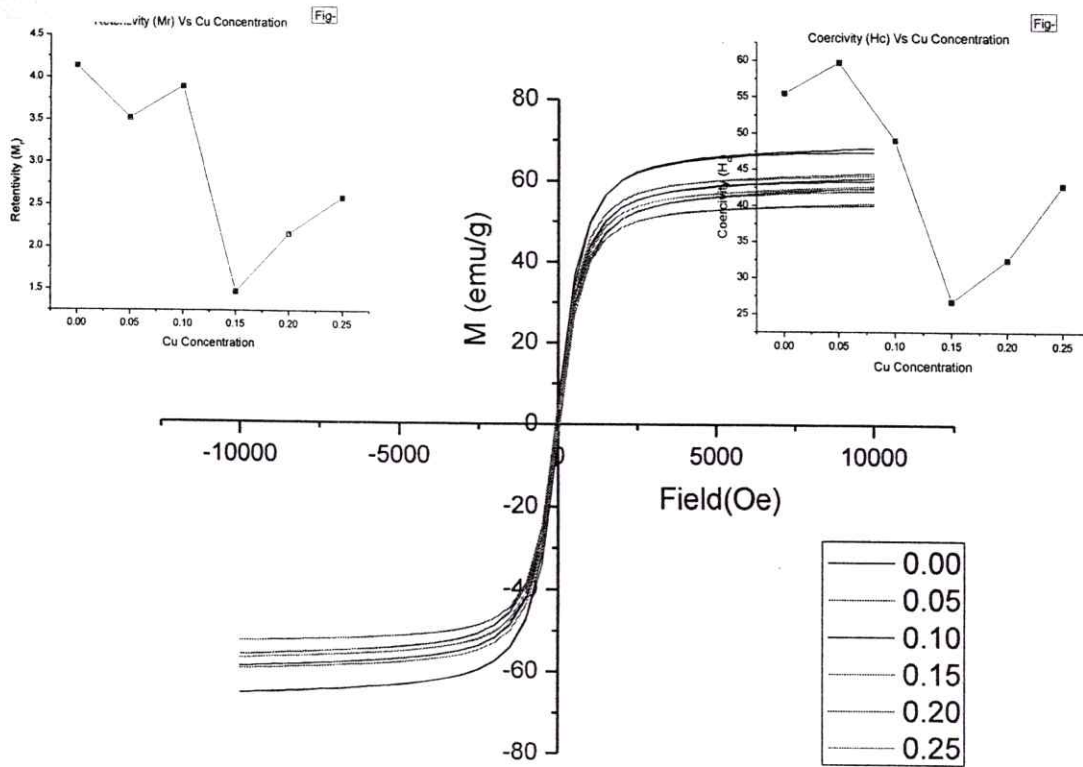


Fig.8 Hysteresis loops of the $Co_{0.5-x}Cu_xZn_{0.5}Fe_2O_4$



Dynamical Analysis of Michaelis-Menten Enzyme Reactions

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Abstract: In this paper Michaelis-Menten type enzyme reactions are studied. With an output of this kind one could consider the following set of equations $\frac{dx}{dt} = a - bx - x^p y^q$, $\frac{dy}{dt} = x^p y^q - \frac{cy}{y+1}$. Taking some particular values of the parameters a, b, p, q a detailed analysis of the system is taken up. The system is analysed by studying the associated differential equations, phase plane analysis and bifurcation analysis.

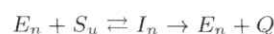
MSC: 80A30, 92C45.

Keywords: Enzyme reactions, Michaelis-Menten, system of differential equations, equilibrium points, phase plane, bifurcation analysis.

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1. Introduction: Michaelis-Menten Enzyme Reaction

Enzymes are biological catalysts that alter the rates of reactions in cells without being, changed themselves during the course of a reaction. A biochemical reaction almost invariably has an output which is not necessarily linear. Such nonlinear phenomena involving enzymes have been explained by several people, amongst them Michaelis and Menten are worth mentioning. Following the law of mass action [17], there are many mathematical models with a Michaelis-Menten type output. Michaelis and Menten in [1, 2] studied a simple enzyme reaction. If an enzyme E_n combines with another reactant S_u and gives rise to an intermediate substance I_n and this intermediate splits into two substances one of which is the original enzyme E_n again and some other substance Q . The reaction can be written as



Michaelis Menten Equation is

$$V = \frac{V_{\max} [S]}{K_m + [S]} \quad (1)$$

where V is the velocity of the reaction, V_{\max} is the maximum velocity of the reaction, $[S]$ is the concentration of the substrate S , K_m is the Michaelis constant.

Michaelis Menten Plot:

Some enzyme reactions like Michaelis-Menten reaction are studied by L.S. Dai in [3–5]. In [6–8] D. Erle and others and C. Escher study some enzyme catalyzed reactions where they show the existence of oscillations, limit cycles and the conditions

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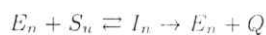
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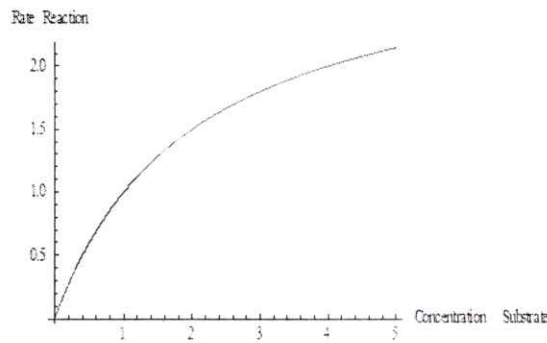
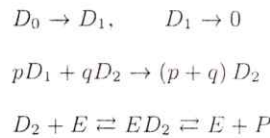


Figure 1. Plot of equation (1) taking $V_{max} = 3$ and $K_m = 2$

required for the associated biochemical reactions. The mathematical model corresponding to this simple reaction can be derived, considering a general enzyme reaction, as follows [16]:



The differential equation corresponding to this enzyme reaction, can be written as

$$\begin{aligned} \frac{d}{dt} [D_1] &= [D_0] - k_1 [D_1] - k_2 [D_1]^p [D_2]^q \\ \frac{d}{dt} [D_2] &= k_2 [D_1]^p [D_2]^q - \frac{V [D_2]}{k + [D_2]} \end{aligned} \quad (2)$$

where V represents the velocity of the enzyme reaction, k is some constant. After adjusting the constants the equations become

$$\begin{aligned} \frac{dx}{d\tau} &= a - bx - x^p y^q \\ \frac{dy}{d\tau} &= x^p y^q - \frac{cy}{y+1} \end{aligned} \quad (3)$$

where $a = [D_0] k_2^{-1} k^{-(p+q)}$, $b = k_1 k_2^{-1} k^{-(p+q)}$ and $c = V k_2^{-1} k^{-(p+q)}$. The second term in the equation (3) namely $\frac{cy}{y+1}$, when considered from a prey-predator point of view, represents the type II functional response of Holling.

2. A Generalised Enzyme Equation with a Michaelis-Menten Functional Response Term

C.S.Holling studied the factors involved in the utilization of resources by predators. He described the changes in the feeding rate of organisms as "the functional response term". He showed that there were three categories of functional response [9].

Type 1. Refers to animals which consume food proportional to the rate of their encounter with food items.

Type 2. Where the organisms take some time to eat and to capture their prey.

Type 3. In this category the organism will not consume the prey if it is below a certain threshold density.

There is a remarkable parallel between enzyme reactions and the predator-prey Holling functional response. The Michaelis-Menten enzyme reaction follows a type 2 functional response. Keeping this type of functional response in mind the following

model is proposed and analysed.

$$\begin{aligned}\frac{dx}{dt} &= a - bx - x^p y^q \\ \frac{dy}{dt} &= x^p y^q - \frac{cxy}{y+1}\end{aligned}\quad (4)$$

For the purpose of understanding and analysis, $b = 0$, $p = 2$, $q = 1$ are taken. Equations (4) reduce to

$$\begin{aligned}\frac{dx}{dt} &= a - x^2 y \\ \frac{dy}{dt} &= x^2 y - \frac{cxy}{y+1}\end{aligned}\quad (5)$$

The equilibrium points of equations (5) are

$$\left(\frac{1}{2} [c - \sqrt{c^2 - 4a}], \frac{-2a + c^2 + c\sqrt{c^2 - 4a}}{2a} \right)$$

and

$$\left(\frac{1}{2} [c + \sqrt{c^2 - 4a}], \frac{-2a + c^2 + c\sqrt{c^2 - 4a}}{2a} \right)$$

Linearising the system (5) about its equilibrium point, the Jacobean matrix is

$$M = \begin{bmatrix} -2x_0 y_0 & -x_0^2 \\ 2x_0 y_0 - \frac{c y_0}{1+y_0} & x_0^2 + \frac{c x_0 y_0}{(1+y_0)^2} - \frac{c x_0}{1+y_0} \end{bmatrix}$$

where the elements in the linearised matrix are to be treated as the functions of the parameter c . The characteristic equation of this matrix has the form $\lambda^2 - S\lambda + D = 0$ where

$$S(c) = \text{the trace of } M = -2x_0 y_0 + x_0^2 + \frac{c x_0 y_0}{(1+y_0)^2} - \frac{c x_0}{1+y_0}$$

and

$$D = \text{determinant of } M = -\frac{2c x_0^2 y_0^2}{(1+y_0)^2} + \frac{c x_0^2 y_0}{1+y_0}$$

The two eigenvalues of this matrix λ_1 and λ_2 are function of c

$$\lambda_1, \lambda_2 = \frac{1}{2} [S(c) \pm \sqrt{S^2(c) - 4D(c)}]$$

A Hopf bifurcation occurs when the real part of the eigenvalues is equal to zero and the imaginary part is nonzero. Solving for the parameter c after setting the trace to zero

$$(1). -2x_0 y_0 + x_0^2 + \frac{c x_0 y_0}{(1+y_0)^2} - \frac{c x_0}{1+y_0} = 0 \Rightarrow c = (x_0 - 2y_0)(1+y_0)^2$$

$$(2). \frac{d}{dc} (\text{Trace}) = \frac{x_0 y_0}{(1+y_0)^2} - \frac{c x_0}{1+y_0} \neq 0.$$

(1) is the non-hyperbolicity condition and (2) is the transversality condition. Thus showing the existence of a Hopf bifurcation for the parameter c . A simulation of the limit cycle is shown in Figure 2.

