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"ESTIMATION OF BIOMASS FROM THE TERRESTRIAL WEEDS."

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ABSTRACT:

Terrestrial weed biomass form a free crop of great potential value and highly productive crop that require no tillage, fertilizer, seed collection or cultivation. The weed biomass is an open treasure for plant's which can be used as a nutrient sources. Primary productivity of an ecological system to one rate of energy conservation from the radiant form to the chemical bonds of organic substances. This result in increase in weight in this method biomass was estimated by harvesting the plants from known areas at periodic intervals and dried in an oven to constant weight. Biomass also improve soil quality by adding organic matter and for some species fixing nitrogen. The dominant terrestrial weeds as Achyranthes aspera, Crotolaria notonii, Cassia Tora and Tephrosia hamiltonii, were selected for the study.

Three sites were selected at three different places in the grassland as shady, moist and dry. A quadrate of 30 x 30cm. i.e., 900sq.cm was laid down. The plant material was collected in a polythene bag with a tag of quadrat number. The same procedure was repeated for dry and shady places. The polythene bags were brought to the laboratory. The plant material was washed and cut into small pieces.

On the basis of result obtained, it can be concluded that the increase in aerial weed biomass kg/ha and total dry matter weed biomass kg/ha is more in all the three condition in plants Tephrosia hamiltonii then Cassia tora as moist, dry and shade condition. There is least increase in Achyranthes aspera in all the three conditions as shade, moist and dry condition, followed by Crotolaria notonii.

KEYWORDS: *potential value and highly productive crop , dominant terrestrial weeds.*

INTRODUCTION

Nature warns human beings that they must maintain to live in harmony with 'nature'. Relationship between environment, body and life is the theme of ecology and this was very well known to the Indian sages of the past though evidence of systematic development of ecology as a science was lacking.

Praphan Prasertsak (2005), Studied that high biomass production can be produced potentially particularly in the tropical environment like Thailand and some other countries in Asia. Using inter-specific conventional cross to develop new high biomass varieties and also the varieties that well adapted to adverse conditions (drought, salinity and etc.) is necessary.

Presently information reliable on the extent and spatial distribution of grasslands just approximation based, upon the geographical/ environmental relationship of grasslands. Thus there is an immediate need to further information with respect to grasslands biome. Primary information for planning, management of the grassland require information with respect to the potential areas and their statistics (Hall and Overend, 1987).

Structure and development of vegetation and the manner in which these are affected by the factors of the environment should be studied with same care and thoroughness as individual plants. Vegetation readily response to changes in the habitat. If the habitat become wetter or drier,

better or more poorly lighted etc. Certain species and often while groups of plants disappear and are replaced by others. Similar changes occur when vegetation is repeatedly moved, grazed, burned or cut as in lumbering. In the adjustment to be modified environment the entire composition and structure of the vegetation may be altered such changes are not only of much scientific interest but are also frequently of great economic importance (Chahal, 1991).

Mycorrhizal infection may also increase the rate of nodulation and N-fixation by rhizobium in leguminous plants (Akobsen and Jensen, 1992). Increased biomass production by VAM inoculated-plants has also been reported (Mosses and Hayman, 1971; Taiwo and Adegbite, 2001). They obtained highly significant correlation between dry matter production and percent mean infection of mycorrhizal plants relative to non-mycorrhizal plants. VAM infection has also been shown to improve water relations to *Faidberbia albida* seedling (Osinubi *et al.*, 1992) and weed cover (Atayese and Laisu, 2001).

"The quantum of dependence of human beings on natural resources, the narrowing resource base and the immediate need for conserving and managing them are much discussed topics today. This study is essential for developing environmentally sound and efficient technologies, it is said that, saving a tonne of biomass through efficient technologies, is cheaper, than growing a new tonne of biomass to sustain inefficient technologies (Shailaja and Sudha, 1997).

BIOMASS:

Biomass can be defined as the weight of all the living organisms in a green population, area, volume or other units being measured. Quite often, biomass is considered as the weight of dry matter of living organisms (phytomass for plants and zoomass for animals) at any given time per unit area.

Plants that were difficult to be identified in the field were later identified with the help of texts and bulletins, handbooks such as *Flora of West Africa* (Hutchinson and Dalziel, 1954) and *Your Guide to identifying some Arable Land Weeds of South Eastern Agricultural Zone of Nigeria*, (Ray P.A. Unanma, 1982).

The relatively lower N recovery rate from the tithonia biomass could partially be attributed to the lack of synchrony between N demand by the maize crop and the N released by the decomposing biomass (Mugendi *et al.*, 2006). Other researchers working on different N sources (organic inputs and synthetic inputs) also reported a percentage N recovery ranging from 25% to 111% (Westerman *et al.*, 1972; Kruijs *et al.*, 1988; Gachengo *et al.*, 1999; Rees and Castle, 2002).

Praphan Prasertsak (2005), Studied that high biomass production can be produced potentially particularly in the tropical environment like Thailand and some other countries in Asia. Using inter-specific conventional cross to develop new high biomass varieties and also the varieties that well adapted to adverse conditions (drought, salinity and etc.) is necessary.

Biomass production and utilization need to be sustainable in term of soil, water and environment. Due to high biomass was harvested, large amounts of nutrients would be removed from the field and would result in soil fertility degradation. So the analysis of nutrient balance in the field is necessary. To sustain the high biomass production, the development of technologies for soil quality improvement such as soil amendment, mulching and sub soiling is important.

Natural resources specially the living resources also called as bio-resources or biomass resources, are important renewable resources. That is they have the capacity to regenerate and therefore can function as a resource base for an indefinite period of time if used with care and caution (OECD, 1984).

Plant biomass provides the primary energy source and acts as the foundation for all life forms. It is an important and measure source of food, fodder for the live stock, timber for housing and furniture and many other products needed for human existence.

BIOMASS USE WILL PRODUCE ECONOMIC BENEFITS:

Weed biomass form a free crop of great potential value and highly productive crop that require no tillage, fertilizer, seed collection or cultivation. The weed biomass is an open treasure for plant's

which can be used as a nutrient sources. Primary productivity of an ecological system to one rate of energy conservation from the radiant form to the chemical bonds of organic substances. This results in increase in weight in this method biomass was estimated by harvesting the plants from known areas at periodic intervals and dried in an oven to constant weight. Biomass also improve soil quality by adding organic matter and for some species fixing nitrogen. The dominant terrestrial weeds as *achyranthes aspera, Crotolaria notonii, Cassia Tora* and *Tephrosia hamiltonii,* were selected for the study.

Surface litter accumulates between biomass crops this litter protects the soil surface from rain thus reducing erosion when planted parallel to riverbanks as interceptor strips, energy crop can decrease sediment runoff and deposition in rivers and streams and reduce overland water flows that cause riverbank erosion (Hall and Scase, 1998).

Materials And Methods (The quadrat):-

Primary productivity refers to the rate of energy conservation from the radiant form to the chemical bonds of organic substances. This results in increase in weight. In this method biomass is estimated by harvesting the plant from known areas at periodic intervals and dried in an oven to constant weight.

Three sites were selected at three different places in the grassland as shady, moist and dry. A quadrate of 30 x 30cm. i.e., 900sq.cm was laid down. The plant material was collected in a polythene bag with a tag of quadrate number. The same procedure was repeated for dry and shady places. The polythene bags were brought to the laboratory. The plant material was washed and cut into small pieces.

"Estimation Of Biomass From Following Dominant Terrestrial Weeds"

Parthenium hysterophorus *Crotolaria notonii* *Cassia tora* *Tephrosia hamiltonii*

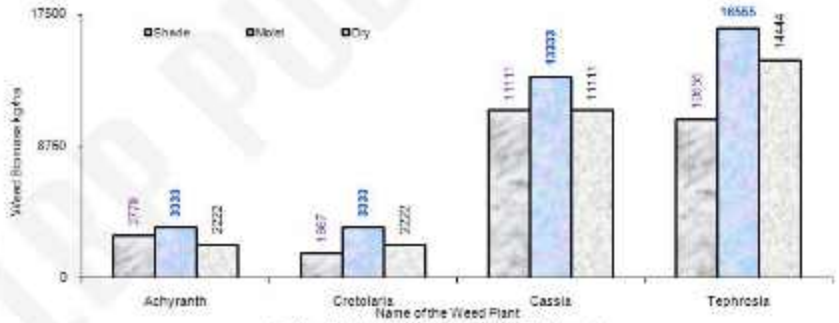

Fig 1 - AERIAL WEED BIOMASS KG/HA [12 August]

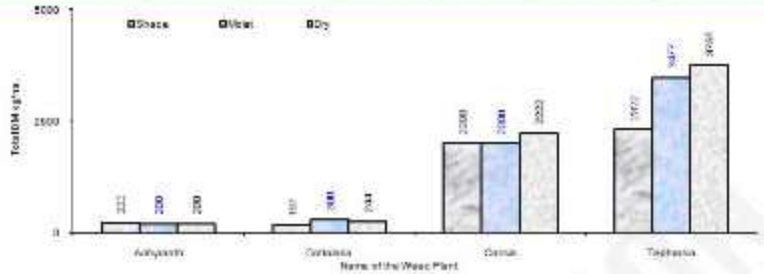

Fig. 2 - TOTAL DM OF WEED BIOMASS Kg/ha (12 August)

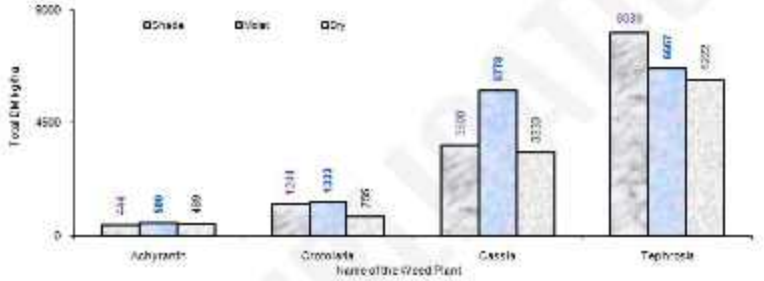

Fig. 3 - TOTAL DM OF WEED BIOMASS Kg/ha (22 September)

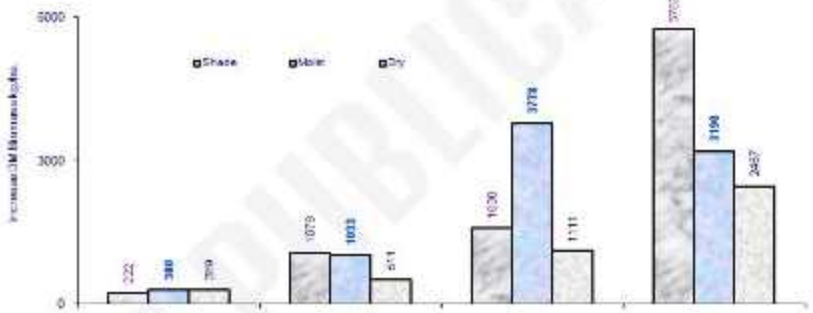

Fig. 4 - INCREASE IN DRY MATTER OF WEED BIOMASS (41Days)

RESULTS AND DISCUSSION :

The productivity of the weed plants depends upon the type of plants, ecological condition and age of the plant. In this experiment sampling was done in the month of August and September.

Tephrosia hamiltonii grown in moist had shown the maximum increase in the yield followed by again *Tephrosia hamiltonii* grown in dry condition and then in *Cassia tora* grown in moist condition. *Tephrosia hamiltonii* had given the highest productivity followed by *Cassia tora* and then *Achyranthes aspera* and lastly *Crotolaria notonii*. However the increase in dry matter % was highest in *Cassia tora* followed by *Crotolaria notonii*, then *Tephrosia hamiltonii* and *lastly Achyranthes aspera*.

CONCLUSION :

On the basis of result obtained, it can be concluded that the increase in aerial weed biomass kg/ha and total dry matter weed biomass kg/ha is more in all the three condition in plants *Tephrosia hamiltonii* then *Cassia tora* as moist, dry and shade condition. There is least increase in *Achyranthes aspera* in all the three conditions as shade, moist and dry condition, followed by *Crotolaria notonii*.

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12. Impact of Covid-19 on Primary to Higher Education in India

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Abstract

The bad impact of pandemic COVID-19 is not only observed in India but also created severe problems around the world, this is the most vulnerable incident for humanity in our lives and we face it in each and every sector and places. This Pandemic stopped around all educational activities partially or permanently in India. The education sector has been fighting to survive with the threat of the pandemic in which the field of primary to higher education it was very crucial for the institutions to grow and adopt new platforms and techniques not been used before. This paper highlights both the positive and negative impacts of COVID-19 on primary to higher educational activities during this time of pandemic situations.

Keywords: Impact, Covid-19, Primary - higher education, pandemic.

Introduction

In India, the first affected case of Covid-19 was detected on 30 January 2020 in the state of Kerala. On March 11, 2020 World Health Organisation (WHO) declared Covid-19 as a pandemic. In India, the first death was reported on March 12, 2020, the Government of Maharashtra closed School, Colleges and universities on 17, March 2020 and the nation observed Janta Curfew for a day on March 22, 2020, again observed 14 hours Janta Curfew on March 24 then, the 1st phase of lockdown was announced by the Prime Minister on March 25, 2020.

Government of India has been extending the lockdown period in different phases, all the phases of lockdown starting from lockdown to till now, the educational institutions throughout the nation have never got any relaxation to start their primary to higher educational activities. Thus, pandemic Covid-19 impacted significantly on the education sector.

Recent figures released by the UNESCO indicate that the covid-19 pandemic has affected almost 1.37 billion students across the world, this comprises 90% of all enrolled students in

around 138 countries, this could be the biggest crisis faced by the mankind over the past century. An effective strategy it is necessary to minimize the adverse impact of the pandemic.

In India primary to higher education Institutions, the crisis has impacted on new admissions, student mobility, examinations, student internships and placements. The Association of Indian universities has undertaken several initiatives to support member universities to minimize the impact of covid-19 these include online faculty development training for online teaching, national and international webinars, leadership talks and online workshops on themes such as assessment and evaluation, and fostering social responsibility among others, An online survey of HEIs is also being conducted to gauge the preparedness of Indian HEIs for online teaching. Most Governments around the world have temporarily closed educational institutions in an attempt to control the spread of the pandemic Covid-19. This worldwide closure has impacted drastically the world's student population.

Governments of India are making efforts to diminish the immediate impact of closure of educational schools and institutions particularly for more vulnerable and disadvantaged communities and trying to facilitate the continuity of education for all using different digital modes of learning. According to a survey report of the Ministry of Human Resource Development (MHRD), Government of India, conducted on higher education it was observed that there are 993 universities, 39931 Colleges and 10725 stand-alone institutions listed on their portal, which contribute to education (DNS Kumar, 2020). Even though the country has been adapting to the new-age learning, but there still lies an obstacle in achieving entire success as only 45 corer people of our total population of the country have access to the internet/e-learning. The people residing in rural areas are still very much deprived of the technologies and therefore hampering the cause of online education. The Covid-19 pandemic taught the entire society on how necessity is the mother of invention by allowing educational institutions to adopt online learning and introduce a virtual learning culture. The pandemic has been steering the education sector forward with technological innovation and advancements. The pandemic has significantly disrupted the Primary to higher education sector. A large number of Indian students who are enrolled in many Universities abroad, especially in worst affected countries are now leaving those countries and if the situation persists, in the long run, there will be a significant decline in the demand for international higher education also.

Objectives

1. Highlight the impact of Covid-19 pandemic on primary to higher education.
2. Enlist various emerging approaches of India for primary to higher education.
3. concluding remarks on primary to higher educational activities facing the challenges created by Covid-19 pandemic.

Methodology

Information are collected from actual experience when working and faced problems as a leading officer (pathkpramuk) in lockdown, different authentic websites, journals and e-contents relating to impact of Covid-19 on educational system of India. Various reports of national and international agencies on Covid-19 pandemic are searched to collect data for current study.

Impact on primary Education

COVID-19 has had an unprecedented impact on school education. It has affected a large number of children across states, class, caste, gender and region. The shutting down of schools and the decision of shifting traditional classrooms to digital platforms is not only increasing learning inequality among children, but also pushing a large number of children out of school due to the digital divide. Other than learning, the absence of schooling would also have a long-lasting effect on the health and nutrition of children. The role of the budget in the current situation as well as beyond the pandemic is very crucial to ensure inclusive education for all. This policy brief highlights some of the issues associated with school closures which need immediate attention. COVID-19 has created an opportunity for governments to learn valuable policy lessons to deal with such situations and also to revamp the system so that it is better equipped to deal with them. In this context, the policy brief has also put forward a set of long-term measures that the government should implement in the due course of time.

Impact on Higher Education

Pandemic Covid-19 has severely affected the total educational system of India as well as the globe Many challenges are created by Covid-19. The HEIs have responded positively and adopted various strategies to face the crisis during the pandemic. The Government of India has also taken number of preventive measures to prevent spread of pandemic Covid-19. The MHRD and University Grants Commission (UGC) have made several arrangements by lunching of many virtual platforms with online depositories, e-books and other online teaching/learning materials, educational channels through Direct to Home TV, Radios for students to continue their learning.

During lockdown, students are using popular social media tools like WhatsApp, Zoom, Google meet, Telegram, You tube live, Face-book live etc. for online teaching learning system. ICT initiative of MHRD (e-Broucher- https://mhrd.gov.in/ict-initiatives) is also a unique platform which combines all digital resources for online education (Pravat, 2020a). UGC has released Guidelines on Examinations and Academic calendar in view of COVID-l9 pandemic and sub sequent lockdown on 29th April, 2020 (UGC notice). All terminal examinations have been postponed and shifted to July 2020 and suggested commencement of classes from August 2020. UGC has also prepared complete calendar for the academic session 2020-2021with new dates keeping in view of the lockdown. Some of the digital initiatives of UGC & MHRD for higher education during COVID-19 are as Swayam provides Massive Open Online Courses (MOOCs) with 140 universities, e-Adhyayan (e-Books), e-Pathya (Offline Access), e-GyanKosh (http://egyankosh.ac.in/), e-PG Pathshala (https://epgp.inflibnet.ac.in/), e-ShodhSindhu (https://ess.inflibnet.ac.in/), e-Yantra (https://www.e-yantra.org/), FOSSEE (https://fossee.in/), Gyandarshan (http://www.ignouonline.ac.in/gyandarshan/), Gyandhara (http://ignouonline.ac.in/Gyandhara/), National Digital Library of India (NDLI) (https://ndl.iitkgp.ac.in/), National Educational Alliance for Technology (NEAT) (https://neat.aicte-india.org/), Shodhganga (https://shodhganga.inflibnet.ac.in/), SAKSHAT (https://sakshat.ac.in/). VIDWAN (https://vidwan.inflibnet.ac.in/), Virtual Labs (http://www.vlab.co.in/),

Enlist various emerging approaches

1. Covid-19 has forced the human society to maintain social distancing. It has created more challenges to continue teaching learning by maintaining social distancing. To meet these challenges there is more demand for open and distance Learning (ODL) and online modes of education and the same trend may continue in future also.
2. Covid-19 has accelerated adoption of digital technologies to deliver education and encouraged the educational institutions to move towards blended mode of learning. All teachers and students became more technology savvy.
3. Students may encourage personalized learning; pursue their learning in the new paradigm as per their choice.
4. Many schools, Colleges and universities have been closed and are delivering all educational activities online.

5. Students will use internet technology to communicate virtually with their teachers and fellow learners through E-mail, WhatsApp, Video conference, Instant message, webinar or any other tool.
6. Learners from low-income families and disadvantaged groups are the more likely to suffer as they may not afford high-speed internet connection and required technical gadgets for online learning.
7. Invisible restrictions constraint the fun & joy of campus life. Sports, Gyms, tournaments.
8. The needs for social distancing imply lesser students in each class. So, most of the educational institutions work in different shifts per day which put more pressure on the teaching and administrative staff of the institution to manage.
9. Examination and evaluation activities are made simpler; the academicians would be able to concentrate more on course development, qualitative teaching-learning and skill development.
10. In India, lots of students or their parents take education loans for higher education. If the employment market does not pick up, student debt crises may rise and create serious issue. Students may face increased stress, anxiety and depression due to their student loans.

Conclusion

This study has outlined various impacts of Covid-19 pandemic on primary to higher education in India. UGC and MHRD have lunched many virtual platforms with online depositories, e-books and other online teaching/learning materials. This would involve upgrading the service platform to enable it to meet the required volume of educational demands of students. Combination of the traditional technologies (radio, TV, landline phones) with mobile/web technologies to a single platform with all depositories would enhance better accessibility and flexibility to education. Education with widely accepted online education or virtual education which may perhaps be a parallel system of education.

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INSECTICIDE DIMETHOATE INDUCED TOXICITY AND ALTERED PROTEIN CONTENT IN FRESHWATER FISH, *PUNTIUS TICTO* : A BIOCHEMICAL ASPECTS

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ABSTRACT : The last three decades, use of modern organic synthetic pesticides has increased in agriculture sector in order to improve crops yield with low labour and effort. Various pesticides such as insecticides, herbicides, fungicides etc. are being used intensively in agriculture leading to numerous health-related problems due to unsystematic applications of the same. These chemicals influence almost every system of environment especially aquatic ecosystems. Pesticides residues reach into the aquatic environment by surface run-off causing risk hazards for aquatic flora and fauna, fishes being one of the most affected organisms. These pesticide residues enter in non-targeted animals via food chain threatening the ecological balance and biodiversity of the nature. Long-term exposure of dimethoate induces biochemical changes in the protein content of fish.

