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## Editor's Note



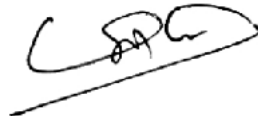
The pandemic continues to play havoc not only with our lives but also with the pattern of living all over the world. The wheels have stopped rotating, the business has nosedived and the printing press has become deserted. The classrooms have been converted into temporary medical centers. The blackboard remains thirsty and so on.

What is happening around us is well known to everyone. Therefore, as editor of this journal, I offer my sincere regret for its delayed publication.

As we start gathering ourselves because of the lessening intensity of the pandemic and as we prepare ourselves to enter the classrooms, I can't restrain myself from making a significant observation. The sad spectacle which pains all of us is the gradual dwindling interest in research. I may say that the research is the exercise of our inquisitive and investigative mind. We want new inventions, new theories in order to understand ourselves and the whole cosmos better. We want the extension and sometimes correction of our knowledge due to the enquiring spirit in us. My regret is that this enquiring mind and this spirit to find out new territory of knowledge are gradually losing sharpness and passion.

This journal is published with the sole objective of arousing our interest in research. I may add that discovery of newness is a matter of joy and triumph. So my sincere hope is that all of us should devote ourselves to this pursuit of knowledge. This journal will act as its platform.

The publication of this journal has been possible due to constant encouragement of the principal of our college, Dr. R.P Tripathy. I have also been encouraged by my associate editors, especially by Dr. Shuchismita Behera, who also shares this vision of a better post-pandemic world.



**(Dr. Pramoda Kumar Das)**



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## Exploration of antioxidant activities of some Schiff bases of substituted indoles and their inclusion complexes with $\beta$ -CD

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**Abstract:** Schiff bases having indole moiety are well known biological active agents. The present research deals with the preparation of 5-substituted furan-2-yl) [1,3,4] thiadiazino[6,5b]indole-3-amine from 2-amino 1,3,4-thiadiazino[6,5b] indole and substituted furfural. In aqueous medium the compounds are less soluble, which causes diminishing biofunctionality. The bioaccessibility and stability of the synthesized schiff bases can be enhanced by the preparation of their inclusion complexes with  $\beta$ -Cyclodextrin. The Schiff bases as well as their inclusion complexes are analyzed through physical and different spectral techniques like UV-visible, FTIR,  $^1\text{H NMR}$ . Thermodynamic properties like change in free energy and stability constant of the inclusion complexes have been ascertained which gives essential information about their stability. In this work, an initiative has been taken to explore the antioxidant behavior of newly synthesized compounds along with their inclusion complexes. The results of the research authenticate the fact that the inclusion complexes of the synthesized compounds exhibit significant antioxidant activities as compared to their bared compounds.

**Key Words:** antioxidant activity, Inclusion complex, substituted indoles,  $\beta$ -cyclodextrin,

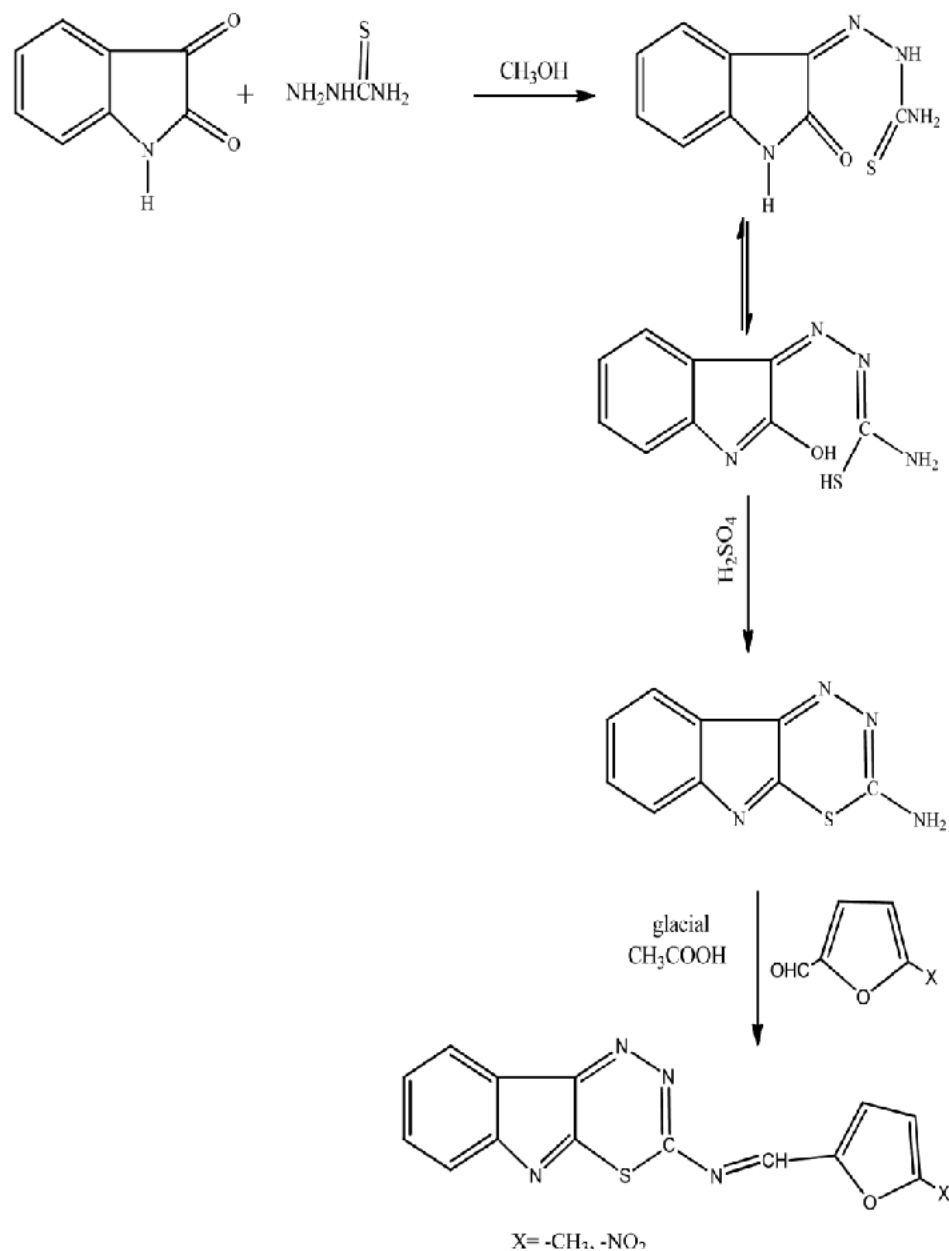
### I. Introduction

Five membered heterocycles and their derivatives have attracted the attention of chemists mainly because of their manifold applications in pharmaceuticals. Schiff bases having indole moiety as active core have considered as versatile pharmacophores because they possess effective pharmacological activities such as antiviral[1], antibacterial[2], anti-inflammatory[3-4], antifungal[5], antioxidant[6], anti tubercular[7], anticancer[8] etc.

In a successful attempt, Schiff bases of substituted furfuraldehyde were prepared first by condensing indole-2,3-dione with thiosemicarbazide to give an intermediate, 2-amino 1,3,4-thiadiazino[6,5b] indole and then the intermediate is condensed with methyl furfural and nitro furfural.

The structure of the synthesized compounds have been analysed spectroscopically (UV, IR, PMR), which provide very valuable information about their structural features. But the solubility of these compounds in aqueous medium is found to be poor, which is a measure stumbling block in showing their bio accessibility and hence their antioxidant activities. To enlist the improvement in their solubility and stability, the complexation of the synthesized compounds have been done with a suitable host molecule i.e.  $\beta$  - cyclodextrin, a useful molecular encapsulant[9]. Also the synthesized schiff's bases obtained from furfuraldehydes have strong ability to form inclusion complexes with  $\beta$  - cyclodextrin. The complex forming tendency of  $\beta$  cyclodextrin is mainly due to its special architecture i.e. hydrophilic outer and a lipophilic inner cavity. The lipophilic cavity of  $\beta$  cyclodextrin facilitates a microenvironment into which apolar moieties of suitable dimension can enter to form inclusion complex. The formation and stability of inclusion complexes are verified from measurement of thermodynamic stability constant and change in free-energy etc.

The potential of the synthesized compounds before and after the inclusion complex formation are examined for antioxidant activities. In comparison, it is found that the inclusion complexes possess promising antioxidant activities as compared to their respective compounds.



**SCHEME 1: Synthetic pathway of Schiff bases**

Compound A= E-N-((5-methylfuran-2-yl) methylene) [1,3,4]- thiadiazino [6 5 b] indol-3-amine

Compound B= N- ((5-Nitro furan-2-yl)methylene) [1,3,4]- thiadiazino [6,5b] indol-3-amine

## I. Materials and Methods

### 2.1 Apparatus and Chemicals

5-methyl furfural and 5- nitro furfural are purchased from Sigma Aldrich Chemical Company and used as such. All other chemicals and solvents used are of the highest grade and are purchased from the local market. Double distilled water is prepared in the laboratory and is used for the preparation of aqueous solutions. Purity of the compounds is checked by its sharp melting point. U.V Spectra are taken with the help of Shimadzu-1800 Spectrophotometer and I.R spectra are recorded on Shimadzu-8400 FTIR Spectrophotometer using KBr pellets.  $^1\text{H}$  NMR spectra in  $\text{CDCl}_3$  are recorded on Bruker spectrophotometer model ultrashield at 300 MHz using TMS as internal standard.

### 2.2 Synthesis of E-N-((5-methyl furan-2-yl) methylene) [1,3,4] – thiadiazino[6,5 b] indol-3-amine:

The synthesis of the above titled compound (Schiff's base- A) involves following three intermediate steps as per

#### 2.2.1 Step-1: Synthesis of 3- Thiosemicarbazido indol-2-one

Equimolar mixture (0.013 mole) of Isatin and thiosemicarbazide are taken in a 500 ml round bottomed flask. The refluxation of the mixture is carried out in methanol for about one hour. The completion point of the reaction is verified through TLC technique. The excess of the solvent is distilled out and the contents are cooled. The cooled content is poured into ice cold water which gives a precipitate. The precipitate is filtered through whatman 42 filter paper. The residue is washed with distilled water, it is dried and recrystallised from  $\text{CH}_2\text{OH}$  to obtain 3- thiosemicarbazido indol -2 – one. Percentage of yield is 80% and the mp is  $235^\circ\text{C}$ .

#### 2.2.2 Step-2: Synthesis of 2- amino -1,3,4 –Thiadiazino [6 5 b] indole.

0.0136 mole of 3-Thiosemicarbazido indol 2- amine is mixed with small quantity of cold conc.  $\text{H}_2\text{SO}_4$  in a beaker. The beaker containing the mixture is kept undisturbed for 16 hours at room temperature. Then ice cold water is poured into the reaction mixture. It is neutralised with few drops of liquid ammonia to get a solid mass. It is filtered through whatman 42 filterpaper. The residue is washed with distilled water. The dried residue is recrystallised from ethanol to give 2- amino -1,3,4-Thiadiazino [6, 5 b] indole. Percentage of yield is 65% and mp is  $220^\circ\text{C}$ .

#### 2.2.3 Step-3: Synthesis of E-N-((5-methylfuran-2-yl) methylene) [1,3,4]- thiadiazino [6, 5 b] indol-3-amine.

1ml (0.01 mole) of 5-methylfurfural and 0.01 mole of 2-amino-1,3,4- thiadiazino [6 5 b] indole are taken in 50 ml DMF. To it few drops of glacial acetic acid is added and the mixture is refluxed for 6 hours. The completion of the reaction is checked by TLC and excess of the solvent is distilled out. The solution is cooled. To the clear solution some crushed ice are added to get a solid product. It is filtered, washed with distilled water and dried. The crude product is recrystallised from absolute alcohol to give the pure compound.

By following the same procedure another Schiff's base of substituted indole i.e N- ((5-Nitro furan-2-yl)methylene) [1,3,4]- thiadiazino [6,5b] indol-3-amine (compound- B) is synthesized by taking equimolar mixture (0.01 mole) of 5- Nitro furfural and 2-amino-1,3,4- thiadiazino [6,5b] indole.

### 2.3 Phase Solubility Measurements:

The solubility of the compound in aqueous phase at various concentrations of  $\beta$ -cyclodextrin (0-7mM) is studied by a method suggested by Higuchi-Conner[10].

### 2.4 Synthesis of inclusion complexes:

Among various methods, co-precipitation method[11] is chosen for the synthesis of inclusion complexes of the compounds (A,B). With the constant molar concentration of the compounds, different molar concentrations of  $\beta$ -cyclodextrin are added. For a period of 48 hours, the mixtures are stirred by a magnetic stirrer and then they are filtered through whatman 42 filter papers. The filtrates are cooled for 24 hours in refrigerator. The precipitates obtained are filtered through G-4 crucible, washed with distilled water and dried in air for 24 hours.

## 2.5 Study of thermodynamic properties:

The stability constants of the complexes (A and B) are calculated from plots of inverse of change in absorbance  $\Delta A$  versus inverse concentration of  $\beta$ -cyclodextrin using Benesi-Hilderband relation[12].

$$1/\Delta A = 1/\Delta \epsilon + 1/K_T [\text{Guest}]_0 / [\beta\text{-CD}]$$

where  $\Delta A$  is change in absorbance,  $\Delta \epsilon$  is change in absorption coefficient,  $K_T$  is stability constant,  $[\text{Guest}]_0$  is the concentration of compound and  $[\beta\text{-CD}]$  is the concentration of  $\beta$ -cyclodextrin. The values of stability constants for all the complexes are calculated using the relation

$$\text{Stability Constant } (K_T) = \text{Intercept/Slope}$$

The value of  $\Delta G$  at 298 K is calculated by using the equation:

$$\Delta G = -RT \ln K_T, \text{ where } K_T \text{ is the stability constant.}$$

## 2.6 Evaluation of Antioxidant activity:

The screening of the antioxidant activities of the synthesized compounds and their complexes are carried out by DPPH scavenging assay method, suggested by Tagashira and Ohtake[13]. In the prepared ethanolic solution of DPPH, the test sample (100  $\mu\text{g/ml}$ ) with required concentration is mixed. The above formed mixture is incubated for 20 minutes at 27°C and the absorbance at 517 nm is measured. The difference in absorbance between a test sample and a control is considered as activity. Ascorbic acid is used as standard of reference.

## III. Results and Discussions

Schiff bases of methyl (compound A) and nitro (Compound B) substituted furfuraldehyde are synthesized in their crystalline solid forms. The maximum encapsulation conc. of  $\beta$ -cyclodextrin has been determined from aqueous phase solubility study (fig.1). The inclusion complexes of the synthesized bioactive Schiff bases having indole moiety are prepared with  $\beta$ -cyclodextrin. The structures of the compounds (A and B) and their inclusion complexes have been elucidated from physical properties (Table 1), elemental composition and spectral data such as UV, IR and  $^1\text{H}$  NMR.

**Table 1 : Some physical properties of the synthesized compounds and complexes**

Sl No	Compound/ Complex	Molecular formula	Molecular weight	Colour	M.P. ( $^{\circ}\text{C}$ )	Yield (%)
1	Compound- A	$\text{C}_{15}\text{H}_{19}\text{N}_4\text{OS}$	294	Light brown	110-115	78
	I.C. <sub>A</sub>			white	260-265	73
2	Compound- B	$\text{C}_{14}\text{H}_7\text{N}_5\text{O}_3\text{S}$	325	Pale yellow	80-85	70
	I.C. <sub>B</sub>			Dull white	270-275	75

An increased melting point of inclusion complexes of respective compounds may be featured through the fact that an additional thermal energy is required for deencapsulation from the  $\beta$ -cyclodextrin cavity (Table 2). The IR frequency data 746 (C-S str.), 1134 (C-N str.), 1338 (C-O str.), 1471, 1520, 1541 (Ar., C=C str.), 1616-1714 (C=N str.), 3041 (=C-H str. Furfural) confirms the presence of these groups in the compound. There is a remarkable change in the IR data in all compounds after encapsulation (absorption frequencies shift towards higher energy side) which is featured to the fact that there are some weak interactions within the hydrophobic cage of  $\beta$ -cyclodextrin. The host-guest complexation is

further supported by NMR data. The NMR signals of different protons of the compounds are recorded before and after encapsulation. It is observed that all the protons undergo smaller shifts (towards upfield in case of all the compounds) after encapsulation. These shifts can be explained on the basis of shielding phenomena which arise due the caging of the protons in the core of  $\beta$ -cyclodextrin.

Different graphs are plotted between fixed conc. of the synthesized Schiff bases and different conc. (0-10mM) of  $\beta$ -CD. The graphs show that solubility of the compounds in aqueous medium enhance linearly as a function of the concentration of  $\beta$ -cyclodextrin up to 6<sup>th</sup> point followed by a slight decline.

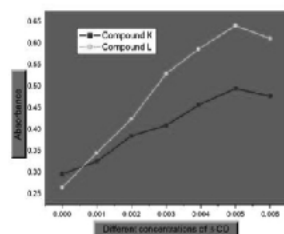


Fig. 1: Phase solubility study of the synthesized compounds

This concludes that the concentration at 6<sup>th</sup> point is the suitable concentration for getting the higher yield of inclusion complex. Nice correlations have been obtained for plots of  $1/\Delta A$  versus  $1/[\beta\text{-CD}]_0$ . The plots are maintaining good linearity with a correlation coefficient ( $r$ ) close to unity (Table 2) which supports the presumed 1 : 1 stoichiometry of complexation.

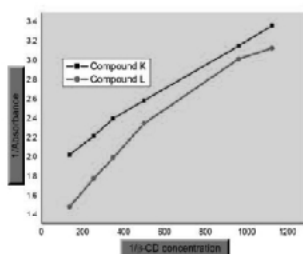


Fig. 2: Plot of inverse absorbance against inverse concentration of  $\beta$ - cyclodextrin

The equilibrium constants ( $K$ ) have been calculated from the above inverse plots (Fig.2) for the compounds A and B and are found to be 857.8 and 748  $\text{M}^{-1}$  respectively (Table-2).

Table 2: Thermodynamic stability constant and free energy change of inclusion complexes

Sl No.	Inclusion complex of Compound	Equilibrium Constant $K$ in $\text{M}^{-1}$	$\Delta G = -2.303RT \log K$ $\Delta G$ (kJ/mol)	Correlation coefficient ( $r$ )
1	I.C. <sub>A</sub>	857.8	-16.846	0.9987
2	I.C. <sub>B</sub>	748	-16.505	0.9756

As the values are falling within ideal range(100-1000  $M^{-1}$ ), the synthesized complexes are having significant stability[14]. The displacement of energy rich water molecule by the hydrophobic guest molecule is the main driving force for these inclusion complex formation[15]. Negative values of free energy changes of inclusion complexes (Table-2) show that the host-guest interaction is spontaneous and thermodynamically feasible.

The antioxidant potential data of the synthesized compounds before and after encapsulation reveals the fact that the free radical scavenging nature of Schiff bases enhanced predominantly after encapsulation (Table-3).

Between compound A and B, the latter shows a considerable radical scavenging activity which may be due to presence of electron withdrawing nitro group in the compound.

**Table-3: Antioxidant activities of compounds and their inclusion complexes**

Compound/Complex	Conc.(500 $\mu$ g/ml)	Conc.(100 $\mu$ g/ml)	% of increase
Compound-K	35.6	26.8	31.46
Inclusion with $\beta$ -CD	46.8	33.6	25.37
Compound-L	38.7	27.5	25.06
Inclusion with $\beta$ -CD	48.4	34.6	25.81
Ascorbic acid	90.00	74.30	

#### IV. Conclusion

The research work successfully synthesized inclusion complexes of Schiff bases with  $\beta$ - cyclodextrin. The results of research concludes that the formation of inclusion complex of the synthesized compounds is the most appropriate mechanism to enhance the solubility, stability and the antioxidant activity in comparison to their respective compounds.