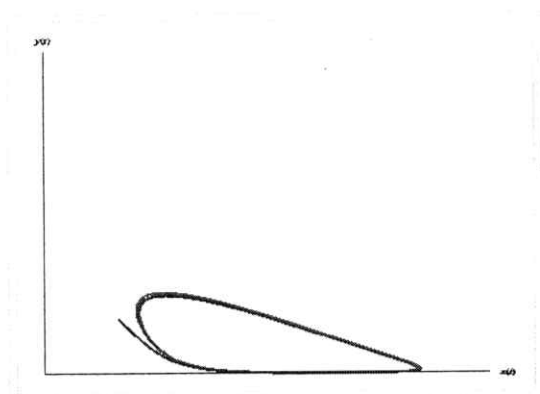


Figure 2. A limit cycle of equations (5) for the values of the parameter $a = 1.8$; $c = 1$; $p = 2$; $q = 1$.

3. Qualitative Analysis of Trimolecular Reaction

From the chemical reactions the dynamical equations corresponding to Belousov's reaction [9, 10] can be represented as

$$\begin{aligned}\frac{d[B]}{dt} &= [A] - K_1 [B] - K_2 [B]^p [C]^q \\ \frac{d[C]}{dt} &= K_2 [B]^p [C]^q - K_3 [C]\end{aligned}$$

where the square brackets denote the concentration of the substance. K_1, K_2, K_3 are the reaction rates, p and q represent the number of molecules of the chemical B and C . After readjusting the constants and relabeling the concentrations, this equation can be written as

$$\begin{aligned}\frac{dx}{dt} &= 1 - ax - x^p y^q \\ \frac{dy}{dt} &= b(x^p y^q - y)\end{aligned}\tag{6}$$

where $x, y \geq 0$, integers $p, q \geq 0$ and parameters $a \geq 0, b \geq 0$. A particular case of trimolecular equations i.e. $p + q = 3$ is discussed. Let $p = 1, q = 2$. The following result given in [8] is used.

Theorem 3.1 ([8]). Suppose that $p, q \in \mathbb{N}, q > 1$,

$$\begin{aligned}a &> 0, b > \frac{aq}{q-1} \\ a &< a_0 = \left(\frac{p^p (q-1)^{q-1}}{(p+q-1)^{p+q-1}} \right)^{\frac{1}{p}} \quad \text{and} \\ \sigma &= \left(\frac{p}{a(p-1) + b(q-1)} \right)^p \left(\frac{b(q-1) - a}{a(p-1) + b(q-1)} \right)^{q-1} = 1\end{aligned}$$

(i). If $b \neq \frac{a(p+2q-1)}{q-1}$ then at most one limit cycle arises from a Hopf bifurcation. The cycle is stable when $b > \frac{a(p+2q-1)}{q-1}$ and unstable when

$$\frac{aq}{q-1} < b < \frac{a(p+2q-1)}{q-1}$$

(ii). If $b = \frac{a(p+2q-1)}{q-1}$ then at most two limit cycles arise from Hopf bifurcation.

To satisfy the conditions of this theorem, the values of the parameters are taken as $p = 1, q = 2, b > 2a$

$$a > a_0 = \left(\frac{1^1 \cdot 1^1}{2^2} \right) = \frac{1}{4}$$

Let us take $\frac{1}{5} = 0.2, b > \frac{2}{5} = 0.4$

$$\sigma = \left(\frac{1}{b}\right) \left(\frac{b-a}{b}\right) = 1$$

Therefore $b^2 - b + a = 0 \Rightarrow b = 0.7236$ or 0.2764 . Take $b = 0.7236$ ($b > 2a$). Thus $p = 1, q = 2, a = 0.2, b = 0.7236$. The plot corresponding to these values is shown in Figure 3.

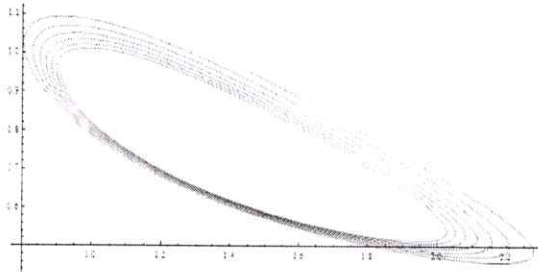


Figure 3. Unstable limit cycle in system (6) with $a = 0.2, b = 0.7236$.

The system is

$$\begin{aligned} \frac{dx}{dt} &= \dot{x} = 1 - 0.2x - xy^2, \\ \frac{dy}{dt} &= \dot{y} = 0.7236(xy^2 - y). \end{aligned}$$

For Case (ii) of the theorem, if $a = 0.16$ then

$$b = \frac{a(p + 2q - 1)}{q - 1} = \frac{(0.16)(1 + 4 - 1)}{1} = 0.64$$

Therefore take $p = 1, q = 2, a = 0.16, b = 0.64$. The system (6) is

$$\begin{aligned} \frac{dx}{dt} &= \dot{x} = 1 - 0.16x - xy^2 \\ \frac{dy}{dt} &= \dot{y} = 0.64(xy^2 - y) \end{aligned} \tag{7}$$

A limit cycle arises which can be seen in Figure (4).

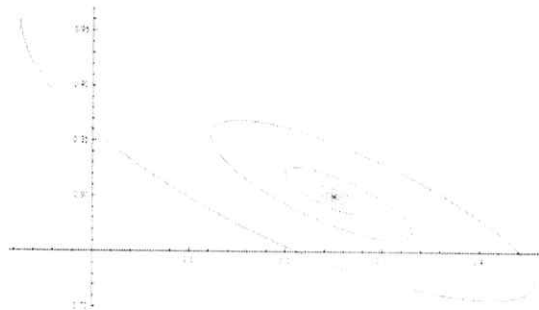


Figure 4. Phase plane of system (6) with parameter values $p = 1, q = 2, a = 0.16, b = 0.64$.

The system is $\dot{x} = 1 - 0.16x - xy^2, \dot{y} = 0.649(xy^2 - y)$. Further, let $b = 0.8$,

$$\sigma = \left(\frac{1}{b}\right) \left(\frac{b-a}{b}\right) = 1$$

$$\therefore b^2 - b + a = 0$$

$$a = b - b^2 = 0.8 - 0.64 = 0.16$$

Therefore take $p = 1$, $q = 2$, $a = 0.16$, $b = 0.8$. The system (6) is

$$\dot{x} = 1 - 0.16x - xy^2$$

$$\dot{y} = 0.8(xy^2 - y)$$

A stable limit cycle arises since $\left(b > \frac{a(p+2q-1)}{q-1}\right)$ which can be seen in Figure 5.

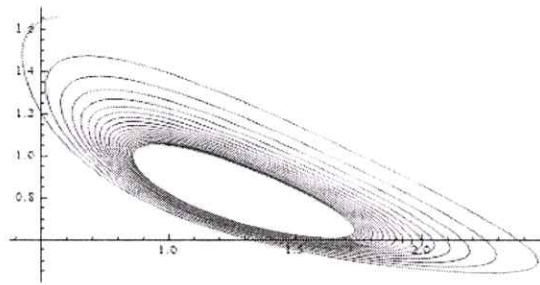


Figure 5. Stable limit cycle in system (6) with parameter values $p = 1$, $q = 2$, $a = 0.16$, $b = 0.8$.

The system is $\dot{x} = 1 - 0.16x - x^2y$, $\dot{y} = 0.8(xy^2 - y)$.

4. Conclusions

- Starting with a simple enzyme reaction a dynamical system is derived.
- The similarity between Michaelis-Menten enzyme reaction and the Holling Type 2 predation term is shown.
- A dynamical analysis of the generalized enzyme reaction is performed.
- The criteria for the existence of limit cycles and Hopf Bifurcation is studied.
- Using different values of the parameters the phase portraits are plotted.