Dimethoate is widely used insecticide that relentleely causes toxic effects in the various aquatic organisms especially in fishes. The effect of dimethoate on certain metabolism of protein was evaluated in the liver, gills and muscle of the *Puntius ticto* during sub lethal toxicity exposure to 30 days. The present findings suggest that accumulation of dimethoate critically altered the protein content in the liver, gills and muscles of *Puntius ticto*.

Key words : Insecticide, dimethoate, fish, biochemical, protein.

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INTRODUCTION

Fish constitutes a valuable commodity from the point of view of human consumption. Aquatic pollution undoubtedly has direct effects on fish health, reproduction and survival. Pesticides are regarded as serious pollutants of the aquatic environment because of their environmental persistence and tendency to be concentrated in aquatic organisms.

Proteins are the important biopolymers of great interest and importance. They play not only a key role informing and maintaining the structure of the cell but also as enzyme and hormones that catalyze numerous reactions and integrate the body functions.

The major metabolites are namely protein, fat and carbohydrates etc. They are prime important to determine nutritive value of fish. Occurrence of polluted water bodies has exposed biota and particularly fish to an unlimited extent of danger. Therefore, it is necessary to evaluate nature and extent of alterations in metabolites of fish.

A change in biochemical constituents in fish gives an indication, help to understand the type of pollutants and its mode of action. Despite the facts, like other living organisms, fish also has its own detoxification mechanism to encounter the toxic effects; however, if the toxic substance enters in the body, certainly damage and weaken the mechanism concerned. The damage may be at cellular or molecular level, but ultimately it will lead to

physiological, pathological and biochemical changes.

In fishes, biochemical changes are induced by the pollutant, before they acquire drastic cellular and systematic malfunctions. Since fishes are important sources of protein; it will be more rewarding to have a thorough understanding of pesticide effects in fishes, in order to improve fish conservation and fishery development. In India few attempts have been made to study the mode of action of pesticides, their involvement in physiological disturbances, biochemical changes and histopathological abnormalities.

Abdelmeguid *et al* (2002) observed histochemical and biochemical changes in liver of *Tilapia zalii* as result of water pollution. Shobha Rani *et al* (2000) observed decline in glycogen and glucose level in various tissue of *Tilapia mossambica* during sodium arsenate intoxication. Durga and Veeraiah (2002) studied the effect of cypermethrin on protein metabolism of the fish, *Labeo rohita* and observed that the total protein level decreased in all the tissues tested where as the free amino acid levels were increased. Rawat *et al* (2002) observed uninterrupted decreased in the glycogen content with increase in the concentration and exposure period in *H. fossilis* to endosulfan.

Khare and Singh (2002) reported steady decline in protein content in the gill of *Clarias batrachus* exposed to malathion. Shinde *et al* (2002) observed decrease in the lipid, protein, and cholesterol content in ovaries of *Notopterus notopterus* after exposure of heavy metal. Seth and Saxena (2003) observed harmful biochemical effects of fenvalerate at sublethal concentrations in fish, *Channa punctatus*. Mushigeri and David (2004) observed the effect of fenvalerate on biochemical contents in freshwater fish, *Cirrhinus mrigala*. Ghanbahandur *et al* (2005) observed the effect of nuvan on protein contents of gill, liver in the fish, *Rasbora daniconius*. Patil and Nanaware (2005) observed the effect of phytotoxin on the biochemical constituents of freshwater fish, *Cyprinus carpio*. Abdul Naveed *et al* (2006) studied on toxicity of lihocin on the activities of glycolytic and glycogenic enzymes of fish; *Channa punctatus* and observed that the level of glycogen and pyruvate declined while glucose and latic acid levels increased. Ramesh and Sarvanan (2008) observed decrease in the plasma level of fish, *Cyprinus carpio* exposed to chloropyrifors. Rathod *et al* (2009) studied toxic effect of dimethoate on the protein, lipid and glycogen content in muscle, gill, liver and kidney of fish, *Arias dussumieri*.

There was a paucity of information on the toxicity of pesticides on biochemical constituents in fishes. In the present investigation, an effort has been made to study the effect of pesticides on biochemical constituents such as protein, ascorbic acid, lipid and glycogen in gill, liver and muscle of *Puntius ticto and Channa punctatus*.

MATERIALS AND METHODS

For biochemical study, the live specimens of *Puntius ticto* were collected from Shivana river near Dhoregaon, 26 km away from Aurangabad (M.S.) and brought to the laboratory. The fishes were maintained in glass aquaria and were acclimatized for four weeks. After acclimatization healthy fishes, showing normal activities were selected for biochemical estimations.

The test fishes, *Puntius ticto* were exposed to three sublethal concentrations of dimethoate for long term (30 days) exposure, showed that there was significant decrease in the level of protein content in liver, gill and muscle at 1.3 ppm, 0.65 ppm and 0.43 ppm dimethoate exposure. Simultaneously, a control aquarium was also maintained. On 30th day's exposure, fishes from each experimental group were sacrificed, liver, gill and muscle were dried in oven at 75 ^{0}C to 80 ^{0}C till constant weight was obtained and blended into dry powder. These powders were used for the estimation of various biochemical components such as protein. The methods applied for estimations are as follows.

Estimation of total protein

100 mg of tissue was homogenized in 5 ml of cold distilled water. 5 ml of 30% TCA was immediately added to precipitate the protein. Precipitate was collected after centrifugation at 3000 rpm for 15 minutes. The supernatant was discarded. The pellet was repeatedly washed with distilled water to remove the traces of TCA. Precipitated protein was redissolved in 0.1 NaOH and estimated by the method of Lowry *et al* (1951) using folin phenol reagent. The protein was expressed in terms of mg/100 mg dry weight of the tissues.

RESULTS

In the present investigation, changes in the biochemical constituents in body tissues of test fishes, *Puntius ticto* were exposed to dimethoate for long term (30 days) exposure at different sublethal concentrations have been recorded for protein. Dimethoate induced changes in the biochemical constituents which have been represented in the form of percentage in alterations of biochemical constituent. The data were supported to various statistical analysis and the variance, standard deviation and standard error of the mean were calculated. Students't' test was used to find out significance. The level of significance was used in the present study ($P<0.1$,

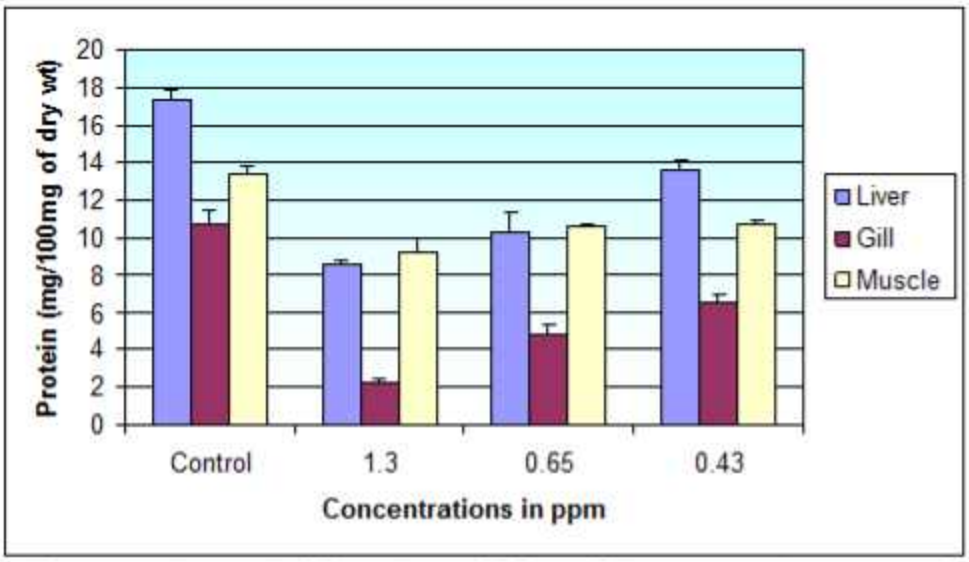

Fig. 1 : Effect of dimethoate on protein content in different tissues of freshwater fish, *Puntius ticto* after exposure to sublethal concentrations for 30 days.

Table 1 : Effect of dimethoate on protein content in different tissues of freshwater fish, *Puntius ticto* after exposure to sublethal concentrations for 30 days.

S.No.	Tissues	Control	1.3 ppm (1/5)	% changes	0.65 ppm (1/10)	% changes	0.43 ppm (1/15)	% changes
1	Liver	17.3213±0.5297	8.6045***±0.2648	50.3237	10.2867**±1.0594	40.6121	13.6511*±0.5297	21.1889
2	Gill	10.7455±0.7007	2.1817**±0.2648	79.6964	4.7814*±0.5297	55.5028	6.4636*±0.4537	39.8482
3	Muscle	13.3758±0.5053	9.2162*±0.7946	31.0975	10.6537*±0.1059	20.3506	10.7455*±0.2648	19.6646

1. The values are expressed in mg/100 mg dry weight (mean ± S.D).
2. ± indicates S.D.
3. *P < 0.005, **P < 0.01, ***P < 0.001

P<0.05, P<0.01, P<0.001) according to Fisher and Yates (1963).

Protein

Protein recorded in control group of fishes, *Puntius ticto* were 17.3213 mg in liver, 10.7455 mg in gill and 13.3758 mg in muscle. The fishes, *Puntius ticto* were exposed to three sublethal concentrations of dimethoate for long term (30 days) exposure, showed that there was significant decrease in the level of protein content in liver, gill and muscle at 1.3 ppm, 0.65 ppm and 0.43 ppm dimethoate exposure. In liver decrease recorded were 50.3237%, 40.6121% and 21.1889% as compared with their control values. In gill decrease recorded were 79.6964%, 55.5028% and 39.8482% as compared with their control value. In muscle decrease rescored were 31.0975%, 20.3506% and 19.6646% as compared their control values. These variations are recorded in Table 1 and Fig. 1.

DISCUSSION

Complex composition and cumulative action of synthetic chemicals and industrial effluent from different discharge sources causes huge amount of stress on the recipient ecosystem (Madhyastha, 1996). During exposure, organism goes through a shift in all the metabolic process to overcome the toxic effects by undergoing all protective measures. Toxic effect of any pollutants leads to changes in biochemical and physiological mechanisms in the organisms. In order to investigate the physiological and biochemical changes have been studied during the course of the present study.

During stress, an organism needs sufficient energy which can be supplied from reserve material i. e. glycogen protein cholesterol lipid etc. If the stress is mild, then only stored glycogen is as source of energy but when stress is strong then energy stored in the form of lipid, protein cholesterol may be used. The toxicant also affects the metabolic or physiological activities in the animals particularly those organs in which phosphorylation, oxidation and hydrolization processes are carried out. The liver is the main site for all the activities and also for detoxification of toxic materials. Metabolic products are broken down in liver cells due to which the liver cells my get damaged more severely than any other cells. This causes changes in biochemical composition. These changes are studied by earlier of workers.

Naik *et al* (2004) reported that, the total protein,

glycogen and lipid content shows significant depletion in the tissue of the tannery effluent treated fish, *Cyprinus carpi.* Agrahari *et al* (2006) reported decrease in total protein content of liver, muscle, brain and gill of fish *Channa punctatus* exposed *to monocrotophos* at sublethal concentrations (0.46, 0.96, and 1.86 ppm) for 30 days. Ghanbhadur *et al* (2005) reported variations in protein content of gill and liver of fish, *Rasbora daniconius.*

Tripathi and verma (2004) observed that, the exposed fish *Clarias batrachus* to fenvalerate induced a significant decline in protein contents in liver, brain and skeletal muscle.

Khare and Singh (2002) exposed *Clarias batrachus* to sublethal concentration of malathion for 7, 15 and 30 days and reported that gradual decrease in protein content of gill during the experimental period.

In the present study, protein content in different tissues showed decreased values in treated fishes, *Puntius ticto* . Decrease in protein content may be attributed to the impairment to protein synthesis or increase in the rate of its degradation to amino acid. The fall in protein level during dimethoate exposure may be due to increased catabolism and decreased anabolism of protein, (Khare and Singh, 2002). Similar results have been reported by number of workers (Tripathi *et al,* 2003; Rao and Padmavati, 2004; Sirohi and Saxena, 2006; Neelamegam *et al*, 2006). The alteration in protein value may be due to some structural changes in the liver, the arrangement of hepatic cords leading to alteration of liver metabolism. Decrease in protein content could possibly due to protein break down and suggests that decreased protein is due to damage of hepatic tissue and an intensive proteolysis.

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NOVEL SYNTHESIS OF [1,2,4]-TRIAZOLO-QUINAZOLINONE AND PYRIMIDINE DERIVATIVES MEDIATED BY CERIC AMMONIUM NITRATE (CAN)

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Abstract: A highly efficient, clean and simple protocol has been established for the synthesis of [1,2,4]-triazolo-quinazolinone and [1,2,4]-triazolo-pyrimidine derivatives in the presence of CAN. This CAN was effective for the one-pot multi-component reaction of aromatic aldehyde, dimedone or ethyl acetoacetate and 3-amino-1,2,4-triazole in acetonitrile under mild reaction conditions. The present work shows attractive features, such as the short reaction time, excellent yield, mild reaction condition, easily isolated the product and no need of chromatographic separation.

Keywords: Triazoloquinazolinone; 3-Amino-1,2,4-Triazole; aromatic aldehyde; CAN; Mild reaction condition

Introduction

Nitrogen containing heterocyclic compound are important parts that often exist in biologically active natural products and medicinal interest of synthetic compounds.[1,2] Among them 1,2,4-triazoloquinazolinone

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derivatives are known for diverse biological and pharmaceutical activities as derivatives are known for diverse biological and pharmaceutical activities as anti-HIV,[3] antihistaminic,[4–6] analgesic,[7] anti-inflammatory,[8] anticancer,[9] anti-bacteria,[10-12] anti-malarial.[13] Alternatively, one pot synthetic strategies of multi-component reaction (MCRs) has been facilitated to the growth of organic synthesis. Because of their advantages over the multistep synthesis such as they generate less waste, minimize isolation of intermediates, save times and minimize cost.[14] In addition, MCRs are eco-friendly, highly a tom economic and they avoid protection–deprotection steps with minimum synthetic effort and time.[15-16]

Due to their wide range of synthetic, industrial and pharmacological application, the synthesis of 1,2,4-triazoloquinazolinone derivatives has become a focus of intense research in recent years. Several synthetic methodologies have been developed for the synthesis of 1,2,4-triazoloquinazolinone derivatives. Among these methods are the condensation of dimedone, various aldehydes with 3-amino-1,2,4-triazole in the presence of Nafion-H®,[17] molecular iodine,[18] Amberlyst-15® in PEG,[19] DMF (microwave assisted),[20] $H_6P_2W_{18}O_{62}$.$18H_2O$,[21] acetic acid,[22] 1-*n*butyl-3-methylimidazolium tetrafluoroborate ([Bmim] BF_4),[23] p-toluenesulfonic acid monohydrate,[24] sulfonic acid functionalized nanoporous silica (SBA-Pr-SO_3H),[25] anthranilic acid,[26] Sulfamic acid.[27]

However, many of these methods suffer from one or more of the limitations such as requirement of strong acidic conditions, longer reaction times, low yields, tedious work-up procedures, excess amount of catalyst, and the use of toxic reagents, catalysts or solvents. Therefore, there is a strong demand for a highly efficient and environmentally benign method for the synthesis of these heterocycles.

In recent literatures, CAN is convenient and widely used reagent for the organic transformation due to the many advantages such as excellent solubility in water, eco-friendly nature, high reactivity, cost-effectiveness, low toxicity and easy work up the procedure. Although, CAN is able to catalyze not only based on its electron transfer capacity, but also with its Lewis acidic property for various organic transformation.[28] CAN have used as an important reagent for the formation of C-C and carbon-heteroatom bonds.[29,30]

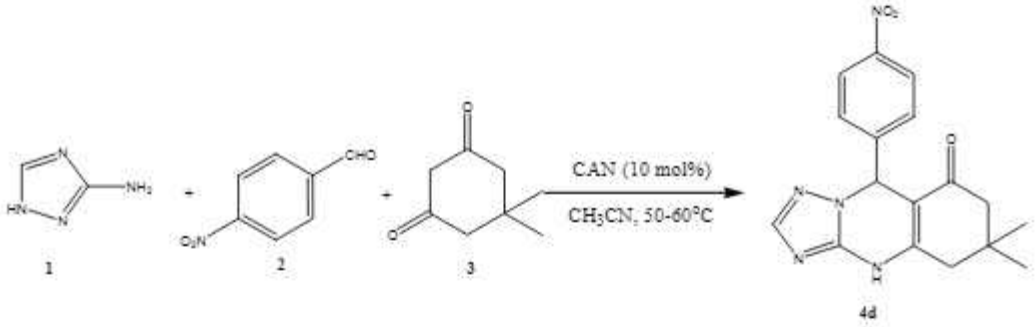
In continuation of our ongoing research work to develop novel methodologies in synthetic chemistry,[31-34] Herein, we report CAN as an efficient, low cost and environmentally benign protocol for the synthesis of 1,2,4-triazoloquinazolinone derivatives under mild reaction conditions at 50–60 °C.

Results and Discussion

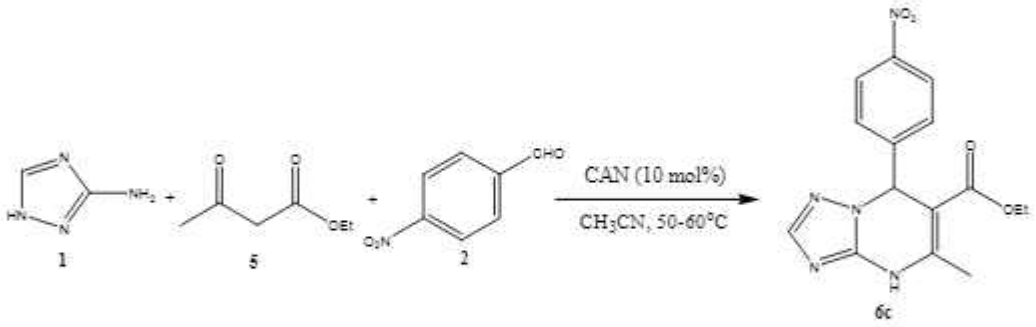
To explore the use of CAN as a catalyst, for the reaction of dimedone or ethyl acetoacetate, 4-nitrobenzaldehydes with 3-amino-1,2,4-triazole for the preparation of 1,2,4-triazoloquinazolinone and 1,2,4-triazolo[1,5-a]pyrimidine-6-carboxylate derivatives compound **4d** and **6c** was considered as a standard model reaction (Scheme 1 and Scheme 2). Model reaction carried out in the absence of catalyst did not lead to formation of preferred product. It means the initiation of reaction was must required the involvement of catalyst. Initially, we find out the exact requirement of amount of catalyst for this transformation. During this study, we consider the model reaction and examine requirement of catalyst concentration using different concentrations of CAN (Table 1). After this study, we have observed that 10 mol% CAN show to be an efficient catalyst

to bring out the reaction smoothly. With these optimized reaction conditions, effect of different solvents such as water, methanol, ethanol, aqueous ethanol and acetonitrile was investigated (Table 1). Among the tested solvents, acetonitrile was found to be better over the other tested solvents in terms of both yield of the product and reaction time (Table 1 Entry 8) for this transformation.

As a results, further set of experiments, in order to make the generality of the reaction, various aromatic aldehydes having both electron-donating as well as electron-withdrawing substituent's were transformed into 1,2,4-triazoloquinazolinone derivatives in high to excellent yields. The entire results are summarized in (Table 2 and Table 3).



Scheme 1

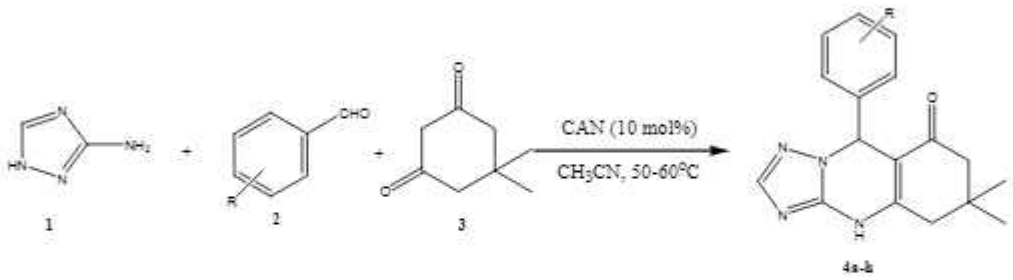


Scheme 2

Table 1. Optimization of solvent and catalyst effect.

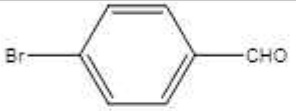
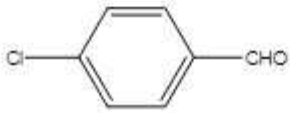
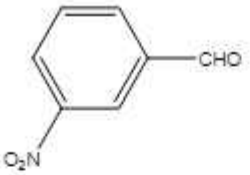
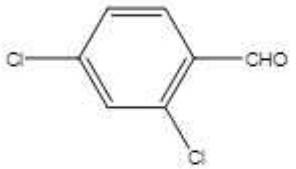
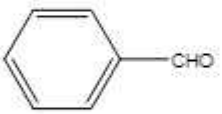
Entry	Solvent	Catalyst (mol %)	Time (min.)	Yield[b] (%)
1	-	-	60	No reaction
2	H_2O	10	50	45
3	CH_3OH	10	50	72
4	EtOH	10	50	80
5	EtOH:H_2O	10	50	68
6	CH_3CN	5	60	75
7	CH_3CN	7	40	82
8	**CH_3CN**	**10**	**17**	**96**
9	CH_3CN	15	17	96

[a]**Reaction conditions:** Dimedone (1 mmol), 4-Nitrobenzaldehyde (1 mmol), 3-amino-1,2,4 triazole (1 mmol), CAN (10 mol%) in acetonitrile (5 mL) at 50-60 °C. [b]Isolated yield.