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## **Diet In Relation To Breast Cancer Risk Among Women**

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A variety of breast cancer risk factors pertain to a woman's adolescence and may be related to nutritional influences. International variation in rates of breast cancer between countries suggests that environmental factors, perhaps dietary may influence risk of this disease [Potischman et al., 1998]. The proof that adolescent diet may affect the risk of breast cancer derives from several lines of evidence [Hunter et al., 1993]. Diet is considered as a source of either carcinogens (intrinsic or cooking generated) present in certain foods or constituents acting in a protective manner (vitamins, antioxidants, detoxifying enzyme-activating substances, etc.) [Sugimura, 2000]. Many researches took place on adolescent diet and the risk of breast cancer in later of the life and the mechanism lying behind it.

It was observed that Norwegian women who were adolescents during World War II, when average caloric intake decreased by 22%, have a reduced incidence of breast cancer, suggesting that energy restriction might affect risk. High intake of meat, poultry, total energy, and total fat and saturated fatty acids has been reported to be associated with increased risk for breast cancer [Bissonauth et al., 2008]. Hunter and Willett [1993] hypothesized that higher energy intake and higher growth rate during adolescence increase breast cancer risk; this possibility is consistent with the results of international correlational studies of fat intake and breast cancer mortality and the associations of greater height with risk of breast cancer. Experiments on animal models showed that energy restriction in the peripubertal period inhibits mammary tissue proliferation and reduces the subsequent risk of mammary tumors [Engelman, 1994].

The fat-breast cancer risk relation may be confounded by factors such as energy intake and weight change [Thiébaud et al., 2007]. Because, obesity is identified as risk-factor for breast cancer among postmenopausal women, it seems that high energy intake and body fatness might be confound the observed positive association of fat intake with breast cancer risk in postmenopausal [Freedman et al., 2006]. The positive association of SFA intake with breast cancer risk has been suggested in several case-control studies [Wakai et al., 2000]. A meta-analysis of 14 cohort studies reported a statistically significant higher risk of breast cancer among women who consumed the highest levels of SFA compared to the lowest levels of SFA [Boyd et al., 2003]. Epidemiological evidence has shown that olive oil, which contains MUFAs, might reduce the risk of breast cancer risk [Pelucchi et al., 2011]. Animal studies have confirmed promoting effect of polyunsaturated fats particularly linoleic acid and

arachidonic acid whereas and also inhibitory effect of marine derived w-3 fatty acids on mammary tumorigenesis.

Increased consumption of eggs was inversely associated with risk of breast cancer. Eggs are rich sources of essential amino acids, minerals and vitamins. For instance, one egg contains 11.5% of the recommended daily allowance for folate and 6.5% of that for vitamin D [Vorster et al., 1995]. 1,25(OH)<sub>2</sub>D has been shown to induce cell-cycle arrest by increasing the expression of cyclin-dependent kinase inhibitors such as p21 and p27 in MCF-7 breast cancer cell lines [Jensen et al., 2001]. Prostaglandins released from breast cancer cells or surrounding tissues stimulate tumor progression by promoting cell proliferation and resistance to apoptosis and stimulating tumor cell invasion and angiogenesis [Wang et al., 2004]. 1,25(OH)<sub>2</sub>D has been shown to down regulate the expression of cyclooxygenase-2 (COX-2), which plays a critical role in prostaglandin synthesis.

Some postmenopausal women appear to have high circulating iron concentrations because of high intake of meat, fortification of foods with iron, and the wide use of iron-containing dietary supplements. High levels of dietary iron have been linked epidemiologically to increased development of tumors in humans [Stevens et al., 1994]. High intake of dietary iron may lead to oxidative stress, DNA damage, and lipid peroxidation, which can increase the risk of breast cancer since iron has pro-oxidant properties [Huang et al., 2003].

It was hypothesised that high salt intake greatly reduced food intake and thus might exert antitumor effect through mimicking calorie restriction. High salt intake greatly reduced food intake and thus might exert antitumor effect through mimicking caloric restriction [Xu et al., 2018].

Although there is literature to suggest an inverse association between folate status (dietary intake and/or blood levels) and the risk of developing cancers [Kim, 2006], there is also evidence which suggests that folic acid supplementation may have a promoting role in cancer progression and that high folate status may actually increase cancer risk [Kim, 2007]. A high proportion of cancer survivors (including breast cancer patients) have been reported to consume supplements containing folic acid [Bright-Gibbry et al., 2011]. The protective effect of adequate folate intake or blood levels may be stronger among women who regularly consume alcohol, a known folate antagonist [Kim, 2006].

Pan *et al* [2011] who reported a protective effect of high intake and long duration of vitamin E supplementation to breast cancer in postmenopausal women. Possible mechanism of actions in inhibiting breast cancer could be: inducing PPAR $\gamma$  (peroxisome proliferator activated receptor) expression and as a result reducing the expression of ER $\alpha$  (estrogen receptor), inducing Nrf2 [nuclear factor (erythroid-derived 2)-like 2] which consequently reduces inflammation and oxidative stress, and inhibiting cell proliferation while inducing apoptosis.

Each of the dietary factors has independent role in the process of gene expression. There is an optimum requirement of a molecule for inhibition or repression in a normal cell or in a cancerous cell. The molecules derived from these dietary elements can influence a particular enzymatic pathway in a normal cell. These therapeutic diets should be given from the age of adolescence as this age is the point where many alternations in gene expression occur. Hence best possible amount of these dietary intakes should be prescribed so as to prevent breast cancer for which more study is needed at different population level.

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# OPTICAL BAND GAP AND THERMAL STUDIES OF NANOCOMPOSITE DERIVED FROM HETEROCYCLIC MONOMER

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## ABSTRACT

Polypyrrole was synthesised in the nanoform by adding ferric chloride and salicylic acid to pyrrole in acidic medium followed by stirring with magnetic stirrer for 10 hrs. Ni nanoparticles, prepared by sonication method, was added to the prepolymer to form nanocomposite. They were characterized by UV, FTIR, XRD, TGA and SEM. The optical band gap calculated from UV data was found to be low. The polymer and the composite in the nanoform was found to be thermally stable.

**Keywords :** nanoparticles, sonication, prepolymer and composite.

## 1. INTRODUCTION

Polymers have always been considered as insulators of electricity. No one would have believed 40 years ago that polymers could conduct as good as metals. This is possible only by simple modification of ordinary organic conjugated polymers. They are called electrically conducting polymers or as synthetic metals. They combine the electrical properties of metals with the light weight, greater workability, resistance to corrosion of polymers. They are used in our day to day life with a wide range of products like applications in space, aeronautics, electronics etc.

Polypyrrole is one of the modern generations of polymeric materials which can be used as compact capacitors, antistatic coating, electromagnetic shielding and smart windows, capable to vary the amount of light to pass. It is mainly used due to its advantage as environmentally stable, easy to synthesise and high conductivity. Nanocomposites have attracted wide attention because of their potential to combine desirable properties of different nanoparticles to improve mechanical, optical, electronic, or magnetic properties.<sup>1-6</sup> There has been a growing interest in incorporating functional components, such as functional groups, polymers and nanoparticles, into the self assembled nanostructures, however, success has been limited to two phase organic/inorganic hybrid materials, nanoparticles or polymer-based nanocomposites.<sup>4,5,7,8</sup> Polymer nanocomposites containing surface engineered metaloxide, or, silica, nanocomposites continuously offer new opportunities to enhance desired properties or, functionalities, such as optical transparency, ductility, flexibility or molecular mobility.<sup>9-13</sup>

## 1. EXPERIMENTAL

### Materials

Pyrrole, ferric chloride, salicylic acid and nickel chloride hexahydrate were purchased from Merck. In this method, 0.1 mole of the hydrated salt solution was prepared in double distilled water. 0.01 mole of citric acid solution and 0.01 mole of  $\text{NaBH}_4$  solution were prepared in double distilled or conductivity water. About 20 ml of the hydrated salt solution was taken in a 50 ml beaker followed by 5 ml of citric acid solution and 5 ml of double distilled or, conductivity water. The solution in the beaker was subjected to sonication for 30 minutes at room temperature. About 5 ml of  $\text{NaBH}_4$  solution was added to it and subjected to further sonication for 45 mins. A green coloured nickel nanoparticle (NP) precipitate was deposited at the bottom of the beaker and was filtered. The NP was washed repeatedly with double distilled water and dried.

1 m mol of pyrrole was dissolved in 200 ml of 2M HCl and stirred by a magnetic stirrer. 1 g of Ni NP was added to the beaker containing the solution. Ferric Chloride and salicylic acid solution was prepared by dissolving 0.01 mol in 50 ml conductivity water and added to the resultant solution followed by stirring at the rate of 240-300 rpm for 10 hrs at rt. The solution was kept undisturbed in a cool and dry place for 48 hrs when brownish precipitate was obtained. The resulting precipitate was filtered and washed several times with conductivity water. The nanocomposite hydrochloride formed was converted to the base by washing it with 1M  $\text{NH}_4\text{OH}$ . It was dried and recrystallised from alcohol to remove impurities if any and finally dried. These samples were kept in vacuum desiccators to avoid contact with moisture from atmosphere and any other possible reactions with atmospheric gases.

### Methods

With the help of Perkin-Elmer Lambda-9 UV-Vis Spectrometer, the spectra of polypyrrole and polypyrrole-Ni nanocomposite was recorded. For UV spectral analysis, chemically suitable spectral grade solvent like 95% ethanol was used to prepare thin films. The spectra was recorded as wavelength vs. absorbance. FTIR was carried out with Perkin-Elmer 4220 spectrophotometer. The solid polymer under investigation was finely powdered and mixed intimately using a small vibrating ball mill about 100 times its weight of dry, powdered KBr and pressed under high pressure of 15000-25000 pound per square inch (psi) into a small transparent disc of about 0.5-1.5 mm thickness and 1 cm in diameter. XRD of the polymer and nanocomposite was carried out by D8 ADVANCE, BRUKER with Cu target voltage 40 KV and current 30 mA, auto slit not used, scan range 2.0-80.0 (deg), continuous scan with 2.0 deg/ min. TG measurements were carried out by Shimadzu DT-50 thermal analyser. The temperature of the reaction is measured with the help of a thermocouple, supported over the boat. The furnace over the boat is placed in such a way that its centre will be at the same spot with the sample. A weighed amount of the sample was placed in the boat of the thermobalance. The change in weight of the sample was recorded directly on the recorder along with the temperature. The thermogram was then recorded with suitable speed of the chart and proper sensitivity of recorders. The analysis was carried out in an atmosphere of nitrogen with temperature range 25<sup>o</sup>-600<sup>o</sup>C and rate of heating 10<sup>o</sup>/ min. SEM was carried out with JEOL-JSM35 CF analyser at an acceleration of 10 KV.

### 3. RESULTS AND DISCUSSION

Small humps in the UV spectrum of Fig 1 and Fig 2 indicates polaron bipolaron transitions for the samples. A shift in the characteristic wavelength was observed after doping

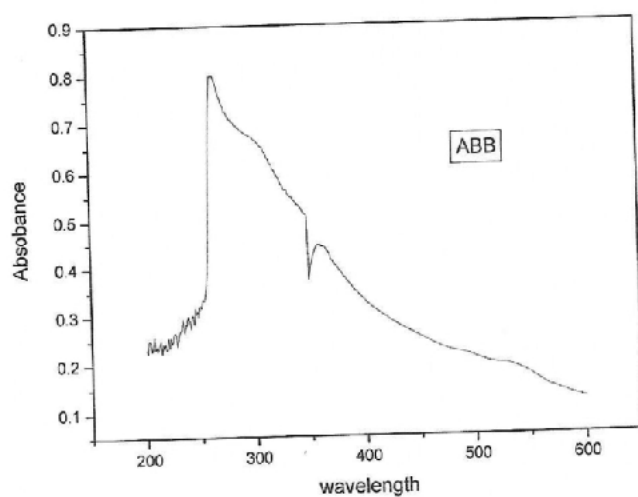


Fig 1 UV graph of polypyrrole

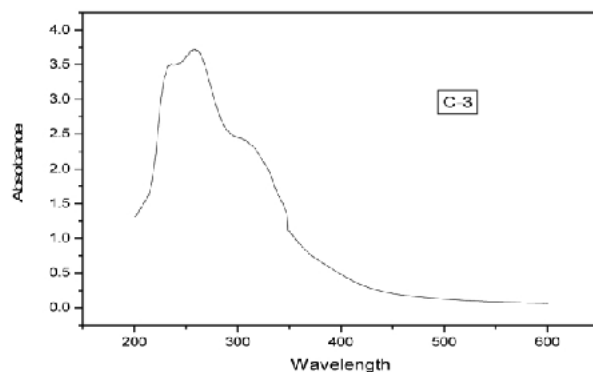


Fig 2 UV graph of Polypyrrole-Ni nano composite

with metals. These shifts observed are due to dopant-polymer interaction.<sup>14-15</sup> The energy gap or band gap  $E_g$  can be determined by applying the Kubelka-Munk (K-M) method. Fig 3 and Fig 4. The K-M method is based on the following equation  $\alpha h\nu = A [h\nu - E_g]^n$  where  $n=1/2$  or 2. For direct band gap materials it is  $1/2$  and for indirect band gap material it is 2. Here it is taken 2. The above figures shows the plots of  $(\alpha h\nu)^2$  v/s  $h\nu$  (Tauc plots). The band gaps were determined by extrapolation of the plot  $(\alpha h\nu)^2$  v/s  $h\nu$ , extrapolation of the line to the x-axis where the value of  $(\alpha h\nu)^2$  is zero, considering indirect transitions, the values obtained for  $E_g$  were when  $\alpha = (1-R)^2 / 2R$  where  $R$  is the reflectance. It can be seen from the graph that the absorbance changes with the addition of nano particles, which results in variation in the energy gap.

The refractive index 'n' can be calculated using the relation  $n=3.3668(E_g)^{-0.32234}$ <sup>16</sup>

**Table1:Optical Band Gap and Refractive Index**

Sl.No.	Material	$E_g(\text{ev})$	Refractive Index(n)
1	Poly pyrrole	1.6	2.893
2	Polypyrrole-Ni nanocomposite	2.1	2.651

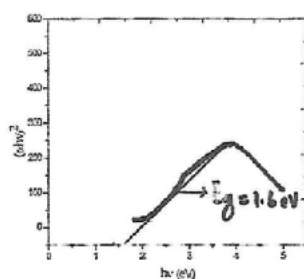


Fig 3 Tauc's plot of Polypyrrole

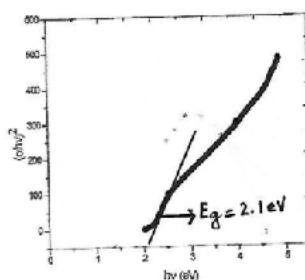


Fig 4 Tauc's plot of Polypyrrole-Ni nanocomposite

The IR spectra in Fig 5 shows a mixed feature with side chain oxidation peak at  $1663 \text{ cm}^{-1}$  having relatively lesser intensity. The distinct character of the polymer is also indicated by the almost equal intensity of the out of plane aromaticity C-H bond vibration at  $815\text{-}851 \text{ cm}^{-1}$  and  $734\text{-}753 \text{ cm}^{-1}$  for two and four adjacent hydrogen (2H and 4H) atoms.



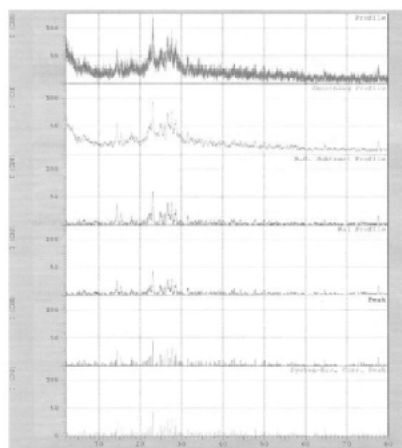
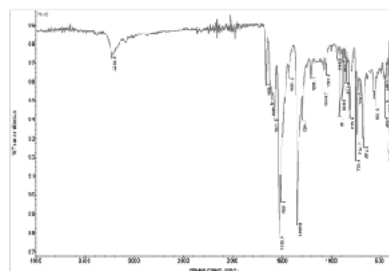


Fig 5 FTIR of Polypyrrole-Ni nanocomposite Fig 6 XRD of Poly pyrrole-Ni nanocomposite

Crystallite size in XRD spectrum in Fig 6 was determined by Debye Scherrer equation,  $D = k\lambda / \beta \cos \theta$ , where  $D$ = mean size of the particle,  $k$ = dimension less shape factor, equal to 0.9,  $\lambda$ = x-ray wavelength of Cu ( $k\lambda$ ) =  $1.54 \text{ \AA}$ ,  $\beta$ = FWHM and  $\theta$ = angle of diffraction. % crystallinity was determined from the formula :  $\% \text{Crystallinity} = \{0.24 / \beta\}^3$  Elastic strain was calculated by using the formula: Elastic Strain =  $\beta / 2\cos \theta$

**Table 2: X-Ray Diffraction**

Sl.No.	Material	Peak no.	Peaks (2θ)	d(Å)	FWHM(β) (in deg)	D (nm)	%Crystallinity	Elastic Strain
1	Poly pyrrole-Ni nanocomposite	48	28.799	3.09751	0.06	2.38	64	0.031
		71	41.087	2.19510	0.07	2.11	40.30	0.037
		72	41.407	2.17888	0.07	2.12	40.30	0.037

From the crystallite size, the particle size conforms to be well within nano dimension. The elastic strain calculated from  $\beta$  and  $\theta$  values is of very low value. The above table confirms the relation between the particle size, % crystallinity and elastic strain. With decrease in particle size, % crystallinity decreases and elastic strain increases. This may be due to increase in covalent character in the polymer.

TGA curve in Fig 7 indicates the nanocomposite to withstand temperatures upto  $600^\circ\text{C}$ .

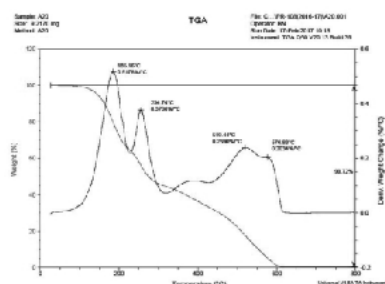


Fig 7 TG of Poly pyrrole-Ni nanocomposite

**Table 3: Oxygen Index (OI) and Weight loss pattern**

Sl.No.	Material	OI	% weight loss at different temperatures					
			100 <sup>o</sup> C	200 <sup>o</sup> C	300 <sup>o</sup> C	400 <sup>o</sup> C	500 <sup>o</sup> C	600 <sup>o</sup> C
1	Poypyrrole-Ni nanocomposite	0.176	1.25	30	55	65	75	97.5

The data represented in Table 3 is in favour of thermal data which are shown in figures. A comparative picture of the characteristic weight loss data at certain temperature ranges including oxygen index (OI) value are displayed in the table, using the empirical equation:

$$OI = \frac{17.5 + (0.4 \times CR)}{100}$$

CR = Charred Residue.