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Some biochemical parameter in relation to roundworms of *Ovis bhawal* from Aurangabad region.(M.S)

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ABSTRACT

Proteins, carbohydrates and fats were estimated in gastrointestinal round worms *Oesphogostomum columbianum*, (Curtice, 1890), *O. asperum* (Ralliet et Henry, 1913), *Bunostomum trigonocephalum* (Rudolph, 1808) of *Ovis bhawal* inhabiting various region of intestine. These chemical composition responsible for antigenicity of parasite and cataloguing their constitute molecules so as to perform metabolism. Protein comprises from peptones, albumins, globulins, albumoses and purine bases as protein fractions segregated from the round worms, protein concentration determined with including nematodes, is usually calculated by multiplying their total nitrogen content. These proteins amount available in the form of enzymes, neurosecretory hormones and metabolic compounds which determine life expectancy. Carbohydrates which is core sources of energy found as stored nutrients, primarily in the form of glycogen which estimated from female worm 5.7 % of the fresh weight and 66.00% of total body glycogen are in the body wall. Fats constitute 1.2-1.9 % of fresh weight and 10.8-10.9 % of the dry weight of the body. Comparatively carbohydrate content was much higher which metabolize very efficiently under anaerobic condition by fermentation in energy production.

Key Words – Biochemical parameter, Round worms, *Ovis bhawal* and Aurangabad.

INTRODUCTION

As roundworms have an alimentary tract simply that most exogenous proteins are ingested and digested inside the alimentary canal where the secretory mechanism occurred that is holocrine and merocrine; In addition to this after extraction of intestine conclusion, it concludes that endopeptidase and exopeptidase activity accomplished. Though the proteins not to be absorbed through the living of digestive tract, even though luminal digestion, the resulting amino acid and peptides are utilized via this route. However the roundworm cuticle is permeable to H₂O, few ions as well as hydrophobic antihelminthics, which unlikely that uptake of nitrogenous compounds via this patch is of common phenomenon but also few evidences that absorption via the gut may be supplemented by uptake via the cuticle. Proteins comprises from longchains of amino acids, linked with peptide bonds. Generally protein structure reveals considerable variation both in amino acid sequence and its gross morphology. As proteins perform various functions in all the tissues like structural, supportive as well as functional (enzymes, hormones antigens etc.) Proteins in combination with carbohydrates and lipids form glycoproteins as well as lipo proteins. As proteins available in two form viz. soluble (H₂O soluble) and insoluble. the soluble proteins consist of enzymes, hormones, antigen, phospholipids, lipoproteins and glycoproteins; While as insoluble proteins sclero proteins, collagen, keratin albumin etc. which utilized for support protection in nature. It is observed that the proteins contents of male parasite are higher than female. The primary oocytes of *O. columbianum*, *O. asperum* and *B. trigonocephalum* had granular structure with the presence of amino acid, pseudoglobulin and protamines the participation of proteins in the formation of layers of egg shells. It is observed that nematodes proteins are having antigenic properties. Amongst these proteins acts as proteases and inhibitor against host digestive enzymes, while metal proteins like haemoglobins acts as oxygen carriers; usually the protein metabolism reaches at peak level during the egg production in roundworms. *O. columbianum* female has 8.4 mg of water soluble

roteins while male shows 9.4 mg of protein per gram wet weight, *O. asperum* male has 9.2 and female 8.8 mg of soluble protein per gram wet weight. At the last *B. trigonocephalum* male has 9.6 mg of soluble protein where as female 7.9 mg per gram wet weight. The insoluble proteins associate to structural proteins of nematodes were hydrolyzed by potassium hydroxide and estimated by Lowry et al method(1964).

Carbohydrates are the principle energy reserves in the adult stage of these nematodes; variation can be seen in their quantity composition, mode of metabolism, by the factors of stage development, sexual dimorphism, seasonal fluctuation and varieties of host and parasite. As carbohydrates are more available in animal parasites than to glucose and trahalose. The chemistry of glycogen shows different in the glycogen biochemical content in the molecular chain length between the host and parasites and from parasite to parasite.

An author has been attempted to understand the carbohydrates metabolism of the three parasites i.e. *O. columbianum*, *O. asperum* and *B. trigonocephalum*. In carbohydrates metabolism the study of glucose, glycogen, pyruvate and lactate level were studied which furnish the fundamental data for substrate and their intermediately metabolites, likewise focus is given on certain essential enzymes in carbohydrate metabolism such as LDH,SDH,MDH,PK and PEPCCK by which possible to percept an idea of metabolic pathway through energy is derived by the parasites. To support this experiment certain confirmatory process were conducted on survival parasites with KCN, NaCl and tetramisole inhibitors of various pathway of energy metabolism and their influence on nematode parasite activity observed. The influence of pure oxygen, CO₂ and nitrogen gas phase on general activity and survival of the parasite was undertaken. *O. columbianum* male has 6.5 mg of glycogen per gram ;and female has 5.5 mg of glycogen; *O. asperum* male has 4.2 mg of glycogen per gram and female has 5.7 mg of glycogen; *B. trigonocephalum* male has 5.3 mg of glycogen where as female has 5.9 mg of glycogen. The glycogen level of these three parasites shows slight fluctuation between male and female parasites.

As carbohydrates and proteins comprises the form of nematode similarly fat also one an important biochemical component; lipids triacylglycerols are the most predominant storage form of energy, which continuously being degraded and resynthesized; several factors increase cAMP level therefore the activity of lipids constitute about 1:1 to 1:7% of the fresh weight and 10:7% of the dry weight of the body. The deposition of fat sites in nematodes is the thickened portion of the body wall musculature. However remarkable differences exist among *O. columbianum*, (male 1.2& female 1 gm) *O. asperum* (male 1.4&female 1.3mg) and *B. trigonocephalum* (male 1.1&female 1.2mg).

Name of parasites	%of carbohydrates	%of protein	% of lipid
<i>O. columbianum</i> Male	6.5	9.4	1.2
<i>O. columbianum</i> Female	5.5	8.4	1
<i>O. asperum</i> Male	4.2	9.2	1.4
<i>O. asperum</i> Female	5.7	7.8	1.3
<i>B. trigonocephalum</i> Male	5.3	9.6	1.1
<i>B. trigonocephalum</i> Female	5.9	7.9	1.2
Mean	5.51	8.71	1.2

MATERIAL AND METHODS

MATERIALS

To collect the nematodes parasites daily visit were made to the slaughter house early in the morning where numbers of sheep and goats are slaughtered in everyday; further viscera of sheep and goats were obtained for examination.

METHOD



Glycogen was estimated by using the method of Kemp and Kito Van Heijningen (1954) the parasites were washed well with tyrode's solution and weighed; and separated into various species sexwise. The proteins were estimated by Lowry et, al.(1951)Lowry et,al.(1964) which is extrapolative as compared to other.

The total lipid content was estimated by the method of Folch et,al.(1957)as modified by Overturf Dryer(1969).

OBSERVATION

From table -1 the tabulated data itself indicate that out of total carbohydrate of three nematodes the female carbohydrates content is higher(5.7mg) than the male and total protein of *O.columbianum* , *O. asperum* and *B. trigonocephalum* (8.7mg of fresh tissue)is more than carbohydrate while as lipid content is very low i.e.1.2 mg.

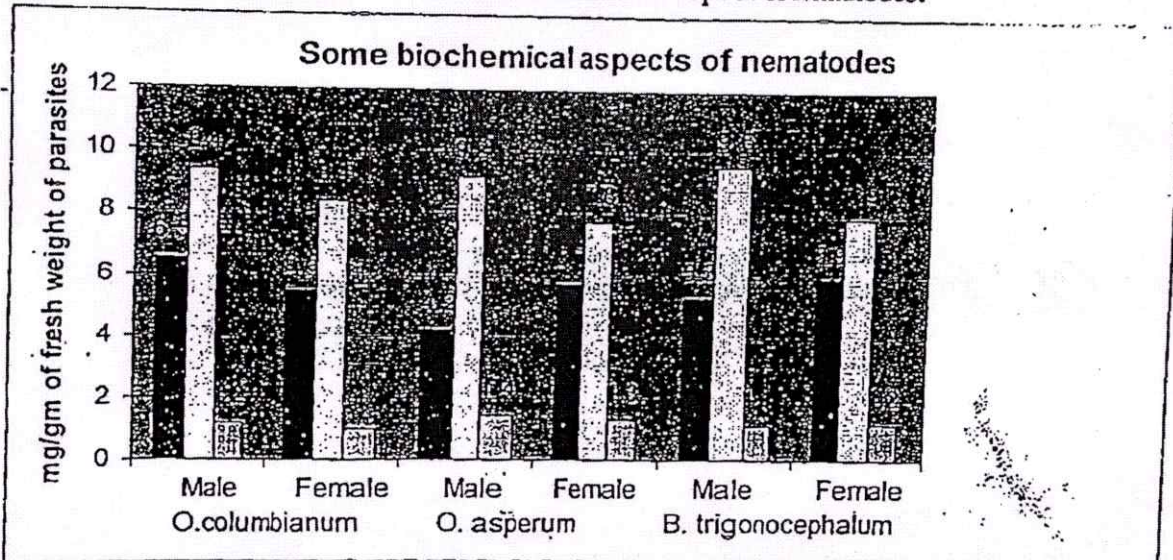
All values are in mg.

Mean % of carbohydrates = 5.51mg.

Mean % of protein = 8.71 mg.

Mean % of lipid = 1.2 mg.

Graph No.- 1. Some biochemical aspect of nematodes.