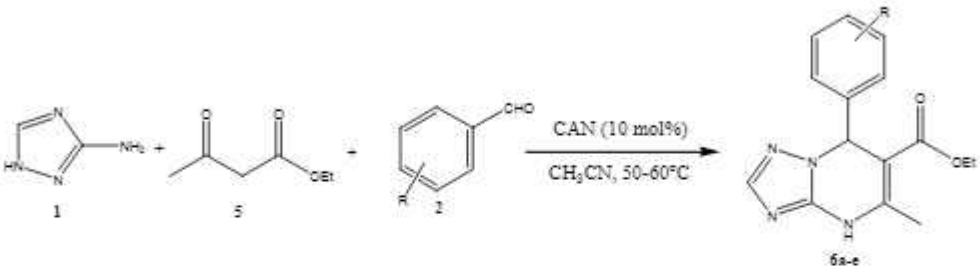


Scheme 3

Table 2. Synthesis of 1,2,4-triazoloquinazolinone derivatives using CAN under mild reaction conditions[a]

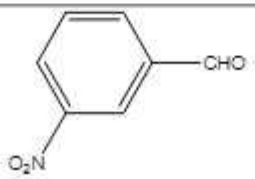
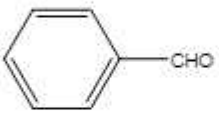
Entry	Aldehyde	Time (min)	Yield (%)[b]	Melting point °C
4a		20	90	284-286
4b		20	94	225-227
4c		21	92	264-266
4d		17	96	302-304
4e		18	95	301-303
4f		18	93	265-268
4g		25	84	322-324
4h		20	94	250-252

[a]**Reaction conditions:** Dimedone (1 mmol), Aromatic aldehydes (1 mmol), 3-amino-1,2,4 triazole (1 mmol), CAN (10 mol%) in acetonitrile (5 mL) at 50-60 °C. [b]Isolated yield.



Scheme 4

Table 3. Synthesis of [1,2,4]triazolo[1,5-a]pyrimidine derivatives using CAN under mild reaction conditions[a]

Entry	Aldehyde	Time (min)	Yield (%)[b]	Melting point °C
6a		10	92	207-210
6b		7	94	252-254
6c		5	95	262-264
6d		10	92	272-275
6e		7	92	191-192

[a]Reaction conditions: Ethyl acetoacetate (1 mmol), Aromatic aldehydes (1 mmol), 3-amino-1,2,4 triazole (1 mmol), CAN (10 mol%) in acetonitrile (5 mL) at 50-60 °C. [b]Isolated yield.

In order to find out the efficiency and greenness of the method, we compared our obtained results for the synthesis of

1,2,4-triazoloquinazolinone derivatives with the pre-eminent of the data from the literature as shown in the following Table 4, many of the formerly reported methodologies experience from one or more disadvantages such as necessity of excess amount of catalyst, high temperature or ultrasound irradiation, prolonged reaction time, use of volatile and toxic organic solvents. We believe that the present method helps to keep away from the disadvantages within the formerly reported methodologies.

Table 4. Comparison of the ability of various catalysts with CAN.

Entry	Catalyst / Reaction condition	Time (min)	Yield (%)[b]	[Ref.]
1	Acetic acid (5 mL)/ 60 °C	25	95	22
2	Anthranilic acid(30 mol%)/EtOH, Reflux, 80°C	360	95	26
3	*p*-TsOH.H_2O (15 mol%)/CH_3CN, 40–50 °C	30	96	24
4	NH_2SO_3H/ CH_3CN, reflux, 80 °C	30	95	27
5	$H_6P_2W_{18}O_{62}.18H_2O$/ CH_3CN, 80 °C	30	95	21
6	CAN (10 mol%)/ CH_3CN, 50-60 °C	20	96	Present work

[b]Isolated Yield

Experimental

All the basic chemicals, reagents and solvents were purchased from S. D. Fine, Spectrochem, Alfa Aesar, and Loba Chemical companies and used further without purification. We have determined melting points by an open capillary tube method and are uncorrected. Progress of the reaction was tested by using alumina TLC plates (Merck 60 F_{250}). ^{1}HNMR and ^{13}CNMR spectra of synthesized heterocyclic compounds were tested by 500

MHz and 125 MHz Bruker Avance spectrometer respectively in DMSO solvents and using tetramethylsilane (TMS) as an internal standard and the value of chemical shift is in the δ scale and *J* value is in hertz (Hz). Mass spectra analyses were performed with electrospray ionization (ESI) method.

General procedure for the synthesis of 1,2,4-triazolo-quinazolinone derivatives and [1,2,4]triazolo[1,5-a]pyrimidine-6-carboxylate

In round bottom flask a mixture of 3-amino-1,2,4-triazole (1.0 mmol), aromatic aldehyde (1.0 mmol), dimedone (1.0 mmol) or ethylacetoacetate (1.0 mmol), 3 mL acetonitrile and 10 mol% of CAN was stirred for the 5-25 min at 50-60 °C. Progress of the reaction was monitored by TLC. After the formation of product, then reaction mixture was cooled to room temperature. The solid products were separated by filtration washed with ethanol. The synthesized pure compounds were characterized by spectroscopic methods.

Selected spectral data:

6,6-dimethyl-9-(4-bromophenyl)-5,6,7,9-tetrahydro[1,2,4]-triazolo[5,1b] quinazolin-8 (4H)-one (Table 2, entry 4a)

Pale yellow solid; IR(KBr): 765, 835, 1252, 1364, 1580, 1642, 2886, 2956, 3082 cm^{-1}; ^1H NMR (500 MHz, DMSO-d6): δ 0.96 (s, 3H, CH_3), 1.09 (s, 3H, CH_3), 2.20 (q, J = 10.38, 16.43 Hz, 2H, $-CH_2$), 2.55 (s, 2H, $-CH_2$), 6.21 (s, 1H, –CH), 7.14-7.16 (d, J = 8.30 Hz, 2H, Ar-H), 7.48-7.50 (d, J = 8.30 Hz, 2H, Ar-H), 7.71 (s, 1H, Ar-H), 11.19 (s, 1H, NH); ^{13}C NMR (125 MHz, DMSO-d6): δ 27.40, 28.86, 32.69, 50.24, 57.94, 105.64, 121.33, 129.73, 131.69, 141.43, 147.29, 150.69, 151.07, 193.49; MS m/z (ESI): 373 $[M+H]^+$.

6,6-dimethyl-9-(4-methoxyphenyl)-5,6,7,9-tetrahydro[1,2,4]triazolo[5,1b] quinazolin-8 (4H)-one (Table 2, entry 4b)

Colourless solid; IR (KBr): 765, 829, 1252, 1364, 1580, 1635, 2950, 3095 cm^{-1}. ^1H NMR (DMSO-D_6, 500 MHz): δ 0.75 (s, 3H). 0.82 (s, 3H), 2.07(d, *J* = 16Hz, 1H), 1.83 (d, *J* = 16Hz, 1H), 1.98 (d, *J* =16Hz, 1H), 2.28-2.37 (m, 2H), 3.47 (s, 3H), 5.93 (s, 1H), 6.60 (d, *J* = 8Hz, 2H), 6.87 (d, *J* = 8Hz, 2H), 7.45 (s, 1H), 10.87 (s, 1H), ^{13}C NMR (DMSO-D_6, 125 MHz): δ 26.79, 28.49, 32.15, 49.78, 54.99, 57.30, 105.71, 113.54, 128.09, 133.82, 146.72, 150.14, 158.66, 192.94; ESI-MS: *m/z* 325 $[M+H]^+$.

6,6-Dimethyl-9-p-tolyl-5,6,7,9-tetrahydro-[1,2,4]triazolo[5,1-b]quinazolin-8(4H)-one (Table 2, entry 4c)

White solid; IR (KBr): 756, 1253, 1368, 1581, 1649, 2924, 3091 cm^{-1}; ^1H NMR (500 MHz, DMSO-d6): δ 0.96 (s, 3H, CH_3), 1.04 (s, 3H, CH_3), 2.20 (d, J = 11.52 Hz, 2H, CH_2), 2.39 (s, 3H, $-CH_3$), 2.50-2.58 (m, 2H, $-CH_2$), 6.16 (s, 1H, –CH), 7.07 (S, 4H, Ar-H), 7.67 (s, 1H, Ar-H), 11.10 (s, 1H, NH); ^{13}CNMR (125 MHz, DMSO-d_6): δ 19.7, 26.0, 37.7, 31.2, 59.1, 59.9, 105.2, 125.7, 127.7, 136.0, 137.3, 145.8, 148.6, 148.9, 192.2; MS m/z (ESI); 309 $[M+H]^+$.

6,6-dimethyl-9-(4-nitrophenyl)-5,6,7,9-tetrahydro[1,2,4]triazolo[5,1b] quinazolin-8-(4H)-one (Table 2, entry 4d)

Pale yellow solid; IR (KBr): 852, 1252, 1346, 153, 1643, 2961, 3080, 3105 cm^{-1}. ^1H NMR (DMSO-D_6, 500 MHz): δ 0.96(s, 3H). 1.05 (s, 3H), 2.07(d, *J* = 16Hz, 1H), 2.21 (d, *J* = 16Hz, 1H), 2.57 (d, *J* =16Hz, 1H), 2.50 (d, *J* = 16Hz, 1H), 6.37 (s, 1H), 7.50 (d, *J* = 8Hz, 2H), 7.74 (s, 1H), 8.17 (d, *J* = 8Hz, 2H), 11.31 (s, 1H), ^{13}CNMR (DMSO-D_6,125 MHz): δ 27.45, 28.78, 32.72, 50.17, 58.01, 105.24, 124.06, 128.97, 147.33, 147.43, 148.90, 150.92, 151.48, 193.52; ESI-MS: *m/z* 340 $[M+H]^+$.

6,6-dimethyl-9-(4-Chlorophenyl)-5,6,7,9-tetrahydro[1,2,4]-triazolo[5,1b] quinazolin-8 (4H)-one (Table 2, entry 4e)

Pale yellow solid, IR (KBr): 795, 1253, 1367, 1579, 1649, 2962, 3088, 3124 cm^{-1}; ^1H NMR (DMSO-D_6, 500 MHz): δ = 0.96 (s, 3H, -CH_3), 1.08 (s, 3H, -CH_3), 2.07(d, *J* = 16Hz, 1H,-CH_2), 2.27 (d, *J* = 16Hz, 1H,-CH_2), 2.50-2.58 (d, *J* =16Hz, 2H,-CH_2), 6.22 (s, 1H, -CH), 7.19–7.37 (m, 4H, Ar–H) 7.71 (s, 1H, NH) 11.19 (s, 1H, NH); ^{13}CNMR (DMSO-D_6, 125 MHz) δ 27.40, 28.86, 31.73, 32.69, 50.24, 57.86, 105.69, 128.76, 129.38, 132.77, 141.01, 147.29, 150.68, 151.06, 193.48; MS m/z (ESI): 329 $[M+H]^+$.

6,6-dimethyl-9-phenyl-5,6,7,9-tetrahydro [1,2,4]-triazolo[5,1b]quinazolin-8(4H)-one (Table 2 , entry 4h)

Pale yellow solid, IR (KBr): 721, 1252, 1373, 1594, 1650, 2962, 3090 cm^{-1}; ^1H NMR (DMSO-D_6, 500 MHz): δ = 0.95 (s, 3H, -CH_3), 1.03 (s, 3H, -CH_3), 2.05(d, *J* = 16Hz, 1H,-CH_2), 2.19 (d, *J* = 16Hz, 1H,-CH_2), 2.52-2.59 (m, 2H,-CH_2), 6.19 (s, 1H, -CH), 7.17-7.29 (m, 5H, Ar–H) 7.68 (s, 1H, NH) 11.14 (s, 1H, NH); ^{13}C NMR (DMSO-D_6, 125 MHz) δ 26.77, 28.45, 32.16, 49.74, 57.89, 105.55, 126.92, 127.69, 128.23, 141.55, 146.82, 150.24, 150.39, 192.96; MS m/z (ESI): 295 $[M+H]^+$.

Ethyl-4,7-dihydro-5-methyl-7-(4-chlorophenyl)[1,2,4]-triazolo[1,5a]pyrimidine-6 carboxylate (Table 3, entry 6b)

Pale yellow solid; IR (KBr): 779, 829, 1246, 1372, 1586, 1691, 2866, 2984, 3095 cm^{-1}; ^1H NMR (500 MHz, DMSO-d6): δ 1.06 (t, 3H, CH_3), 2.42 (s, 3H, CH_3), 3.92-3.99 (q, 2H, –CH_2), 6.28 (s, 1H, –CH), 7.24-7.26 (d, 2H, J = 8.30 Hz, Ar-H), 7.36-7.38 (d, J = 8.30 Hz, 2H, Ar-H), 7.67 (s, 1H, Ar-H), 10.86 (s, 1H, NH); ^{13}CNMR (125 MHz, DMSO-d6): 14.3, 18.9, 59.3, 59.8, 97.2, 128.8, 129.0, 129.1, 129.4, 132.9, 141.5, 147.3, 147.5, 150.7, 165.4; MS m/z (ESI): 319 $[M+H]^+$.

Ethyl-4,7-dihydro-5-methyl-7-(4-hydroxy phenyl)-[1,2,4]-triazolo[1,5-a] pyrimidine-6-carboxylate (Table 3, entry 6d)

Pale yellow solid; IR(KBr): 731, 821, 1252, 1372, 1586, 1691, 2866, 2976, 3151 cm^{-1}; ^1H NMR (500 MHz, DMSO-d6): δ 1.07 (t, 3H, CH_3), 2.07 (s, 3H, CH_3), 3.92-3.99 (q, 2H, $-CH_2$), 4.0 (s, 1H, –OH), 6.16 (s, 1H, –CH), 6.65-6.99 (d, 2H, J = 8.30 Hz, Ar-H), 7.02 (d, J = 8.30 Hz, 2H, Ar-H), 7.63 (s, 1H, Ar-H), 10.71 (s, 1H, NH); ^{13}CNMR (125 MHz, DMSO-d6): 14.4, 18.8, 59.4, 59.7, 98.0, 115.7, 128.6, 133.1, 146.6, 147.3, 150.4, 157.4, 165.6; MS m/z (ESI); 301 $[M+H]^+$.

Conclusions

In summary, we have developed highly efficient protocol for the synthesis of [1,2,4]-triazoloquinazolinone and [1,2,4]-triazolo[1,5-a] pyrimidine derivatives from the condensation reaction of dimedone or ethyl acetoacetate, aromatic aldehyde and 3-amino-1,2,4 triazole using CAN (10 mol%) in acetonitrile at 50-60 °C. Present protocol offers many advantages such as short reaction time, easy isolation, simple procedure, inexpensive, mild reaction condition and no need of chromatographic separation.

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A REUSABLE MORPHOLINIUM BISULFATE PROMOTED SYNTHESIS OF 2-ARYL BENZOTHIAZOLE DERIVATIVES UNDER GRIND-STONE METHOD

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Abstract: In this protocol, we have synthesized the 2-arylbenzothiazoles using highly inexpensive, reusable and mild morpholinium bisulfate [morH][HSO_4] ionic liquid as a catalyst with the condensation reaction of 2-aminothiophenol and aromatic aldehydes under grind-stone method. The use of highly efficient with high catalytic activity is one more advantages of this protocol.

Keywords: 2-Arylbenzothiazoles, Ionic liquid, Grind-stone method, 2-Aminothiophenol, Recyclable.

Introduction

Benzothiazole heterocycles are an important part of heterocyclic compounds. Highly reactive compounds 2-aminobenzothiazoles are widely used as reactants or reaction intermediates for the synthesis of several fused heterocyclic compounds.[i] Medicinal chemists more concentration was drawn to this series of compounds, when pharmacological profile of Riluzole (Figure 1) was observed as clinically available anticonvulsant drug.[ii] Also, Erythrazoles A and Erythrazoles B were separated from mangrove sediments (Figure 1).[iii] 2-arylbenzothiazoles heterocyclic compounds possess diverse of biological and pharmacological activities[iv-vi], such as antimicrobial[vii-viii], antitumor[ix], anti-convulsant[x-xi] and antidiabetic[xii] activities. Moreover, in the area of organic optoelectronic material they have also found wide range of application[xiii-xvii].

2-arylbenzothiazoles heterocyclic compounds possess diverse of biological and pharmacological activities. Because of their importance, numerous methods have been developed for the synthesis of 2-arylbenzothiazoles, which mostly includes condensation reaction of 2-aminothiophenols and carboxylic acids/ acid chlorides/ aldehydes/ esters/ nitriles/ ketones/ thioesters such as Bi_2O_3 nanoparticles[xviii], cerium (IV) ammonium nitrate[xix], NH_2SO_3H[xx], pTSA[xxi].

However, many among these methods suffer from one or more limitations such as unbearable reaction conditions, prolonged reaction time period, poor yields with formation of

many side products and use of large quantity of volatile organic solvents. So, the development of a clean, high yielding and eco-friendly approach is still desirable. In recent years, room temperature ionic liquids (RTILs) were introduced because of their unique physical and chemical properties of non-volatility, non-flammability, thermal stability, and recyclability[xxii]. Also, RTILs promising as greener alternative reaction media as well as catalyst towards conventional organic solvents which is an essential part of today's force towards sustainable chemistry.[xxiii]

In continuation of our ongoing research to develop novel methodologies in synthetic chemistry[xxiv-xxviii], we have investigated here an efficient, low cost, and environmentally benign protocol for the synthesis of 2-arylbenzothiazole using morpholinium bisulfate [morH][HSO_4] ionic liquid a simple, reusable and inexpensive catalyst under solvent-free grindstone method.

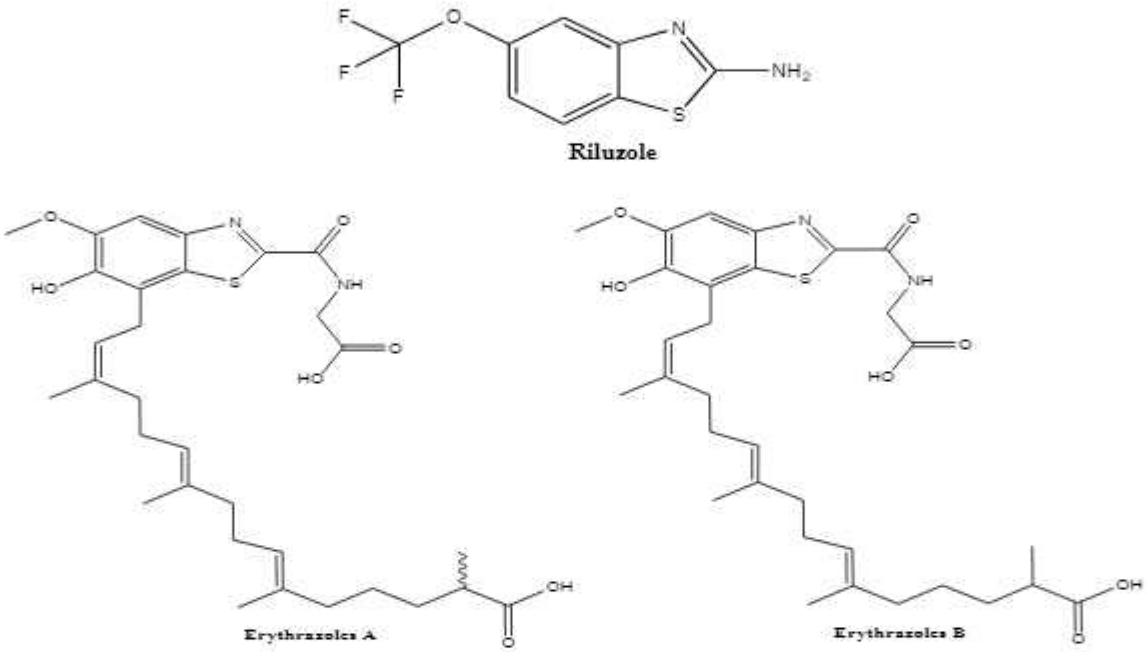


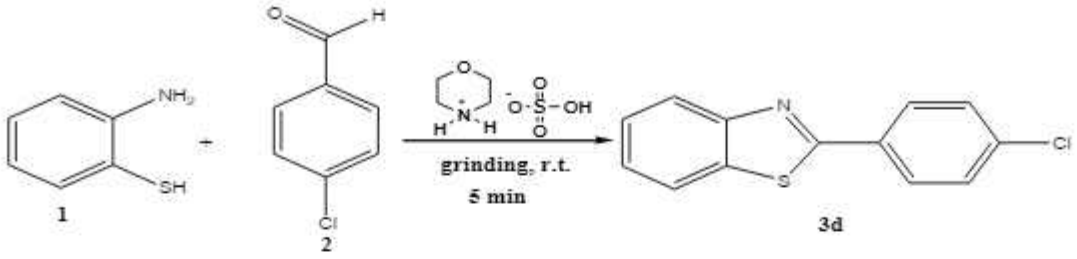
Figure 1: Naturally occurring benzothiazoles

Result and Discussion

To explore the use of morpholinium bisulfate [morH][HSO_4] ionic liquid as a catalyst for the synthesis of 2-arylbenzothiazole from the condensation reaction of 2-aminothiophenol and aromatic aldehydes under the grind-stone method. We have considered as standard model reaction of 2-aminothiophenol and 4-chlorobenzaldehyde in the presence of ionic liquid [morH][HSO_4] under grinding method (Scheme 1). Initially, we have optimized the amount of ionic liquid catalyst required for the formation of the product (Table 1). During this study, we have observed that the reaction smoothly carried out using 10 mol% of morpholinium bisulfate [morH][HSO_4] ionic liquid. Furthermore, same reaction work up with absence of catalyst then there is no desired product formed it means the catalyst was must be required for the initiation of reaction.