From the thermograms, it indicates the decomposition of the nanocomposite in three or four distinct stages. The initial weight loss upto 150<sup>o</sup>C is due to the moisture and volatile impurities retained in the sample. 30% mass loss at about 200<sup>o</sup>C followed by oxidative degradation, which is fast completed at 518<sup>o</sup>C. The exothermic change taking place without any accompanying mass loss up to 200<sup>o</sup>C is due to interchanged cross linking reaction. The final oxidative degradation takes place in two steps at 2600C and at about 5200C, assuming coupling occurs. The nanocomposite undergoes 50% weight loss due to decomposition at about 300<sup>o</sup>C . As is evident from low OI values in the table, it can be concluded that the nanocomposite is not a good flame retardant, though specific analytical procedures based on the mass of the carbonaceous char was not followed.

Based on the observed trend of weight loss with temperature, the possible degradation mechanism may be outlined in three distinct stages:

- The decomposition up to 2500C may be due to loss of moisture and volatile organic matters.
- The decomposition pattern at a temperature range from 250<sup>o</sup>C-350<sup>o</sup>C may be attributed to breakage of polymer chain at the points of polymerization sites.

- c) The final stage of decomposition up to a temperature range of 550<sup>0</sup>C-600<sup>0</sup>C may be due to the breakage of monomer matrix. Beyond 550<sup>0</sup>C the nanocomposite is found to be exothermic in nature.

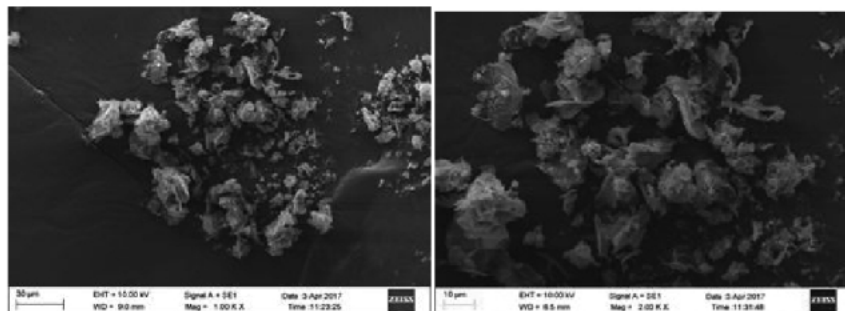


Fig 8 & 9 SEM of Poly pyrrole-Ni nanocomposite

SEM pictures of polypyrrole-Ni nanocomposite in Fig 8 and Fig 9 conforms the formation of nano dimension.

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#### 4. CONCLUSION

From the UV spectrumanalysis followed by optical band gap determination, it is found that the nanocomposite can be used as potential optoelectronic appliances. From XRD and TG studies it is concluded that the nanocomposite has less crystallinity and more elastic strain with fairly thermal stability.

#### 5. ACKNOWLEDGEMENT

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## DIABETES MELLITUS AS A COMMON LIFE STYLE DISEASE

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### **Abstract**

Diabetes mellitus is a lifestyle disease generally caused due to both endocrinological and metabolic disorder. This disease gradually increased its importance in global scenario. Its main symptom is high blood glucose levels which occurred due to insufficient secretion of pancreatic insulin. The severity and complication of this disease may lead to the premature death of the patient. This review puts light on the history, epidemiology, historical perspective, disease management, economic status and biochemical basis of diabetes mellitus.

**Keywords :** Diabetes mellitus, insulin, ketoacidosis

### **INTRODUCTION**

The Diabetes mellitus is one of the health disorders which caused due to the combination of heterogeneous disorders commonly presenting with episodes of hyperglycaemia and glucose intolerance due to of lack of insulin /defective insulin action, or both (1). This kind of situation is created due to derangements in the regulatory systems for storage and mobilization of metabolic fuels, including the catabolism and anabolism of carbohydrates, lipids and proteins emanating from defective insulin secretion, insulin action, or both (2). Diabetes mellitus is classified into four types such as :type 1 diabetes, type 2 diabetes, gestational diabetes, and other specific types (1). Type 1 diabetes is the major type of diabetes but it accounts a low number of diabetic patient from the diabetic population and younger age groups at majority of well-to-do countries. But gradually the incidence of type 1 diabetes is

increasing in both rich and poor countries (1). Maximum cases i.e 85 to 95% of all diabetes in high-income countries as well as developing countries are of type 2 diabetes. This is associated with improper utilization of insulin by target cells and tissues which is a serious health concern worldwide (3). The incidence of the disease is more due to rapid urbanization, dietary changes, practice of unhealthy life style and decreasing physical activity. (3) Around 285 million people in between the age group 20-79 were suffered from diabetes worldwide in 2010, 70% of the patient contributed by developing nations. From this account it is expected to increase to about 438 million, by 2030. Further, by 2030, the number of people with IGT is projected to increase to 472 million, or 8.4% of the adult population (1). The severity of diabetes mellitus can cause dysfunction or failure of various organs; It can also leads to retinopathy, nephropathy (4). Diabetics are accompanied by risk of cerebrovascular, cardiovascular and peripheral vascular diseases. Various pathogenetic processes are involved in the development of diabetes, including destruction of pancreatic  $\beta$ -cells that lead to lowered sensitivity of insulin action (5).

#### **DIABETES MELLITUS is an unwanted economic issue**

The treatment and management of Diabetes mellitus is a very expensive. The patient having microvascular and macrovascular complications and their associated cost can reduce the quality and expectancy of life (7,8,9). In Latin America and the Caribbean it was estimated that total annual cost associated with diabetes is to be US\$65.216 billion (10) and in Spain is over US\$650 million during 1994 there were over 1.4 million known diabetics (11). Cost of type 1 diabetes is US\$1.92 million In England and Wales, the estimated (12). Similar kinds of evidence were found for the WHO African Region (13).

#### **DIABETES MELLITUS ( How the name is created?)**

The words "Diabetes" and "Mellitus" are derived from Greek. "Diabetes" having the meaning "a passer through; a siphon" and "Mellitus" denotes "sweet". It is thought that the Greeks named it so because of the presence of excessive amounts of urine produced by diabetics attracted flies and bees. The ancient Chinese were diabetes mellitus by observing whether ants are attracted to a person's urine or not. During

medieval ages, the European doctors diagnose for diabetes by tasting the urine themselves (6).

### **Historical background of diabetes mellitus**

The disease Diabetes mellitus has created its identity from ancient ages and some information about its treatments were known since the Middle Ages. In 20th century its pathogenesis come to Non-progressing Type II diabetics cannot be diagnosed in that period (6). Joseph Von Mering and Oskar Minkowski in 1889 put light on the role of the pancreas in diabetes. Sir Edward Albert Sharpey-Schafer of Edinburgh in Scotland In 1910, suggested that diabetics lacked a chemical produced by the pancreas. After some time the name of this chemical was proposed as insulin (14), the first clinical patient being treated in 1922. The distinction between type I and type II diabetes was made by Sir Harold Percival (Harry) Himsworth in 1935 (14). Rosalyn Yallow and Solomon Berson in 1958 discovered the radioimmunoassay for insulin, and in the 1990s identification of thiazolidinediones as effective antidiabetics for it.

### **Biochemistry of diabetes mellitus**

Each and every cell of the human body need energy for its function and glucose act as the primary energy source that circulates in the blood and provide energy to every cell (4). Insulin the pancreatic hormone regulates the blood glucose level. Insulin affords entry of glucose into respiring cells by binding to its receptor sites on peripheral side of the cell membranes. By the action of Insulin glucose converted into pyruvate through the process glycolysis. Insulin hormone can also play a role in the upregulation of glycogenesis from excessive cytosolic glucose and lipogenesis from excessive cytosolic acetyl-CoA. These events are antagonistic to glucagon mediated events. When the glucose levels are at or below threshold level at that time instead of entering into the cells glucose stays in the blood (15). The human body tried to arrest hyperglycemia, by means of drawing water out side of the cells and into the bloodstream that leads to excess sugar is excreted in the urine. Due to this diabetic patient having constant thirst with urge to drinking excess water because the cell want to remove extra glucose that can cause polyuria which may leads to glucosuria (4).

Due to long term hyperglycemias the cells of human body are devoid of glucose by lacking insulin hormone, so the cells need alternative energy sources and derive energy from fatty acids stored in adipose tissue. But these fats do not act as energy sources for the brain, kidney cortex and red blood cells. The beta-oxidation pathway rests in mitochondria but red blood cells don't have mitochondria. So the fatty acids cannot pass the blood-brain barrier. Here the acetyl-CoA arising from catabolism of fatty acids is diverted to ketogenesis to generate ketone bodies and avail energy to such cells and tissues, which can serve as alternative energy sources for such cells and tissues. But sometimes these ketone bodies are passed in the urine called as ketonuria, that characterizes diabetes mellitus. When ketone bodies are present in the blood it produces ketosis. The pH of the blood lowers to acidic due to the presence of Ketone bodies which will lead to acidosis. When both of ketosis and acidosis are present that will lead to a condition called ketoacidosis. Without proper treatment, ketoacidosis leads to coma and death (15).

### **Insulin and diabetes mellitus**

In humans Insulin hormone is secreted from the beta cells of the islets of Langerhans in the pancreas and the main target organ for the action of insulin are liver, many tissues like adipose tissue. Insulin promotes the synthesis of carbohydrates, proteins, lipids, and nucleic acids. It also plays a role in glucose transport across muscle and adipocyte cell membranes, regulation of hepatic glycogen synthesis, and inhibition of glycogenolysis and gluconeogenesis (4). All these actions lead to the reduction in blood glucose concentration. Insulin plays a great role in the protein synthesis, nucleic acid synthesis, transfer of amino acids across membranes and inhibits proteolysis. Insulin causes the incorporation of fatty acids from circulating triglyceride into adipose triglyceride and lipid synthesis by inhibiting lipolysis (16). Insulin can bind to a high affinity specific receptor located on the plasma membrane. The receptor is saturable, at a plasma insulin concentration of 20 to 30  $\mu\text{U/ml}$  the binding capacity and the biological activity of insulin are maximum. Insulin transmits its signal to the interior of the cell by means of a second messenger



that influences enzymatic processes, after binding to the receptor. By this way insulin carries out its actions (17). Insulin can also stimulate of intracellular Potassium transport (18). Insulin helps in the accumulation of intracellular Magnesium accumulation can cause activation of critical intracellular enzymes, after an overnight fast, early morning normal plasma insulin concentration is 5 to 15  $\mu\text{U/ml}$  and Postprandial values, 100g glucose, can be 5 to 10 times higher than the baseline. Insulin output under basal condition approximates 0.5 to 1.0 U/h and increases about 5 times after intake of food (17). The production of insulin is directly proportional to the amount of sugar (carbohydrate) consumed. That means the more sugar consumption leads to more insulin production, but in contrast to this small pancreatic beta cells are unable to produce more amount of insulin which is beyond their capacity. Insulin over production can lead to stop the function of a cell (19). Glycogenesis in the hepatocytes and myocytes are mainly regulated by insulin (5), so insulin deficiency can lead to cause all form of Diabetes. In Diabetes mellitus several organs like kidney, eye, blood vessels, heart are suffered from damage or dysfunction due to chronic hyperglycemia, that leads to nephropathy, retinopathy, sexual dysfunction, peripheral neuropathy etc. The hyperglycemia is a condition mainly characterized by weight loss, polyuria, polydipsia, blurred vision sometimes with polyphagia and stunted growth.

(20). Insulin regulates hepatic gluconeogenesis, blood glucose levels and promote glucose catabolism by the skeletal. Post absorptive hepatic glucose production and gluconeogenesis is increased in type 2 diabetes mellitus (21).

#### **Diabetes in India and Odisha**

As per a population based study type 2 diabetes was 12.1%. The prevalence was the highest in Hyderabad (16.6%), followed by Chennai (13.5%), Bengaluru (12.4%), Kolkatta (11.7%), New Delhi (11.6%) and Mumbai (9.3%) (22). In India the prevalence of Diabetes mellitus ranging from 0.7 to 10.1% in tribal population. (23) Odisha has more than 40 lakh diabetics with incidence ranging from 12 to 16% in urban areas and 6 to 7% in rural parts (24).

### **Life style management for diabetes mellitus**

It is the best way to manage the life style to reduce the severity as well as risk of diabetes mellitus. It is recognized as being an essential part of diabetes and cardiovascular disease prevention. The life style management includes physical activities such as exercise, and healthy diet plans and proper medication to avoid complications which will increase the life expectancy as well as reduce the incidence rate of this disease. The dietary management of diabetes mellitus is a complement of lifestyle management (4).

### **Future plans for Diabetes**

The diabetes mellitus is a curse for healthy life to understand its every aspect we need to focus on the genetic, biochemical and molecular basis of this disease. So it will provide effective management interventions against this disease which will lead to further drug discovery and betterment of treatment process. In this concern, e.g. synthetic insulin with rapid actions having long term action and ability to traverse all body compartments, without side effects yet to be designed. Gene therapy can help in drug discovery and it can help the non-insulin producing cells could be manipulated to produce insulin using a suitable promoter and insulin gene construct diabetes mellitus. In future the medical science may intermix molecular biology, immunology and gene therapy for the new drug discovery as well as to study the elimination of this disease.

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## Carbasugars as glycosidic inhibitors

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### Abstract:

Glycosidases are the enzymes which play a key role in many biological processes. Hence the importance of these glycosidic enzymes is manifested by a number of diseases due to the lack of a given glycosidase. Thus by the use of these glycosidic enzyme inhibitors, the metabolic disorder or viral infection can be prevented. In this review, an attempt has been made in highlighting the synthetic routes of carbasugars (enzyme inhibitors) along with their recent developments in biological and pharmacological potential values.

**Keywords:-** carbasugars, glycosidase, viral infection, inhibitors

### Introduction:-

Carbohydrate chemistry constitutes today a “multifaceted” discipline strongly connected with organic, pharmaceutical and medicinal chemistry<sup>1</sup>. Carbohydrates are important biomolecules whose role is not only limited to energy storage, also they are constituents of glycoproteins, glycolipids, and other conjugates. Moreover the carbatrifuranose and carbapyranosepolyols in which the ring oxygen is replaced by a  $-CH_2-$  even shows improved biological properties compared to those of parent carbohydrate structures. Therefore these structures otherwise called as carbohydrate mimetics or carbasugars. Carbasugars are thus carbohydrate analogues in which the endocyclic oxygen has been replaced by a methylene group. This means that the acetal linkage of a sugar is formally transformed into non-hydrolysable ether in a carbasugar (Figure 1(a)). Natural and synthetic carbasugars, either as single molecules or as subunits of more complex molecules, have shown to display interesting biological activities<sup>2</sup> mainly as enzymatic inhibitors. As time passed, the term “pseudosugar” was besmirched and employed for a large variety of sugar analogues, thus requiring a specification of the definition for different subclasses of mimetics. S. Ogawa<sup>3</sup> proposed the use of the prefix “carba”, preceded, where considered necessary, by the appropriate locant (“4a” for an aldofuranose, “5a” for an aldopyranose), followed by the name of the sugar (Figure 1(b, c)).

**Figure 1 (a) and 1 (b):**

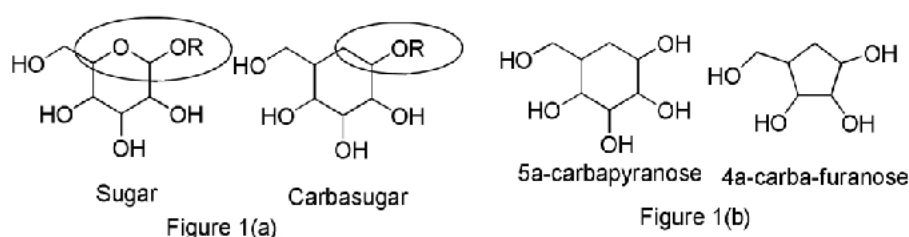
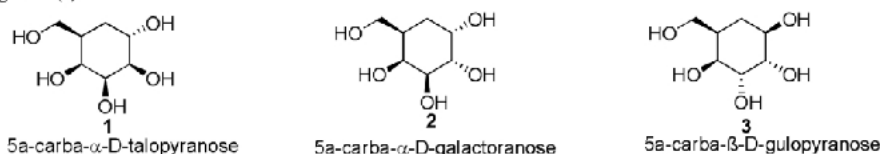


Figure 1(c)

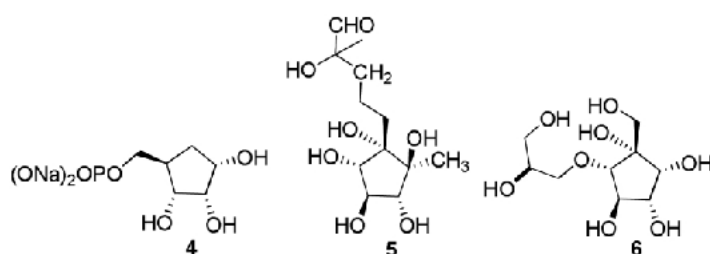


**Classification of carbasugars:** Basically all the carbasugars are classified into two subcategories (i) carbafuranoses (ii) carbapyranoses

**(i) Carbafuranoses:**

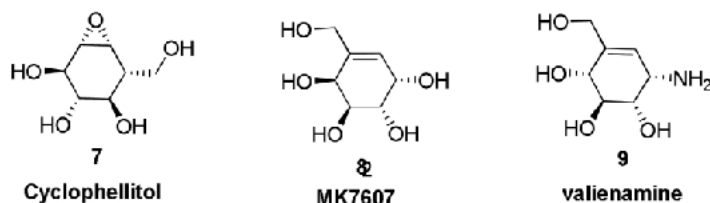
The carbasugars exist in five membered furanose form are called as carbafuranoses. Carbafuranoses are not freely found in nature except cPIRP4 which is the only pure reported carbafuranose isolated from natural sources. The subunits of carbafuranoses isolated from natural sources, in particular are carbanucleosides. These compounds have been the subject of interest in recent years.<sup>4</sup> It should be pointed out, however, that five-membered cyclitols, such as caryose<sup>5</sup> or caldiol<sup>6</sup> (Figure-2), have been isolated as natural products.

**Figure 2: naturally occurring carbapyranoses**



Carbasugars existing in six membered (pyranose) forms are called as carbapyranoses. Carbapyranoses have been scarcely found in nature; however they are abundant as subunits of other natural products. Compounds such as carba- $\alpha$ -D-galactopyranose<sup>2</sup> (isolated from *Streptomyces* sp. MA-4145)<sup>7</sup>, cyclophellitol<sup>7</sup> (isolated from *Phellinus* sp.)<sup>8, 9</sup>, or MK7607 <sup>8</sup> (isolated from *CurVulariaeragestrises*)<sup>10</sup> (Figure 3) were isolated directly from natural sources whereas aminocarbasugars, such as valienamine<sup>9</sup> have been mainly found as subunits of several, more complex molecules. From a formal standpoint, carba-D-galactopyranose<sup>2</sup> is the only "genuine" carbasugar isolated from natural sources.<sup>7</sup>

**Figure 3:**



### Biological effects of Carbasugars:

To the best of our knowledge, 5-phosphoribosyl-1-pyrophosphate (cPRPP4, Figure 2) the only natural carba-furanose isolated. Its biological activity was evaluated by examining the enzymatic inhibitory activity against the enzyme 5-phosphoribosyl-R-1-pyrophosphate (PRPP) synthetase and further this enzyme reacts with ATP in the presence of Mg ion to give PRPP, a compound involved in the biosynthesis of histidine and tryptophan. From a biological point of view, there is evidence that the activity of PRPP synthetase is elevated in tumors. Then, inhibitors of this enzyme show antineoplastic activity. Compound 4 inhibits PRPP synthetase with a  $K_i$  of 186  $\mu$ M (human type PRPP synthetase) and a  $K_i$  of 3811 mM (*Bacillus subtilis* PRPP).<sup>11</sup>

Similarly carbapyranoses like 5a-carba- $\alpha$ -D-galactopyranose<sup>2</sup> has been found in a fermentation broth of *Streptomyces* sp. MA-4145, as an antibiotic.<sup>12</sup> Inhibition of D-glucose-stimulated release of insulin has been studied by using  $\alpha$ -DL-carba-glucopyranose as a glucokinase inhibitor. That is 5a-carba- $\alpha$ -DL-glucopyranose and 5a- $\beta$ -DL-carba-glucopyranose were used as synthetic analogues of D-glucose anomers in order to study the mechanism of D-glucose stimulated release of insulin by the pancreatic islets. It was found that the carba-sugar was neither phosphorylated by liver glucokinase, nor stimulated release of insulin from the islets. Incubation of islets with  $\alpha$ -DL-carba-glucopyranose resulted in an accumulation of carba-sugar, probably the D enantiomer, in the islets.  $\alpha$ -DL-carba-glucopyranose inhibited both D-glucose stimulated release of insulin (44% inhibition at 20 mM) and islet glucokinase activity (36% inhibition at 20 mM), but  $\beta$ -DL-carba-glucopyranose did not show any activity.