DISCUSSION

In the *O. columbianum* , *O. asperum* and *B. trigonocephalum* , the quantity of proteins (8.71 mg) and carbohydrates (5.51 mg) is higher as compare to the lipid (1.2 mg content Table-1).The fluctuation of values can be explained indirectly by studying by observation of another roundworms inhabiting same niches of mammals .In Jejunum an appropriate oxygen tension appears to be present .Moreover an adult nematodes contain a fluid which has affinity for oxygen combining at lower oxygen tension than the corresponding mammalian blood matrix. Such a high affinity for the oxygen even though makes it unlikely physiological carriers of this gas. Since it binds the oxygen to eagerly and would probably not dissociate appreciably under physiological condition.

It can be concluded that *O. columbianum* , *O. asperum* and *B. trigonocephalum* are also an aerobic nematodes parasites living in oxygen rich surrounding that blood might theoretically drive most of their energy from oxidation of fats or proteins but carbohydrate metabolism nevertheless predominates in such form either or not a completely functional Krebs cycles operates in roundworms has been a controversy. Since this pathway is the terminal oxidative pathway for the end products of carbohydrate, protein and lipid metabolisms; and playing a core part in synthetic mechanisms, however earlier work generally not possible to establish unequivocally a functional role for the the cycle in

todes (Barret, 1981) but work has established that, *O. columbianum*, *O. asperum* and *B. trionocephalum* under partly aerobic conditions, it plays an efficient metabolic function.

Proteins deposited in the oocytes are not used as sources of energy however as precursor for the ins of the egg shell. Specific target has been the proteins, released by nematodes such as *O. columbianum*, *O. asperum* and *B. trionocephalum* at various stages of their life cycle viz. skin penetration, food digestion, the cuticle of adult, larval form and direct or indirect involment of amino for synthetic and energy. The potential significant of amino acids in the energy metabolism is the vation that aerobically but not an aerobically; amino acids can sustain motility as well as glycogen, level in the above said parasites (Singh et.al, 1992a.).

At lipid metabolism *O. columbianum*, *O. asperum* and *B. trionocephalum* are very important use lipid not only a part of storing and releasing energy but also important constituents of cell branes ;The large amount of triacylglycerols and other lipids are incorporated into the oocytes and The total lipid content of *O. columbianum*, *O. asperum* and *B. trionocephalum* 1.2 mg of fresh e in Table-1. These nematodes parasites revealed carbohydrates and lipid metabolism are directly ed. (Cheng 1973).

At last can be concluded that comparatively the carbohydrates content is higher than lipid; Apart this protein amount is highest than the carbohydrate and lipid ,which available in the form of mes, neurosecretory hormones and metabolic compounds (from Table -1), however the core energy ce of nematodes parasites is only carbohydrate which is in the form of glycogen .

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जागतिकीकरण व विपणन

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सारांश:-

आज जागतिकीकरणाचा मुद्दा एक व्यापक चर्चेचा विषय बनलेला आहे. ही संकल्पना मोठी विस्तारीत आहे, याची कागदपत्रे जागतिकीकरणाच्या आर्थिक दृष्टिकोनावर केंद्रित आहेत. जागतिकीकरणाच्या प्रक्रियेचे विपणनाच्या मिश्रणाशी संबंधित घोरणे आणि विपणन संशोधनाच्या विशिष्ट साधनांचा डिझाइन आणि वापर काय प्रभावित केला आहे हे स्पष्ट केले आहे, शिवाय व्यावहारिक उदाहरणांच्या मालिकेचे यामध्ये विश्लेषण केले आहे.

प्रस्तावना:-

जागतिकीकरण हे ५००० वर्षांपेक्षा जुने आहे. परंतु विशेषतः युएसएसआरच्या पतनानंतर ते जास्त गतीने वाढले होते. जागतिकीकरणाचा शब्द ६० व्या शतकात कुठेतरी दिसला, जेव्हा तो कॅनेडियन तज्ज्ञाने मारम मिडिय मध्ये सुरू केला होता आणि १९६१ मध्ये प्रथम शब्दकोशात सादर केला गेला, तरी जागतिकीकरण करणे ही किंवा पहिल्यांदाच उल्लेख करण्यात आली आहे १९४४ मध्ये मेरियम वेबस्टर डिक्शनरी पारित झाल्या असे मानले जाते. व्यवसायात जागतिकीकरणाच्या संदर्भात नवीन संघी वाढत्या बाजारपेठेतील संभाव्यतेचा संदर्भ घेत असताना, संभाव्य ग्राहकांची वाढती संख्या, गुंतवणीकोची संभाव्यता आणि संसाधनांची उपलब्धता वाढविते तर प्रतिस्पर्धेची तीव्रतेच्या वाढीवर लक्ष केंद्रित करणे आणि व्यवसायाच्या वातावरणाचे अंदाज घ्यायला अडथळा वाढविणे ज्यामुळे त्यांची गुंतागुंत आणि गतिशीलता वाढते. विपणन अत्यंत गतिशील असल्याकारणाने ते जोरदार आहे.

विपणनामध्ये जागतिकीकरणाची संकल्पना एक दृष्टिकोन:-

व्याख्या:-

१. आर्थिक जागतिकीकरण म्हणजे जागतिक व्यापार आणि आर्थिक बाजारपेठे यांचे एकीकरण होय.
२. जागतिकीकरणामुळे बाजार, राष्ट्र आणि सदस्य राज्यांचा अविभाज्य तंत्रज्ञानाचे एकीकरण झाले आहे. आंतरराष्ट्रीय / प्रत्यक्ष परकीय गुंतवणीची संस्था जे राष्ट्रीय सीमा ओलांडून त्यांचे कार्य समायोजित करतात.
३. विपणनाच्या दृष्टीने जागतिकीकरणाचा अर्थ म्हणजे ग्राहकोपयोगी वस्तूसाठी आंतरराष्ट्रीय बाजाराचा उदर अशा प्रकारे त्यात उत्पादनांची विक्री समान प्रचार मोहिमांद्वारे पूर्णपणे भिन्न संस्कृतींच्या लोकांसाठी केले जाते.

जागतिकीकरण विरुद्ध आंतरराष्ट्रीयकरण:-

विपणन क्रिया कलावर जागतिकीकरण प्रक्रियेने परिणाम विश्लेषण करण्यापूर्वी जागतिकीकरणाची संकल्पना आणि आंतरराष्ट्रीयकरणाची संकल्पना यामधील फरक विशद केला पाहिजे. विग्नोलीच्या मते जागतिकीकरणाचा अर्थ असा आहे की विपणन ही रणनीति विकसित करणारा एकच शब्द असला तरी विपणन हे सर्व उत्पादनांना सर्वत्र एकाच प्रकारे विपणन करणारे आहे. तसेच आंतरराष्ट्रीयकरणास एक प्रक्रिया म्हणून पारिभाषित केले आहे. ज्यामध्ये सांस्कृतिक, प्रादेशिक आणि राष्ट्रीय मतभेदांनुसार शब्दांच्या विविध भागासाठी विपणन घोरणाचा अवलंब करणे आवश्यक आहे. ज्याप्रमाणे विशिष्ट लक्ष्य बाजार आंतरराष्ट्रीयीकरण ही उत्पादने आणि सेवांचे नियोजन आणि अंमलबजावणी करण्याची प्रक्रिया आहे. जेणेकरून त्यांना विशिष्ट स्थानिक भाषा आणि संस्कृतीकडे सहजपणे स्थिकारता येईल ज्याला स्थानिकीकरण असे म्हटले जाते. आंतरराष्ट्रीयकरण प्रक्रियेला कधीकधी अनुवाद किंवा स्थानिकीकरण सक्षमता देखील म्हणतात. याचाच अर्थ उत्पादनाच्या डिझाईनिंगचा अर्थ असा आहे की ते बऱ्याच देशांमध्ये वापरकर्त्यांची आवश्यकता पूर्ण करेल किंवा असे करण्यास सहजतेने अनुकूल केले जाऊ शकते. आंतरराष्ट्रीयीकरण म्हणजे उदा. वेबसाइट डिझाईन करणे जेणेकरून जेव्हा ते इंग्रजीमधून स्पॅनिशमधून भाषांतरित केले जाते तेव्हा ते लेआउट अदृश्यपणे कार्य करते तरी स्पॅनिशमधील बऱ्याच शब्दांमध्ये अधिक वर्ण असताना आणि म्हणूनच इंग्रजीमध्ये पृष्ठावरील स्पॅनिशमध्ये अधिक जागा घेतात. आंतरराष्ट्रीय स्तरावर उत्पादित केलेले उत्पादने त्या देशाच्या वापरकर्त्यांच्या गरजा पूर्ण करण्यासाठी स्थानिकीकृत केलेली असणे आवश्यक आहे. उदा. अमेरिकेत वापरल्या जाणाऱ्या १४ नोव्हेंबरच्या तारखेपर्यंत आणि नोव्हेंबर १४ मध्ये इंग्लंडमध्ये वापरण्यासाठी आंतरराष्ट्रीय पातळीवरील सॉफ्टवेअर प्रोग्रामला स्थानिकीकरण करणे आवश्यक आहे. आंतरराष्ट्रीयकरणाने प्रौढांकरिता अभ्यासक्रमाने डिझाईन देखील संदर्भित केले आहे. जे विद्यार्थ्यांना परदेशी देशांमध्ये आणि इतर संस्कृतीकडे परस्परसंवादांमध्ये सक्षम करण्यास मदत करेल. विपणन क्रिया कल्पनांच्या संदर्भात जागतिकीकरणाच्या तर्कानुसार कल्पना जागतिक बाजारपेठेत एक बाजारपेठ म्हणून पाहतात कारण या बाजारपेठेच्या गरजा पूर्ण करण्यासाठी विपणन मिश्रणाचे अनुकूलतेस मदत करते. भिन्न बाजार किंवा बाजार खंडातील फरक इतके मोठे नाहीत.