Encouraging by this results, we build the generality of reaction with electron donating and electron withdrawing group. When we carried out the reaction with both substituent's there is no observe any strong effect of nature of the substituent's on the yield and time of the products. In other terms, when electron-donating (–OCH_3, –CH_3, –OH) and electron-withdrawing groups (–Cl, –NO_2) were employed the reaction smoothly with less reaction time

and gives high to excellent yields. All obtained results are mentioned in the (Table 2 entries 3a-k).

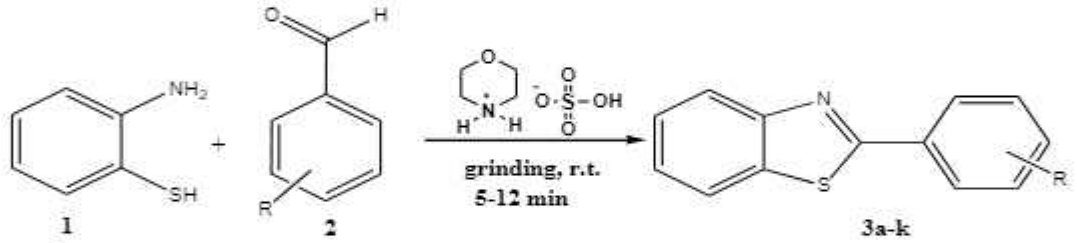


Scheme 1

Table 1 Optimization of catalyst[a]

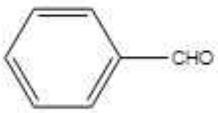
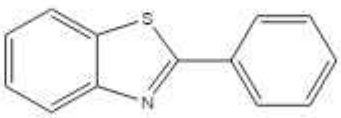
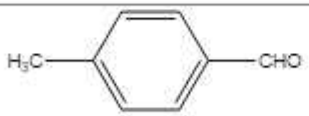
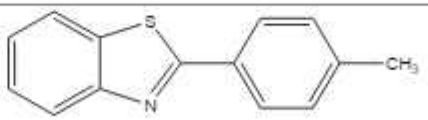
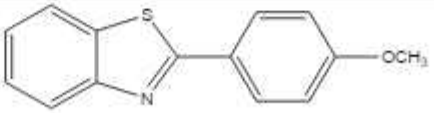
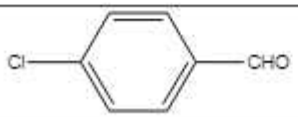
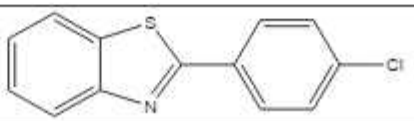
Entry	Catalyst mol%	Time (min)	Yield[b] %
1	-	20	No reaction
2	2	20	45
3	5	10	85
4	**10**	**05**	**95**
5	15	05	94

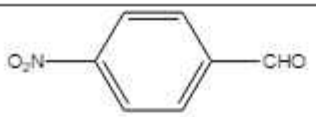
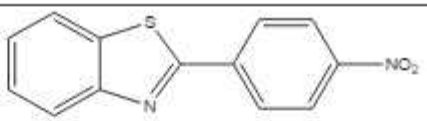
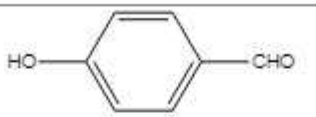
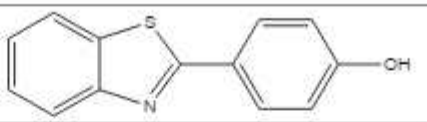
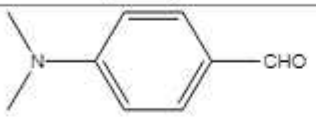
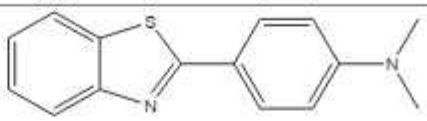
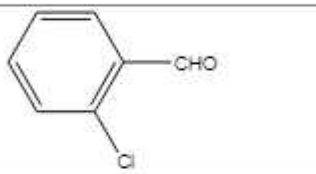
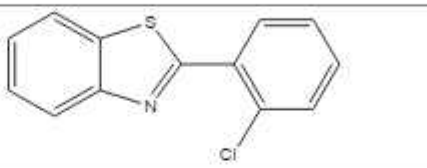
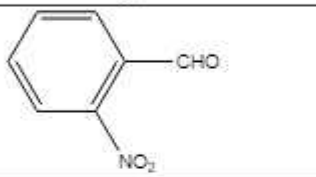
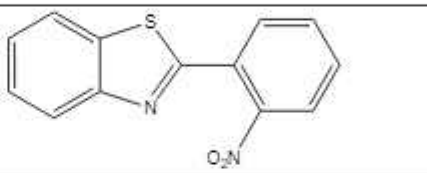
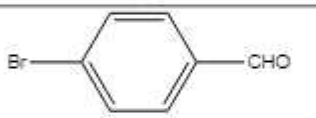
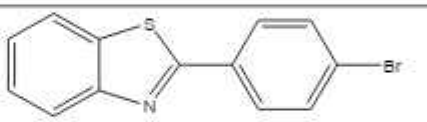
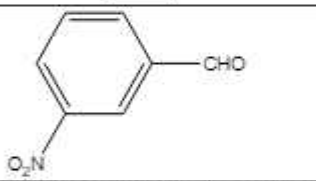
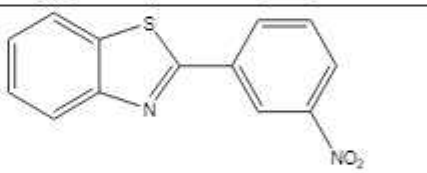
[a]**Reaction conditions:** 4-chlorobenzaldehyde(1 mmol), 2-aminothiophenol (1 mmol), morpholinium bisulfate [morH][HSO_4] (10 mol%) under grind-stone method, [b]Isolated yield.



Scheme 2

Table 2 Synthesis of 2-arylbenzothiazole using morpholinium bisulfate [a]

Entry	Aldehydes	Products	Time (min)	Yield (%)[b]
3a			5	94
3b			5	94
3c			8	93
3d			5	95

3e			6	95
3f			12	88
3g			8	90
3h			7	92
3i			7	90
3j			5	94
3k			7	92

[a]**Reaction conditions:** Aromatic aldehyde(1 mmol), 2-aminothiophenol (1 mmol), morpholinium bisulfate [morH][HSO_4] (10 mol%) under grind-stone method, [b]Isolated yield.

Finally, we have studied the reusability of catalyst; reaction of 4-chlorobenzaldehyde (1.0 mmol) and 2-aminothiophenol (2.0 mmol) was selected as standard model reaction for this study. After completion of reaction, the reaction mixture was extracted with ethyl acetate and placed till to formation of two phases. The aqueous layer of ionic liquid phase was easily separated by separating funnel and washed with ether dried under reduced pressure and the catalyst can also be reused even after three runs for the same model reaction.

Table 3 Reusability of catalyst

Runs	**Time (min)**	**Yield[b] %**
Fresh	5	95
1	5	95
2	6	93
3	7	92

[b]Isolated Yield

Experimental

All the required chemicals were purchased from commercial suppliers either from S. D. Fine, Spectrochem and they were used without further purification. Melting points were recorded by the open tube capillary method and are uncorrected. The progress of the reaction was tested by thin-layer chromatography (TLC) analytical silica gel plates (Merck 60 F250). ^{1}HNMR and ^{13}CNMR spectra were characterized by Bruker Avance (400 and 100 MHz, respectively) instrument in $CDCl_3$ solvent, chemical shifts are specified in δ ppm comparative to tetramethylsilane (TMS) and coupling constants (*J*) are expressed in Hz.

Preparation of Morpholinium bisulfate [morH][HSO$_4$]

Morpholinium bisulfate acidic ionic liquid as a stable reagent is easily prepared as reported by the reaction of morpholine with conc. sulfuric acid (Yield 80%) [xxix]

General procedure for the preparation of 2-aryl benzothiazole (3a-k)

A mixture of aldehyde (1 mmol) and 2-aminothiophenol (1 mmol) was taken in mortar in the presence of morpholinium bisulfate (10 mol%)and was crushed with pestle for appropriate time at room temperature. The path of the reaction was monitored by TLC. After completion of the reaction, the ice cold water pour into mixture and solid product obtained was separated by filtration. Further purification was performed by recrystallization from ethanol.

Selected Spectral data:

2-Phenyl-1,3-benzothiazole (Table 2, Entry 3a)

Yellow solid, Yield: 94%, M.P-112-114 °C; IR (KBr): *v/max* 1562, 1612, 3020, 3058 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.38 (t, *J* = 7.6 Hz, 1H), 7.51 – 7.47 (m, 4H), 7.90 (d, *J* = 8.0 Hz, 1H), 8.10 – 8.07 (m, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 121.6, 123.2, 125.2, 126.3, 127.6, 129.0, 130.9, 133.6, 135.1, 154.1, 168.1; ESI-MS: *m/z* 212 $[M+H]^+$.

2-(4-N,N-Dimethylphenyl)-benzothiazole (Table 2 Entry 3g)

Yellow solid, Yield: 90%, M.P-174-176 °C; IR (KBr) ν (cm^{-1}); 3060, 2901, 1594, 1544, 1440, 1372, 1240, 1162, 815, 745 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ ppm: 7.86 (2H, d, *J*=8.5 Hz); 7.62 (1H, d, *J*=7.8 Hz); 7.16 (1H, t, *J*=7.7 Hz); 7.08 (1H, t, *J*=7.6 Hz); 7.02 (1H, d, *J*=7.6Hz); 6.75 (2H, d, *J*=8.9 Hz); 3.07(6H, s); ^{13}C NMR (100 MHz, $CDCl_3$) δ ppm: 159.5, 152.7, 149.7, 131.8, 130.8, 128.8, 126.5, 125.8, 125.5, 124.4, 117.1, 111.5, 40.1; MS: m/z 254.09, 157.9, 131.9, 114.0, 102.1, 86.2, 72.4.

Conclusion

In summary, we have used highly efficient, mild and effective methodology for the synthesis of 2-arylbenzothiazole from the condensation reaction of 2-aminothiophenol and aromatic aldehydes in the presence of morpholinium bisulfate [morH][HSO$_4$] (10 mol%) under grind-stone method. The use of reusable, inexpensive with high catalytic activity is the advantage of this protocol. In difference to other acids, no need of special precautions for storage and handling of this catalyst and it can be stored on the bench top for weeks without losing its catalytic activity.

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FACILE AND EFFICIENT SYNTHESIS OF XANTHENE DERIVATIVES MEDIATED BY LANTHANUM(III) NITRATE HEXAHYDRATE UNDER SOLVENT FREE CONDITIONS

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Abstract: The present paper shows that lanthanum(III) nitrate hexahydrate can be used as mild and environment friendly homogeneous catalyst for an efficient one-pot multi-component synthesis of biologically active 1,8-dioxo-octahydroxanthene and 14*H*-dibenzo[$a_{,j}$]xanthene derivatives. The solvent free condensation reaction of aromatic aldehydes and dimedone or β-naphthol was carried out at 70-80°C during 10-30 min. The obtained compounds were analysed by mass and NMR spectroscopic techniques. The advantages of this eco-friendly synthesis route are numerous, and include the use of an inexpensive catalyst, high to excellent yield, short reaction time and high catalytic activity that can make this method an interesting alternative to multi-step approaches.

Keywords: lanthanum(III) nitrate, xanthene derivative, dimedone, β-naphthol, solvent free condition.

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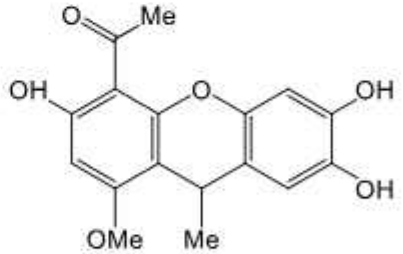
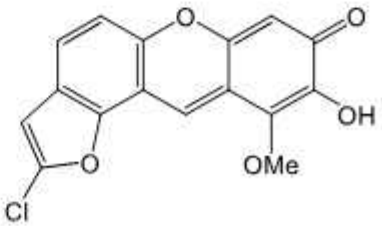
Introduction

Recently, the synthesis of heterocyclic compounds such as xanthene and benzoxanthene derivatives has received great attention from researchers, because of their important pharmaceutical and biological properties such as anti-malarial [1], anti-inflammatory [2], photodynamic therapy [3]. Furthermore, xanthenes have been used as additives in the food industries [4,5], as dyes [6,7], as fluorescent materials [8], and in laser technologies [9]. In natural plants xanthenes are rare; the majority of them are synthesized or are present as microbial metabolites. To present date, xanthenes have been isolated only from plants of two families, *Fabaceae* and *Compositae*. Natural novel xanthenes, blumeaxanthene (A) and blumeaxanthene (B) have been isolated from *Blumea riparia* (Blume) DC (*Compositae* family), a Chinese medicinal herb traditionally used to treat gynecological disorders (Figure 1) [10].

Recently, several methods have been developed for the synthesis of xanthene derivatives using various catalysts, such as succinic acid [11], γ-Fe_2O_3 hydroxyapatite-Fe^{2+} nanoparticles [12], iron oxide nanoparticles (FeNP@SBA-15) [13], acetic acid [14], sulphamic acid [15,16], succinamide-*N*-sulphonic acid [17], silica sulphuric acid [18], citric acid [19], lactic acid [20], tartaric acid [21], niobium pentachloride [22], *p*-toluenesulphonic acid [23,24], indium(III) chloride and metaphosphoric acid [25], silica functionalized propyl sulphonic acid [26], montmorillonite K_{10} [27], iodine [28].



Blumeaxanthene (A)



Blumeaxanthene (B)

Figure 1. Examples of natural xanthene.

However, all of the synthetic protocols needed longer reaction time, high temperature, expensive and toxic catalyst, excess solvent and offered lower yields as compared to the present developed method; thus, the present work tries to overcome all these disadvantages with excellent yield.

In the past decades, lanthanum(III) nitrate based catalysts have attracted rising interests due to their versatility, and notable chemical and physical properties such high acidity, relevant stability, low toxicity, and easy to handle, low price and availability. The importance of lanthanum(III) nitrate as a homogeneous catalyst in biologically significant organic transformations has been highlighted in the literature [29-35]. Previously, lanthanum(III) nitrate was successfully used in the synthesis of 2-arylbenzothiazoles [36].

As a continuation of the ongoing work, the aim set for the present study was to develop a new method for the synthesis of xanthene derivatives using inexpensive, eco-friendly and non-hazardous homogeneous lanthanum(III) nitrate (10 mol%) as catalyst under solvent-free conditions.

Experimental

Generalities

The *β*-naphthol, dimedone, aromatic aldehyde, *n*-hexane, ethyl acetate and lanthanum(III) nitrate hexahydrate were purchased from Merck, S.D. fine-Chem and Sigma-Aldrich.

Melting point values of all compounds were recorded using the Contemp Melting Point Apparatus MEPOAP121 by the open tube capillary method; uncorrected values are given and compared with those reported in literature and found to be identical.

The progress of the reaction and the purity of the compounds were monitored by *thin-layer chromatography* (TLC), using analytical silica gel plates (Merck 60 F_{254}).

The *^1H and ^{13}C NMR* spectra were registered on a Bruker Avance Spectrometer 500 and 125 MHz, respectively, in $CDCl_3$ solvent and with tetramethylsilane (TMS) as internal standard. Chemical shift values were recorded as parts per million (ppm) and the coupling constants (*J*) were expressed in Hertz (Hz).

Mass spectra were recorded on a Bruker IMPACT HD mass spectrometer, applying the electrospray ionization (ESI) method. Also, the structures of some products were confirmed by ^{1}H and ^{13}C NMR and mass spectral data.

General procedure for the synthesis of 14H-dibenzo[a,j]xanthene derivatives (Table 2, entry 1-6)

The reaction mixture of one of aromatic aldehydes **1a-i** (1 mmol), *β*-naphthol (**2**) (2 mmol) and lanthanum(III) nitrate (10 mol%) was prepared and heated at 80°C for an appropriate time. After completion of the reaction, the mixture was washed with cold water and the solid was separated by filtration. The crude product was recrystallized with ethanol.

14-(4-Hydroxyphenyl)-14H-dibenzo[a,j]xanthene ***(3b)***. ^{1}H NMR: *δ* 4.73 (1H, br. s., OH), 6.42 (1H, s, CH), 6.56 (2H, d, *J*= 8.8, Ar-H), 7.35-7.58 (8H, m, Ar-H), 7.76-7.82 (4H, m, Ar-H), 8.34 (2H, d, *J*= 8.4, Ar-H), ^{13}C NMR: *δ* 37.0, 115.2, 117.4, 118.0, 122.6, 124.2, 126.7, 128.7, 128.8, 129.3, 131.0, 131.3, 137.4, 148.6, 153.8. MS: m/z= 375 (M+H).

14-(4-Chlorophenyl)-14H-dibenzo[a,j]xanthene ***(3c)***. ^{1}H NMR: *δ* 6.45 (1H, s, CH), 7.07 (2H, d, *J*= 9.3, ArH), 7.39-7.83 (12H, m, ArH), 8.29 (2H, d, *J*=9.5, ArH). ^{13}C NMR: *δ* 37.3, 116.7, 118.0, 122.4, 124.3, 126.9, 128.6, 128.9, 129.0, 129.4, 131.0, 131.2, 132.0, 143.4, 148.7. MS: m/z= 393 (M+H).

14-(3-Nitrophenyl)-14H-dibenzo[a,j]xanthene ***(3e)***. ^{1}H NMR: *δ* 6.58 (1H, s, CH), 7.25-7.85 (13H, m, ArH), 8.28 (2H, d, *J*= 7.5, ArH), 8.40 (1H, s, ArH). ^{13}C NMR: *δ* 37.7, 115.8, 118.1, 121.7, 122.0, 122.7, 124.5, 127.2, 129.0, 129.5, 131.0, 134.2, 146.9, 148.2, 148.8. MS: m/z= 404 (M+H).

14-(3,4-Dimethoxy phenyl)-14H-dibenzo[a,j] xanthene ***(3f)***. ^{1}H NMR: *δ* 3.68 (3H, s, OCH_3), 3.72 (3H, s, OCH_3), 6.44 (1H, s, CH), 6.65 (1H, d, *J*= 8.3, ArH), 6.91(1H, d, *J*= 1.7, ArH), 7.11-7.13 (1H, dd, *J*= 8.3, 1.8, ArH), 7.39-7.58 (6H, m, ArH), 7.77-7.83 (4H, m, ArH), 8.40 (2H, d, *J*= 8.4, ArH). ^{13}C NMR: *δ* 37.4, 55.7, 110.7, 111.6, 117.4, 117.9, 120.3, 122.7, 124.2, 126.7, 128.7, 128.8, 131.1, 131.4, 137.6, 147.5, 148.7, 149.0. MS: m/z= 419 (M+H).

General procedure for the synthesis of 1,8-dioxo-octahydroxanthene derivatives (Table 2, entry 7-12)

The reaction mixture of one of aromatic aldehydes **1a-i** (1 mmol), dimedone (**4**) (2 mmol) and lanthanum(III) nitrate (10 mol%) was heated at 80°C for an appropriate time. After completion of the reaction, the mixture was washed with cold water and the solid was separated by filtration. The crude product was recrystallized with ethanol.

9-(4-methoxyphenyl)-1,8-dioxo-octahydro xanthene ***(5b)***. ^{1}H NMR: *δ* 0.99 (6H, s, $2CH_3$),

1.09 (6H, s, $2CH_3$), 2.18(4H, d, *J*= 18.2, $2CH_2$), 2.45 (4H, d, *J*= 16.2, $2CH_2$), 3.73 (3H, s, OCH_3), 4.69 (1H, s, CH), 6.76 (2H, d, *J*= 8.8, Ar-H), 7.20 (2H, d, *J*= 8.8, Ar-H). ^{13}C NMR: δ 27.3, 29.2, 30.9, 32.2, 40.8, 50.7, 55.1, 113.4, 115.8, 129.3, 136.5, 157.9, 162.0, 196.5. MS: m/z= 381 (M+H).