### Synthesis of Carbasugars:

The strategies adopted to obtain carba-furanoses and carbapyranoses can be broadly classified into two groups: (i) synthetic methods which employ non-carbohydrates as starting materials<sup>13a-c</sup> and (ii) protocols which utilize carbohydrates as precursors.<sup>14a-i</sup> Some other strategies which make use of natural products other than carbohydrates as starting materials have also been examined.<sup>15a-c</sup>

### Glycosidase inhibition mechanism:

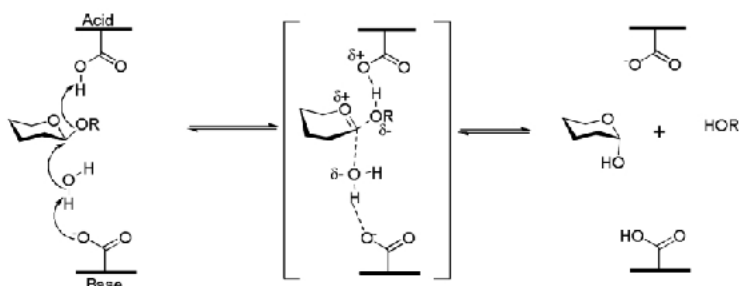
Hydrolysis of the glycosidic bond proceeds with either net retention or inversion of anomeric configuration. The 'classical' mechanisms for glycoside hydrolysis were first proposed by Koshland in 1953.<sup>16</sup> Traditionally (although there are exceptions) classical glycosidases possess two carboxylate-containing residues which are responsible for hydrolysis. Both mechanisms involve oxocarbenium-ion like transition states and a pair of carboxylic acids in the active site of enzyme.<sup>17</sup>

#### (a) Inversion mechanism:

Inversion of stereochemistry is a single step mechanism (Figure 4) which allows both substrate and a water molecule to be bound simultaneously. One of the catalytic residues acts as a general acid and the other as a general base. Protonation of the glycosidic oxygen by the general acid and departure of the leaving group

is accompanied by concomitant nucleophile attack by a water molecule that has been deprotonated by the general base.<sup>18</sup>

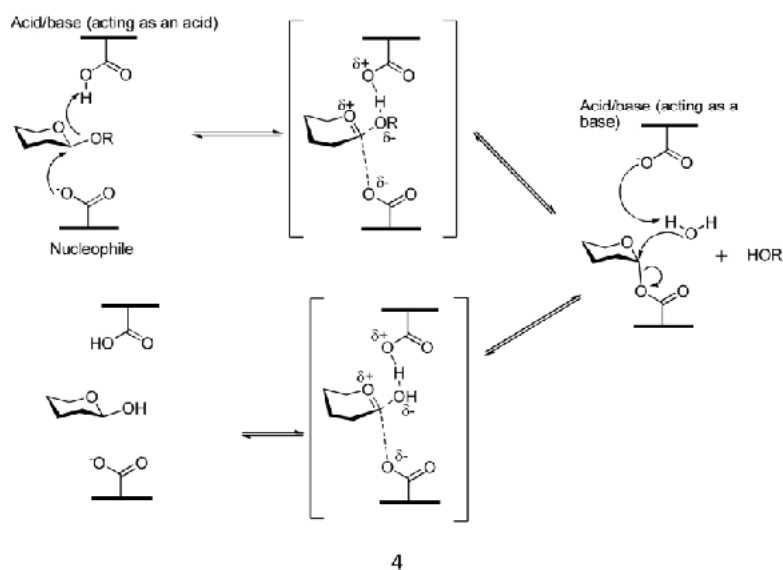
**Figure 4: Inversion mechanism**



**(b) Retention mechanism:**

Retention of stereochemistry is a double displacement mechanism, consisting of two inverting steps (Figure 5); one of the catalytic residues acts as the acid/base residue and the other as a nucleophile. During the first (glycosylation) step of the reaction the acid/base protonates the glycosidic oxygen to aid leaving group departure, which is concomitant with attack of nucleophile at the anomeric carbon, and leads to formation of a covalent glycosyl-enzyme intermediate. In the second (deglycosylation) step the acid/base residue deprotonates a water molecule which provides a nucleophilic species to attack at the anomeric carbon and displace the glycoside.<sup>19</sup>

**Figure 5: Retention mechanism**

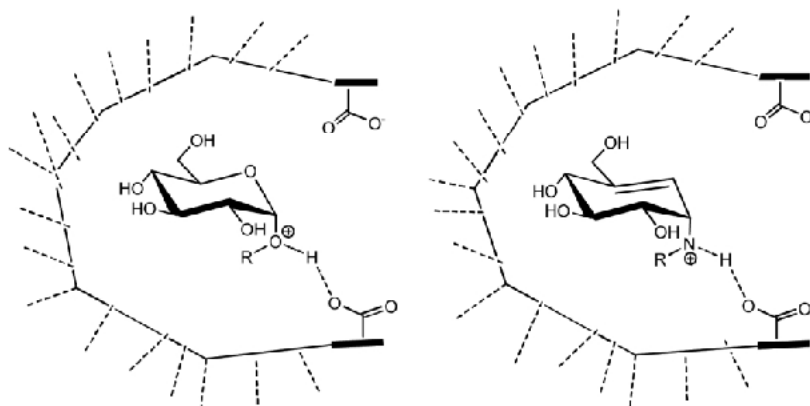




### Inhibition mechanism:

The rationale behind the use of cyclitols or aminocyclitols as glycosidase inhibitors lies on the ability of these systems to mimic the protonation form of the exocyclic anomeric oxygen atom required for the enzymatic hydrolysis of the glycosidic bond (Figure 6).<sup>20</sup> Particularly, the amino group or hydroxyl group mimics the protonated form of the leaving group oxygen atom in  $\alpha$  or  $\beta$  orientation in the transition state of glycosidase-catalyzed reaction.

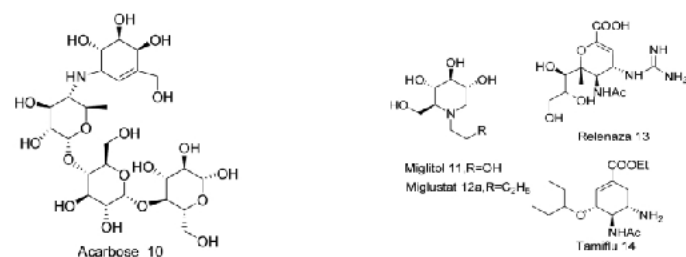
Figure 6:



Since hydrolysis of the glycosidic bond is ubiquitous biological process, glycosidase inhibitors have many potential applications, including use as agrochemical and therapeutic agents. Great efforts have been made in recent years to design and synthesize inhibitors of glycosidases. Given their multitude of roles *in vivo*, inhibition of these enzymes in a number of different processes is extremely attractive with potential in the treatment of lysosomal storage diseases, diabetes and viral infections including influenza and HIV<sup>21</sup>, indeed there are a number of drugs currently on the market which are used in the treatment of some of these diseases. Acarbose<sup>10,22</sup> and Miglitol<sup>11,23</sup> target intestinal tract  $\alpha$ -glucosidases and  $\alpha$ -amylases in the treatment of type II diabetes. Miglustat<sup>12a</sup> is a quite similar iminosugar to miglitol<sup>11</sup> acting as an inhibitor of glucosylceramide synthase and  $\alpha$ -glucosidase administered for the treatment of type I Gaucher disease very recently. These enzymes are responsible for the digestion of dietary carbohydrates to monosaccharides that can be absorbed through the intestinal wall into the blood stream; their inhibition helps to control uptake of monosaccharides into the blood and suppress an excessive rise in blood glucose.

Relenaza<sup>13,24</sup> and Tamiflu <sup>14,25</sup> (Figure 7) target a neuraminidase on the influenza virus surface, which during infection cleaves terminal sialic acid residues to destroy the receptors recognised by haemagglutinin, and thus plays an important role in spreading the virus and preventing aggregation of viral particles. Inhibition of the neuraminidase causes the spread of the progeny virus to new cells to be slowed or halted.

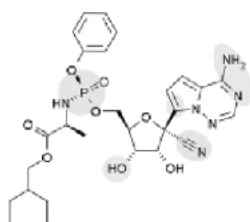
**Figure 7:**



Two general classes of glycosidase inhibitors can be defined: (i) natural products and synthetic analogues whose design has been inspired by the inhibitory activity of the natural inhibitors and (ii) inhibitors whose design has been rationally conceived from the mechanism of the enzymatic reaction. The later class of inhibitors comprises transition-state analogues of the glycoside cleavage process,<sup>26</sup> mechanism based inactivators,<sup>27</sup> and conformationally locked molecules.<sup>28</sup> A major goal of glycosciences has been to design and synthesize new generations of glycosidase inhibitors with which chemists might exert more potent effective control over glycoside hydrolysis. Aside from their potential value in basic biochemical research, several synthetic glycosidase inhibitors have already demonstrated promising therapeutic applications in the area of both diabetes management and anti viral chemotherapy. Inhibitors of these enzymes by both natural and synthetic, have attracted considerable attention from the synthetic community.

Recently COVID-19 has emerged as a global pandemic. The american biopharmaceutical company developed a carbohydrate based nucleotide Remdesivir (Figure 8) which inserts into viral RNA chains causing their premature termination and hence it can be used as a drug for clinical trial for post-infection treatment for COVID-19. Moreover CIDDD also under last stages of human trial synthesised by Emory company as an antiviral agent COVID-19 pandemic.

**Figure 8: Remdesivir: Antiviral agent against COVID 19**



## Conclusion:-

Earlier McCashland's group synthesized the first carbocyclic analogue and imagined that these pseudosugars can show enhanced chemical stability and could replace sugars with respect to their interaction with enzymes. Later their prediction came true by the discovery of many active carbasugars. Today these carbasugars are being treated as important targets for many chemists and biologists. Therefore, it is noteworthy to expect immense possibilities for the young researchers to extend the work on carbasugars and their derivatives so that it would serve the human society at large.

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## BREAST CANCER AND ENVIRONMENTAL RISKS

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Breast cancer is a group of diseases in which cells in breast tissue change and divide uncontrolled, typically resulting in a lump or mass. Approximately 41,760 women and 500 men are expected to die from breast cancer in 2019. During 2012-2016, the median age at the time of breast cancer diagnosis was 62. This means that half of women who developed breast cancer were 62 years of age or younger at the time of diagnosis (American Cancer Society 2019). The prospect of developing breast cancer is a source of anxiety for many women.

Many well-known risk factors for breast cancer—increasing age, later age at menopause, younger age at first menstruation, and certain genetic traits—appear to offer little chance for intervention. Many researches include animal studies to understand the role of environmental agents in the initiation and progression of cancer, as well as research on chemical risk factors and genetic susceptibility in human populations. Mainly three factors appear to be involved in development of breast cancer: Oestrogen in pharmaceutical products, Alcohol consumption and smoking, Weight gain and lack of exercise (Heal, 2008). Less is known about possible environmental causes of breast cancer, another potential area for preventive actions. The Breast Cancer and the Environment Research Centers (BCERCs) are studying the role of environmental factors in female pubertal development as a potential window of susceptibility for breast cancer risk, arguing for the importance of puberty as a window of susceptibility. Some of the environmental reagents responsible for development of breast cancer are listed in Table 1.

**Table 1. Environmental Agents Studied and the Major Sources of Exposure**

<b>Class of Environmental Agent</b>	<b>Major Sources of Exposure</b>
Phthalates	Plastics, personal care products, fragrances
Polychlorinated biphenyl (PCB) congeners	Contaminated food (e.g., fish, high fat foods) and water
Phenols (e.g., bisphenol A: BPA)	Drinking bottles, food can liners, water pipes, dental sealants
Perfluorinated compounds (e.g., perfluorooctanoic acid: PFOA)	Contaminated air and water, industrial sources
Phytoestrogens (e.g., enterolactone-ENL; genistein)	Diet: lignans, soy products
Cotinine	Tobacco smoke
Polybrominated diphenyl ether (PBDE) congeners	Brominated flame retardants, furniture foam, mattresses, carpet padding, hard plastic used in electronics; contaminated air, water, and food
Organochlorine pesticides	Contaminated food and water; persistent in the environment, now in diet and breast milk

Source: BCERCs progress report-2009

In some regions of the country where there is an unusually high incidence of breast cancer, environmental factors have been targeted as a possible cause for this increase. Of the environmental factors reviewed, those with the most consistent evidence of a link with increased breast cancer risk are use of hormone therapy that combines estrogen and progestin, exposure to ionizing radiation (which occurs, for example, during medical diagnostic procedures such as CT scans). The National Toxicology Program, an interagency program headquartered at NIEHS that evaluates agents of public health concern, has listed six substances in its Report on Carcinogens (RoC) that cause or may cause breast cancer in humans. These include diethylstilbestrol, a synthetic form of estrogen that was used to prevent miscarriages; steroidal estrogens used for menopausal therapy; X-ray and gamma radiation; alcoholic beverages; tobacco smoking; and the sterilizing agent, ethylene oxide (HHS, 2018).

Ionizing radiation is the best documented exogenous exposure known to increase breast cancer risk. Women younger than age 20 years at exposure are at higher risk of radiation-associated breast cancer than those exposed at older ages, while women more than 50 years of age at exposure have no measurably increased risk of breast cancer. Girls exposed to ionizing radiation at Nagasaki-Hiroshima who were in

the age range when puberty occurs (approximately aged 10–14 years) were much more likely to develop breast cancer than older girls or adult women who were exposed to comparable radiation doses (Tokunaga et al., 1994).

Certain endocrine disruptors like PCBs (polychlorinated biphenyls) and the DDT (dichlorodiphenyltrichloroethane) metabolite DDE (dichlorodiphenyldichloroethylene) affect on breast development and pubertal maturation has been reviewed recently (Den, 2006). Examples include PBB (polybrominated biphenyl) exposure associated with early menarche and pubic hair development (Blanck et al., 2000), higher phthalate levels among girls with precocious thelarche (breast budding), smoke exposure and early menarche (Windham et al., 2004) and delayed menarche and pubertal development with lead exposure (Selevan et al., 2003).

Many classes of chemicals and sources of exposure may be important in altering the pubertal transition and breast cancer risk through an effect on the endocrine system. Phthalates, parabens, and organic solvents are found, among other sources, in personal care products such as cosmetics (Wolff et al, 1996). Bisphenol A (BPA) may be leached from tin cans and polycarbonate containers (Howdeshell et al., 2003). Pesticides are found in household use and in residues or bioaccumulation from agricultural use and have been associated with earlier menarche (Ouyang et al., 2005).

Not all chemicals are bad. In fact, all of us are exposed to natural and man-made chemicals in the air we breathe, the food we eat, the water we drink and the consumer products we use in our daily lives. But it is increasingly being recognised that we need to identify those chemicals which do have harmful properties and stop using them (Heal, 2008). So the preventive actions may include avoiding unnecessary medical radiation throughout life, avoiding use of postmenopausal hormone therapy that combines estrogen and progestin, avoiding smoking, limiting alcohol consumption, increasing physical activity, and, particularly for postmenopausal breast cancer, minimizing weight gain (IOM, 2011).

Major advances have been made in understanding breast cancer and its risk factors, but more needs to be learned about its causes and how to prevent it. So step should be taken to understand the mode of action of these agents on animal cells



during pubertal development which may lead to progression of breast cancer in later life.

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## MALE BREAST CANCER

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### **Introduction:**

Male breast cancer is a rare cancer that forms in the breast tissue of men. Though breast cancer is most commonly thought of as a disease that affects women, breast cancer does occur in men (just 1% of all breast cancers)(Korde et al. 2010). It is most common in older men, though it can occur at any age.

Types of breast cancer diagnosed in men include :

- A. Ductal carcinoma (Cancer that begins in the milk duct): Nearly all male breast cancer is ductal carcinoma.
- B. Lobular carcinoma (Cancer that begins in the milk producing glands): This type is rare in men because they have few lobules in their breast tissue.
- C. Paget's disease of the nipple: It is a rare form of breast cancer in which cancer cells collect in or around the nipple. The cancer usually affects the ducts of the nipple first then spreads to the nipple surface and the areola (dark circle of the skin around the nipple). The nipple and areola become scaly, red and itchy. The condition is an uncommon disease accounting for 1 to 4.3% of all breast cancers and was first described by Sir James Paget in 1874.
- D. Inflammatory breast cancer: It is a rare and very aggressive disease where lymph vessels in the skin of breast are blocked by cancer cells and breast looks swollen and red or inflamed (Morita et al.2005). This type cancer progresses rapidly (within few weeks or months).

### **Symptoms :**

- A painless lump or thickening in the breast tissue.
- Changes to the skin covering the breast, such as dimpling, puckering, redness or scaling, warmth, swelling or pain.
- Changes to the nipple such as redness or scaling or a nipple that begins to turn inwards.
- Discharge from nipple.

### **Causes and Risk Factors :**

It is not clear what causes male breast cancer. Male breast cancer occurs when some breast cells divide more rapidly than healthy cells do. The accumulating cells form a tumor that may spread (metastasize) to nearby tissue, to lymph nodes or to other parts of the body. Everyone is born with a small amount of breast tissue. Breast tissue

consists of milk-producing glands (lobules), ducts that carry milk to the nipples, and fat. During puberty, women begin developing more breast tissue, and men do not. But because men are born with a small amount of breast tissue, they can develop breast cancer.

**Risk Factors :**

**A. Genetic factor-** Some men inherit abnormal (mutated) genes from their parents that increase the risk of breast cancer. Mutations in one of the several genes, especially a gene called BRCA2 (BRCA2 gene provides instructions for making a protein that acts as a tumor suppressor), puts the person at a greater risk of developing breast and prostate cancer.

**B. Environmental factors :**

- Older age - The risk of breast cancer increases with age. Male breast cancer is most often diagnosed in men in their 60s (Tural et al. 2013).
- Heavy alcohol use - Drinking a lot of alcohol can cause rise in estrogen level that induce breast cancer(Guenel et al. 2004).
- Radiation exposure - A man who has previously had radiation treatment to the chest area may have a higher risk (Thomas et al. 1994).
- Exercise - Having a low level of physical activity may increase the risk.
- Jobs - There may be a link between breast cancer and exposure to organic solvents or working with steel and rolling mills(Cocco et al. 1998).