त्याऐवजी आंतरराष्ट्रीयकरणाचा अर्थ म्हणजे विपणन मिश्रित घटक (उत्पादन, किंमत, स्थान आणि पदोन्नती) वेगवेगळ्या बाजारपेठांमध्ये संस्था व्यवस्थापित करते. आंतरराष्ट्रीयकरणाच्या संदर्भात हे बाजारपेठेतील मोठ्या विशिष्टतेनुसार तयार केली जातात एकदा विपणन विभाजनाच्या प्रक्रियेस सुरुवात झाली की, विकेंते वेगवेगळ्या निकाषप्रमाणे क्षेत्रे किंवा देशांना सांस्कृतिक, सामाजिक, राजकीय, आर्थिक आणि तांत्रिकदृष्ट्या गटबद्ध करण्यास प्रारंभ करतात आणि देश किंवा प्रदेशांच्या या गटांनुसार तयार केलेल्या विपणन धोरणे विकसित करतात. जरी या दोन संकल्पनांमधील मर्यादा स्पष्टपणे स्थापित केल्या पाहिजेत तरी त्यांना विरोधाभास म्हणून पाहिले जाऊ नये. याउलट साहित्यात अनेक दृष्टिकोनांची ओळख पटविली जाऊ शकते ज्यामध्ये संस्थानी जागतिकीकरणास आणि आंतरराष्ट्रीयकरणाच्या दोन्ही घटकांना त्याच्या धोरणांचे डिझाइन करण्याच्या हेतूचे समर्थन केले पाहिजे. उदा. टेलर येतो असे म्हटले आहे.

विपणनामध्ये जागतिकीकरणाचा प्रभाव:-

ग्लोबल एंटरप्राइजच्या मार्केटिंग क्रियाकलापांच्या संदर्भात आम्ही एकीकडे पाहू शकतो की प्रतिस्पर्धांची अभूतपूर्व तीव्रता आणि सर्व भागामध्ये अत्यंत वेगवान असंख्य आणि तीव्र बदल आणि तथाकथित जागतिक उत्पादनांचे उदभवने (उदा. कोका कोला, टेक्सको, मर्सिडीज, टोयोटा, मायक्रोसॉफ्ट आणि मॅकडॉनल्ड्स) आजच्या काळातील कंपन्यांच्या विपणन विभागांना जागतिक पातळीवर प्रचंड प्रतिस्पर्धांचा सामना करावा लागतो त्यांचे विपणन उपक्रम अतिशय गतिशील जागतिक वातावरणात चालविले जातील, परिणामी विपणन कार्यक्रमांचे वास्तविक पुरावृत्ती होईल. या संदर्भात पीटर ड्रुकर प्रसिद्ध अमेरिकन व्यवस्थापन गुरू यांच्यामते विशिष्ट कालावधीसाठी व्यवसाय यशस्वी होण्यासाठी पुढील कालावधीमध्ये कार्य करणार नाही आणि दिवाळखोरा होऊ शकते. सध्या बऱ्याच कंपन्यांनी जागतिक बाजारपेठेतील त्यांचे प्रचंड विक्री पुरवठा आणि उत्पादन ऑपरेशन्स वाढविले आहेत, जागतिक संरचना तयार करण्यास व्यवस्थापित करते ज्यामुळे त्यांना जगातील इतर कोपऱ्यातून माहिती आणि कल्पना द्रुतपणे प्रसारित करण्याची परवानगी मिळते. व्यवसायाना अधिक व्यापक विपणन वातावरण आणि पूर्वोपेक्षा अधिक जटिल सामना करावा लागतो. उदा जागतिक स्पर्धेच्या संदर्भात युरोपियन आणि अमेरिकन कंपन्यांना त्यांच्या देशांमध्ये मोठ्या आशियाई उत्पादकांना (उदा. सोनी, टोयोटा, सॅमसंग) सामना करावा लागतो जो आक्रमक आणि अत्यंत स्पर्धात्मक विपणन धोरणाचा वापर करते.

जागतिकीकरणामध्ये विपणनाचे फायदे:-

जागतिकीकरणामुळे संस्थामध्ये विपणन संघटनांसाठी बरेच फायदे उत्पन्न झाले आहेत ते पुढीलप्रमाणे.

1. अर्थव्यवस्थेमध्ये ऑपरेशनल विपणन आणि विशेष पॅकेजिंगमध्ये त्यांचे प्रमाणन करून माहितीची देवाण घेवाण करणे शक्य आहे.
2. जागतिकीकरणामध्ये कंपन्या एक वपपिश्चा कमी कालावधीमध्ये जगभरात नवीन उत्पादनाची योजना आखून ती व्यवस्थापित करून बाजारपेठेला गती प्राप्त झाली आहे.
3. जागतिक कंपन्यांसाठी एक जागतिक ब्रॅंड नाव आणि ब्रॅंड ओळख तयार करण्यास जागतिकीकरणाचा फायदा झाला आहे.
4. जागतिकीकरणामुळे उत्पादनांच्या समान संकल्पनांचा वापर करून बाजारपेठेतील सर्व प्रादुर्भाव्या समान अवस्थामध्ये त्यांना लक्ष्य केंद्रित करून अनावश्यक होणारा खर्च टाळतो येतो.
5. बाजारपेठेचा विस्तार वाढल्यामुळे विक्रीच्या प्रमाणात मोठ्या प्रमाणावर वाढझाली.
6. बाजारपेठेत नवीन स्रोत आणि वित्तपुरवठ्याचे वेगवेगळे मार्ग यांना प्रवेश करण्यास सुलभ झाले आहे. यापैकी सर्वात महत्त्वाचे फायदे खालील तक्त्यामध्ये दिले आहेत ते पुढीलप्रमाणे.

जागतिकीकरणाचे फायदे

कंपन्यांसाठी	ग्राहकांसाठी	देशासाठी
प्रमाणात अर्थव्यवस्था आणि खर्च कमी	कमी किंमती	विकसित आणि विकसनशिल राहणीमानाचे सुधारित मानक
बाजारात वेगवान वेग	जास्त पसंती	वाढलेली लोकशाही
अद्वितीय जागतिक ब्रॅंड नाव आणि ब्रॅंड ओळख	सुधारित गुणवत्ता	
वस्तुमान बाजारात प्रवेश (विक्री वाढली)		
संसाधनांचा प्रवेश		
वित्त आणि कर बचत प्रवेश		

(स्रोत:- बूकच्या अनुसार प्रक्रिया, वेदरस्टोन आणि विल्किन्सन)

जागतिकीकरणामध्ये विपणनाचे मोठे:-

१. केंद्रीकरणाच्या नकारात्मक प्रभावामुळे काही विपणन निर्णय मंद होवू शकतात.
२. स्थानिक बाजारपेठेतील संवेदनशीलता आणि कमी प्रतिसाद क्षमता कंपनीच्या मुख्यालयातील विपणन व्यवस्थापकांकडे असल्यामुळे स्थानिक बाजारपेठेत संपर्क कमी आहे.
३. काही मानकीकृत उत्पादनांचा विकास झाला तरी काही ग्राहकांच्या गरजा पूर्ण करीत नाहीत.
४. जागतिकीकरणाचे सर्वात मोठे नुकसान मानकीकरणाने झाले जे ग्राहकांच्या समाधानाची पातळी नकारात्मक पध्दतीने प्रभावित करू शकते.