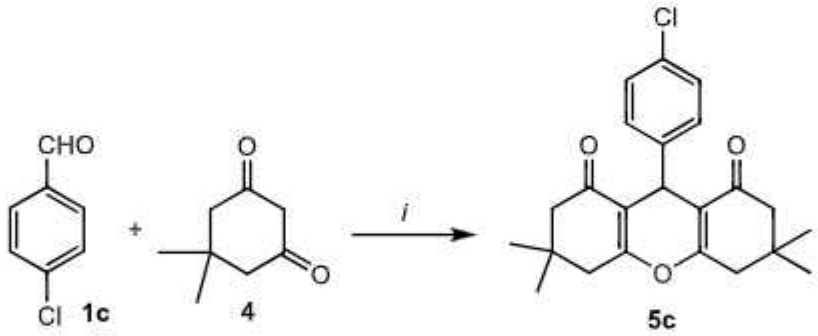
9-(4-nitrophenyl)-1,8-dioxo-octahydroxanthene ***(5d)***. ^{1}H NMR: δ 0.99 (6H, s, $2CH_3$), 1.12 (6H, s, $2CH_3$), 2.15-2.27 (4H, d, *J*= 18.2, $2CH_2$), 2.49 (4H, d, *J*= 16.2, $2CH_2$), 4.82 (1H, s, CH), 7.48 2H, (d, *J*= 8.6, ArH), 8.08 (2H, d, *J*= 8.8, Ar-H). ^{13}C NMR: δ 27.2, 29.2, 32.2, 32.3, 40.8, 50.6, 114.5, 123.4, 129.3, 146.4, 151.5, 162.9, 196.2. MS: m/z= 396 (M+H).

9-(2,4-dichlorophenyl)-1,8-dioxo-octahydro xanthene ***(5e)***. ^{1}H NMR: δ 1.01 (6H, s, $2CH_3$), 1.10 (6H, s, $2CH_3$), 2.17 (2H, d, *J*= 18.2, CH_2), 2.24 (2H, d, *J*= 18.2, CH_2), 2.44 (2H, d, *J*= 16.2, CH_2), 2.48 (2H, d, *J*= 16.2, CH_2), 4.94 (1H, s, CH), 7.13-7.15 (1H, d, *J*= 1.8, ArH), 7.24 (1H, dd, *J*= 8.3,1.8, Ar-H), 7.38 (1H, d, *J*= 8.3, ArH). ^{13}C NMR: δ 27.3, 29.2, 32.0, 40.7, 50.6, 113.3, 126.7, 129.8, 132.7, 133.7, 134.0, 138.6, 163.2, 196.5. MS: m/z= 419 (M+H).

Results and discussion

Lanthanum(III) nitrate hexahydrate reagent was explored for the synthesis of 1,8-dioxo-octahydroxanthene and 14*H*-dibenzo[*a,j*]xanthene derivatives as an efficient catalyst. The solvent free condensation reaction of aromatic aldehydes **1a-i** and dimedone (**4**) or β-naphthol (**2**) was carried out at 80°C. Initially, for reaction conditions optimization, the condensation reaction of dimedone (**4**) (2 mmol) and *p*-chlorobenzaldehyde (**1c**) (1 mmol) at 70-80°C under solvent-free condition was used as a model reaction (Scheme 1). When the reaction of *p*-chlorobenzaldehyde (**1c**) (1 mmol) was carried out with dimedone (**4**) (2 mmol) at 70°C in absence of lanthanum(III) nitrate catalyst, no significant amount of product formed (Table 1, entry 1). This means that the involvement of catalyst is necessary for the initiation of the reaction. By increasing the amount of catalyst used from 2 to 10 mol%, the yield gradually increased from 45 to 95% (Table 1, entries 2-6). The obtained results show that the best yield for the synthesis of compound **5c** were observed when using 10 mol% of the catalyst, the reaction completes in 10 min with a yield of 95% at 80°C (Table 1, entry 6).

Increasing the concentration from 10 to 20 mol% of lanthanum(III) nitrate, at 80°C, does not result in any noticeable changes in the reaction time or yields (Table 1, entries 7-9). Moreover, when the reaction temperature was increased, no improvement in the yield of the product was observed (Table 1, entries 5-7).



Reagent and conditions: i) lanthanum(III) nitrate, solvent free, 80°C, 10 min, 95%.

Scheme 1. Synthesis of 9-(4-chlorophenyl)-1,8-dioxo-octahydroxanthene (5c).

Table 1

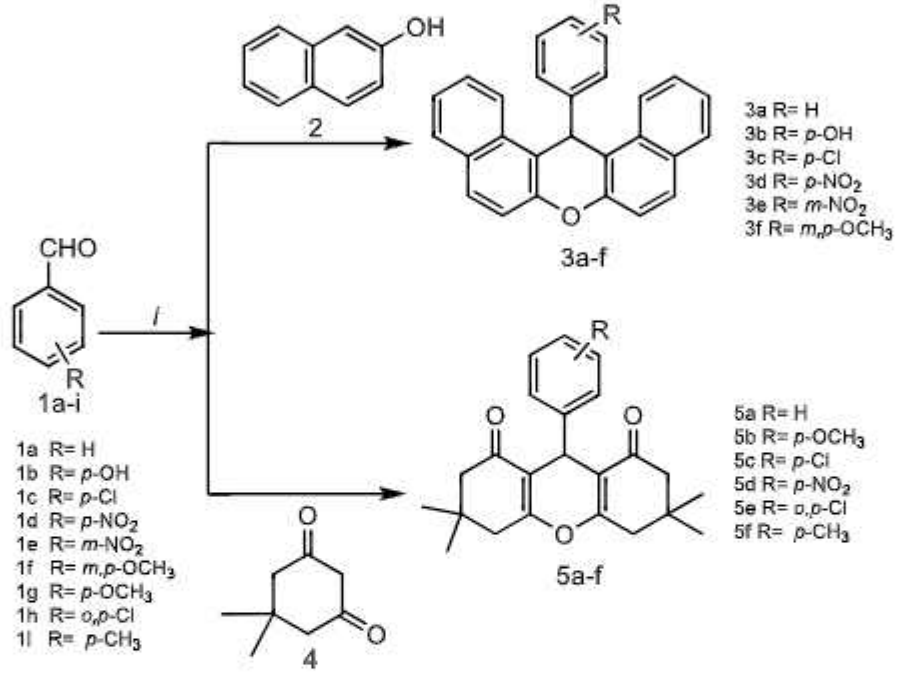
The optimization of reaction conditions[a] for synthesis of 5c.

Entry	*Catalyst (mol%)*	*Temperature (°C)*	*Time (min)*	*Yield[b] (%)*
1	-	70	60	No reaction
2	2	70	40	45
3	5	70	30	75
4	7	70	20	85
5	10	70	15	94
6	**10**	**80**	**10**	**95**
7	10	90	10	95
8	15	80	10	95
9	20	80	10	94

*[a]Reaction conditions: p-chlorobenzaldehyde (**1c**) (1 mmol), dimedone (4) (2 mmol), lanthanum(III) nitrate (10 mol%) under solvent-free conditions. [b]Isolated yield.*

Based on the optimized reaction conditions, the scope of this cyclization reaction was explored. The reaction of β-naphthol (**2**) or dimedone (**4**) with various aldehydes bearing electron-withdrawing and electron-donating group was carried out in the presence of lanthanum(III) nitrate under solvent-free reaction condition (Scheme 2). Aromatic aldehydes bearing both electron-withdrawing substituents and electron donating substituents showed better activity. All results are summarized in Table 2.

In order to find out the efficiency and greenness of the method, obtained results for the synthesis of xanthene derivative **3a** were compared with the pre-eminent data from the literature as shown in Table 3. It was noted that many of the formerly reported methodologies experience from one or more disadvantages such as necessity of excess amount of catalyst, high temperature, prolonged reaction time, use of volatile and toxic organic solvents. The present method helps avoiding the disadvantages within the formerly reported methodologies.



Reagent and conditions: i) lanthanum(III) nitrate, solvent free, 70-80°C, 10-30 min.

Scheme 2. General procedure for the synthesis of xanthene derivatives (5).

Table 2

Synthesis of xanthenes derivatives catalyzed by lanthanum(III) nitrate.

Entry	*Aromatic aldehyde*	*Compound*	*Product*	*Time (min)*	*Yield[b] (%)*	*Melting point values (°C)*	
						Found	*Reported [Ref.]*
1	C_6H_5	**2**	**3a**	25	92	181-182	180-183 [14]
2	p-OH-C_6H_4	**2**	**3b**	30	88	138-140	136-139 [21]
3	p-Cl-C_6H_4	**2**	**3c**	20	94	287-290	286-289 [14]
4	p-NO_2-C_6H_4	**2**	**3d**	20	94	307-309	306-308 [13]
5	m-NO_2-C_6H_4	**2**	**3e**	22	92	212-213	211-213 [13]
6	m, p-OCH_3-C_6H_3	**2**	**3f**	22	85	170-172	-
7	C_6H_5	**4**	**5a**	10	94	202-204	203-206 [14]
8	p-OCH_3-C_6H_4	**4**	**5b**	12	94	247-249	249-251 [14]
9	p-Cl-C_6H_4	**4**	**5c**	10	95	230-232	231-233 [14]
10	p-NO_2-C_6H_4	**4**	**5d**	10	95	228-230	229-231 [14]
11	o, p-Cl-C_6H_3	**4**	**5e**	14	88	255-257	254-256 [14]
12	p-CH_3-C_6H_4	**4**	**5f**	10	92	215-216	216-218 [15]

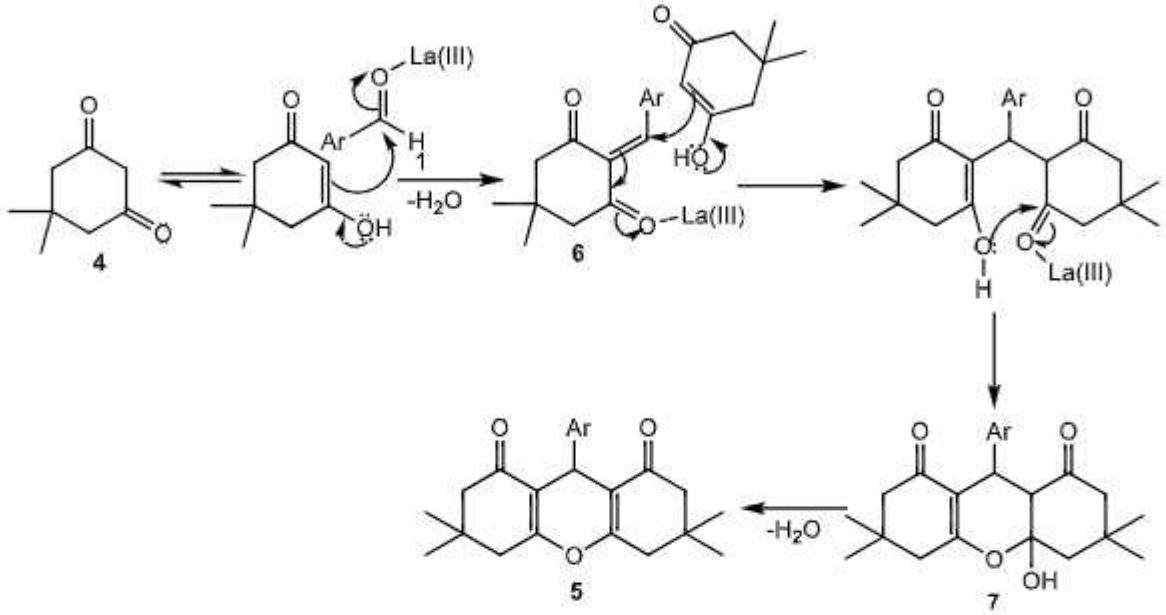
[a]*Reaction conditions: aromatic aldehyde (1 mmol), β-naphthol (**2**) or dimedone (**4**) (2 mmol), lanthanum(III) nitrate (10 mol%) under solvent free conditions.*

[b]*Isolated yield.*

Table 3

Comparison of the efficiency of various catalysts used in the synthesis of *3a*.

Entry	*Catalysts*	*Conditions/T (°C)*	*Time (h)*	*Yield % [Ref.]*
1	Sulphamic acid	Solvent free/125	8	93 [15]
2	Silica sulphuric acid	Solvent free/80	0.75	89 [18]
3	Niobium pentachloride	DCM/ ambient temperature	48	90 [22]
4	Montmorillonite K10	Solvent free/120	3	75 [27]
5	Lanthanum(III) nitrate hexahydrate	Solvent free/80	0.41	92 [Present work]



Scheme 3. Proposed mechanism for the synthesis of xanthene derivatives 5.

A plausible mechanism for the synthesis of xanthene derivatives was proposed in Scheme 3. Due to the strong oxophilicity, lanthanum(III) nitrate appears to play a more efficient catalytic role. Initially, the carbonyl group of the aromatic aldehyde coordinates with lanthanum ion and facilitates the nucleophilic attack. Then, the carbon atom of the carbonyl group of aldehydes is attacked by the nucleophilic dimedone (**4**) to form Knoevenagel product **6**. Next, the subsequent addition of **6** with **4** gives the acyclic adduct intermediates, followed by intramolecular cyclization with the participation of two hydroxyl groups to give the xanthene derivative **5**.

Conclusions

An efficient and green protocol for the synthesis of xanthene derivatives was developed. The advantage of this method is the use of a one-pot multi-component reaction catalyzed by 10 mol% lanthanum(III) nitrate hexahydrate. Due to the strong oxophilicity, lanthanum(III) nitrate appears to play a more efficient catalytic role in the synthesis of xanthenes derivatives. The obtained compounds were confirmed by mass and NMR spectroscopic techniques. The merit of the present synthesis protocol is the use of non-toxic catalyst, eco-friendliness, shorter reaction time, excellent yield and high catalytic activity which can made the proposed method an interesting alternative to multi-step approaches.

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AN EFFICIENT SYNTHESIS OF [1,2,4] TRIAZOLO-QUINAZOLINONE DERIVATIVES USING TIN (II) CHLORIDE DIHYDRATE UNDER MILD REACTION CONDITIONS

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Abstract: In present protocol, we have developed an efficient and environmentally benign protocol for the synthesis of [1, 2, 4] triazolo-quinazolinone derivatives by the condensation of 3-amino-1, 2, 4-triazole as amine sources, with aromatic aldehydes and dimedone in the presence of 10 mol % of $SnCl_2 \cdot 2H_2O$ in acetonitrile at 80 °C. The key advantages of these reaction is low cost, non toxic, excellent yield, shorter reaction time, eco-friendly nature, mild reaction condition and no need of column chromatographic separation.

Keywords: Tin (II) chloride dihydrate, Aromatic aldehydes, dimedone, 3-amino-1,2,4 triazole, Mild reaction condition.

Introduction

In medicinal chemistry azoles heterocycles are important structural moiety due to their wide range of pharmaceutical and therapeutic activities. In this regard many methods have been reported and reviewed[i]. Fused heterocyclic compounds triazolo-quinazolinone derivatives are gained much more synthetic attention due to found in their most of the biological activity such as anticancer[ii], antitumour[iii], antihypertensive,[iv] analgesic and anti-inflammatory,[v] antihistaminic,[vi] and antiHIV[vii] activities. Because of their importance from industrial, synthetic and pharmaceutical point of view, few methods have been reported for the synthesis of triazolo-quinazolinone derivatives in the literature. The one pot multi-component condensation reaction of dimedone, different aldehydes with 3-amino-1,2,4-triazole by microwave irradiation[viii], conventional[ix] and conventional solvent free methods such as Microwave-assisted silica-promoted[x], Nafion-H®[xi], $H_6P_2W_{18}O_{62} \cdot 18H_2O$[xii] and $H_4[W_{12}SiO_{40}]$ grafted on magnetic chitosan[xiii], DMF/TsOH[xiv] Nafion-H®[xv], molecular iodine[xvi], Amberlyst-15® in PEG[xvii], DMF[xviii], $H_6P_2W_{18}O_{62} \cdot 18H_2O$[xix], acetic acid[xx].

However, among these many methods experience from one or more of the disadvantages such as requirement of strong acidic conditions, longer reaction times, low yields, tedious work-up procedures, excess amount of catalyst, and the use of toxic reagents, catalysts, or

solvents. As a results, the researcher have strong demand to developed better methodology for the synthesis of 1,2,4-triazoloquinazolinone derivatives in terms of simplicity, environmentally benign method, economic viability, highly efficient and high yielding which is achieved by using stannous chloride dihydrate ($SnCl_2 \cdot 2H_2O$).

In recent literature, $SnCl_2 \cdot 2H_2O$ is commonly used as a catalyst in organic synthesis[xxi] because of their properties such as non-toxic nature, easy availability, inexpensiveness and easy handling. It also played very important role for the synthesis of biologically active heterocycles such as benzimidazoles[xxii], quinoxalines[xxiii], functionalization of 4,5-diaminopyrazoles[xxiv] and meso-substituted dipyrromethanes[xxv].

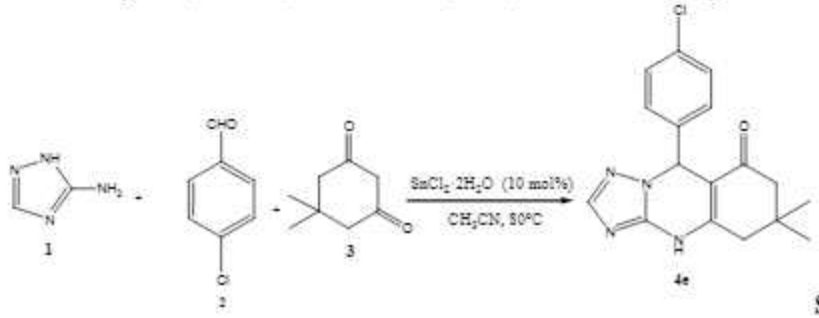
Result and Discussion

To explore the use of stannous chloride dihydrate ($SnCl_2 \cdot 2H_2O$) for the synthesis of 1,2,4-triazolo-quinazolinone by the condensation reaction of 4-chloro benzaldehyde, dimedone and 3-amino 1,2,4-triazole as a amine source in acetonitrile at 80 °C is consideration as a model reaction (Scheme 1). Initially, we have investigated the amount of catalyst required for this organic transformation. During this study, we have carried out the model reaction without/absence of catalyst for 120 min. but did not any desired product formed. It means initiation of the reaction was must to adding the catalyst. We realize the exact requirement of concentration and amount of catalyst for the reaction. Throughout the study, we have observed that the 10 mol% $SnCl_2 \cdot 2H_2O$ proved to be an efficient catalyst for the smoothly conversion of reaction (Table 1, Entry 8). All the [1,2,4]triazolo-quinazolinone derivatives were obtained in excellent yields with good purity. With this study of reaction conditions, we have also optimized the effect of various solvents on the reaction conditions such as water, methanol, ethanol, aqueous ethanol and acetonitrile was investigated. The acetonitrile was found to be the best solvent than the other tested solvents in terms of both yield of the product and reaction time (Table 1 Entry 8) for this transformation.

Table 1 Optimization of solvent and catalyst in synthesis of 1,2,4-triazoloquinazolinone derivatives under mild reaction conditions at 80°C[a]

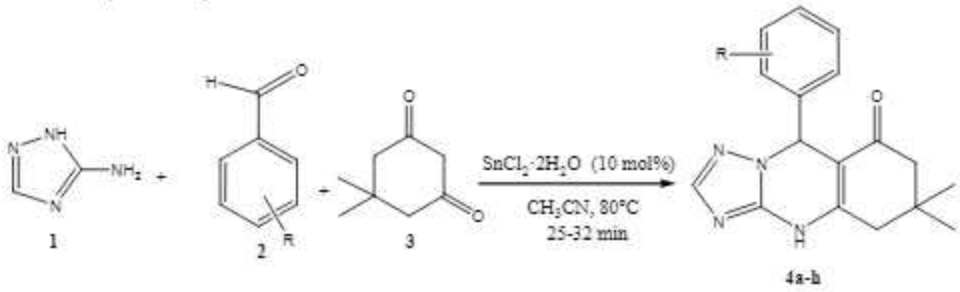
Entry	Solvent	Catalyst (mol %)	Time (min.)	Yield[b] (%)
1	-	-	120	Trace
2	H_2O	10	60	50
3	CH_3OH	10	60	72
4	EtOH	10	60	85
5	EtOH:H_2O	10	60	65
6	CH_3CN	5	60	70
7	CH_3CN	7	50	82
8	**CH_3CN**	**10**	**25**	**94**
9	CH_3CN	15	30	94

[a]**Reaction conditions:** Dimedone (1 mmol), 4-Chlorobenzaldehyde (1 mmol), 3-amino-1,2,4 triazole (1 mmol), stannous chloride dihydrate (10 mol%) in acetonitrile (3 mL) at 80 °C. [b]Isolated yield.



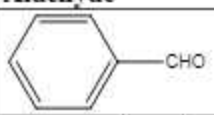
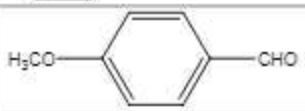
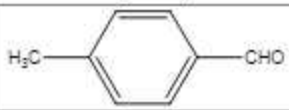
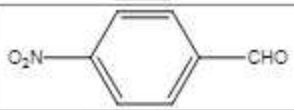
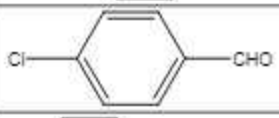
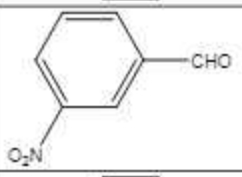
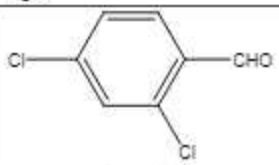
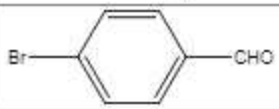
Scheme-1

Encouraging by this results, in further set of experiments, with both electron-donating or electron-withdrawing groups of various aromatic aldehydes were converted to 1,2,4-triazoloquinazolinone derivatives in good to excellent yields. The entire results are summarized in (Table 2).