**C. Other health conditions :**

- Exposure to estrogen - If a person take estrogen related drugs, such as those used for hormone therapy for prostate cancer, the risk of breast cancer is increased.
- Family history of breast cancer - If the person has a close family member with breast cancer, there is greater chance of developing the disease.
- Klinefelter's syndrome - This genetic syndrome occurs when boys are born with more than one copy of the X-chromosome. Klinefelter's syndrome causes abnormal development of the testicles. As a result, men with this syndrome produce lower levels of certain male hormones (androgens) and more female hormones (estrogen).
- Liver disease - Certain conditions, such as cirrhosis of the liver, can reduce male hormones and increase female hormones, increasing the risk of breast cancer.
- Obesity - Obesity is associated with higher levels of estrogen, which increases the risk of the breast cancer.
- Testicle disease or surgery - Having inflamed testicles (orchitis) or surgery to remove a testicle (orchietomy) can increase your risk of male breast cancer.

## **Diagnosis**

A doctor may conduct a number of diagnostic tests and procedures such as –

- Clinical breast exam - The doctor uses his or her fingertips to examine the breasts and surrounding areas for lumps or other changes.
- Imaging tests - Imaging tests may a breast X-ray (mammogram) or an ultrasound.
- Biopsy - A biopsy is the only way to make a diagnosis of breast cancer. Biopsy samples are sent to a laboratory for analysis where experts determine whether the cells are cancerous or not.

## **Treatment**

Male breast cancer (MBC) treatment often involves surgery and may also include other treatments.

- Surgery
  - a) Mastectomy - Removing all the breast tissue.
  - b) Sentinel lymph node biopsy - Removing a few lymph nodes for testing(Gomez et al. 2010).
- Radiation therapy - Radiation therapy uses high energy beams, such as X-rays and protons to kill cancer cells.
- Hormone therapy - If the cancer is hormone sensitive, then it is recommended for hormone therapy(Nahleh A.2006).
- Chemotherapy - Chemotherapy is an option for men with advance breast cancer. These medications may be administered through a vein in arm (intravenous).

## **Conclusion**

Breast cancer in Indian males is seen at a relatively early age and the disease is aggressive in nature. A comprehensive multi-institutional study is required to exactly delineate the behavior of the disease and to better understand the clinical spectrum.

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## Gender Inequality in contemporary India: Scenario and Solutions

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### **Abstract :**

Gender Inequality is deep penetrated in Indian society. Although it is a global phenomenon, but in the patriarchal Indian society, the women are suppressed, oppressed and exploited by men in the every part of the country. Differential treatment on the bases of gender is found right from the childhood. Girls are considered as liability. This study considers the gender inequality that exists among every region, social class and prevents the growth of Indian economy from improving the lives of Indian people. The reality of gender inequality in India is very complex and diversified, because it exists in every field like education, health, employment opportunities, income, social issues, cultural issues, economic issues etc. An attempt has been made to find out those factors which are responsible for these issues in India. Gender inequality in India is a crucial reality. In contemporary era, women are performing exceptionally well in different spheres of activities. This paper is trying to bring out the factors that are responsible for gender inequality and suggests measures to eradicate this problem.

**Key words:** gender inequality, patriarchy, opportunities, suppressed, exploited, issues, eradicate

### **Introduction**

Gender Inequality means disparity between men and women in different social, economical & political, cultural and legal aspects. In India, since long back, women were considered as an oppressed section of the society and they were neglected for centuries. Boys are encouraged to be tough and outgoing but girls are encouraged to be homebound and shy. All these differences are gender differences and they are created by society. As per UNDP report, India ranks 132 out of 187 countries on gender inequality index (GII). India ranks low partly because of its skewed ratio, with only 914 females for every 1000 males, according to Indian government data<sup>1</sup>.

After independence in India one of the issues which has attracted the attention of the policy makers was gender issues and concerns. Gender issues have become central policy arena. The issues of gender equality and justice assumed added significance in the context of the interface between new economic policy perceptions and gender relations. The gender equity became part of country's strategy for eradicating poverty and human misery. The policy makers are strongly believed that a positive commitment to gender equality and equity will strengthen every area of action to reduce poverty because women can bring new energy and new insights. A lot of debate is going on women and development since last few decades. Several interventions had taken place both at national and international level leading to passing of several laws including law against physical violence IPC Section 498 (a) and Section 125 for maintenance. The importance of feminism has been steadily growing and gaining intellectual legitimacy.

**Types of Gender Inequality:** - According to Nobel Laureate Prof. Amartya Sen<sup>2</sup>, there are seven types of gender inequalities at present in India. Here is a brief explanation of all the types of gender inequality.

1. **Mortality Inequality:** - In this, Inequality between women and men directly involves matters of life and death, and takes the brutal form of unusually high mortality rates for women and a consequent preponderance of men in the total population, as opposed to the preponderance of women found in societies with little or no gender bias in health care and nutrition.
2. **Natality Inequality:** - In this kind of inequality a preference is given to boys over girls. It is ardent in many of the male dominated societies and these manifests in the form of parents wanting their newborn to be a boy rather than a girl. With the availability of modern techniques to determine the gender of foetus, sex selective abortions has become common in India.
3. **Employment Inequality:** - In terms of employment as well as promotion at work women often face greater handicap than men. This is clearly exemplified as men getting priorities other than women in our society.
4. **Ownership Inequality:** - In many societies ownership of property can also be very unequal. Since ages the traditional property rights have favored men in the most parts of India. The absence of claims to property can not only reduce the voice of women, but also make it harder for women to enter and flourish in commercial, economic and even some social activities. Their work opportunities and pay scale than their female counterparts.



5. **Special Opportunity Inequality:** - Even when there is little difference in basic facilities including schooling, the opportunities of higher education may be far fewer for young women than young men. Indeed, gender biasness in higher education and professional training can be observed in India.

6. **Basic-Facility Inequality:** - Even when demographic characteristics do not show much or any anti-female bias, there are other ways in which women can have less than a square deal.

7. **Household inequality:** - There are often enough, basic inequalities in gender relations within the family or the household, which can take many different forms. Even in cases in which there are no overt signs of anti-female bias in, say, survival or son-preference or education, or even in promotion to higher executive positions, the family arrangements can be quite unequal in terms of sharing the burden of housework and child care.

#### **OBJECTIVES OF THE STUDY:**

1. To identify the factors which are responsible for gender inequality
2. To give solutions to reduce gender inequality in India

#### **Factors responsible for Gender Inequality:**

**Environmental factors:** At work, this disparity is visible through a different working environment for women, unequal wages, undignified treatment, sexual harassment, higher working hours, engagement in harmful industries, occupational hazards, working roughly twice as many hours as men and a nearly 27 percentage of women are accounted by unpaid activities. Violence against women is also prominent in India which leads to every 42 minutes a sexual harassment occurring, every 43 minutes a woman kidnapped and every 93 minutes a woman is burnt for dowry. And by the pre quarter of reported, rapes involve girls under the age of 16 years. Every 26 minutes a woman is molested and every 34 minutes a rape take place.

**Inequality in education:** A primary outcome of this increased focus on education and learning has been a sizable increase in literacy rates among the Indian population from approximately 18% to 65% in the fifty years ending in 2001. However, a significant gender gap of nearly 22% still remained at the beginning of the 21st century<sup>3</sup> (GOI 2000; GOI 2011). According to census

estimates, the literacy rate has continued to climb to 73% in 2011; however, the gender gap has only narrowed slightly, with women still at literacy levels 16% below men (GOI 2011)<sup>4</sup>. Literacy rates among youths age 15-24 were higher still, at 81% in 2013-2016, yet a 14% gender gap remained (UNESCO 2016). Only 26.6% women above 25 years received a secondary education in 2015, compared to 50.4% of men. Pakistan scored even lower, with 18.3% of women having received secondary education compared to 43.1% of men. In the U.S., 94.7% women have received a secondary education – a figure slightly higher than for men (94.3%).

#### **ECONOMIC FACTORS:**

**Labour participation:** - There is wage inequality between man and woman in India. A substantial number of women enter the labour market after thirties, generally after completion of their reproductive roles of child bearing and rearing.

**Occupational inequality:** - Women are not allowed to have combat roles in military services. Permanent commission could not be granted to female officers because they have neither been trained for command nor have been given the responsibility in India.

**Inequality in Property Rights:** - Although women have equal rights under the law to own property and receive equal inheritance rights, yet in practice, women are at a disadvantage. The Hindu Succession Act of 2005 provides equal inheritance rights to ancestral and jointly owned property, the law is weakly enforced.

**Women's inequality in proper inheritance:-** Women are insignificantly deprived of their proper inheritance culturally and religiously as well. The religious constitution doesn't give women equal inheritance; there is a segregation of giving the property to women as they will not be given the property as men can have. Though Islamic constitution permits women having at least half of the property as man, society is reluctant to give the desired property to women let alone giving the equal share.

**Employment inequality:** - Some common inequalities that take place in the workplace are the gender-based imbalances of individuals in power and command over the management of the organization. Women are not able to move up into higher paid positions quickly as compared to men. Some organizations have more inequality than others, and the extent to which it occurs can differ greatly. In the workplace the men usually hold the higher positions and the women often hold lower paid positions such as secretaries.

## **SOCIAL FACTORS**

**Education:** - The female literacy rate in India is lower than the male literacy rate. According to census of India 2011<sup>5</sup>, literacy rate of female is 65.46% compared to males which are 82.14%.

**Health:-** On health issue, the gender inequality between women's and men's life expectancy and women live compared to men in good health because of lots of violence, disease, or other relevant factors.

**Patriarchal Society:** - Most of India has strong patriarchal custom, where men hold authority over female family members and inherit property & title. It is the custom where inheritance passes from father to son, women move in with the husband & his family upon marriage & marriages include a bride price or dowry.

**Dowry:** - The dowry system in India contributes to gender inequalities by influencing the perception that girls are a burden on families. Such belief limits the resources invested by parents in their girls and limit her bargaining power within the family.

**Gender-based violence:** - Gender-based violence such as rape, sexual assault, insult to modesty, kidnapping, abduction, cruelty by intimate partner or relatives, importation or trafficking of girls, persecution for dowry, indecency and all other crimes are practiced on women. These crimes show the high degree of inequality in India.

**Women's inequality in decision making:** In India, Women have less authority than men to legal recognition and protection, as well as lower access to public knowledge and information, and less decision-making power both within and outside the home. This is also one of the reasons for inequality in gender.

### **Solutions to reduce gender inequalities in our country**

i. Strategies for advancement of women should be higher literacy, more formal education, greater employment opportunity. In education it needs to be reducing primary and secondary dropout of female child.

ii. In post literacy, the basic literacy skills at speaking, reading, and writing and problem solving shall be imparted. Women learners should educate their children which further enhances social advancement.

iii. In job opportunities there shall be reservation or expenditure or provision of services or special provisions.

iv. In governance all rights and all legal measures should be available for women's protection and support.

v. Human rights education , know how to take control of their circumstance , help to achieve their own goals, helping themselves, enhancing their quality of life and motivating for lobbying or advocacy are also enablers for their advancement.

vi. Politicians should frame out policies for increasing social welfare development regarding this issue. The Campaign of our Prime Minister Mr. Narendra Modi "Beti Bachao Beti Padhao" can be successful, when the mindset of Indian society will be changed towards women.

vi. Collaborators such as NGO, INGOs, NPOs, SHGs, CBOs , policy makers, local leaders , information disseminators ,health care providers , teachers and family members should help in the social advancement of women.

**CONCLUSION:** India must take concrete steps needs to reduce the gender inequality. As persistent gender inequalities continue, there is need to rethink the concepts and strategies for promoting women's dignity and rights. There is need for new kinds of institutions, incorporating new norms and rules that support equal and just relations between women and men. Man and woman are like two wheels of a carriage. The life of one without the other is incomplete. The only fool proof method to stop gender inequality is to bring about change in the mind sets of people. This problem can't be solved by few but everyone must join hands to eradicate this inequality. To ensure equality of status for our women we still have miles to go. Man and Woman are like two wheels of a carriage. The life of one without the other is incomplete.

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## **TRIBAL EDUCATION IN ODISHA** **With special Reference to Mayurbhanj District**

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“Education, a word that relates to knowledge which further gave birth to wisdom.  
Wisdom to work wisely in every matter.”

### **Abstract**

Education is an unique process which aims at an all round development of man's physical, mental, moral and spiritual well being. It is a medium through which a biological being get converted into a social being. Education is a way of refinement of our nature .It is a way to learn how to get adapted to a given geographical environment and at the same time modify the environment according to one's needs. Since education as a process has become formal in nature, it is not reaching in equal manner to all the sections of the society. Tribal society is one such group which has not yet reached to the level of satisfaction in regard to the education. Providing education among this section is an utmost priority of both the Government and the so-called civil society because of their backwardness in every respect, be it physical, psychological, economical, cultural or social. Tribal group of any country are somehow unique in their way of living, unique in their perspective to see the life and the nature, so they must be consider as something different while thinking of their education.

**Keywords :** Education, development, tribe.

### **Introduction**

For today's world Education is the key catalyst to the development of human resources. In the past education was the monopoly restrict to the upper castes. Indirectly we can say they have the only right to opt for education. This kind of discriminative attitude became one of the causes for the exploitation and pitiable plight of the tribal's. Though tribals are one of the backward sections of our society they needed the most attention of educational system for their social, economical & political upliftment. For the tribals education is the pivot on which their success depends. Education disseminates knowledge. Knowledge gives inner strength which is very much essential for the tribal's for attaining freedom from exploitation and poverty.

Tribe is a collection of families or groups of families bearing a common name, member of which occupy the same territory, speak the same language and observe certain taboos regarding marriage, profession or occupation and have developed a well assessed system of reciprocity and mutuality of obligations being an endogamous unit. There are altogether 427 tribal communities all over India constituting 8.08 percent of total population. They appear in different names in different parts of the country, the most important among them are the Gonds of Madhya Pradesh, Maharashtra, the Bhills of Rajasthan and Gujarat. The Santhals of Bihar, Odisha, the Chenchus of Andhra Pradesh and Lodhas of West Bengal.

Similarly in Odisha there are 62 types of tribes constituting 22.43 percent of the total population of the state. Among the primitive tribes Bhuyan, Gond, Kisan, Munda, Kharia, Kisan, Oraon, Santal, Kolha, Bhumija and Bathudi are found almost exclusively in northern and western parts of Odisha. They are docile, simple, honest, hardworking and hospitable. But economically backward and exploited, physically oppressed, socially ostracized, segregated and humiliated, culturally isolated, politically unconscious and little education to understand the issues in right perspective. So for them education assumes a significant part of the very foundation of their modern life, an avenue for social mobility, political consciousness and equality of opportunities to education, occupation, better living condition, protection of rights etc.

Although many of the tribal communities had their traditional institutions to prepare their young ones to take up their roles as socially useful productive members of the community, but these institutions rarely fulfill the requirements actually they need to keep pace with the modern monetary and exchange system. For any society education is considered as an important indicator. Literacy being the simplest and easily measurable aspect, its percentage in any society is taken as indicator of its development.

Despite government efforts to promote education among the scheduled Tribes (STs), their literacy rates as compared to the national average have remained low. The literacy rate as per Census 2011 is 73 percent but for STs is 59 percent only. "The overall literacy gap amongst the various groups and STs has come down from 19.77 percent in 1961 to 14.03 percent in 2011, a scrutiny of state wise literacy data reveals that in most of the north eastern states like Meghalaya, Mizoram, and Nagaland, STs are at par with the general population." While in Madhya Pradesh, Maharashtra, Odisha, Tamilnadu and West Bengal, which have sizeable ST population in remote areas, the literacy gap is as high as 18 10 26 percent.

### Research activities, Findings & Suggestions

Odisha is the home to 62 distinct tribes; out of this 13 are the PVTGs (ie. Particularly Vulnerable Tribal Groups). Out of 30 districts of Odisha 9 are considered as tribal districts. Mayurbhanj is one of them with 56.7% of tribals living with their distinctive cultures. It is the second largest district after Malkangiri in terms of tribal population. .

Mayurbhanj is one of the tribal dominated districts of Odisha, which has been declared as fully Scheduled district of the state. With four sub-divisions Baripada and Kaptipada are the part of the plain areas and Bamanghati and Panchapirha are the hilly tribal dominated region of the district. Out of 26 Blocks the tribals are more concentrated in Udala, Khunta, Bijatala, Jamda and the Baripada blocks where the population varies from 70 percent to 80 percent of the total population of the respective blocks.

According to 2001 census Mayurbhanj houses 30 tribes. The major tribes inhabiting in district are Santhal, Kolha, Bathudi, Bhumij, Munda, Gond, Saunti, Hill Kharia, and the minor tribes are Mankirdia, Lodha, Kol, Kisan, Baiga, Holva. The major tribes belong to the Austro and Indo-Aryan language group. Most of them speak their own language.

All these tribes are mainly agriculturists depending mostly on forests for their subsistence living. Forest are the main resource for them to get all the important items which can further be used for additional income. Though tribals are all sufficient to make their living, the problem of isolation from the mainstream society is leading them to many social problems which only can be solved by education. Social problems, which are already been there in the society like superstitions, blind beliefs, ignorant about the importance of education, health problems child marriage etc, such problems can be eradicate with help of education. In relation to tribal people it has been found that education goes a long way in dispelling many traditional values related to superstitions that serve as a great hindrance to development and progress.

Socially, Tribals of this district are very nature loving which can be seen in their culture also. In each festival they offered their gratitude by worshipping the Nature. Their relationship with nature makes them the real conservationist of the Natural resources. They are the nurturer of the nature in a true sense. Apart from this, tribals have the good knowledge about the medicinal qualities of the plants found deep in the forests. Here the role of education is needed for them to enhance the quality and productivity of those plants and herbs known by the tribes. In Mayurbhanj most of the tribes are rural-based people living their life depending on agriculture. From each household we can find a farmer who have the well knowledge of how to plough the land and how to yield the harvest.



But the lack is an environment of education; this means illiterate parents (applicable for some parents) those who do not know the importance of education for them and also for their children. We can see this type of situation during the harvest season, because at this time most of the students remained absent for their classes. The dropout rate among the tribal's are more during this time because both the boys and girls are called by their parents to help them in farming lands. Here one day survival is much important for them than getting education which they do not understand will provide them a long term help.

Also it is seen that small boys and girls travel to the working site near their village or some city for work as laborers, all these situation shows that acquiring knowledge is not so important for them. So here question arises where was the fault?. Whether in Government plan & policies, implementation, loopholes in administration, indifference towards them by our so-called civil society or disinterestedness of tribal's for education.

The objective of this research paper is to examine the condition of education system among the tribal's in Odisha with special reference to Mayurbhanj district. The data has been collected by interviewing the parents, teachers and students about their educational background, performance, attitudes and opinions of parents etc. . The Study conducted mainly in the village area of Samakunta Block of Mayurbhanj district, where it is found most of the pupils are studying in living with their parents and some few of them are residing in ashram schools and hostels.

It is seen that parents have much concern about their children education, they quite understand the importance of education for the child's future but some of hindrances like poverty, lack of suitable environment, illiteracy of the parents etc forces them not to continue the education. For the poverty- ridden parents education of their children is a luxury which they can hardly afford. Unavailability of electricity is also one of the reasons for their poor performance in education. Language is also a big obstacle to their education where they are sometime incapable to understand the teacher. As per the students English is too hard for them to understand. Despite of these problems students are full of hope to see their future in a better position. When they were asked about their choices, whether they will quit their education in a midway or continue with it, their answer is seems to very hopeful, that they have deep interest in learning.