जागतिकीकरणाचा विपणनावर झालेला प्रभाव:-

१. **उत्पादन धोरण:-**जागतिक कंपन्यांच्या उत्पादन धोरणाच्या संदर्भात दोन मूलभूत प्रश्नांची उत्तरे दिली पाहिजेत बऱ्याच बाजारपेठेत विकल्या जाणाऱ्या उत्पादनांच्या बाबतीत हे सुरवातीला ठरवले पाहिजे की जेथे उत्पादन केले जाईल तेथे ते निर्दिष्ट केले जावे. धोरणात्मक पर्याय म्हणून कंपनी अनेक उत्पादनांची उत्पादने करीत असते त्यामध्ये आपले कोणते उत्पादन कोणत्या बाजारपेठेत विकले जाईल याचा शोध घेवून कंपनी अशी बाजारपेठ निवडू शकते.
२. **किंमत धोरण:-**वर सांगितल्यानुसार प्रमाणीकरणामुळे खर्चाच्या दृष्टीने महत्त्वपूर्ण बचत होवू शकते परंतु जागतिक बाजारपेठेच्या संदर्भात काम करणाऱ्या बहुतेक कंपन्यांना हे समजले आहे की विशिष्ट वातावरणाच्या गरजा पूर्ण करण्याच्या क्षमतेस यश मिळते. त्यामुळे बहुतेक कंपन्या वेगवेगळ्या देशांसाठी वेगवेगळी किंमत धोरणे राबविताना दिसून येतात.
३. **वितरण धोरण:-**भारतासारख्या देशाचा विचार करावयाचा झाल्यास वेगवेगळ्या ठिकाणी वेगवेगळी वितरण धोरणे राबवावी लागतात. ही धोरणे ठरविताना ग्राहकांची मागणी आणि बाजारपेठेची विविधता यांच्याआधारे ती ठरवावी लागतात. ग्रामीण भागासाठी वितरण व्यवस्था वेगळ्या पध्दतीची व शहरी भागासाठी वितरण व्यवस्था वेगळ्या प्रकारची निश्चित करावी लागते.
४. **विक्रयवृद्धी धोरण:-**स्थानिक ग्राहकांना आकर्षित करण्यासाठी व राष्ट्रीय ओळख आणि प्रतिविवित करण्यासाठी त्यांना प्रोत्साहन देण्यासाठी प्रचारात्मक धोरणे विकसित केली जाणे आवश्यक आहे. जसे की ग्राहकांना आकर्षित करण्यासाठी सचिन तेंडुलकर, अमिताभ बच्चन, आमिर खान यासारख्या भारतातील प्रसिध्द व्यक्तींनी वेगवेगळ्या प्रकारच्या जाहिराती करताना दिसून येतात उदा. ब्राझीलमधील कोर्टुविक मूल्ये आणि चीनमधील वैयक्तिक मूल्यांच्या तुलनेत समूह इच्छित असू शकेल. ज्यावेळी व्यवहार्य असेल त्यावेळी कमीत कमी समायोजनासह जागतिक जाहिराती आणि जाहिरात धोरणे विकसित केली जावू शकतात जागतिक प्रचारात्मक तंत्रज्ञानातील बदल आणि नविन माध्यमांचा उदय (इंटरनेट, मोबाईल फोन आणि सोशल नेटवर्किंग साईट्स) वाढत्या तंत्रज्ञानामुळे मोठ्या प्रमाणात ग्राहकांपर्यंत पोचण्यास मदत होते. त्यामुळे विक्री जास्त वाढविण्यासाठी मोठ्या प्रमाणावर जाहिराती प्रसिध्दी, एका वस्तूवर दुसरी वस्तू फ्री देणे, रोख रकमेवर सूट जाहिर करणे, ग्राहकांना घरोघर वस्तू देणे, वस्तूमध्ये जर काही विघाड झाला असेल तर वस्तू बदलून किंवा दुस्त करून देणे अशा वेगवेगळे प्रयत्न विक्री वाढविण्यासाठी सर्वत्र उत्पादक संघटना करताना दिसून येतात.

विपणन संशोधन प्रक्रियेवर जागतिकीकरणाचा प्रभाव:-

बाजारपेठेतील कामकाज आणखी वाढले असल्याने विपणन व्यवस्थापकांसाठी संशोधन अधिक उपयुक्त ठरते. याचे कारण असे आहे की, एक देशात किंवा प्रदेशात अनुभव आणि अंतर्दृष्टी असलेल्या व्यवस्थापकांना या कौशल्यांकडून संचित केले जाते. अपरिचित आणि परकीय संदर्भात स्वतःला शाखावे लागते. अभ्यासातून असे दिसून आले आहे की विपणन संशोधन अभाव किंवा अयशस्वी ही जागतिक विपणन क्रियाकलापांच्या अयशस्वी ठरविण्याचे एक महत्त्वपूर्ण घटक आहे त्यामुळे या कारणामुळे आम्ही अशा प्रकारच्या व्यवस्थापकांची शिफारस करतो जे आंतरराष्ट्रीय आप्पेशमध्ये गुंतले पाहिजेत. पारंपारिक विपणन संशोधन भूमिकेकडे दुर्लक्ष न करण्यामध्ये सभास्य महाम अयशस्वी होण्यापासून ते टाळतात. पारंपारिक विपणन संशोधन परिपक्व बाजारांवर केंद्रित आहे (उदा. उत्तर अमेरिका, युरोप) आणि बऱ्याच अडथळ्यामुळे (उदा. सांस्कृतिक, कायदेशिर, परिचालित) म्हणून विकसनशिल अर्थव्यवस्थेवर केंद्रित आहे. परंतु जागतिकीकरणाच्या प्रक्रियेने अर्थव्यवस्थेतील विपणन संशोधनाचा प्रसार वाढविला आहे. व्यवसाय जागतिकीकरणाच्या प्रक्रियेमुळे मार्केटिंग संशोधन प्रक्रियेच्या परिणामस्वरूप अनेक परिणाम झाले आहेत. अशा प्रकारे परदेशातील व्यावसायिक व्यावसायिक कंपन्यांच्या विस्तारामुळे नविन बाजारपेठ उघडून त्यामध्ये विपणन अभ्यास करणे आवश्यक आहे. विपणन संशोधनावर आणखी एक प्रभाव असल्याचे दिसून येते की त्या विपणनावर केलेल्या विविध प्रकारच्या अभ्यासांच्या बाबतीत विविध बाजारपेठेतील महत्त्वपूर्ण फरक आहे. वेगवेगळ्या बाजारपेठेतील किंवा बाजारातील विभागावरील अभ्यासांच्या संदर्भात गट मूलाखत ही सर्वसाधारणपणे तपस्या जाणाऱ्या गुणात्मक संशोधन तंत्रापेकी एक आहे. जागतिक दृष्टिकोनातून फोकस ग्रुपचा संघटना विशिष्ट गटाकडे लागू करणे आणि विशिष्ट लक्ष्याद्वारे निश्चित केलेल्या विशिष्ट बाबींचा विचार करते ज्यामध्ये हे लक्ष समूह वेगवेगळ्या ठिकाणी होतील. प्रत्येक देशात फोकस ग्रुपच्या वास्तविक संघटनेने दोन मूलभूत

आवश्यकतांना प्रतिसाद दिला पाहिजे. निर्णय प्रक्रियेत व्यवस्थापकांनी आवश्यक माहिती मिळविणे आणि प्रत्येक देशामध्ये अस्तित्वात असलेल्या विशिष्ट गोष्टींचा विचार करणे आवश्यक आहे. यापैकी काही विशिष्टता खालील प्रमाणे सादर केल्या आहेत.

फोकस गटांच्या संघटनेसाठी ज्या देशांतर्गत हे कार्य केले जात आहे त्यानुसार देश आणि शिफारसी:-

१. आपण व्यवसाय ते व्यवसाय फोकस ग्रुप आयोजित करू इच्छित असल्यास आठवड्यातून प्रत्येक रात्री फक्त एकच मुलाखत आयोजित करणे शक्य आहे. परंतु जपानी व्यावसायिक वेचून शनिवार व रविवारला गट किंवा मुलाखती घेण्यास तयार आहेत.
२. जर्मनी:-जर्मनीमध्ये सर्वात प्रतिबंधित गोपनीयता कायदे आहेत. ईमेल सूची, प्रकाशन सूची किंवा इतर डेटाबेसमधून नावे मिळविण्याची शक्यता गंभीरपणे प्रतिबंधित केली जावू शकते.
३. फ्रान्स:-फ्रान्स हा देश संपासाठी प्रसिध्द आहे त्यामुळे कामगारांच्या वाहतूक समस्येकडे लक्ष देणे गरजेचे आहे.
४. इंग्लंड:- व्यवसायातील लोकांमध्ये शैक्षणिक पातळीचे विस्तृत मिश्रण आहे. जर फार महत्त्वाचे नसेल तर त्यादेशामध्ये कोणतीही डिग्री आवश्यक नाही.
५. स्कॉडिनेव्हिया:- या देशामध्ये युरोप मधील सर्वोत्तम तंत्रज्ञान आधारभूत संरचना आणि सर्वात शिक्षित आणि धारदार इंग्रजी बोलणारे व्यावसायिक आहेत.
६. रोमानिया:- कंपन्यांच्या खराब तांत्रिक उपकरणे 'टेलिकॉन्फ्रेस फोकस ग्रुप' या प्रकारला परवानगी देत नाहीत, ग्राहकांना इतरांबद्दल माहिती मिळविण्यापासून टाळण्यासाठी विचार करणे, ज्याचा त्यांना विश्वास आहे.