Scheme 2

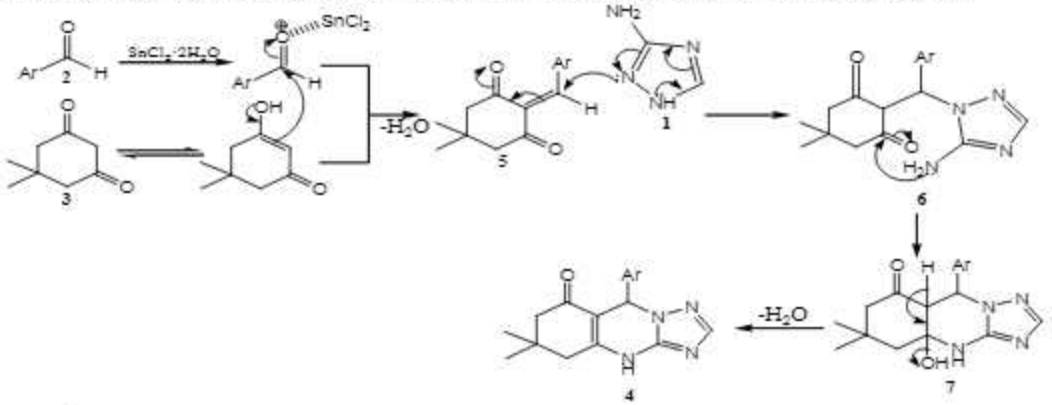
Table 2 synthesis of 1,2,4-triazoloquinazolinone derivatives using stannous chloride dihydrate under mild reaction conditions[a]

Entry	Aldehyde	Time (min)	Yield (%)[b]	Melting point °C
4a		30	92	248-250
4b		25	94	224-226
4c		28	92	264-266
4d		25	94	303-304
4e		25	94	302-304
4f		30	92	266-268
4g		32	87	324-325
4h		28	92	284-285

[a]**Reaction conditions:** Dimedone (1 mmol), Aromatic aldehydes (1 mmol), 3-amino-1,2,4 triazole (1 mmol), Stannous chloride dihydrate (10 mol%) in acetonitrile (3 mL) at 80 °C. [b]Isolated yield.

The probable mechanism of the stannous chloride dihydrate catalyzed conversion is shown in Schemes 3. In this regard to reaction mechanism, we suggest that initially, the

stannous chloride dihydrate catalyst protonates the carbonyl group of aromatic aldehyde **2**, which then condenses with dimedone to produce the intermediate product **5**. Michael addition reaction takes place undergoing more nucleophilic endocyclic nitrogen attack in the 3-amino-1,2,4-triazole **1** to α, β-unsaturated carbonyl compound **5** creates acyclic intermediate **6**. Further intermediate **6** undergoes intra-molecular cyclisation followed by loss of water molecule giving rise to corresponding quinazolinones derivatives **4** via compound **7**



Scheme 3

Experimental

All chemicals and solvents purchased from S.D. Fine, Spectrochem and Loba chemical companies. Formation of products monitored by thin layer chromatography (TLC) and melting points were determined by open capillary and are uncorrected. ^{1}HNMR and ^{13}CNMR spectra were characterized by using Bruker Avance spectrometer 500 MHz and 125 MHz respectively in $CDCl_3$ solvent. Chemical shift (δ) values expressed in parts per million (ppm) and tetramethylsilane (TMS) used as internal standard. Mass spectra were recorded on a macro mass spectrometer, applying electro-spray ionization (ESI) method.

General procedure for the synthesis of 1,2,4-triazolo-quinazolinone derivatives

The condensation reaction of aromatic aldehydes (1.0 mmol) and dimedone (1.0 mmol) with amine source 3-amino-1,2,4-triazole (1.0 mmol) in the presence of 10 mol % of $SnCl_2{\cdot}2H_2O$ in acetonitrile at 80 °C for appropriate time period. The progress of reaction was monitored by TLC. After completion of reaction, then solid product separated by filtration and resultant solids repeatedly wash with water. Solid products were recrystallization from ethanol.

Selected spectral data:

6,6-dimethyl-9-phenyl-5,6,7,9-tetrahydro[1,2,4]-triazolo[5,1b]quinazolin-8(4H)-one-(Table 2, 4a)

Pale yellow solid, yield—92%, mp-248-250 °C; IR (KBr): 3090, 2962, 1650, 1594, 1373, 1252, 721 cm^{-1}; ^{1}H NMR (DMSO-D_6, 500 MHz): δ = 0.95 (s, 3H, -CH_3), 1.03 (s, 3H, -CH_3), 2.05(d, *J* = 16Hz, 1H,-CH_2), 2.19 (d, *J* = 16Hz, 1H,-CH_2), 2.52-2.59 (m, 2H,-CH_2), 6.19 (s, 1H, -CH), 7.17-7.29 (m, 5H, Ar–H) 7.68 (s, 1H, NH) 11.14 (s, 1H, NH); ^{13}C NMR (DMSO-D_6, 125 MHz) δ 26.77, 28.45, 32.16, 49.74, 57.89, 105.55, 126.92, 127.69, 128.23, 141.55, 146.82, 150.24, 150.39, 192.96; MS m/z (ESI): 295 $[M+H]^+$.

6,6-Dimethyl-9-p-tolyl-5,6,7,9-tetrahydro-[1,2,4]triazolo[5,1-b]quinazolin-8(4H)-one (Table 2, entry 4c)

White solid; Yield 92%; mp 264–265 °C; IR (KBr): 3091, 2924, 1649, 1581, 1368, 1253, 756 cm^{-1};^{1}H NMR (500 MHz, DMSO-d6): δ 0.96 (s, 3H, CH_3), 1.04 (s, 3H, CH_3), 2.20 (d, J = 11.52 Hz, 2H, –CH_2), 2.39 (s, 3H, –CH_3), 2.50-2.58 (m, 2H, –CH_2), 6.16 (s, 1H, –CH), 7.07 (S, 4H, Ar-H), 7.67 (s, 1H, Ar-H), 11.10 (s, 1H, NH); ^{13}C NMR (125 MHz, DMSO-d_6): d

192.2, 148.9, 148.6, 145.8, 137.3, 136.0, 127.7, 125.7, 105.2, 56.9, 59.1, 31.2, 37.7, 26.0, 19.7; MS m/z (ESI); 309 $[M+H]^+$.

6,6-dimethyl-9-(4-Chlorophenyl)-5,6,7,9-tetrahydro[1,2,4]-triazolo[5,1b]quinazolin-8 (4H)-one (Table 2, 4e)

Pale yellow solid, yield—94%, mp-302–304 °C; IR (KBr): 3124, 3088, 2962, 1649, 1579, 1367, 1253, 795 cm^{-1}; ^1H NMR (DMSO-D_6, 500 MHz): δ = 0.96 (s, 3H, -CH_3), 1.08 (s, 3H, -CH_3), 2.07(d, *J* = 16Hz, 1H,-CH_2), 2.27 (d, *J* = 16Hz, 1H,-CH_2), 2.50-2.58 (d, *J* =16Hz, 2H,-CH_2), 6.22 (s, 1H, -CH), 7.19–7.37 (m, 4H, Ar–H) 7.71 (s, 1H, NH) 11.19 (s, 1H, NH); ^{13}C NMR (DMSO-D_6, 125 MHz) δ 193.48, 151.06, 150.68, 147.29, 141.01, 132.77, 129.38, 128.76, 105.69, 57.86, 50.24, 32.69, 31.73, 28.86, 27.40; MS m/z (ESI): 329 $[M+H]^+$.

Conclusion

In summary, we have developed highly efficient and environmentally benign protocol for the synthesis of 1,2,4-triazoloquinazole derivatives using $SnCl_2 \cdot 2H_2O$ as a catalyst by the condensation reaction of dimedone, 3-amino 1,2,4-triazole as a amine source and various aromatic aldehydes in acetonitrile as a solvent at 80 °C. These protocol has few advantages is inexpensive and non-toxic catalyst, easily handling, simple procedure, mild reaction conditions eco-friendly, high yield and no need of chromatographic separation.

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"ADVANCED USE OF HYDROGEN AS FUEL."

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Abstract:
Hydrogen is a clean, efficient and versatile energy carrier, which together with electricity, may satisfy all the energy needs and form an energy system that would be permanent and independent of energy sources. Hydrogen has the most reduced nuclear load of any component, at 1.008 grams per mol (g/mol); nuclear hydrogen is multiple times lighter than carbon (C), multiple times lighter than nitrogen (N) and multiple times lighter than oxygen (O). Notwithstanding normal or light hydrogen 1H (protium), there are likewise two other hydrogen molecules (isotopes): substantial hydrogen (2H) or deuterium (D) and super-weighty hydrogen (3H) or tritium (T), with extra neutrons. The examination on hydrogen driven advances are currently engaged on beating the issues related with hydrogen creation. A portion of these advances will be introduced with the end goal of understanding the difficulties on the various cycles. There are different courses to use hydrogen from various assets. Hydrogen for mechanical applications is as of now being delivered by breaking carbonaceous petroleum product (for example methane) through steam changing furthermore, fractional oxidation yet there are additionally advancements on strategies utilizing sustainable assets like biomass through gasification

Key Words: Energy carrier, carbon, nitrogen, oxygen, proteum, deuterium,, tritium

Introduction:

The name "hydro-gène" ("water maker") was first instituted in 1787 by the French scientist Antoine Laurent de Lavoisier, from the Greek words "hydor" (water) and "genes" (producing). It had before been classified "inflammable air" by the English scientific expert and physicist Henry Cavendish on account of its high combustibility. The German name "Wasserstoff" ("water substance") moreover alludes to its water creating properties.Hydrogen (synthetic symbol H for the Latin name hydrogenium) is the primary component in the intermittent table and furthermore the most straightforward. Customary hydrogen comprises of an emphatically charged core (pro-ton) and a contrarily charged electron. Hydrogen has the most reduced nuclear load of any component, at 1.008 grams per mol (g/mol); nuclear hydrogen is multiple times lighter than carbon (C), multiple times lighter than nitrogen (N) and multiple times lighter than oxygen (O).Notwithstanding normal or light hydrogen 1H (protium), there are likewise two other hydrogen molecules (isotopes): substantial hydrogen (2H) or deuterium (D) and super-weighty hydrogen (3H) or tritium (T), with extra neutrons. As the neutron in the hydrogen core is generally a similar load as the proton, deuterium is around twice as hefty and tritium roughly multiple times as heavy as protium. Practically all hydrogen (99.985 %) is conventional hydrogen; just 0.015 % happens as heavy hydrogen. The extent of super-heavy hydrogen is vanishingly little.Under standard conditions, for example surrounding temperature and atmospheric pressure of 1.013 bar, nuclear hydrogen (H) doesn't happen. All things considered, hydrogen exists in dimerised structure, where two hydrogen atoms solidly consolidate to shape a hydrogen atom (H2). The molecular weight of a hydrogen particle is then 2.016 g/mol.The H-H particle has a moderately high bond energy of 436 kJ/mol, which implies that the H2 atom is steady and chemically inert at room temperature. Contingent upon whether the protons of a H-H compound turn in equal or in inverse ways about their own hub (atomic turn), the two changes are referred to separately as ortho-hydrogen and para-hydrogen. Ortho-hydrogen (o-H2) has a higher energy content than para-hydrogen (p-H2). Likewise, their specialized and actual properties contrast somewhat. Under winning thermodynamic conditions ortho-and para-hydrogen structure a balance blend. Under standard conditions hydrogen exists as a 75:25 combination of o-and p-hydrogen, while cryogenic hydrogen comprises for the most part of p-H2. The change of o-to p-hydrogen is an exothermic compound response where energy is

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delivered. Consequently, regardless of whether cryogenic fluid hydrogen is totally secluded, dissipation happens except if all o-H2 is changed over into p-H2. The expression "hydrogen" will generally be utilized as an equivalent for the H2 atom.Hydrogen is the first and most significant component known in the universe. Its assessed mass portion is in the request for 75 %. In the early uni verse, some 13.8 billion years prior, hydrogen cores were shaped by combination at incredibly high temperatures (nucleosynthesis). In the hot inside of stars, the resulting heavenly combination of hydrogen to helium, otherwise called "hydrogen consuming", is the most significant and most extravagant wellspring of energy in their life cycle. The age of a star can be resolved from the conveyance of the components and the heaveniy mass.(Albat*et.al*, 2008)

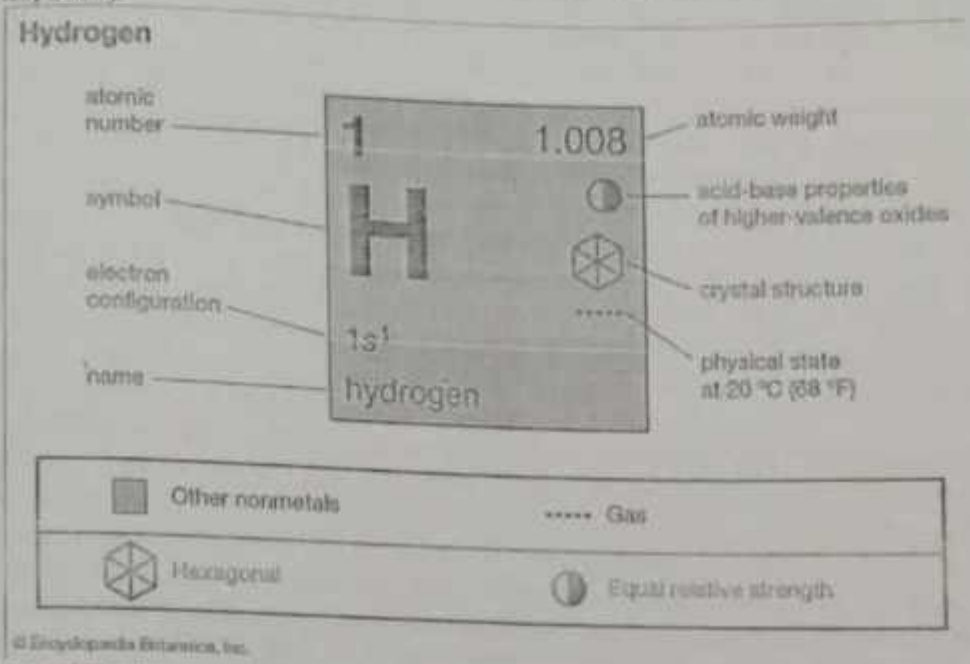

Fig.1: Structure of Hydrogen atom

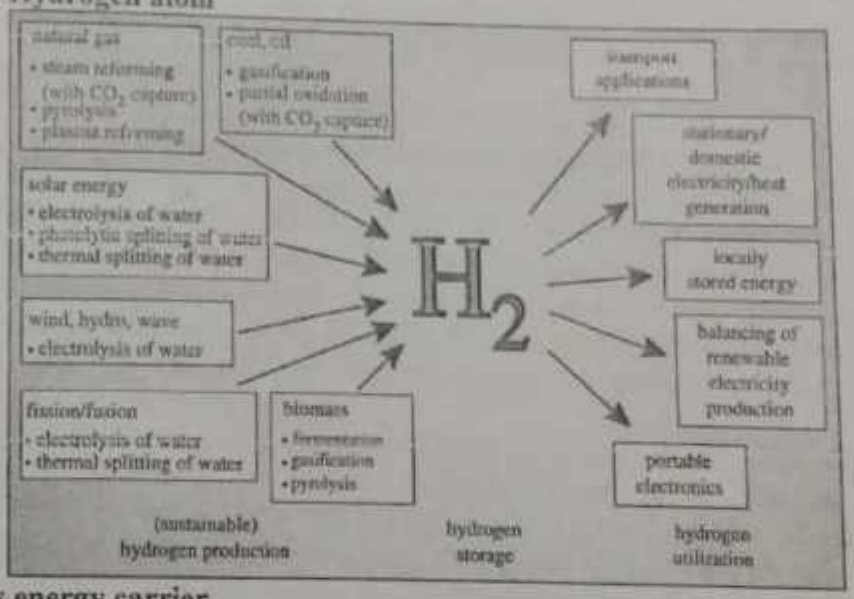

Fig.2: Hydrogen as energy carrier.

Review of Literature:

1) **Sherif*et.al*(2003)** reported that hydrogen is a clean, efficient and versatile energy carrier, which together with electricity, may satisfy all the energy needs and form an energy system that would be

permanent and independent of energy sources. It has unique characteristics that make it an ideal energy carrier which include the fact that it can be produced from and converted into electricity at relatively high efficiencies, its raw material for production is water- available in abundance; it is a completely renewable fuel; it can be stored in gaseous form (convenient for large scale storage), in liquid form (convenient for air and space transportation), or in the form of metal hydrides (convenient for surface vehicles and other relatively small scale storage requirements); it can be transported over large distance through pipelines or via tankers; it can be converted into other forms of energy in more ways and more efficiently than any other fuel (such as catalytic combustion, electrochemical conversion, and hydriding; it is environmentally compatible as its production, storage, transportation, and end-use do not produce any pollutants (except for small amounts of nitrogen oxides), greenhouse gases, or any other harmful effects on the environment.

2) **Edwards *et.al* (2007)**stated that hydrogen can also be used a storage medium for electricity generated from intermittent, renewable resources, such as solar, wind, wave and tidal power; it thereby provides the solution to one of the major issues of sustainable energy, namely the vexing problem of intermittency of supply. As long as the hydrogen is produced from non-fossil fuel feedstock, it is a genuinely 'green fuel'. Moreover, locally produced hydrogen allows for the introduction of renewable energy to the transport sector, provides potentially large economic and energy security advantages and the benefits of new infrastructure based on distributed generation. It is this key element of the energy storage capacity of hydrogen that provides the potent link between sustainable energy technologies and sustainable energy economy, generally placed under the umbrella of hydrogen economy.

3) **Balat M(2008)** reported that hydrogen is an attractive alternative fuel. However unlike coal, gas or oil, hydrogen is not a primary energy source. Rather its role mirrors more closely that of electricity as a secondary 'energy carrier', which must first be produced using energy from another source and then transported for future use where its latent chemical energy can be fully realized. Hydrogen can be obtained from diverse resources, both renewable (hydro, wind, wave, solar, biomass and geothermal) and non-renewable (coal, natural gas and nuclear). It can be stored as a fuel and used in transportation and distributed heat and power generation systems using fuel cells, internal combustion engines or turbines, with the only by-product at the point of use being water. The ability of hydrogen to replace fossil fuels in the transportation sector could address one of the world's major environmental problems.

4) **Rachel (2008)** said that hydrogen is the fuel of the future. As an avid research of alternative fuels and an ambitious chemistry student, this researcher understands the importance of a shift to a hydrogen economy. Hydrogen is an energy carrier that can be used in internal combustion engines or fuel cells producing virtually no greenhouse gas emission when combusted with oxygen. The only significant emission is water vapor. Hydrogen production and storage is currently undergoing extensive research. A solar hydrogen system can provide the means of a totally emissions-free method of producing hydrogen. Although steam reformation of methane is currently the major route to hydrogen production, the emissions involved can also be controlled much more efficiently than our current system of transportation fuel.

5) **Mary Grace (2015)** stated that the world had been dependant on oil as the pillar of its economy with fossil fuels leading as the world's primary energy supply. Member countries of the Organization of the Petroleum Exporting Countries (OPEC) are the major oil exporters in the world and depending on the supply and demand they control the price and supply of oil to its consumers. This dependence in oil was seen during the 1973 oil embargo which struck the economies of the industrialized countries for months. Countries with the highest energy consumption are notably China followed by United States, and India in 2013. Since the advent of industrial revolution, the use of oil for electricity and other industrial applications had become inevitable. The driving force

of a civilization will always be energy accessibility. But with the uncertainty of the oil reserves due to failed forecasting and underestimated oil reserves along with the increasing energy demand of the growing population, the necessity to develop alternatives for fossil fuel had been the focus of the century.

Materials and Methods:

Hydrogen Production Technologies:

Besides being utilized as fuel for ICE and FC, hydrogen is likewise a significant crude material for a few ventures. One of its mechanical applications is to handle raw petroleum into refined fills like fuel what's more, diesel by eliminating its pollutants. It is additionally a significant feedstock for alkali creation for use in compost, semiconductor creation, glass industry, hydrogenation of fats and oils, methanol creation, creation of HCl, plastics reusing, rocket fuel, and welding and cutting. Hydrogen extraction techniques are sourcespecific and can be delivered utilizing an assortment of feedstock.

The examination on hydrogen driven advances are currently engaged on beating the issues related with hydrogen creation. A portion of these advances will be introduced with the end goal of understanding the difficulties on the various cycles. There are different courses to use hydrogen from various assets. Hydrogen for mechanical applications are as of now being delivered by breaking carbonaceous petroleum product (for example methane) through steam changing furthermore, fractional oxidation yet there are additionally advancements on strategies utilizing sustainable assets like biomass through gasification. On the other hand, there are additionally approaches to use hydrogen by water breaking wherein electrolysis is being utilized. The significant expense of power for creation through electrolysis is a significant mishap subsequently, high temperature warm breaking from atomic reactors and photovoltaic cells are done rather to decrease power utilization.A few innovations have been accessible for the creation of hydrogen fuel, one of which is the creation from non-renewable energy sources that is fossil fuels. The feedstock, flammable gas is decontaminated by eliminating sulfur and chlorine by hydrogenation, and response with Zinc Oxide(ZnO) bed. After the evacuation of impurities, the excess methane through endothermic condition is responded with steam at 750-800°C at 3-25 bar pressure within the sight of impetuses, consequently called steam improving creating carbon monoxide (CO) and hydrogen (H2) as syngas. The subsequent CO from the syngas was additionally responded for high temperature water gas move response and for high temperature water gas move response and for low temperature water gas move response at 350-190°C. Subsequently, different contaminations are eliminated by the Pressure Swing Absorption (PSA) leaving basically hydrogen as the item, and the debasements are moved back to the steam reformer to permit more creation of hydrogen gas. A similar water gas move response measure applies to the incomplete oxidation strategy the thing that matters is that sure measure of methane will at first be oxidized by permitting it to respond with a stoichiometric measure of oxygen yielding CO and H2 Auto-warm transforming then again, is the mix of both steam improving and halfway oxidation to create syngas. It works at 950-1100°C at 10 MPa with around 80-90% productivity.