When teachers were asked about the performance of their students they expressed in a inferiority manner that the tribal's students are poor in their education in comparison to the general students and reasons they showed for this were diseases like malaria, inexperienced teachers, non- availability of teaching aids, science equipments, library books etc.

## **Approaches towards Tribal Development**

Our great thinkers and anthropologists have provided three approaches for tribal development. Education is one of the way to their development or we can say the main tool of their overall success. Approaches means three main ideas that how should the tribal be treated in their way towards development. These three approaches are also called as three schools of thought.

1. Isolation ( Merrier Elwin)
2. Assimilation (GS Ghurye)
3. Integration ( Jawaharlal Nehru)

The third approach that is the policy of Integration came with the best and applied idea to deal with the tribal's. As per this idea tribals should be allowed to develop in all matters along with their respective culture. This idea is a part of Nehru's principle of 'Panchasheel'. One of the first point of panchasheel is tribal people should develop along the lines of their own genius and we should avoid imposing anything on them. We should try to encourage in every way their traditional art and culture.

So tribal education system must be in a way or manner so that while learning the mainstream culture they should not feel departs or cut from their own culture or tradition. One of the big hindrances to their education process is the lacking of educational environment. This kind of environment needed is parents must aware of the importance of acquiring education, such people can only guide and help them in the continuance and completing education of their children. Here the role of socializing agents is very much required for them to grow up to an establishing life. Here it will be wrong if we said educated parents can only help their children in completing their education, but very often it is seen very bright students sometime belongs to very poor background. By educational environment, the writer means to say, such healthy condition where the children can get encouragement, guidance, helping hand even from the illiterate parents. It is the responsibility of the parents to create such an healthy educational environment, to achieve this idea again it is the responsibility of our Government and civil society to encourage the parents on this behalf.

After this problem the tribal students faces the problem of language. The communication problem is one of the main obstacles behind their low performance in education. Tribal's have their own distinct language to speak which is also their identification in society. Language problem, when we are talking about education is a two-way problem, means while communicating, teachers also faces problem to make their students understand.

But now this problem have been solved in some of the tribal groups because of their own script, which they have started to teach in some of their schools. Yet this has not made any big difference to achieve the goal. So here what actually should be done is to teach both the teachers and the students about the language of each other. Knowledge about each other language develops familiarity between the students and the teachers. This kind of arrangement could be more help to the non- tribal teachers.

So these are some of the facts and experiences regarding the above mentioned topic which throws light on how to improve our mechanism to deal with education of tribal's. Improvement of the tribal is a community- based effort which will help to create a well-healthy educational environment.

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## **AHIMSA- ITS NATURE**

### **- A positive Virtue**

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### **ABSTRACT**

(Mohandas Karamchand Gandhi, fondly known as Mahatma Gandhi, was born on 2nd October, 1869, in Porbandar, a coastal town of Gujarat. His life has been an inspiration for millions of people in India and the world for over a century. Every year on 2nd October, his birth anniversary is celebrated in India with great favour as Gandhi Jayanti as he is revered as the 'Father of the Nation'. On 15 July 2007, the United Nations General Assembly passed a resolution to designate 2nd October every year as the International Day of Non-Violence as Mahatma Gandhi is regarded as the greatest icon of non-violence in the world. The resolution reaffirmed the universal relevance of the principle of non-violence for promoting a culture of peace, tolerance, understanding and non-violence. His principle of non-violence has inspired great leaders like Martin Luther King, who led the civil rights movement in the United States of America, and Nelson Mandela, who led the struggle against apartheid in South Africa. Therefore, on the occasion of the 150th birth anniversary of Mahatma Gandhi, it is appropriate to reflect on the significance and relevance of his life for the world today. In a world that has become more violent with wars, conflicts and various form of violence against women and other marginalized groups, Gandhi's teaching on non-violence is more relevant than ever before. He himself practiced non-violence and presented his life as an example for others to emulate. Gandhi was deeply influenced by the principle of non-violence (ahimsa) in Jainism. He considered non-violence as the highest ethical value to be observed by all living beings at all times. For him, non-violent resistance demanded courage of a high order, the courage to resist injustice without rancor, to invite suffering but not to inflict it, to die but not to kill. Mahatma Gandhi went on to adopt this non-violent principle to provide moral leadership to India's freedom

struggle, which posed a challenge to the might of the British Empire and resulted in the end of the colonial rule in 1947. It is ironic that this champion of 'non-violence' met with a violent death on 30 January, 1948, and those who inspired the assassination of Mahatma Gandhi have become the ruling elite in India today. Another aspect that characterized the life of Mahatma Gandhi was his pursuit of 'Truth'. His autobiography was titled "My Experiments with Truth". Initially, he believed that "God is Truth", but later he realized that "Truth is God". He believed that the most important battles in life is confronting one's own fears and insecurities. He called his political struggle '*Satyagraha*', which means "reliance on the Truth". Today, *satyagraha* continues to be the weapon of the weak to challenge the might of the powerful and speak truth to power.)

### **Non-violence in Individual and Collective Life**

we hold that non-violence is not merely a personal virtue. It is also a social virtue to be cultivated like the other virtues. Surely society is largely regulated by the expression of non-violence in its mutual dealing. What we ask for is an extension of it on a large, national and international scale.

In its positive form ahimsa means the largest love, the greatest charity. If I am a follower of ahimsa, I must love my enemy. I must apply the same rules to the wrong-doer who is my enemy or a stranger to me, as I would to my wrong-doing father or son. This active ahimsa necessarily includes truth and fearlessness. As man cannot deceive the loved one, he does not fear or frighten him or her. Gift of life is the greatest of all gifts; a man who gives it in reality, disarms all hostility. He has paved the way for an honourable understanding. And none who is himself subject to fear can bestow that gift. He must therefore be himself fearless. A man cannot then practice ahimsa and be a coward at the same time. The practice of ahimsa calls forth the greatest courage.

### **POWER OF NON-VIOLENCE**

With Satya combined with Ahimsa, you can bring the World to your feet. Ahimsa, truly understood, is panacea for all evils mundane and extramundane. Non-violence in its dynamic condition does not mean meek submission to the will of the evil-doer, but it means the pitting of one's whole soul against the will of the tyrant. Working under this law of our being, it is possible for a single individual to defy the whole might of an unjust empire to save his honour, his religion, his soul and lay the foundation for that empire's fall or its regeneration. It is a profound error to suppose

that whilst the law is good enough for individuals, it is not for masses of mankind. It is the acid test of non-violence that in a non-violent conflict there is no rancour left behind, and in the end the enemies are converted into friends.

#### **NON-VIOLENCE-THE LAW OF THE HUMAN RACE**

Non-violence is the law of the human race and is infinitely greater than and superior to brute force. The only condition of a successful use of this force is a recognition of the existence of soul as apart from the body and its permanent nature. And this recognition must amount to a living faith and not mere intellectual grasp. In the last resort it does not avail to those who do not possess a living faith in the God of Love. Non-violence affords the fullest protection to one's self-respect and sense of honour, but not always to possession of land or movable property, through its habitual practice does prove a better bulwark than the possession of armed men to defend them. Non-violence in the very nature of things is of no assistance in the defence of illgotten gains and immoral acts. Individuals and nations who would practice non-violence must be prepared to sacrifice (nations to the last man) their all except honour. It is therefore inconsistent with the possession of other people's countries, i.e., modern imperialism which is frankly based on force for its defence. Non-violence is a power which can be wielded equally by all-children, young, men and women or grown up people, provided they have a living faith in the God of Love and have therefore equal love for all mankind. When non-violence is accepted as the law of life it must pervade the whole being and not be applied to isolated acts.

#### **NON-VIOLENCE AND POLITICS- BASIC PRINCIPLE**

We could not be leading a religious life unless we identified ourselves with the whole of mankind, and that we could not do unless we took part in politics. The whole gamut of man's activities today constitutes an indivisible whole. You cannot divide social, economic, political and purely, religious work into water tight compartments. We do not know any religion apart from human activity. No man could be actively non-violent and not rise against social injustice no matter where it occurred. To practice non-violence in mundane matters is to know its true value. It is to bring heaven upon earth. There is no such thing as the other world. All world is one. We hold it therefore to be wrong to limit the use of non-violence to cave-dwellers and for acquiring merit for a favoured position in the other world. All virtue ceases to have use if it serves no purpose in every walk of life.

#### **Non-violence-Virtue of the Strong**

We do believe that where there is only a choice between cowardice and violence, I would advise violence. Our creed of non-violence is an extremely active force. It has no room for cowardice or even weakness. There is hope for a violent man to be

some day non-violent, but there is none for a coward. Non-Violence presupposes ability to strike. It is a conscious, deliberate restraint put upon one's desire for vengeance. But vengeance is any day superior to passive, effeminate and helpless submission. Forgiveness is higher still. Forgiveness is more manly than punishment. Forgiveness adorns the soldier. But abstinence is forgiveness only when there is the power to punish; it is meaningless when it pretends to proceed from a helpless creature. Non-Violence is without exception superior to violence, i.e., the power at the disposal of a Non-Violence person is always greater than he would have if he were violent. Man for man, the strength of non-violence is in exact proportion to the ability, not the will, of the non-violent person to inflict violence.

### **Satyagraha or Soul Force- The Law of Truth**

The term Satyagraha was coined by me in South Africa to express the force that the Indian there used for full eight years. Its root meaning is holding on to Truth. I have also called it Love-force or Soul-force. In the application of Satyagraha, I discovered in the earliest stages that pursuit of Truth did not admit of violence being inflicted on one's opponent. For what appears to be Truth to the one may appear to be error to the other. And patience means self-suffering. So, the doctrine came to mean vindication of Truth, not by infliction of suffering on the opponent, but on one's self. But on the political field, the struggle on behalf of the people mostly consists in opposing error in the shape of unjust laws. When you have failed to bring the error home to the law giver by way of petitions and the like the only remedy open to you, if you do not wish to submit to error, is to compel him by physical force to yield to you or by suffering in your own person by inviting the penalty for the breach of the law. Hence satyagraha appears to the public as civil Disobedience or civil Resistance. It is civil in the sense that it is not criminal.

### **Satyagrahi as Direct Action-How it Works**

It is a force that works silently and apparently slowly. In reality, there is no force in the world that is so direct or so swift in working. The hardest heart and the grossest ignorance must disappear before the rising sun of suffering without anger and without malice. And when once it is set in motion, its effect, if it is intensive enough, can overtake the whole universe. It is the greatest force because it is the highest expression of the soul. Since Satyagraha is one of the most powerful methods of direct action, a satyagrahi exhausts all other means before he resorts to Satyagraha. He will therefore constantly and continually approach the constituted authority, he will appeal to public opinion, educate public opinion, state his case calmly and coolly before everybody who wants to listen to him, and only after he

has exhausted all these avenues will he resort to Satyagraha. But when he has found the impelling call of the inner voice within him and launches out upon Satyagraha, he has burnt his boats and there is no receding.

### **TEN COMMANDMENTS OF SATYAGRAHA**

Satyagraha is utter self-effacement, greatest humility, greatest patience and brightest faith. It is its own reward. As a satyagrahi I must always allow my cards to be examined and re-examined at all times and make reparation if any error is discovered. Satyagraha is gentle, it never wounds. It must not be the result of anger or malice. It is never fussy, never impatient, never vociferous. It is the direct opposite of compulsion. A Satyagrahi may not even ascend to heaven on the wings of Satan. He must believe in truth and Non-violence as his creed and therefore have faith in the inherent goodness of human nature which he expects to evoke by his truth and love expressed through his suffering. A satyagrahi never misses, can never miss, a chance of compromise on honourable terms, it being always assumed that in the event of failure he is ever ready to offer battle. He needs no previous preparation; his cards are always on the table. A satyagrahi bids goodbye to fear. He is, therefore, never afraid of trusting the opponent. Even if the opponent plays him false twenty times, the satyagrahi is ready to trust him the twenty-first time, for an implicit trust in human nature is the very essence of his creed. It is never the intention of a satyagrahi to embarrass the wrong-doer. The appeal is never to his fear; it is, must be, always to his heart. The Satyagrahi's object is to convert, not to coerce, the wrong-doer. He should avoid artificiality in all his doings. He acts naturally and from inward conviction. The very nature of the science of Satyagraha precludes the student from seeing more than the step immediately in front of him.

### **Conclusion**

A satyagrahi must never forget the distinction between evil and the evil-doer. He must not harbour illwill or bitterness against the latter. He may not even employ needlessly offensive language against the evil person, however unrelieved his evil might be. For it is an article of faith with every Satyagrahi that there is no one so fallen in this world but can be converted by love. A satyagrahi will always try to overcome evil by good, anger by love, untruth by truth, himsa by ahimsa. There is no other way of purging the world of evil.



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## EMERGENCE OF GANDHI AS A NATIONAL POLITICAL LEADER, 1915-1919

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### INTRODUCTION

*Non-violence is not a garment to be put on and off at will. Its seat is in the heart, and it must be an inseparable part of our being—Mahatma Gandhi<sup>1</sup>.*

*When I despair, I remember that all through history the ways of truth and love have always won. There have been tyrants, and murderers, and for a time they can seem invincible, but in the end they always fall. Think of it—always—Mahatma Gandhi<sup>2</sup>.*

*Generations to come will scarcely believe that such a man in flesh and blood once trod upon this earth—Albert Einstein.*

The Indian national movement was certainly one of the greatest mass movements modern world has ever seen. It was also a famous multi-class movement that galvanized thousands of people from different ideologies into freedom struggle and brought to its knees a great imperial power. It was essentially the consequence of a basic conflict between the Indians' interest and that of the English colonialism. The Indian individuals could see that India was retreating economically and experiencing a procedure of underdevelopment. This anti-colonial ideology encouraged and increased the sentiment of nationalism among the Indian people. The development of modern nationalism is closely associated with the anti-colonial era in India, the same as in any other nation. During the period of their struggle with the British, people started showing their unity. Although every group or class of people felt that they were being persecuted under imperialism, the impacts of colonialism were felt in a different way. Mahatma Gandhi attempted to combine these groups altogether inside one movement under the Congress. Gandhi formulated and implemented his non-violent method of Satyagraha<sup>3</sup> in the freedom struggle rejecting all sorts of violence for the purpose of attaining freedom of India. But like anywhere else, unity did not come easily without facing conflicts. Therefore, what were the factors played a pivotal role in making Gandhi a national leader? What were the role Gandhi had played in the early stage of his political activism? And above all to what extent Gandhi's theory of Non-violence had contributed in assimilating all national forces at his initial stage of becoming a national leader? To answer these questions, I have chosen three important early activisms of Gandhiji which can be roughly put in a time bracket from 1915 to 1919.

### ***Gandhiji's Early Political Activity in India***

Gandhi was back in India, in 1915. A great reception awaited him in Bombay. Gandhi was overwhelmed by the great love shown to him by the people of India. Gokhale was in Poona and was in poor health, so Gandhi went to see him. He was received with great affection. Gandhi told Gokhale that his plan was to have an *ashrama* where he could settle down with his Phoenix family. They had already reached India and were at Santiniketan. Gokhale approved of the idea and promised whatever help he could give. Gandhi went on to Santiniketan and met Tagore for the first time and also C.F. Andrews who was there too. During his short stay at Santiniketan Gandhi heard the sad news that Gokhale had passed away. He immediately left for Poona. C.F. Andrews accompanied him as far as to Burdwan. At that time Andrews asked Gandhi that "a time will come for satyagraha in India? If so, how soon will it be?" Gandhiji replied 'It is difficult to say'. 'For one year I am to do nothing. Gokhale made me promise that I would travel in India for one year to gain experience, and that I would express no opinion until I had finished this period of probation. So, I do not think there will be any occasion for satyagraha for five years'.

### ***Banaras Speech***

In February 1916, Gandhi was invited to speak at the laying of the foundation stone of the Banaras Hindu University. The Viceroy and many of the most important people of India were there. Turning to the audience he said, 'I want to think audibly and speak without reserve.' His first words froze the audience. 'It is a matter of deep humiliation and shame for us,' he said, 'that I am compelled this evening under the shadow of this great college, in the sacred city, to address the shadow of this great college, in the sacred city, to address my countrymen in language that is foreign to me.' It was a bomb-shell. Nobody had ever dared to speak against the English language. But Gandhi went on, "His highness the Maharaja who presided yesterday over our deliberations spoke about the poverty of India. But what did we witness? A most gorgeous show an exhibition of jewellery. There is no salvation for India unless you strip yourselves of this jewellery and hold it in trust for your country men in India.' Gandhi gave a long speech, covering many topics. His speech was full of outspoken criticism. Mrs. Annie Besant, who was one of the organizers of the function, was horrified and urged Gandhi to sit down. But Gandhi went on. Some people went red with rage, but others listened to Gandhi with the greatest interest. 'Here at last is a man telling the truth,' they thought, 'he is the man to raise India from the mire.' They applauded him and shouted joyfully. Gandhi turned to them and said, 'No amount of speeches will ever make us fit for self-government. Finally Gandhi, the man who three times had supported the British in their war efforts, said, 'If I found it necessary for the salvation of India that the English should retire, that they should have to go, and I would not hesitate to declare that they would have to go, and I hope I would be

prepared to die in defence of that belief. The people were amazed at Gandhi's frankness. It was Gandhi's first great political speech in India.

### **Emergence of Gandhiji as a Political Leader**

The emergence of Gandhi played a pivotal role in the history of Indian Nationalism. The development of Indian Nationalism occurred in three separate phases. It was the third phase of Indian Nationalism that witnessed the rise of Mohandas Karamchand Gandhi, as the man who took the country by storm with his novel political ideologies centred on the cardinal principles of *ahimsa* and *satyagraha*.

Armed with these ideological tools Gandhi shouldered critical responsibilities in the momentous events that finally led India to the path of freedom. Gandhi's political ideals were merely an extension of his spiritual tenets, which were rooted in deep humanitarian values. Gandhi's greatness lies not only within pioneering a unique fervour in Indian politics and the rise of the masses, but in the way he revolutionized the entire way of looking at politics as an extension of mankind's inherent greatness, enriched with an innate belief in and commitment to truth. No wonder, he is revered as the Mahatma and has been immortalized as The Father of the Nation.

#### **i. The Champaran Satyagraha, 1917-The First Civil Disobedience.**

Now Gandhi heard about an obnoxious system of agricultural labour prevailing in Bihar. In the Champaran district, Bihar, the cultivators were forced by Europeans to grow indigo, a blue dye, and this imposed on them untold sufferings. They could not grow the food they needed, nor did they receive adequate payment for the indigo. Gandhi was unaware of this until an agriculturist from Bihar, Rajkumar Shukla, met him and told him of the woes of the people of Champaran. He requested Gandhi to go to the place and see for himself the state of affairs there. Gandhi was then attending the Congress meeting at Lucknow and he did not have time to go there. After getting repeated request from Rajkumar Shukla, Gandhi at last promised to visit the place. Gandhi went to Champaran with Rajkumar early in 1917. On his arrival the District Magistrate served him with a notice saying that he was not to remain in the district of Champaran but must leave the place by the first available train. Gandhi disobeyed this order. He was summoned to appear before the court. The magistrate said, 'If you leave the district now and promise not to return, the case against you will be withdrawn.' But Gandhiji declined all these orders.

He visited many villages. He cross-examined about 8,000 cultivators and recorded their statements. In this way he arrived at an exact understanding of their grievance and the causes underlying them. He came to the conclusion that the ignorance of the cultivators was one of the main reasons why it was possible for the European planters to repress them. Gandhi therefore set up voluntary organizations to improve the economic and educational conditions of the people. They opened schools and also taught the people how to improve sanitation.