(स्त्रोत:- आंतरराष्ट्रीय संशोधन व्यवस्थापनासंदर्भात प्रक्रिया)

निष्कर्ष:-

दुर्दैवाने बरीच अशी उदाहरणे आहेत की कंपन्यांनी राष्ट्रीय बाजारपेठेत यशस्वी झालेल्या विपणन कार्यक्रमांची अंमलबजावणी केली त्याचे फायदे विदेशी बाजारपेठेत फायदे आहेत. आत्तापर्यंतचे सर्व ग्राहक पूर्वीचे सर्व उत्पादने मिटवतील आणि जागतिक ओळख पटविणाऱ्या जागतिक विस्तृत बनविणाऱ्या उत्पादनांची आणि विपणन धोरणे स्विकारण्यास इच्छुक नाहीत. या विपणन धोरणाचा अवलंब करणाऱ्या कंपन्या अत्यंत सावधगिरी बाळगणे आवश्यक आहे कारण बाजार हिंसकपणे प्रतिक्रिया देवू शकतो. यामध्ये हिंसा जागतिकीकरणाच्या विरुद्ध प्रत्यक्ष स्वरूपाचे स्वरूप घेणार नाही परंतु ते अशा प्रकारे स्पष्ट होईल जे इतरांसारखे कठिण असू शकते. राष्ट्रीय शिमाबाहेरील बाजारातील व्यापार विस्ताराने विकास आणि अंमलबजावणी केली असल्यास त्याचा एकल विपणन धोरण करणे अशक्य आहे. आजकाल सर्व बाजारपेठेत यशस्वी होण्यासाठी विपणन धोरणे स्थानिक पातळीवर व्यवस्थापित केली जाणे आवश्यक आहे. जागतिक कंपन्यांनी मुख्यालयात दिशानिर्देश स्थापन करावा आणि शब्दात पसरलेल्या एकाधिक विविध बाजारपेठांमध्ये ऑपरेशन व्यवस्थापित करावे. अनेक बहुराष्ट्रीय कंपन्यांमध्ये विपणन धोरण सामान्य नसते आणि ते यशस्वी होण्यासाठी स्थानिक पातळीवर ते व्यवस्थापित केले जावे. जागतिक बाजारपेठेतील स्पर्धात्मक फायदा मिळविण्यासाठी कंपन्यांनी आंतरराष्ट्रीय आणि जागतिकीकरण घटकाना एकत्र करणे आवश्यक आहे. म्हणूनच बऱ्याच कंपन्यांचे विपणन मिश्रण एकाच वेळी जागतिक आणि स्थानिक कंपन्यात ते ग्लोकल आहे. जागतिक विपणन धोरण व्यवस्थापित करणे एका स्थानिक आवृत्तीवरून प्रारंभ होवून जे नंतर जागतिक स्तरावर व्यवस्थापित केले जाते. बऱ्याच कंपन्यांना लागू होतात. सर्व विपणन मिश्रित घटकांसाठी ओट्टम असे म्हणतात की जागतिक विचार करा आणि स्थानिक कार्य करा.

संदर्भ ग्रंथसूची:-

१. विपणन व्यवस्थापन- डायमंड प्रकाशन, पुणे
२. विपणन व्यवस्थापन- कॅलास प्रकाशन, औरंगाबाद
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जागतिकीकरणानंतर सामाजिक संस्थातील बदल-विशेष संदर्भ जातिसंस्था

प्रा.डी.एम.शिंदे

समाजशास्त्र विभाग प्रमुख

रामकृष्ण परमहंस महाविद्यालय, उस्मानाबाद

प्रास्ताविक :

"रोम एका दिवसात बांधले गेले नाही" असे जे व्यापक अर्थाने म्हटले जाते त्यापेक्षा कितोतरी व्यापक अर्थाने भारतीय समाजाच्या जडणघडणीबद्दल म्हणता येईल. भारतीय समाज हा प्राचिन आणि संकिर्ण आहे. जवळजवळ 5000 वर्षांचा इतिहास आहे. म्हणून अन्य कोणत्याही समाजापेक्षा पुरातन समजला जाणारा व आदर्शवत अशी संस्कृती लाभलेला भारतीय समाज उदारमतवादी, लवचिक व वाहता आहे. प्राचिन काळापासून वेगवेगळ्या कालखंडात महत्वाचे स्थित्यंतरे, सामाजिक बदल झाले त्याचे बरेवाईट परिणाम समाजरचनेवर झाले आहेत. त्याला विविध प्रकारची कारणे आहेत. त्यापैकी जागतिकीकरण हे एक आहे.

शोध निबंधाची उद्दिष्टे :

1. जागतिकीकरणाची संकल्पना समजून घेणे.
2. जागतिकीकरणाचा सामाजिक संस्थावर विशेषतः जातिसंस्थेवर पडलेल्या प्रभावसमजून घेणे.

संशोधन पद्धती :

प्रस्तुत शोध निबंधासाठी वर्णनात्मक, विश्लेषणात्मक व निरीक्षणात्मक संशोधन पद्धतीचा अवलंब करण्यात आलेला असून वेगवेगळे समाजशास्त्रीय पुस्तके, ग्रंथ व वृत्तपत्रे तसेच राज्यस्तरीय व राष्ट्रीय पातळीवरील चर्चा सत्रातील शोध निबंधाचा आधार घेण्यात आलेला आहे.

आशय विश्लेषण :

कोणताही समाज अनेक व्यक्ती गट प्रमाणके, मूल्ये व सामाजिक संस्था यांनी मिळून बनलेला असतो.

संस्था म्हणजे काय?

1. के.डेव्हिस म्हणतात "संस्था म्हणजे एक किंवा अनेक कार्याच्या भोवती रचल्या गेलेल्या लोकरुढी, लोकनिती व कायदे यांची गुंफन होय"
2. हार्टन व हंट म्हणतात - "संस्था ही सामाजिक संबंधाची अंशी संघटीत व्यवस्था आहे की, की ज्या व्यवस्थेत काही समान मूल्ये व वर्तन पद्धतीचा समावेश असून ती समाजाच्या काही मुलभूत गरजांची पूर्तता करते"

तेव्हा संस्था ह्या मुलभूत गरजांची पूर्तता करित असतात. सामाजिक मूल्यांची जपणूक करतात. भारतीय समाज व्यवस्थेत कुटूंब संस्था, विवाह संस्था, अर्थ संस्था, धर्म संस्था, जातीसंस्था त्यापैकी विवाह, कुटूंब व जातिसंस्था या महत्त्वाच्या व मुलभूत सामाजिक संस्था आहेत. भारतीय समाजाच्या सम्यक आकलनासाठी "जातीसंस्थेतील सातत्य व बदलाचा अभ्यास महत्त्वाचा ठरतो".

सामाजिक स्तरीकरणाचा एक प्रकार म्हणून समाजशास्त्रज्ञ जातीच्या अभ्यासाकडे वेधले गेले. हिंदू समाजाचे महत्त्वाचे वेगळेपण म्हणजे जन्मावर आधारित जातीची स्तरीकरण व्यवस्था होय. जातीच्या या स्तरीकरण व्यवस्थेत श्रेणीची उतरंड श्रेष्ठत्व, कनिष्ठत्व या निकषावर आधारलेली असते. भारतीय समाजात वेदकाळी वर्णव्यवस्था विद्यमान होती त्याप्रमाणे समाजाचे ब्राह्मण, क्षत्रिय, वैश्य व क्षुत्र अशा चार स्वर्गापात विभाजन होते. स्मृतिकाळापर्यंत वर्णव्यवस्था अबाधित होती. परंतु त्यानंतर जातीचे प्रचलन झाले. इ.स.पू. 300 वर्षांपासून आजपर्यंत जातीव्यवस्था भारतीय समाजाचे अनेक उच्च, निम्न स्तरात विभाजन करित आहे.

Caste ही संज्ञा Casta या पोर्तूगिज भाषेतील शब्दावरून बनली आहे. Casta म्हणजे वंश वंशाने मिळणारी ही जाती असा अर्थ सांगता येईल. Castus ह्या लॅटीन शब्दापासून Caste हा शब्द बनला आहे. असेही मत आढळते. एकूण जन्माने प्राप्त होणारा आणि वंशानुवंशे चालणारा तो जातीसमुह होय.

1. चार्लस कुले - "जेव्हा एखादा वर्ग विशेष करून अनुवंशाने ठरतो तेव्हा त्याला जाती म्हणतात"
2. रिसले - "जात म्हणजे कुटूंबांचा समुह आहे"
3. डॉ. इरावती कर्वे - "जाती म्हणजे एक विस्तारित कुटूंब होय"

जातीला कुटूंब म्हणण्याचे कारण म्हणजे हा एक आंतर्विवाही लोकांचा गट आहे जातीची उत्पत्ती नेमकी कशी झाली याबद्दल विद्वानांच्या मतभेद आहेत. दैवी सिद्धांत, वांशिक सिद्धांत, व्यावसायिक सिद्धांत इत्यादी सिद्धांत जातीच्या उगमाचे विवेचन करित असले तरी या सिद्धांतांच्यात मतएक्य नाही. तेव्हा जातीसंबंधी खालील बाबी महत्त्वाच्या आहेत.

1. जाती बंद स्तरीकरणाचा प्रकार आहे.
2. जाती सभासत्व जन्माने प्राप्त होते. व ते कायम राहते.
3. व्यवसाय स्वातंत्र्याचा अभाव
4. जात एक आंतर्विवाही गट आहे.
5. जाती सामाजिक गतिमत्त्वाला वाव नाही.
6. पूर्वीच्या काळी जाती जातीतील सामाजिक संबंधावर व खाण्यापिण्यावर अनेक निर्बंध होते.

तेव्हा हिंदू समाजातील जन्मावर आधारित स्तरीकरण व्यवस्था म्हणजे जाती व्यवस्था होय.

1981 च्या जनगणनेनुसार 2378 जाती व जमाती होत्या याचा अर्थ असा होतो की, 2 हजारापेक्षा जास्त खंड होते. एवढेच नव्हे तर प्रत्येक जातीत "साडेबारा पोटजाती" असतात असे कथन प्रचलित आहे. म्हणून तर भारतीय समाज हा अठरा पगड जाती जमातींनी मिळून बनलेला आहे. विविधता हे भारतीय समाजाचे वैशिष्ट्य आहे. म्हणून भारतीय समाजाला जगाची एक छोटी प्रतिकृति म्हटले जाते.