One more abundant source of hydrogen on earth comprises 70% of the actual Earth – water. As said before in this article that hydrogen exist on Earth in mixtures, subsequently water parting should be done to separate water into hydrogen and oxygen. Water parting can be utilized through the utilization of electrical energy in an electrolytic cell. An electrolyte, for example fluid potassium hydroxide (KOH) arrangement or then again a polymer electrolyte film, is utilized to circle to an electrolytic cell with an anode and a cathode. In high temperature electrolysis strategy, water as steam (utilizing outside warmth source, for example sun powered or atomic) is taken care of in the cathode of an electrolysis cell disintegrating water. Oxygen conductive electrolyte in the anode isolates the oxygen from hydrogen to forestall recombining. Combination of hydrogen gas what's more, steam are gone through a condenser leaving unadulterated hydrogen as item. This cycle can give up to 60% proficiency. Sun powered energy from photovoltaic frameworks coupled to electrolyzer utilizes light to straightforwardly split water into hydrogen and oxygen

is called photolysis. The last mentioned technique decreases generally electric energy costs notwithstanding, the turn of events of a photograph electrolytic cell with higher sun based to hydrogen convoconversion proficiency and erosion safe material remaining parts a test

Hydrogen from Biomass Conversion:

Biomass is the most adaptable among the inexhaustible assets since gas can be gathered in fluid or vaporous structure. Energy acquired from biomass on the planet can be gotten from wood squanders, civil strong squanders, agrarian waste, and ranger service squanders. Wood squanders are dialect cellulosic materials containing three polymers: cellulose, hemicellulose and lignin. Cellulose is 40-half of the biomass wherein the most plentiful utilitarian gathering is hydroxyl bunches thus having hydrogen holding as the primary firm power of the polymer.Biomass compound structure through extreme examination on the other hand recognizes the measure of hydrogen which might be removed from woody biomass.Having moderately low H2 substance will likewise give H2 low yield thus, the center was transformed into improving item gas creation, limiting tar, and upgrading carbon transformation

Result and Conclusion:

Hydrogen, an auxiliary energy asset, is equipped for producing power just as fuel source. As talked about in this paper, it very well might be delivered from an assortment of feedstock. Nonetheless, in building hydrogen economy for the future, the unwavering quality of hydrogen creation and its long haul impacts should be completely thought of. Dependability would mean a more economical hydrogen energy determination subsequently creating less discharges that can be hurtful to the climate. Today, the most settled hydrogen creation is from petroleum products through steam improving interaction. However, the limit of this essential asset is an approaching emergency, thus, more grounded Research and development zones ought to be thought of in creating H2 from sustainable assets all things being equal. Natural and thermo substance measure from biomass assets are somewhat costefficient contrasted with electrolysis as far as its innovative angles. Biomass then again, is considered as a whimsical fuel feedstock lacking homogeneity and conflicting quality adding to poor mechanical developments throughout the long term. It is as yet the most encouraging feedstock with gasification and pyrolysis as the most ideal driving innovation for H2 commercialization. To understand this, there ought to be higher H2 yield from thermo synthetic cycles. As seen from the introduced measures, a great deal of work actually should be done one of which is improving the change innovations through transforming at lower temperatures, upgrade appropriateness of feedstock, and expanding change proficiency. Moreover, for a more steady hydrogen creation the advancement of the monetary and attractiveness of the fuel angles later on should be grounded.

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"CHEMISTRY OF BIOLUMINESCENCE"

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Abstract:

Emission of light from a living organism which functions for its survival of propagation is called as bioluminescence. It can be thought as chemiluuiscence that is catalyzed by an enzyme. Light which is emitted from an organisms is cold which is resulting from a specific biochemical processes, these biochemical processes are specific for that organisms. Bioluminescence is one of the major communication mechanisms also known as "Quorum sensing". From an overall perspective, the important synthetic response in bioluminescence includes a light-producing atom and a protein, by and large called luciferin and luciferase, individually. Since these are conventional names, luciferins and luciferases are frequently recognized by including the species or groups, for example firefly luciferin. On the whole described cases, the compound catalyzes the oxidation of the luciferin. In certain species, the luciferase requires different cofactors, like calcium or magnesium particles, and here and there additionally the energy-conveying atom adenosine triphosphate (ATP). Bioluminescence is an interesting chemical reaction whereby a conspicuous visible light emitted by the several luminescent organisms. The history of this phenomenon could be found in terrestrial, freshwater and particularly marine environments. Yet, all most of all the luminous organisms share similar chemical components involved in the luminescence emission refer to as luciferin and luciferase. Particularly this phenomenon is enormously common in deep sea, especially from aphotic zone to till the bottom of the sea.

Key Words: Bioluminescence, chemiluminescence, enzyme, light, quorum sensing

Introduction:

Bioluminescence is the creation and discharge of light by a living life form. It is a type of chemiluminescence. Bioluminescence happens broadly in marine vertebrates and spineless creatures, just as in certain organisms, microorganisms including some bioluminescent microbes, and earthly arthropods like fireflies. In certain creatures, the light is bacteriogenic, delivered by advantageous microorganisms like those from the variety Vibrio; in others, it is autogenic, delivered by the actual creatures. From an overall perspective, the important synthetic response in bioluminescence includes a light-producing atom and a protein, by and large called luciferinand luciferase, individually. Since these are conventional names, luciferins and luciferases are frequently recognized by including the species or groups, for example firefly luciferin. On the whole described cases, the compound catalyzes the oxidation of the luciferin. In certain species, the luciferase requires different cofactors, like calcium or magnesium particles, and here and there additionally the energy-conveying atom adenosine triphosphate (ATP). In development, luciferins shift close to nothing: one specifically, coelenterazine, is found in 11 diverse creature phyla, however in a portion of these, the creatures get it through their eating routine. On the other hand, luciferases change broadly between various species, which is proof that bioluminescence has emerged more than 40 times in transformative history. Both Aristotle and Pliny the Elder referenced that soggy wood at times emits a gleam. Numerous hundreds of years after the fact Robert Boyle showed that oxygen was associated with the interaction, in both wood and glowworms. It was not until the late nineteenth century that bioluminescence was appropriately explored. The marvel is broadly appropriated among creature gatherings, particularly in marine conditions. Ashore it happens in growths, microorganisms and a few gatherings of spineless creatures, including bugs. The employments of bioluminescence by creatures incorporate counter-enlightenment cover, mimicry of different creatures, for instance to draw prey, and motioning to others of similar species, for example, to pull in mates. In the lab, luciferase-based frameworks are utilized in hereditary designing and biomedical exploration. Scientists are additionally exploring the chance of utilizing bioluminescent frameworks for road and brightening lighting, and a bioluminescent plant has been made (Johnsen*et.al*, 1999)

Emission of light from a living organism which functions for its survival of propagation is called as bioluminescence. It can be thought as chemiluminiscence that is catalyzed by an enzyme. Light which is emitted from an organisms is cold which is resulting from a specific biochemical processes, these biochemical processes are specific for that organisms. Bioluminescence is one of the major communication mechanisms also known as "Quorum sensing". Organisms showing bioluminescence are mostly found in marine environment. Bioluminescence is special form of chemical luminescence. In bioluminescence the nature of biochemical reactions results in an electronically excited state of some molecule which subsequently emits light. Luminescence phenomenon is widely distributed in the animal and plant kingdom. (John Lee,2014).

Review of Literature:

1) **Tosho Goto (1967)** reported that with their fascinating phenomena we recognize many bioluminescent organisms, such as firefly, luminous bacteria, luminous fungi, and luminous deep-sea fish. Some eighty years ago, Dubois found that the bioluminescence of the luminescent beetle Pyrophorus is due to the luciferin—luciferase reaction. Bioluminescence1—9 was observed when a hot aqueous extract ("luciferin") of the insect was mixed with a cold aqueous extract ("luciferase") after the initial luminescence had disappeared. This observation led to numerous studies on the luciferin—luciferase reaction many bioluminescent organisms. It is now known that hot water extracts luciferin and destroys luciferase; the cold-water extract contains luciferase, and also luciferin at first, but the latter changes into an inactive oxidation product on standing in air.
2) **Ramesh *et.al* (2015)** said that Bioluminescence is an interesting chemical reaction whereby a conspicuous visible light emitted by the several luminescent organisms. The history of this phenomenon could be found in terrestrial, freshwater and particularly marine environments. Yet, all most of all the luminous organisms share similar chemical components involved in the luminescence emission refer to as luciferin and luciferase. Particularly this phenomenon is enormously common in deep sea, especially from aphotic zone to till the bottom of the sea. This emission could be found over all the major phyla which represent at least one genus, except few groups refer to plants, birds, amphibians, and mammals. This phenomenon covers diverse hues, reactions and emission patterns. The proteins and genes involved in the luminescence of some organisms have a wide importance in medical and biotechnological applications. In this review we shall devote to talk very briefly about bioluminescence of different organisms, current aspects, and applications.
3) **John Lee (2017)** stated that The molecular mechanisms of the bioluminescence systems of the firefly, bacteria and those utilizing imidazopyrazinoneluciferins such as coelenterazine are gradually being uncoveredusing modern biophysical methods such as dynamic (ns–ps) fluorescence spectroscopy, NMR, X-ray crystallography and computational chemistry. The chemical structures of all reactantsare well defined, and the spatial structures of the luciferases are providing important insight into interactions within the active cavity. It is generally accepted that the firefly and coelenterazine systems, although proceeding by different chemistries, both generate a dioxetanone high-energy species that undergoes decarboxylation to form directly the product in its S1 state, the bioluminescence emitter. More work is still needed to establish the structure of the products completely. In spite of the bacterial system receiving the most research attention, the chemical pathway for excitation remains mysterious except that it is clearly not by a decarboxylation. Both the coelenterazine and bacterial systems have in common of being able to employ "antenna proteins," lumazine protein and the greenfluorescent protein, for tuning the color of the bioluminescence. Spatial structure information has been most valuable in informing the mechanism of the Ca2+-regulated photoproteins and the antenna protein interactions.
4) **W.D McElroy *et.al*(2021)** said that numerous studies during the past fifty years on luminous organisms have established beyond doubt that the necessary energy for the light production is yielded by chemical reactions. Bioluminescence is a special form of chemiluminescence. The

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nature of the biochemical reactions which result in an electronically excited state of some molecule which subsequently emits light is, therefore the central problem in bioluminescence. Luminescence is distributed widely in the animal and plant kingdom, and Harvey has recently summarized most of this information in his book, the first definitive experiment regarding the nature of the components necessary for light production was reported by Dubois in 1885, he found that the luminous organs of pyrophorus, a luminous beetle would cease to emit light if immersed in hot water. He found however, the cold water extract which had ceased to luminesce could be stimulated to emit light by adding the hot water extract. On the basis of this type of experiment, Dubois proposed the theory that there was, in the hot water extract, a substance stable to heat which was destroyed during its luminescent oxidation through the action of a catalyst present in the cold water extract.

Chemical Mechanism of Bioluminescence:

Bioluminescence is a type of chemiluminescence where light energy is delivered by a chemical reaction. This reaction includes a lightemitting color, the luciferin, and a luciferase, the protein segment. In view of the variety of luciferin/luciferase blends, there are not very many shared traits in the chemical mechanism. From as of now contemplated frameworks, the solitary binding together system is the part of atomic oxygen, which gives synthetic energy; frequently there is a simultaneous arrival of carbon dioxide (CO2). For instance, the firefly luciferin/luciferase reaction requires magnesium and ATP and produces CO2, adenosine monophosphate (AMP) and pyrophosphate (PP) as byproducts. Different cofactors might be required, like calcium (Ca2+) for the photoproteinaequorin, or magnesium (Mg2+) particles and ATP for the firefly luciferase. Conventionally, this reaction can be depicted as:

Image number 1.1 **(Source-Internet)**

Distribution of Bioluminescent Organisms:

The biodiversity and dissemination of bioluminescent organic entities could be found in each climate relating to earthly, freshwater, and marine conditions.In spite of the fact that the circulation of radiant creatures are known to be transcendent in marine anyway very hardly in new water climate additionally iridescent creatures (Latianeritoides) can be seen. As everybody realizes fireflies are the most normally discovered earthbound brilliant living beings and less mushrooms

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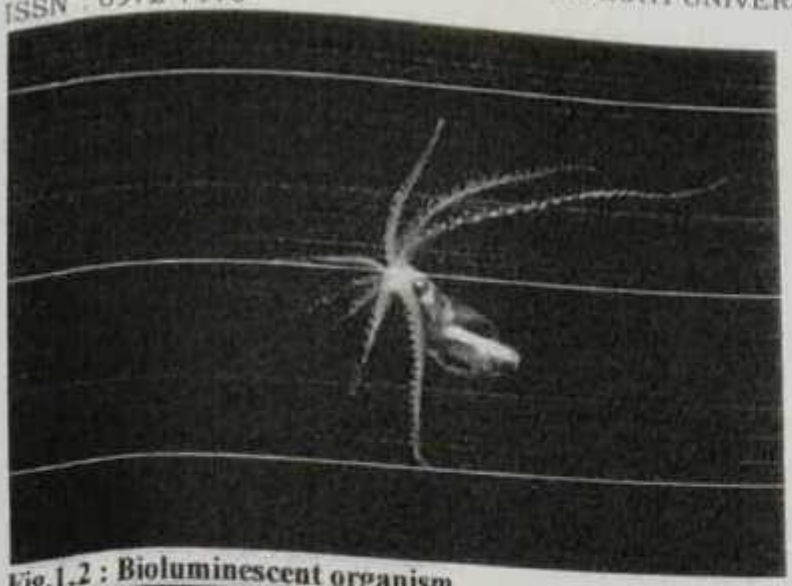

Fig.1.2 : Bioluminescent organism

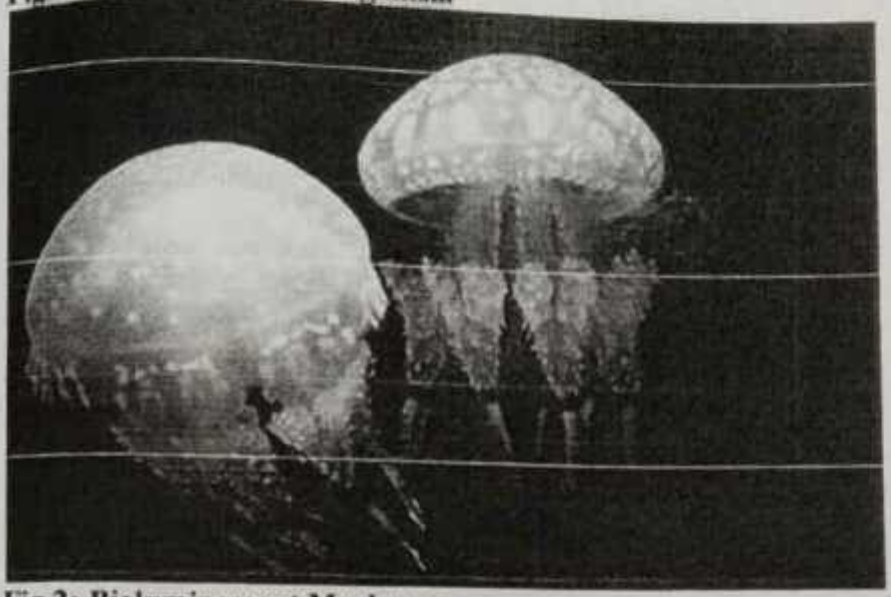

Fig.2: Bioluminescent Mushroom

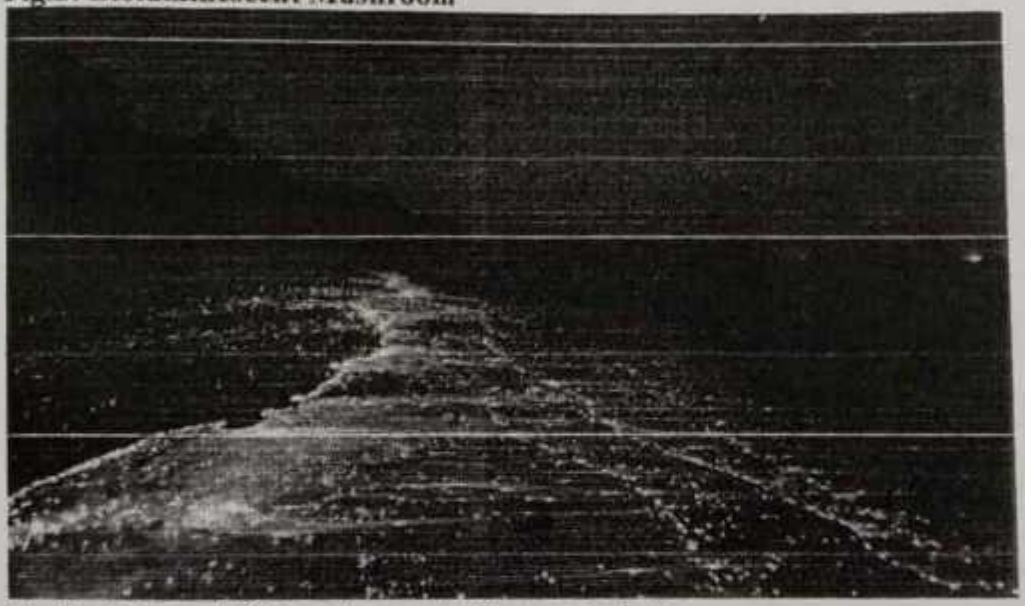

Fig.13: Bloom of Bioluminescent Microorganisms.

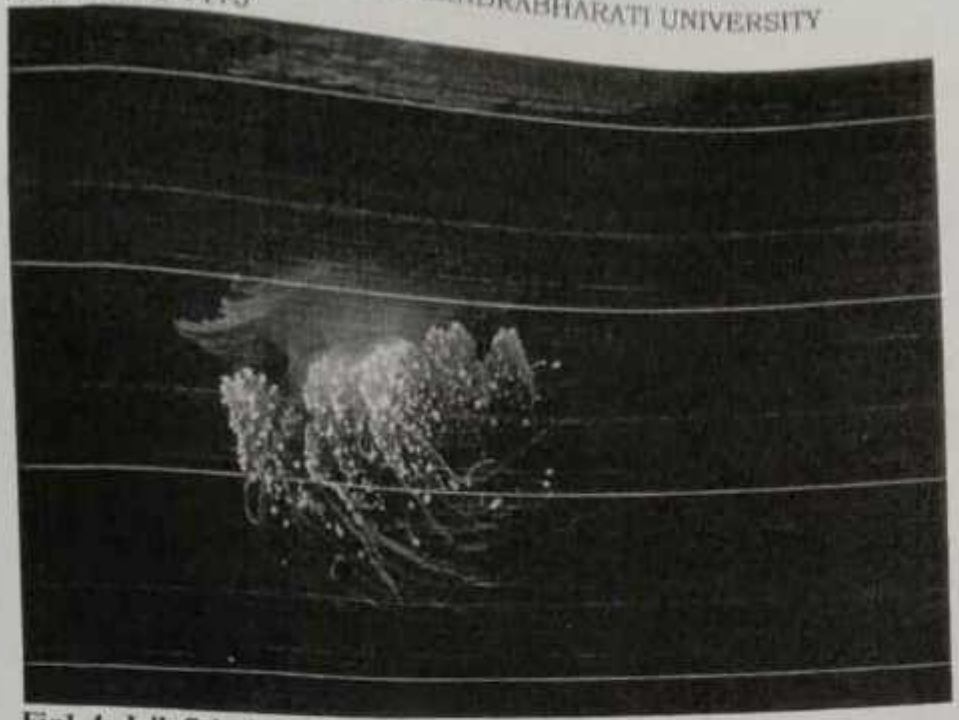

Fig1.4: Jellyfish showing Bioluminescence Phenomenon.

Involvement of Protein in Bioluminescence:

There are five distinct luciferins answerable for the bioluminescence of the greater part of the known bioluminescent organisms. They are bacterial luciferin (a subordinate of riboflavin), dinoflagellateluciferin (identified with the chlorophyll structure), firefly luciferin (requires ATP for bioluminescence), coelenterazine (very normal, found in a few animal types), and vargulin (found in Ostracods). Notwithstanding, emission mechanism of numerous iridescent living beings are yet to be found. Discernibly fluorescent proteins like GFP (in jellyfishes) and lumazine protein (in Photobacteriumphosphoreum) are additionally known to be engaged with emanation of intense luminance.