The government realized Gandhi's strength and his devotion to causes. They themselves then set upon a committee to enquire into the grievances of the cultivators. They invited Gandhi to serve on that committee, and he agreed. The result was that within a few months the Champaran Agrarian Bill was passed. It gave great relief to the cultivators and land tenants.

Gandhi could not stay longer in Bihar. There were calls from other places. Labour unrest was brewing in Ahmedabad and Gandhi was requested to help settle the dispute.

**ii. The Ahmedabad Mill-Workers Satyagraha, 1918—First Hunger Strike.**

In Ahmedabad there were many textile mills. Prices had gone up and the mill workers were demanding higher wages. The mill owners would not agree. Gandhi sympathized with the workers and took up their cause. He launched a struggle and resorted to peaceful resistance. The workers proudly followed Gandhi and pledged their full support to him. They paraded the streets with large banners, and said they would not go back to work until a settlement had been reached. Days passed. The mill owners were adamant. The strikers were getting impatient for they were faced with starvation. Their discipline became weak. Gandhi feared that some workers would break their pledge and go back to work. That would be a great moral defeat. One morning he called the workers and said, 'Unless the strikers rally and continue the strike till a settlement is reached. I will not touch any food.' The workers were shocked. 'Not you, but we shall fast,' they said. 'Please forgive us for our lapse; we shall remain faithful to our pledge.'

Gandhi did not want anybody else to fast. His fast was not against the mill owners, but against the lack of co-ordination and unity among the workers. The fast lasted only for three days. It influenced the mill owners so much that they came to an agreement with the workers.

**iii. The Kheda Satyagraha, 1918-First Non-Cooperation.**

Hardly was the mill workers' strike over, when Gandhi had to plunge into the Kheda Satyagraha struggle. The Kheda district of Gujarat was on the verge of famine

owing to failure of the crops. The yield had been so low that the cultivators, especially the poorer section, were unable to pay the revenue. The crops have been generally less than four *annas* this year and so the collection of revenue ought to be suspended<sup>5</sup>. The available evidence goes to show that the crops do not exceed four *annas* in the district as a whole. But the government insisted that the yield had not been so bad and that the cultivators should pay the tax. Gandhi saw the justice of the cause of the cultivators and advised them to offer Satyagraha by not paying their taxes. Many leaders, like Vallabhbhai Patel, Shankarlal Banker, Mahadev Desai and others, took an active part in this struggle. The campaign came to an unexpected end. There had been signs that it might fizzle out, but after four months' struggle there came an honourable settlement. The Government said that if well-to-do cultivators paid up the poorer section would be granted suspension. This was agreed to and the campaign ended. The Kheda Satyagraha marked the beginning of an awakening among the peasants of Gujarat, the beginning of their true political education. In addition, it gave to the educated public workers the chance to establish contact with the actual life of the peasants

The Kheda peasant struggle is also known as *no-tax peasant* struggle. It was a satyagraha launched in March 1919 under the leadership of Gandhiji, Sardar Vallabhbhai Patel, IndulalYajnik, N.M. Joshi, ShankarlalParcekh and several others. It was again an experiment, quite like that of Champaran, made on non-violence. It was also participated by intelligentsia. Incidentally, the movement provided an opportunity to the educated public workers to establish contact with the actual life of the peasantry. The educated workers learnt to identify themselves with the peasantry and made themselves available for sacrifices.

The Kheda peasantry mainly consisted of the Patidar peasants. The Patidars have always been known for their skills in agriculture. The land of Kheda a part of central Gujarat is quite fertile for the cultivation of tobacco and cotton crops. Educationally also, the Patel cultivators are well-off. The struggle of the peasants was organised for several causes. However, a few important causes are given below:

1. The government reassessed the Kheda land and the cultivated crops. On the basis of land data, collected in this way, the revenue was increased. This was unacceptable to the peasants.
2. The peasants had suffered a famine and this had resulted in a large-scale failure of crops.

The Gujarat Sabha consisting of the peasants, submitted petitions and telegrams to the highest governing authorities of the province requesting for the suspension of the revenue assessment for the year 1919. But the officials maintained and rejected the popular demand for non-payment of tax. When the government

refused to consider the demands of the Kheda peasants for non-payment of land tax, Gandhiji exhorted the peasants to resort to satyagraha.

In some cases, the government removed the opium crop by alleging that it was without permission. This was considered to be a mischievous technique adopted by the government. The Patidar peasants and the intelligentsia developed its faith in satyagraha.

What is important about the movement was that it had created an awakening among peasants about their demands. On the other hand, they sought their involvement in the struggle for independence. The impact of the success was also realized among the peasants of Gujarat and the neighbouring states.

#### ***iv. The Rowlett Act, 1919-First Mass Strike.***

Britain and France were in a difficult position at the initial phase of the First World War. At the mean time the "Rowlett Committee" was formed to recommended the introduction of amendments to the criminal law. And provisions were made to imprison without trial i.e. any Indian could be arrested in the name of Defence of India during the war time. These recommendations startled Gandhi. There were agitations everywhere against Rowlett Committee's report. But the Government was determined to give effect to its recommendations, and in 1919 the Rowlett bill was introduced. When the bill was debated in India's Legislative Chamber. Gandhi had attended as a visitor. In spite of all opposition from national-minded people the bill was passed and it became law. Gandhiji being disappointed with this, went to Madras with Mahadev Desai met for the first time with C. Rajagopalachari. A small conference of leaders was held on the issue of Rowlett Bill.

It was also in Madras that Gandhi first conceived the idea of an all-India *hartal* as the beginning of the Satyagraha movement. The leaders at once took up the suggestion and gave much publicity to the forthcoming *hartal*. The date was first fixed for March 30, 1919, but was subsequently changed to April 6. The people had received only short notice for the *hartal*, but it turned out to be most successful. That was the great awakening of India in her struggle towards independence. Gandhi left Madras went to Bombay to join in the *hartal* there on April 6. Meanwhile in Delhi, Lahore, and Amritsar, the *hartal* had been observed on March 30. In Bombay the *hartal* was a great success. In some places violence replaced non-violence. There were violences in Ahmedabad and also in the Punjab and he decided to go to these places to propagate non-violence. On the way to the Punjab he was arrested at a wayside station called Palwal and sent back to Bombay.

The news of his arrest inflamed the entire population of Bombay. There was an enormous crowd awaiting his arrival there. When he reached Bombay, he was set free. The crowd greeted Gandhi with frenzied joy. A huge procession started but the police barred its progress.

### V. Jallianwala Bagh Massacre, 3 April, 1919

In the Punjab, a meeting was to be held in a garden called Jallianwala Bagh, to make a protest against the Government's actions. General Dyer reached the place soon after the meeting began and he took with him armoured cars and troops. Without giving any warning he ordered, 'Fire till the ammunition is exhausted.' The garden was surrounded by walls and buildings and had only one exit. At the first shot the exit was jammed and there was no hope of escape for the crowd. There were between six and ten thousand people there. The soldiers fired over sixteen hundred rounds into that unarmed mass of people. Once a garden, it was now a scene of merciless massacre. Hundreds of men, women, and children were butchered, though the official figures given were only 379 killed and 200 wounded. Leaving the wounded and dying on the ground, the troops marched away.

Gandhi went to Punjab on his arrival at Lahore railway station, Gandhi found that almost the entire population of the city was there waiting for him. The Congress had appointed a committee to enquire into the atrocities committed in the Punjab. On his arrival in Lahore he was requested to join the committee. He started a slow but methodical investigation of the incidents in the Punjab. Gandhi's report of the atrocities showed that efforts were being made by the government to shield certain persons. Gandhi was never interested in taking revenge on anybody but he was shocked at the way the Government sat silent when its own report was published. Gandhi was very much moved by the sufferings of the people in the Punjab. He knew the extent of the atrocities which had been committed on the defenceless people.

### CONCLUSION

By the close of 1920 Gandhi was the undisputed leader and head of the Indian National Congress. On August 1, 1920, in a letter to Lord Chelmsford, the Viceroy, Gandhi gave the signal for a non-co-operation campaign. Along with it he returned the *Kaiser-i-Hind* gold medal which had been awarded to him in 1915. In the columns of the *Young India* Gandhi wrote in detail in defence of non-violent non-co-operation. With other leaders he travelled extensively, addressing huge meetings and preaching the essentials of Satyagraha. Everywhere the crowds welcomed him with great love and enthusiasm. Again, and again he warned the people against violence. He abhorred mass fury. 'If India has to get her freedom by violence,' he said, 'let it be by the disciplined violence named war.' At the end of August, the Gujarat Political Conference passed a non-co-operation resolution, and a special session of the Congress was held in Calcutta on September 4 to 9. The draft of the non-co-operation resolution had been prepared by Gandhi.

The special Congress session adopted the non-co-operation plan as a means of attaining Swaraj. During the latter part of 1920 Gandhi advocated a triple boycott. He wanted an absolute boycott of the Government and all government institutions,



including schools, colleges, and courts.

On December 26, the Congress session was held in Nagpur. Though there were signs of opposition to Gandhi's policies his resolution was passed with an overwhelming majority. The adoption of the new programme at Nagpur was the signal to start the mass movement.

**Note :**

1. See, M K Gandhi, *The story of My Experiment with Truth*, Navjiban Publication, New Delhi, 2016.
2. Ibid
3. *Satyagraha*: The word Satyagraha is from the Sanskrit words *satya* (meaning "truth") and *Agraha* ("insistence", or "holding firmly to"). For Gandhi, Satyagraha went far beyond just "passive resistance" (resisting without taking action). His non-violence also became his strength. He said that he chose the name because Truth means Love, and Insistence means Force, and the Sanskrit name showed it was a force born from Truth and Love (non-violence). Source (Richard L., Johnson, *Gandhi's Experiments with Truth: Essential Writings by and about Mahatma Gandhi*, (Lexington: USA), 2006, p.73)
4. Rajkumari Sankar, *The Story of Gandhi*, Children's Book Trust, New Delhi, 1969, p. 65.
5. Speech of M. K. Gandhi at Nadiad, March, 22, 1918, The INC, Akbar Road, New Delhi.



## MAKING OF THE COMMUNIST PARTY OF INDIA IN ORISSA : A BRIEF HISTORY, 1936-1964

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### INTRODUCTION

First of all, I deem it necessary to brief here that, hardly any attempt has yet been made by the scholars of history as well as political science to produce a compendium on the history of the Communist Movement in Odisha.<sup>1</sup> Various factors may be summarized under this shortcoming. But, when I went through the primary records of various kinds, it became very much conspicuous that there existed a Communist movement, though in a super-flexibility manner, which could impact well the socio-economic polity of pre-Independent as well as post-Independent India. My personal observation needs to be elaborated here. Generally, there exists a pair of debate on the issue of the Communist movement in Odisha, which can broadly be categorized as the broader perspective and the narrow perspective. The broader perspective stretches the idea of existence of a strong communist-led movement, having its profound influence on the national movement for freedom, the *Prajamandal* movements, the peasants' movements, the workers' movements, students' movements and the women's movements. On the other hand, the narrow perspective, though, supports the prevalence of such an influence (of Marxist ideology) on the movements but argues a different connotation, that movement had a special characteristics of a very shallow, hazy and lukewarm way of organization. Here, my work differs from both the above arguments and my contention is, after going through a wide range of available literatures, that the Communist movement in Odisha itself has been puzzled and perplexed in between the two ideological and organizational setups, one, the Indian National Congress (INC) and other, the Communist Party of India (CPI) at the national level.

The birth of the Communist Party of India in two successive stages—first on 17<sup>th</sup> October, 1920 at Tashkent by M.N Roy and the second in December, 1925 at Kanpur by Satyabhakti, became the real background of the dissemination of the Marxist ideology across the country in general and in Odisha in particular.<sup>2</sup> The influence can best be marked with the publication of an editorial in the *Samaja*, on 02. 01. 1926, edited by Pandit Gopabandhu Das, an eminent Congress leader. The editorial of the *Samaja* reads thus;

The influence of the Communist Party is growing up day by day. The government has also kept a strong eye on it... It seems quite impossible to progress this ideology in a country like India. It has to pay a lot for its existence. If its ideology and practice has come in, by the instruction of god, to fit with the need of the hour, who can say, it will not alter the existing system governance in the society ?<sup>3</sup>

Hence, in the course of my research, I have picked up two most important assumptions corresponding to the editorial of the Samaja and these two assumptions is to be tested in the course of my work. Firstly, how and why Gopabandhu's imagination of foundation of the Party came into reality in 1936 i.e. after nearly ten years of publication of the editorial in 1926 and secondly, why couldn't it succeed to alter the existing system of governance in the body polity of Orissa?

The genesis of the Communist Party of India in Odisha was neither spontaneous nor an accidental affair. It was the culmination of long-drawn process that had started just after the end of the Civil Disobedience Movement.<sup>1</sup> Following the formation of the Congress Socialist Party (CSP) in Gaya session of the Indian National Congress, on 24<sup>th</sup> May 1934, the Odisha unit of the CSP was formed at Cuttack on 5 June, 1934<sup>5</sup>. The members of this unit were well trained and indoctrinated by a stretch of ideologies—from Marxism to Gandhism to Revolutionary Terrorism at Kashi Vidyapith.<sup>6</sup> With regard to give their ideological domain an organizational shape, they congregated to form a League known as the *Utal Samyavadi karmi Samgha* or the *Orissa Congress Communist Workers League* in Banaras<sup>7</sup>. Meanwhile, *as the Congress failed to meet the rising nationalist demands and the Communist Party was not formed, the destiny of peasant movement passed in to the hands of the Congress Socialists.*

The pre-natal stage of the Party was conceptualized, for the first time, at the resident of *Comrade Gurucharan Patnaik, one of the founding members of the Party*, in December 1936 at *Dagarpada, Khurdha*.<sup>8</sup> Bhagawati Charan Panigrahi was its first secretary.<sup>9</sup> Despite various prohibitive colonial laws, which had thwarted its organic growth, the party started working along with the CSP within the Congress for nearly four years from its inception. In other words, before the formation of the CPI in Odisha, all of the Communists had their membership in the CSP.<sup>10</sup>

If we look at the functional approach of the Party, it is very interesting to note that the mass contact for the CPI was made possible only because of its membership in the CSP as the CSP got this opportunity to be a part of the Congress. The opportunity for mass contact thus afforded was of incalculable value, and the label the Congressman gave the Communists unprecedented respectability and influence<sup>11</sup>. At Moscow Congress in 1935, the Communist International had adopted the "United Front Thesis" against Fascism and Nazism and this policy followed from 1935-1939.<sup>2</sup> During that time the Communists by taking the leadership of the peasants and tribal mobilization had strengthened their position in the Congress. By the end of 1938-39, the leftist trend in the Congress had increased significantly, but, very

interestingly, the radicals in the Congress did not even think to unseat the dominant Gandhian leadership which was very much divergence from the national politics.<sup>13</sup>

At the meantime, Jayaprakash Narayan, a veteran socialist leader of the CSP convened a meeting of the workers of the CSP, Orissa, at Cuttack in 1939 and proposed to break the CSP rank from within on the ideological ground. The one of the biggest consequences of the meeting was seen when the Communists were singled out of the CSP in 1939 (but continued to work till 1940) and finally expelled out of the CSP in 1940.<sup>14</sup> A permanent office of the Party was inaugurated on 9, August 1942 at Cuttack and Bhagavati Charan Panigrahi became its first secretary.

In the course of my work, I have found one important deviation on part of the party in Orissa. The party breaking away from its guiding principle of the CPI made an alliance with the Congress when the party at the Centre had adopted the "From Below Tactic". The very fact is that with the mounting danger of war against the USSR, the CPI concentrated its attack on the enemies of the socialist fatherland and thus, an alliance with all anti-imperialist forces, including the Gandhian leadership of the congress was made.<sup>15</sup> Even after the Nazi-Soviet non-aggression pact in August 1939, when the Russian and Comintern spokesperson clearly demanded the continuation of the "United Front Tactic", the CPI, departing from making an alliance with the Congress, adopted the "From Below Tactic" and attacked all other political leadership including the congress and other leftist as well. At the same time the CPI in the state very conveniently supported the Congress and its war principles. Pran Nath Patnaik observed that the Communists should follow the Congress guideline rejecting the "From Below Tactic" of the CPI. He was also one of the members in the Gandhian "Individual Satyagraha" in 1940 and was imprisoned in 1940.<sup>16</sup>

During the Quit India Movement, 1942, the character of the war for the Communists got changed. When the CSP taking part in the movement gave it a revolutionary turn by supporting the concept of class struggle and organized peasant movements on the basis of class, on the other hand the CPI at the initial stage supported the Gandhiji's call to "Quit India" but gradually started following the "People's War" policy of the Party at the national level. This naturally affected the growth and popularity of the Communist party for the time being.<sup>17</sup>

Despite all these shortcomings, the party in the elections of 1945-46, managed to defeat the Congress leader Md. Hanif from the labour constituency of Orissa. Baidyanath Rath, the leader of the AITUC, was elected to the Assembly from that labour constituency. This achievement was, however, very encouraging on part of the party because of its restricted franchise system. Only 14 percent adults enfranchised on the basis of property and income.<sup>18</sup> The work of the CPI, however, as a mild-dominating pressure group, started working in the Assembly since the general election of 1952.<sup>19</sup>

In the general elections of 1951-52, the CPI had negotiated less formal bilateral electoral agreements with the Forward Block (Marxist)<sup>20</sup> and could capture

only seven seats in the State Legislative Assembly of Orissa<sup>21</sup>. After the second general elections in 1957, Dr. Harckrushna Mahtab, the leader of the INC, formed the government with the support of nine Communist MLA's. Meanwhile, the general election, 1957, led the CPI to form of the Communist-led government in Kerala i.e. for the first time in the world that the Communists came to the power through electoral performances. Apart from this, in the midterm elections to the Orissa State Assembly in June 1961, only four members were elected. It seems that the party had to suffer a heavy loss as compare to the elections of 1957.

In 1962 the CPI had to suffer a great jolt for basically two reasons; the death of Ajoy Ghose in January 1962, and the Chinese Aggression in October 1962. These two successive reasons, however, destroyed the party completely from within. Similarly, the split of the Party at the national level in 1964 had its effect in the State too. The split had caused a greatest setback for the Communist movement in India in general and in the state in particular.

### CONCLUSION

Above all in the course of my study I came to know that the party had to bear a flexible ideological as well as organizational set up throughout the course of its politics. Basically, it was regulated by the Party's high command. Similarly, some of the national as well as the international issues had played a pivotal role in shaping the future of the party.

Hence, the present study focuses on how the Utkal Pradesh Communist Party or the CPI in Odisha utilized the background for mass mobilization prepared by the Congress and the CSP prior to its formation in 1936? How did it singled out of the CSP in 1939, though they had continued to work with the CSP on the Congress platform till they were finally expelled out in March, 1940? How and why did the party support the Congress and the Gandhian Individual Satyagraha of 1940 instead of following the "From Below Tactic" that the party had adopted at the central level? How the Communists were guided by the Gandhian principles of non-violence and joined the Quit India Movement of 1942? How the Communists supported the Congress government formed by Dr. H. K. Mahtab in 1957 and its legislative measures related to the land reforms in Odisha (Odisha Land Reforms Bill, 1959)? How and why did the party suffer in the third general elections, electing only four candidates to the floor of the Assembly? And how did it receive the effect of the split of 1964 at the national level?