मध्ययुगीन कालखंडापासून संतांनी आरंभ केलेल्या भक्ती आंदोलनापासून छत्रपती शाहु महाराज, महात्मा फुले, महात्मा गांधी डॉ. बाबासाहेब आंबेडकर पर्यंतच्या विचार प्रवर्तकांनी जातीचा विमोड करण्याचा कसोसोने प्रयत्न केलेला आढळतो. तसेच पाश्चिमात्यांचा प्रभाव, पाश्चात्य शिक्षण औद्योगिकीकरण व शहरीकरण शासकीय कायदे त्याच प्रमाणे जागतिकीकरणामुळे जातीव्यवस्था खिळखिळी होत आहे.

जागतिकीकरणाची संकल्पना :

स्वातंत्र्य प्राप्तीनंतर भारताने मिश्र अर्थव्यवस्था व नियोजन यांचा स्वीकार केला. आर्थिक विकासासाठी व समाजवादी समाज रचना प्रस्थापित करण्यासाठी सार्वजनिक क्षेत्रात उद्योगधंदे व मुक्त स्वातंत्र्य, संचार यावर भर दिला. जगात 1985 पासून उदारिकरण, खाजगीकरण व जागतिकीकरणाची सुरुवात झाली. ज्या देशाने या प्रक्रियांना जवळ केले त्या देशांच्यात जागतिकीकरणाची प्रक्रिया सुरु झाली. भारतात 1991 नंतर जागतिकीकरणाची प्रक्रिया सुरु झाली.

जागतिकीकरण म्हणजे काय?

1. प्रा.दिपक नायर - "देशाच्या राजकीय आणि भौगोलिक रेषा ओलांडून केले जाणारे आर्थिक व्यवहार म्हणजे जागतिकीकरण होय.
2. प्रा.सी.टी.कुरियन - "जागतिक अर्थव्यवस्था म्हणजे विविधता असलेल्या अर्थव्यवस्थांचा समूह होय. त्यामध्ये निश्चित कार्यक्रमाने एकमेकांशी विविध मार्गाने परस्परांवर क्रिया करतात आणि कालांतराने त्यांच्या वृत्तीत बदल करतात"

सर्वसाधारण जागतिकीकरण म्हणजे अर्थव्यवस्थेमध्ये खुलेपणा आणणे होय. जागतिकीकरणामुळे विविध देशांची अर्थव्यवस्था परस्परांवर अवलंबून राहते. जागतिकीकरणामुळे आर्थिक विकासाला प्रेरणा मिळाली आंतरराष्ट्रीय व्यापारात वाढ झाली. स्पर्धा शक्ती वाढली. उत्पादन क्षमता वाढली. असे जरी असले तरी समाज जीवनावर देखील जागतिकीकरणाचा परिणाम झाला. त्यापैकी जातीसारख्या पारंपारिक घटकांवर परिणाम होऊन नविन बदलाचा प्रवाह जातीसंस्थेत सुरु झाला. जागतिकीकरणामुळे जातीसंस्थेतील बदल होत आहेत.

निष्कर्ष :

1. उच्च जातीच्या प्रतिष्ठेचा न्हास
2. प्रत्येकाला व्यवसाय निवडीचे स्वातंत्र्य आंतरजाती विवाहास चालना व वैधता
3. खानपान व सामाजिक संपर्काबाबत मोकळीक
4. सामाजिक व धार्मिक वर्तनाबाबतचे सर्वांना स्वातंत्र्य
5. जाती संस्था व धर्म यांची हरकत झाली.

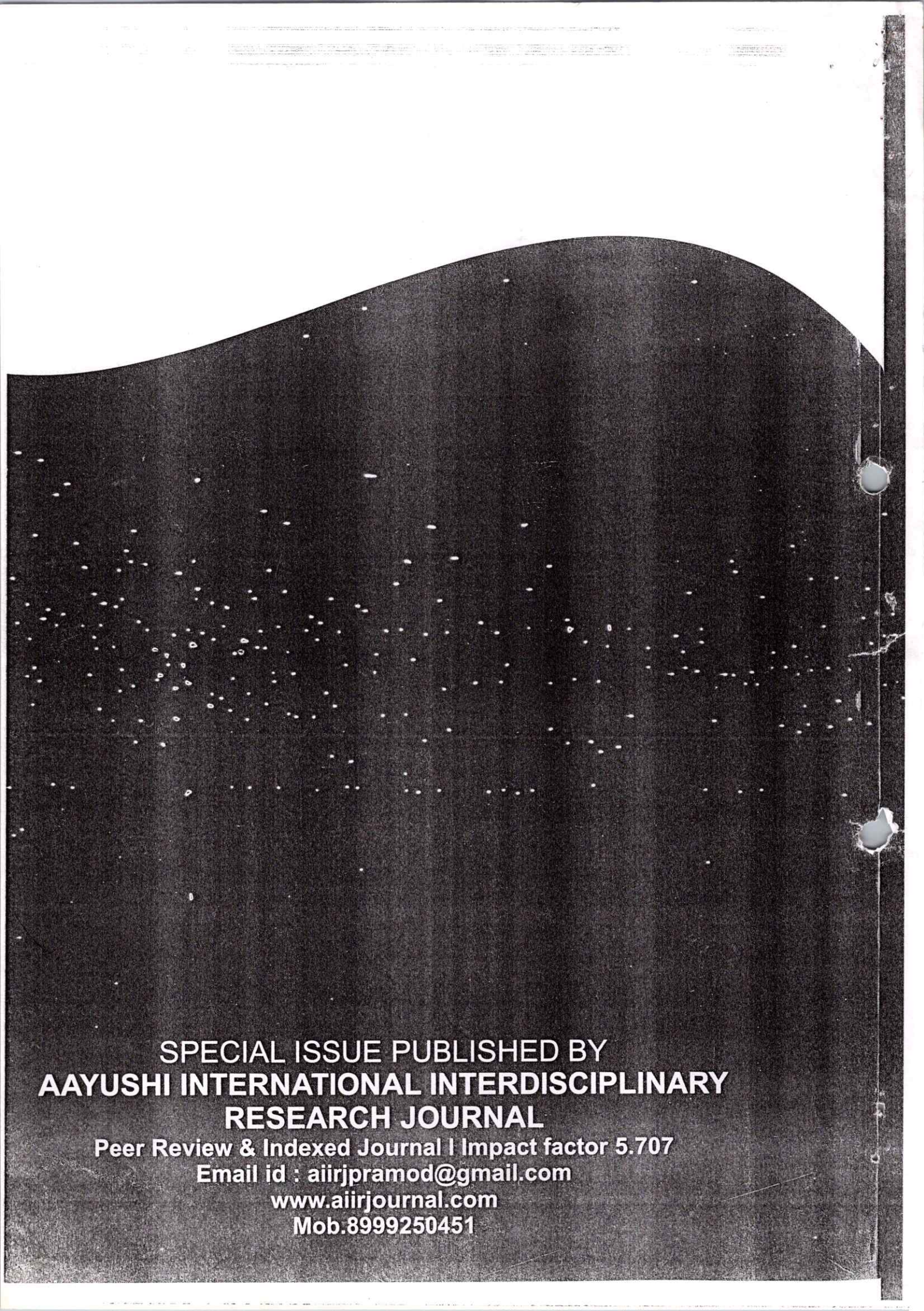
वैदिक काळापासून ते जागतिकीकरणाच्या काळापर्यंत जाती व्यवस्थेत बदल होत आहेत: जाती व्यवस्था नष्ट झालेली नाही. पण तिचे स्वरूप बदलत आहे. (उदा- बारा बलुतेदार व आठरा आलुतेदार ही जाती व्यवस्थेतील कामाची विभागणी जवळ जवळ बंद झालेली आहे.) तिच्यात संरचनात्मक व संस्थात्मक अशा दोन्ही प्रकारे जागतिकीकरणामुळे बदल झालेले दिसून येतात.

समारोप :

जी "जात" नाही ती "जात" असे कोणी म्हणत असेल तर तेही आपणास ना कबूल करणे अवघड आहे. महाराष्ट्रात बाबा आढाव सारख्यांना गावागावातून "एक गांव एक पाणवठा" अशा चळवळी हाती घ्याव्या लागतात. राखीव म्हणून मागास ठरलेल्या जातींना मिळणाऱ्या सवलती बाबत इतरांची वाढती ना पसंती, तथाकथित जातींची स्वतःची जात श्रेष्ठ हा दुराभिमान आहे. आजच्या जागतिकीकरणाच्या काळात आजही जाती निष्ठा जोपासल्या जात आहेत. विशेषतः निवडणूकीच्या राजकारणाने तर जातीयतेला खत पाणी घालून जातीयेतेचा भस्मासूर उभा केला आहे. निवडणूका या जातीय तत्वावर लढवल्या जात आहेत. डॉ. एम. एन. श्रीनिवास या बाबत म्हणतात "जात हा सामाजिक, धार्मिक पातळीवर फार छोटा घटक दिसून येतो तर राजकीय पातळीवर फारच मोठा घटक दिसून येतो" असे आजही जागतिकीकरणात दिसून येते. ही एक शोकांतिका म्हणावी लागेल. विविध जातीची मंडळे एकीकडे आपल्या जाती बांधवांना शिष्यवृत्त्या, शिक्षण, वसतीगृहे यासाठी मदत करीत आहेत तर दुसरीकडे आपल्या जातीगटाचे संघटन करीत आहे.

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