### *Nature of Sources*

The proposed study uses both primary and secondary sources. Primary sources like the Proceedings of the Odisha Legislative Assembly, Home Political Files, Government of Odisha and party publications, newspapers, memoirs written by many of the leaders, letters, interviews with some of the veteran Communist leaders of the present days, reporting's of both national and regional field etc. would be scanned and used in the course of the study.

Similarly some of the government reports, before and after independence, available at the CPI and CPI(M) state offices, their publications available books in the Orissa State Archives, Dr H.K. Mahatab State Library, Bhubaneswar, Odisha State

Assembly Library, Dr Pranakrushna Prija Library, Utkal University, Odisha, ISCUF Library, Cuttack, Odisha, Bhagavati Bhavan, CPI Party Office, Bhubaneswar, Dr Ambedkar Library, JNU, P.C. Joshi Library, JNU, Nehru Memorial Museum Library, New Delhi, National Archives, New Delhi, and contemporary publications has been used and analyzed in proper historical perspective as the secondary sources with the help of proper historical criticism.

1. By the 113<sup>rd</sup> Constitutional amendments of 2011 the old name of the state "Orissa" has been replaced by a new one i.e. "Odisha".
2. E.M.S. Namboodiripad, *The Left in India's Freedom Movement and in Free India*. Social Scientist, Vol. 14, No. 8/9, Aug. - Sep., 1986, pp. 3-17. There are two conflicting dates regarding the birth of the Party. The secretariat of the CPI dates 1925 as the date because the party formed earlier in Tashkent and given consultative status at the Third Congress of Communist International, was not formed in Indian soil. Muzafar Ahmad, on the other hand, contends that it was formed in 1920 (the first stage of formation) because of the earnest efforts made by M.N. Roy. It was M.N. Roy, one of the active members in the formation of the party abroad helped the dissemination of Communist ideas in India through his letters, messages and articles etc. The contribution made by Roy helped in a big way to the second stage of formation of the CPI at Kanpur in 1925 and thus, the party was formally constituted in Indian soil.
3. *The Samaj*, Cuttack: dated., 2.01.1926.
4. Surendra Nath Dwivedi, *Quest for Socialism: Fifty Years of Struggle in India*, New Delhi: Radiant, 1984. p. 25. Mr. Dwivedi was a great Socialist leader in the state. He wrote after 1933-34 when Gandhian satyagraha reached a point of full many of the young minds started questioning themselves that how could they return their home without achieving purna swaraj? They felt that the Gandhian strategies had some inadequacies and was not enough to attract people's imagination. In order to maintain the continuity of the revolution, the revolutionaries must be determined and search for a new theory, prepare strategy and tactics to arouse people's enthusiasm. But it was Gandhiji's answer, after his tour to Odisha and a halt at Bhadrak (Jivaramji Kalyanji's Ashram), cleared many questions of the young minds. Asked about why did he stop the movement? Gandhiji retorted "It is wrong to say that it has been stopped. Our goal remains unchanged; our march is on. Only the nature of the nature of the work is changed. There is greater need for gathering more strength and support. Implementation of constructive programme for the sake of swaraj is a part of this march.
5. Gokul Mohan Raichudamani, "Odhisare Communist Party ra Janma" (Odia), in *Odhisare Communist Party ra Janma* ed., Pranath, Cuttack: 1985, pp. 4-5.
6. Abani Baral, *Gana Samgramara Mahanayak: Pranath* (Odia), Bhubaneswar:

Samghamitra, 2013, p.39. Gurucharan Patnaik, one of the founding fathers of the both the CSP and CPI, in a letter says that Kashi Vidyapith was a hub of terrorists to which he was greatly inclined for few times. It was also a common platform where Maxism started swelling day by day.

7. Sarat Patnaik, *Odisare Communist Party ra Adbhyudaya* (Odia), pp.4-5. The OCCWL was converted into the CSP after its formation in 1934 at the national level. 8. However, Dr. Biswamay Pati contends that the Party was formed in 1937
9. Pranatanth Patnaik, et al., *Odisare Communist Party ra Janma* (Odia), Cuttack: Navyug Granthalay, 1985, pp. 3-4. Before its formation, according to the organizational principle of the party it needed at least three members to start a provincial branch. Accordingly, Gurucharan Patnaik was the first to become the member of the West Bengal unit of the Communist Party of India in Sept., 1936. Later on Pranatanth Patnaik joined in it in Oct., 1936 and Bhagavati Charan Panigrahi in December 1936. All these three became the founding member of the Communist Party of India, Odisha branch, whose first meeting was held at Cuttack in Dec., 1936.  
The others whose effective leadership in this regard praise worthy were Sarat Patnaik, Prannath Patnaik, and Bhagabati Panigrahi. Bhagabati Charan Panigrahi became its first Secretary. He passed away on 23rd October 1943 and was succeeded by Sarat Patnaik and later on he was succeeded by Gurucharan Patnaik.
10. Following the Dut-Bradley thesis for a united front and Meerut meeting of the CSP in January, 1936 the CPI-CSP alliance at the national level was made. Hence, the communist minded young men in Odisha got a chance to become the members of the CSP (though the CPI in Odisha was not formed yet) since the CPI at national level was declared illegal. So it is rightly observed that the CPI penetrated freely into Socialist ranks and captured it. Sometimes, when disruption erupted between the two, CSP claimed that the CPI had gone too far to the right.
11. Gene D. Overstreet and Marshall Windmiller, *Communism in India*, Bombay: Perennial Press, 1959. P. 166.
12. Surendra Nath Dwivedi, *Quest for Socialism: Fifty Years of Struggle in India*, New Delhi: Radiant, 1984. P. 92.
13. In the state the radicals were greatly influenced by the Gandhian ideology. But, according to Gene D. Overstreet and Marshall Windmiller at the national level in the Congress presidential election in 1939 the radicals had seized the balance of power and seriously challenged the supremacy of the constructive Gandhian group, p. 168.

14. Amiya Patnaik, Proceedings of Odisha History Congress, XXVII, Annual Session, 2005, p. 204. Surendra Nath Dwivedi, Opcit, p. 92
15. *Ibid.*, p. 170.
16. Abani Baral, Ganasamgramara Mahanayak Pranatanath, Bhubaneswar, Samghamitra, 2013, p. 131. During that time Pranatanath Patnaik, being a Communist, was a MLA from the Congress and thus supported the Individual satyagraha of Gandhi and entered the Jail.
17. *Ibid.*, p. 94.
18. *Mr. Rath defeated his arch rival Md. Hanif, the Congress labour candidate and won the election.*
19. Gene D. Overstreet and Marshall Windmiller, Opcit, p. 474. At the end of 1950, the British Communist mentors counseled the party to resume legal operations and to prepare for the general elections to be held in 1951-52.
20. Gene D. Overstreet and Marshall Windmiller, Opcit, p. 475. The election turnover was quite fair. It managed to secure large representation in four states – Madras (62), West Bengal (28), Hyderabad and (42), Travancore-Cochin (32). It also won scattering seats in Assam, Bombay, Mysore, Odisha, PEPSU and the Punjab assemblies. Among the most significant results it could emerge the second largest party after the Congress. The Central Committee of the CPI had given four causes for its unexpected success-i) the party had done well where it had led mass struggle, ii) where it had succeeded in organizing peasant support, iii) and the united front tactics.
21. Who's Who, Odisha Legislative Assembly, Bhubaneswar, 1951-52.





## भारत में लैंगिक असमानता : दशा और दिशा

डॉ. प्रीतिरेखा स्वाई

हिंदी विभाग

पितृसत्तात्मक समाज दाहरे नैतिक मापदण्डों, मूल्यों एवं अन्तर्विरोधों की समझ व पहचान आज एक नये बहस को जन्म देता है, जैसे हम लौकिक असमानता कहते हैं। लैंगिक समानता का अर्थ यह नहीं कि समाज का प्रत्येक व्यक्ति एक ही लिंग का हो अपितु लैंगिक समानता का सीधा अर्थ समाज में महीला, पुरुष एवं किन्नरों के समान अधिकार, दायित्व तथा रोजगार के सु-अवसर प्रदान करना है।

‘Gender’ एक सामाजिक, सांस्कृतिक शब्द है। यह सामाजिक परिभाषा से संबंधित है जो समाज में पुरुषों, महिलाओं एवं किन्नरों के कार्य एवं व्यवहार को परिभाषित करता है। जबकि लिंग या ‘Sex’ शब्द आदमी या ‘औरत’ को परिभाषित करता है जो एक जैविक और शारीरिक घटना है। अपने सामाजिक ऐतिहासिक और सांस्कृतिक पहलुओं में लिंग पुरुष और महिलाओं के बीच शक्ति के कार्य से संबंधित है। जहाँ पुरुष को महीला श्रेष्ठ माना जाता है। इस तरह लिंग को मानव निर्मित सिद्धान्त माना जा सकता है। यह मानव की प्राकृतिक तथा जैविक विशेषता है। भारत जैसे बहुभाषी राष्ट्र में २२ राष्ट्र भाषाओं के बावजूद आज Gender के लिए उपयुक्त शब्द ढुंढा नहीं जा सका है।

प्राचिन भारतीय हिंदु कानून के निर्माता तथा आर्य संस्कृति के प्रथम पुरुष मनु जिनके संतान ‘मानव’ कहलाए ने कहा है - “स्त्री को बाल्यकाल में अपने पिता के अधीन, यौवन में पति के अधीन तथा वृद्धावस्था में अपने पुत्र के अधीन रहना चाहिये। यानि किसी भी परिस्थिति में वह स्वतंत्र नहीं है।

“विना आश्रयेण न बर्तने कविता बनीता जनाः।” के तर्ज पर स्त्री के अस्तित्व को हर बार नकार दिया गया है। धार्मिक ग्रन्थों संस्कृति तथा परंपरा के नाम पर स्त्री को परतंत्रता प्रदान की जाती है। समोन द वांडबार अपनी पुस्तक ‘द सेकेण्ड सेक्स’ में लिखती हैं, “साहित्य, संस्कृति, इतिहास व परंपराएँ पुरुषों ने बनाई है और अपने बनाए इस विधान में पुरुषों ने स्त्री को दोयम दर्जा दिया है।”

१८८ भाषाओं में लिखित ‘रामचरितमानस’ में तुलसी दास ने कहा :-

“ढोल गवार शुद्र नारी, यह सब ताडन के अधिकारी।” यानी स्त्री जो पूरे आवादी का आधा हिस्सा है, उसे ताडना से ही सही ..... जिसने लैंगिक असमानता को बढ़ावा दिया है। प्रसिद्ध

समाजशास्त्री सिलविया वाल्वे के अनुसार, “पितृसत्तात्मकता सामाजिक संरचना की ऐसी प्रक्रिया एवं व्यवस्था है, जिसमें आदमी औरत पर प्रभुत्व जमाता है। उसका दमन करता है और उसका शोषण करता है।” हमारे पितृसत्तात्मक समाज में अपनी बैधता और स्वस्कृति धार्मिक विश्वासों चाहे वह हिन्दु, मुसलीमा या अन्य कोई धर्म क्यों न हो, प्राप्त की है।

हमारे देश भारत में लिंग आधारित भेदभाव बहुत व्यापक स्तर पर काम कर रहा है। जन्म से लेकर मृत्यु तक, शिक्षा से लेकर रोजगार तक, मनोरंजन से लेकर खेलकुद तक हर जगह लैंगिक असमानता दृष्टिगोचर होता है। इस भेदभाव को कायम रखने में सामाजिक एवं राजनीतिक पहलु बहुत बड़ी भूमिका निभाते हैं। महिलाओं का समाज में निछला स्तर होने सबसे बड़ा कारण गरीबी और शिक्षा की कमी है। जिसके परिणाम स्वरूप महिलाएं कम वेतन पर घरेलु कार्य करने, वेश्यावृत्ति का कार्य करने या प्रवासी मजदूरों के रूप में कार्य करने के लिए मजबूर होती है।

२१ वीं शताब्दी में लड़का को शिक्षित करना आज भी एक बुरा निवेश माना जाता है क्योंकि शादी कर वह अपने ससुराल चली जाएगी। उच्च एवं अच्छी शिक्षा के अभाव में कौशल शिक्षा की शर्तें पूरी न कर पाने के कारण नौकरियों में उनका अनुपात पुरुषों से बहुत कम है। महिलाओं को खाने के लिए वही मिलता है जो परिवार के पुरुष सदस्य के खाने के बाद बच जाता है। समुचित और पौष्टिक आहार के अभाव में महिलाएं कई तरह के रोगों का शिकार हो जाती है।

विश्व आर्थिक मंच (World Economic Forum) 2017 के ग्लोबल जेण्डर गैप इंडेक्स में १४४ देशों सूची में भारत १०८ नंबर आता है। इस रैंक से साथ अंदाजा लगाया जा सकता है कि भारत में लैंगिक असमानता की जड़ें कितनी गहरी और मजबूत है। विश्व आर्थिक मंच के ताजा रिपोर्ट के अनुसार महिलाओं की आर्थिक भागीदारी, और अवसर, शैक्षिक उपलब्धियों, स्वास्थ्य एवं जीवन प्रत्याशा तथा राजनीतिक सशक्तिकरण के सूचकोकों में भारत का स्थान 87वाँ है। देश श्रमबल में महिलाओं की घटती भागेदारी और संसद में महिलाओं का ..... कम होता जा रहा है। जिसके फल स्वरूप जनसंख्या में असंतुलन पैदा हो रहा है। यही कारण है कि महिलाओं के विरुद्ध अपराध बढ़ रहे हैं। हरियाणा, पंजाब, राजस्थान जैसे राज्यों में लड़की को पैदा होने के तुरंत बाद ही दूध में डुबो कर मार दिया जाता है। और इसके विपरीत अपने वंशवृद्धि के लिए गरीब परिवार से लड़की को खरीद कर पुरा परिवार उसे निजार्तित करता है। वॉमेन ट्राफिकिंग की जड़ें भारत ही नहीं विदेशों में थी फैली हुई है। उज्जावाला (UJJAWALA) योजना भी इस स्थिति में विशेष सुधार नहीं ला पाई है। जब भी वह अपने खिलाफ हो रहे अत्याचारों के विरुद्ध आवाज उठाने की कोशिश करती है, तब कभी परिवार के नाम पर, कभी मर्यादा के नाम पर कभी धर्म और कभी समाज के नाम पर उसका मुँह बंद कर दिया जाता है। एक तरफ उसे दूर्गा, सरस्वती, लक्ष्मी के रूप

में पूजा जाता है और दूसरी तरफ समाज, परंपरा, संस्कृति, धर्म, मर्यादा के बंधन से उसे बाँध दिया जाता है, शिक्षा, मनोरंजन, खेल आदि क्षेत्र में उसकी दक्षता को अस्वीकार कर उसके अस्तित्व को नकार दिया जाता है। उसे त्याग की मूर्तिमान कर उसकी अभिलाषाओं की आहुती दे दी जाती है। पारिवारिक, सामाजिक, आर्थिक राजनीतिक हर स्तर पर उसका शोषण किया जाता है।

भारत में लैंगिक असमानता के खिलाफ संवैधानिक एवं कानूनी कदम उठाए जा रहे हैं। संविधान का अनुच्छेद 15 लिंग, धर्म, जाति और जन्म स्थान अलग होने के आधार पर किये जाने वाले सभी भेद-भावों को निषेध करता है। अनुच्छेद 15 (3) किसी भी राज्य को बच्चों एवं महिलाओं के लिए विशेष प्रधान बनाने के लिए अधिकारित करता है। संयुक्त राष्ट्र और भारत के साक्षेदारी में विभिन्न अभियान चलाए जा रहे हैं। दोनों देशों के बीच साझा प्रोग्रामिंग, जन समर्थन जुटाना, शोध एवं संवाद अंतर सरकारी प्लेटफॉर्म के जरिए लैंगिक समानता का समर्थन देने। और उसका निरीक्षण करना आदि कार्य शामिल है। युएन विसेन, युनिसेफ, युएनडीपी और युएनएफपी का उद्देश्य लिंग चयन और बाल विवाह के खिलाफ किये जानेवाले कार्य का समर्थन करना है।

जन समर्थन अभियान जैसे "He for SHE" और लिंग आधारित हिंसा के खिलाफ 16 दिनों का एक्टिविज्म (प्रत्येक वर्ष नवंबर 25 से 10 दिसम्बर) तक चलाया जा रहा है। संयुक्त राष्ट्र ..... Transforming India" ऑनलाइन अभियान शुरू किया है। SDW Sustainable Development for Women is 5 लक्ष्यों को पुरा करने के लिए सभी राज्यों ने सहमती जतायी है।

स्त्रियों एवं लड़कियों के साथ सभी तरह की हिंसा को समाप्त करना, जिसमें देह व्यापार एवं अन्य तरीकों का शोषण शामिल है।

उन सभी प्रथाओं एवं परंपराओं को खत्म करना जो स्त्रियों एवं लड़कियों के शारीरिक, मानसिक एवं यौन स्वास्थ्य को हानि पहुँचा सकती है।

घर पर स्त्री के काम को मान्यता तथा महत्व देना। सुने जाने के समान अवसरों और सभी राजनीतिक, आर्थिक एवं सार्वजनिक क्षेत्रों में उनकी भागीदारी के वास्तविक अवसरों को हासिल करने के लिए स्त्रियों एवं लड़कियों को प्राप्ताहित करना।

स्त्रियों के प्रजनन और यौन स्वास्थ्य के अधिकारों को सुरक्षित करना।

लैंगिक समानता को सुनिश्चित करने के लिए नीतियों और कानूनों को बढ़ावा देना।

परंतु जमीनी हकिकत तो यह है कि सारे प्रावधानों संवैधानिक सुशासनात्मक व्यवस्था के बावजूद पूरे विश्व की आधी आवादी आज दोगुने दर्जे की नागरिक है। महिलाओं पर अत्याचार

आज खतरनाक स्तर पर है। दहेज प्रथा आज भी प्रचलन में है और कन्या भ्रूणहत्या आज आदर्श है।

समानता एक सुंदर और सुरक्षित समाज की वह नींव है जिस पर विकास रूपी इमारत बनाई जा सकती है। सिक्के की दो पहलुओं की तरह पुरुष और स्त्री समाज के दो पक्ष हैं। पुरुष प्रकृति है तो स्त्री शक्ति है। जितना आसान स्त्री पर व्यंग करना या उपहास उड़ाना है, उतना ही कठिन स्त्री होना है। जितना आसान पुरुष को कठोर और हिंसात्मक कहना है, उतना मुश्किल पुरुष होना है। क्या स्त्री, स्त्री हो सकती है पुरुष के बिना और क्या पुरुष पुरुष हो सकता है स्त्री के बिना। एक का अस्तित्व दुसरे से है। एक की सार्थकता दुसरे से है। एक दुसरे से .... नहीं बल्कि एक दूसरे के प्रति सम्मान और आदर में ही सशक्त समाज की नींव छुपी है। पुरुष को पुरुष से बेहतर बनने का प्रयास एवं स्त्री को स्त्री से बेहतर बनने की कोशिश करना भारतीय संस्कृति है। यही अर्धनारीश्वर की संकल्पना है। यही शक्ति है और यही इस लैंगिक असमानता से मुक्ति भी है।

लाजमी है दोनों का एक दूजे की तरह होना  
मुझ में कुछ तेरा होना तुझमें कुछ मेरा होना  
मेरा पुरुषत्व जब संहार करे,  
मेरा स्त्रीत्व तुझे संभाले।  
मेरा स्त्रीत्व लाचार हो तो तेरा पुरुषत्व मुझे संभाले।

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