Applications of Bioluminescence:

The "Green-Fluorescent Protein" or GFP, is likely the most acclaimed protein in Biology (Nobel Prize in Chemistry, 2008). GFP was cloned in 1992 (13), and communicated in different living beings in 1994 (14). Since that time the quantity of writing references has ascended into a huge number, as utilizations of GFP have expanded. Specifically, GFP is currently grounded as an amazing quality tag or protein tag. GFP can be combined to a protein of interest, and fluorescence (and accordingly the protein of interest) can be followed inside a cell to examine its confinement and conduct. GFP has exceptional underlying security, and with the property of having the option to frame the fluorescence in situ without the outside expansion of substrate, GFP turns into a phenomenal device for examining cell and sub-cell measures (15). Quick and compelling indicative tests dependent on bioluminescence are continually advancing in the commercial center. For instance, "Microtox" for water quality/poisonousness testing utilizes the bioluminescent marine microorganisms Vibrio fischeri. At the point when this living being is tested by a poison, the breath pathway is upset, bringing about a decline in bioluminescent power. Some "fun" applications and thoughts exist, for example, the possibility of glowing Christmas Trees and walkways notwithstanding radiant brew and champagne. The utilization of light sticks for night shows and controlling airplane to air terminal entryway positions are nevertheless a couple of consistently uses of this far and wide wonder: iridescence.

Result and Conclusion:

Bioluminescence is far reaching across most types of metazoan marine life. The circulation inside scientific classifications is inconsistent, some of the time even between sister taxa. Light is normally produced by the organic entity itself and simply once in a while because of bacterial symbionts. Light producers (luciferins) are saved, while chemicals (luciferases) are different and species-

explicit. One luciferin, coelenterazine, is the light producer for nine distinct phyla. In view of the synthetic components known, iridescence has developed autonomously in excess of multiple times. It serves an assortment of capacities, both hostile and protective, even inside a solitary creature. Since an enormous part of creatures is bioluminescent, evaluating radiance can give an intermediary to heterotrophic biomass. The circulation of bioluminescent life forms can be estimated via robotized instruments and is a valuable boundary for understanding sea environment.

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"ATMOSPHERIC CHEMISTRY EFFECTS ON CLIMATE CHANGE"

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Abstract:

The retention of surface produced active infrared radiation in the air, trailed by re-emanation at the neighborhood air temperature, can prompt an expansion of surface temperatures. This has been named the "greenhouse effect." .Environment models show that a multiplying of CO2, likelihood inside the following century, would increment worldwide found the middle value of surface temperatures by 1.5-4.5°C. The more perplexing three-dimensional general flow models compute brings about the upper finish of this reach. While no other single gas is probably going to straightforwardly affect environment anticipated from CO2, radiative-convective environment models propose that the amount of radiative impacts from other follow gases, for example, CH4, N2O, and the CFC's, could successfully twofold the climatic effect of extended expansions in CO2 if latest things in the environmental groupings of these gases proceed. For air groupings of interest, the radiative forcings from these individual gases are almost added substance as for their effect on a superficial level lower atmosphere environment framework. The essential expulsion instruments for CO and CH4 are by responses with OH, and these equivalent responses give the main direct transformation responses for OH to different types of HOX on a worldwide premise. These collaborations infer that increments in CO and CH4 plenitudes can prompt reductions in OH, with an ensuing positive criticism on the lifetime and wealth of CH4 (and different hydrocarbons, including in part halogenated species). An increment in tropospheric temperatures would prompt expanded H2O focuses, and an expansion in OH. Further, increments in tropospheric NOX and O3 can prompt expansions in OH by upgrading cycling responses that convert HO2 to OH. The net impact of every one of these cooperation's on OH is obscure. To comprehend and incorporate these impacts in detail will require three-dimensional worldwide tropospheric-compound models not yet accessible.

Key words: Greenhouse effect, CO2, radiative, convective, CH4, N2O, CFC, NOX, O3

Introduction:

Plentiful proof exists showing that surface discharges and convergences of around the world significant follow gases are expanding. When all is said in done, the expanding convergences of these gases are believed to be owing to human related causes. A considerable lot of these gases can effectively affect environment through their retention of infrared radiation. Environmental change, being related with long haul changes in climate, is described by worries about patterns and fluctuation in surface temperatures, precipitation, overcast cover, and other environment factors. The retention of surface produced active infrared radiation in the air, trailed by re-emanation at the neighborhood air temperature, can prompt an expansion of surface temperatures. This has been named the "greenhouse effect." Consequently, the expanding air groupings of these infrared retaining follow gases can influence the worldwide environment, and have hence been the subject of much late investigation. The expanding convergence of carbon dioxide, (CO2) generally because of non-renewable energy source ignition, has gotten the most consideration. Environment models show that a multiplying of CO2, likelihood inside the following century, would increment worldwide found the middle value of surface temperatures by 1.5-4.5°C. The more perplexing three-dimensional general flow models compute brings about the upper finish of this reach. While no other single gas is probably going to straightforwardly affect environment anticipated from CO2, radiative-convective environment models propose that the amount of radiative impacts from other follow gases, for example, CH4, N2O, and the CFCs, could successfully twofold the climatic effect of extended expansions in CO2 if latest things in the environmental groupings of these gases proceed. For air groupings of interest, the radiative forcings from these individual gases are almost added substance as for their effect on a superficial level lower atmosphere environment framework. The direct

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radiative constraining on the air those outcomes from some random measures of CO2 and other follow gases is for the most part surely known and isn't being referred to. Notwithstanding, the extent of environmental change that could result is still profoundly dubious. Specifically, there are numerous vulnerabilities in the environment input measures that will decide the inevitable change in temperature and other climatic factors. The degree of future environmental change will rely upon the intricate co-operations between air radiative, dynamical, and compound cycles, just as the climatic criticism systems referenced already. Notwithstanding immediate radiative impacts of surface-produced gases, there are aberrant consequences for environment that should be thought of. Air science assumes a critical part in the assurance of large numbers of these impacts. At last, the genuine air creation of the ozone harming substances will depend on characteristic and anthropogenic surface discharges, yet additionally on any barometrical synthetic cycles influencing their fixations and disseminations. In contrast to the direct radiative impacts, photochemical cycles influencing environmental piece are for the most part coupled and nonlinear. Along these lines, the assessment of net radiative effect of changes interceded by photochemistry will in general be explicit to the definite situation expected for follow gas bounty and discharge patterns. (Donald *et.al*, 2012)

Review of Literature:

1) **Daniel *et.al* (2014)** reported thatAerosols counteract part of the warming effects of greenhouse gases, mostly by increasing the amount of sunlight reflected back to space. However, the ways in which aerosols affect climate through their interaction with clouds are complex and incompletely captured by climate models. As a result, the radiative forcing (that is, the perturbation to Earth's energy budget) caused by human activities is highly uncertain, making it difficult to predict the extent of global warming. Recent advances have led to a more detailed understanding of aerosol-cloud interactions and their effects on climate, but further progress is hampered by limited observational capabilities and coarse-resolution climate models. Recent advances have revealed a much more complicated picture of aerosol-cloud interactions than considered previously. For example, radiative forcing due to aerosol-cloud interactions may be limited by buffering mechanisms that result in compensation between different cloud responses to aerosols. Other situations may be hypersensitive to aerosols because aerosols have become extremely depleted by precipitation. In these ultraclean regimes, addition of aerosols can dramatically increase cloud cover, causing a large cooling. Another newly appreciated process is aerosol-induced invigoration of deep convective clouds that may transport larger quantities of smaller ice particles to the anvils of such clouds. The higher, colder, and more expansive anvils can lead to warming by emitting less thermal radiation to space. The Intergovernmental Panel on Climate Change's fifth assessment report begins to account for some of these aerosol cloud– mediated effects. Most studies address a subset of known or suspected mechanisms, and they generally cannot separate individual contributions. Yet, this represents advancement with respect to the fourth assessment report which accounted for only one specific effect: the aerosol-induced reduction of cloud drop size and the resultant increasing cloud solar reflectance. It is now clear that the reduced cloud drop size triggers other processes that may induce larger radiative perturbations than the droplet-size effect through mechanisms such as those depicted in the figure. The inability to fully quantify these effects increases the uncertainty in the radiative forcing of aerosols and clouds. Furthermore, little is known about the unperturbed aerosol level that existed in the preindustrial era. This reference level is very important for estimating the radiative forcing from aerosols. Quantification of the reference level requires better quantitative understanding of the natural and anthropogenic emission sources and their interactions. At fine scales (tens of meters or less), the processes by which aerosols alter the formation and growth of cloud drops and by which drops coalesce into rain are comparatively well understood, as are the ways in which turbulence affects these processes. Less clear is the response of the cloud cover and organization to the loss of water by rainfall. Understanding of the formation of ice and its interactions with liquid droplets is even more limited, mainly

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due to poor ability to measure the ice-nucleating activity of aerosols and the subsequent ice-forming processes in clouds. Explicit computer simulations of these processes even at the scale of a whole cloud or multi-cloud system, let alone that of the planet, require hundreds of hours on the most powerful computers available. Modelers must therefore resort to simple parametric representations of these processes

2) **A.R Ravishankara*et.al* (2015)** stated that Human activities are known to affect our environment. Major 20th and 21st century environmental issues include deterioration of air quality (fog, photochemical production of smog and tropospheric ozone, mercury pollution, etc.), poor water quality (due to release of pollutants to water bodies), vast pesticide usage, acid precipitation (from coal combustion that leads to SO2 and thus sulfuric acid), ozone layer depletion (due to use of ozone depleting substances such as chlorofluorocarbons), etc. Some of these issues have been successfully tackled through national and regional legislations, international agreements, provision of alternatives, and/or changes in peoples' expectations and behavior. However, climate change due to emission of anthropogenic greenhouse gases and other chemicals into the atmosphere is now recognized to be one of the major asyet- unsolved challenges facing humanity in the coming decades and centuries. The impacts of anthropogenic climate change are slow in coming, it is sometimes difficult to see the signal above natural variability, and impacts are coupled to some of the most basic needs of society, such as energy production and utilization, food security, and infrastructure. Therefore, it is a very challenging problem for society. After all, when it is difficult to see changes above variability and noise, it is hard to take action, especially when the results may be visible only in the distant future. Furthermore, the issue requires making choices between very important social behavior and economic factors. Yet, it is clearer than ever that anthropogenic climate change is an issue to be reckoned with. The largest contributor to the predicted anthropogenic climate change arises from the burning of fossil fuels that generates carbon dioxide, a greenhouse gas. Increases in CO2 concentration will not only influence climate but also the acidity of the oceans. While acid–baseequilibria and their changes are at the heart of the latter issue (a topic not covered in this special issue), in the atmosphere, CO2 is not very chemically active. Therefore, one could wonder: what is the role of chemistry in Earth's climate system, especially the human-induced climate change? The answer to this question is multipronged. (1) In addition to CO2, there are many other emissions of chemically active species that directly or indirectly force Earth's climate. They include CH4, halocarbons, N2O, nonmethane hydrocarbons (NMHC), and nitrogen oxides. Together, these non-CO2 emissions contribute almost as much as human-produced CO2 to today's climate forcing, as measured using the metric of radiative forcing the current radiative forcing by CO2 is estimated1 to be about 1.68 Wm−2,while the non-CO2 emissions contribute about 1.65 Wm−2). Unlike the greenhouse gases, aerosols (a suspension of liquid or solid matter in the air) and clouds are expected to exert a global negative forcing and they are currently estimated to be offsetting positive forcing by the greenhouse gases by as much as 50% of the forcing by CO2. However, there is a large uncertainty about the cooling and heating effects of different aerosol types such as soot, dust, and absorbing organic molecules. Some of the aerosols are emitted directly, while some form in the atmosphere by a series of reactions initiated by oxidation of different volatile gases. Ozone is another greenhouse gas, produced by the troposphere in chemical reactions that consume emitted volatile hydrocarbons and use nitrogen oxides as a catalyst. Finally, most emissions are removed from the atmosphere by the oxidants in the atmosphere such as such as OH radicals, nitrate radicals, and ozone; these determine the crucial "cleansing" capacity of the atmosphere. Evidently, chemically active agents are a large part of the influence of human activities on climate. The impact of climate change on Earth is multifaceted. The most notable changes are rise in sea level, changes in precipitation, drought, extreme weather events, and more. Chemistry is greatly involved in shaping many of these impacts. For example, aerosols are at the heart of radiative forcing and the precipitation issues. Other key impacts occur through changes in the atmospheric

chemical composition, for example deterioration of air quality, changes in the oxidative capacity of the atmosphere, and possible changes in the atmospheric circulation patterns. Climate change, related to non-CO2 gases and aerosols, is very dependent on chemical processes. The contribution of an emission that leads to greenhouse gases or aerosols, and thus alters the radiation balance of the Earth system, depends on chemical properties. Key questions regarding each emission include: how long does the emitted species stay in the atmosphere before it is removed or transformed to another species, where and how strongly does it (or products of its atmospheric reactions) absorb or scatter UV, visible, or infrared radiation, and how does it modify the atmospheric lifetime and properties of other chemicals in the atmosphere? Chemistry plays important roles in any potential climate change mitigation and adaptation strategies, including intentional human intervention efforts, commonly termed as "geo-engineering" or "solar radiation management". For the above reasons, it is abundantly clear that chemistry plays a pivotal role in Earth's climate system. The essence of the role of chemistry in climate is captured on the cover of this issue. The Earth system is highly coupled. The coupling means that the different environmental issues noted earlier are often connected. For example, fossil fuel burning is clearly at the heart of anthropogenic climate change and it is also the pivotal issue for air quality. Ozone layer depletion is caused by chlorinated and brominated fluorocarbons (and related chemicals). These ozone-depleting chemicals (ODSs) are not only destructive to the ozone layer but are also potent greenhouse gases. Therefore, the control on ODSs has not only helped heal the ozone layer but also greatly helped climate.

OH and Climate Change: The essential expulsion instruments for CO and CH4 are by responses with OH, and these equivalent responses give the main direct transformation responses for OH to different types of HOX on a worldwide premise. These collaborations infer that increments in CO and CH4 plenitudes can prompt reductions in OH, with an ensuing positive criticism on the lifetime and wealth of CH4 (and different hydrocarbons, including in part halogenated species). An increment in tropospheric temperatures would prompt expanded H2O focuses, and an expansion in OH. Further, increments in tropospheric NOX and O3 can prompt expansions in OH by upgrading cycling responses that convert HO2 to OH. The net impact of every one of thesecooperation's on OH is obscure. To comprehend and incorporate these impacts in detail will require three-dimensional worldwide tropospheric-compound models not yet accessible. Furthermore, worldwide patterns in OH fixations are not yet quantifiable and are obscure. Any expectation of additional progressions in worldwide normal tropospheric OH plenitudes relies upon representing the synchronous activity of the many coupled HOx-controlling cycles. Huge vulnerabilities are experienced even in examination of inferred patterns of OH bounty in the new past. In investigations of the CH4 abundance3"6 20 to 80 percent of the CH4 increment has been attributed to OH diminishes. In any case, uncertain vulnerabilities in CO, NOX and NMHC patterns, just as worldwide circulation of NOX sources, lifetimes and plenitudes add to the wide scope of conceivable ongoing change. Thinking about the lower atmosphere all in all, it is felt that the current circumstance is NOx-poor regarding net HOX creation in CO, CH4 and NMHC oxidation. Extended expansions in these mixtures are consequently prone to prompt proceeded with decline altogether tropospheric OH bounty, as is appeared by Isaksen and Hov7 in a 2-D model investigation of coupled annoyances to the lower atmosphere. This normal end incorporates, in any case, critical local variety, in which a few territories of the lower atmosphere might be portrayed by OH increment. Gracious is expanded marginally in their model when NOX CO, CH4 and NMHC are expected to increment simultaneously. As appears to be likely, CO and CH4 discharges keep on expanding, the normal OH plenitude could diminish, hence improving the tropospheric groupings of CH4 past that normal from the immediate expansions in emanations, and prompting a bigger environment sway. Different types of radiative or stratospheric photochemical significance (e.g., hydrogen containing halocarbons) that are principally annihilated by response with OH would be

comparably influenced by such an input instrument. Computations with the LLNL 1-D model recommend that expanding methane at the deliberate 1%/yr could diminish tropospheric OH by as much as 0.25%/yr, accepting any remaining follow gas discharges stay at current levels. Since water fume is the parent compound for OH and other HOX species, changes to its fixation ought to adjust the grouping of tropospheric OH. Tropospheric water fume is in offset with a dissipation and happening source from the seas, soils, and plants and the precipitation sink. Worldwide expansions in temperature, driven by an environmental change, are required to prompt changes in the tropospheric water focuses. On the off chance that the wellsprings of water fume are not irritated by changes in vegetative cover and on the off chance that dissemination designs don't prompt more incessant precipitation occasions, the convergence of H2O may be required to increment, taking note of that worldwide normal relative mugginess will in general remain practically consistent with warming in environment model tests. As a straightforward gauge, a two degree increment in temperature could be related with a 10-30 percent expansion in tropospheric H2O levels, inferring a couple of percent increment in OH and other HOX relatives. Response of O3 with HO2 cycles HOX back to OH. Hence, increments in the tropospheric convergence of O3 would prompt expansions in OH. Tropospheric O3 focuses might be expanding because of direct outflows of NOX, NMHCs, and CH4 just as through circuitous changes in the emanations of these species (and others) which are driven by an environmental change. As a result of the job of NO in parceling HOX and in light of the enormous variety in the centralization of NO between far off maritime zones and mainland regions, an expansion in O3 by a factor of 2 could expand OH by maybe 10% over sea zones and by most likely more noteworthy than 10% over the landmasses. These progressions may, obviously, criticism on the focus bother of O3 and would be better assessed utilizing a completely coupled worldwide model. Changes in stratospheric ozone could likewise affect tropospheric OH focuses. Since the greater part of the ozone segment lives in the stratosphere and in light of the fact that ozone is answerable for a large part of the barometrical mistiness under 300 nm, these progressions would affect tropospheric OH by changing photolysis rate constants for any species with critical retention in this reach. Specifically, ingestion by tropospheric ozone prompting the arrangement of O (1D) would change, making an adjustment in the immediate wellspring of HOX and OH. Another instrument for environment sway on OH concerns the size of the wellspring of OH made by the oxidation of NMHC. The convergence of OH may be diminished by however much a factor of 2 in the initial 100 m over the ground level because of biogenic outflow of isoprenes and terpenes. The outflow of biogenic hydrocarbons is dramatically subject to temperature. An increment of 5 K could prompt an increment in the biogenic discharge of hydrocarbons by in excess of a factor of 3. A gauge of the effect on worldwide OH fixations is troublesome on the grounds that the significance of the part of NMHC in the worldwide spending plan for OH isn't all around characterized. Nonetheless, unmistakably locally, at any rate, these progressions would prompt declines in OH, albeit the worldwide ramification (for evacuation of CFCs, CH4, and so on) can't be assessed as of now.

Result and Conclusion: The possibly significant part of air science in environmental change has not been exceptionally evaluated. A couple of studies, restricted in scope, have endeavored to analyze a portion of the connections between environmental science and environment. Lamentably no authoritative examination has been done at this point, in any event part of the way on the grounds that proper multi-dimensional models with capacities for looking at completely intelligent synthetic and climatic inputs are not yet accessible. Regardless, compound cycles in the air address a significant connection between follow gas discharges and the arrangement of the air. We have seen that these substance cycles can effectively affect the follow gases straightforwardly impacting environmental change. It is fundamental that these compound cycles and the communication with environment be surely known, on the off chance that we are to effectively identify and evaluate the part of CO2 and

other follow gases in deciding the environmental change signal. All things considered, this investigation proposes that the connection between synthetically dynamic follow gas emanations and the radiatively dynamic synthesis of the environment has significant ramifications for the assurance of conceivable future approach alternatives.

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Body Image Concern: Social Media and Adolescents

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Introduction:

How people think and feel about their own body is what we call as **Body Image**. It relates to a person's perceptions, feelings, and thoughts about his or her body and is usually conceptualized as incorporating body size estimation, evaluation of body attractiveness, and emotions associated with body shape and size.(1) With the growing sense of ideal body image, adolescents try to lose or gain body weight to attain that perfect body. Because of various physical, psychological and social changes adolescents are more vulnerable to body dissatisfaction (2); especially girls when going through puberty (3). Along with biopsychosocial factors like today social media contributes a lot to develop body image dissatisfaction among adolescents.

We all see media promoting unrealistic ideals about what should be the men and women's body type which is considered to be attractive. Such as men should be extremely lean and muscular and women should be extremely thin. Media has a negative influence on body image and can actually cause body dissatisfaction and especially girls follow the mantra of thin/muscular = beauty. These unrealistic ideals lead to, dieting in extreme ways or engaging in various unhealthy weight control behaviors, such as taking diet pills, steroids, laxatives, or diuretics (4).

The media and our society serve up rigid and uniform standards of beauty. "Fair & Lovely" "Get a slimmer waist in just 10 days" "Join this gym to be the complete man" "The Axe

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Effect" and so on. It doesn't stop there these adds generally send out a strong definition of, "What looks beautiful is good" and we try to achieve that. Researches show that the standards of this so-called beauty or masculinity become even harder to attain with time leading to chronic feelings of insecurity and under confidence.(5)

With the increasing influence of social media, researchers have begun to investigate the relationship between social media usage and users' subjective well-being. The negative effects of social media usage on individuals' psychological well-being could be explained by the social comparisons that repeatedly occur on social media, which in turn decrease users' self-esteem and then psychological well-being (6)

Statistics of Social Media Usage in India

Social media usage in particular has increased dramatically over the last decade and continues at an incline. India currently has a total population of over 1.36 billion people (it's the second most populous country). Of that population, 230 million or 70% are active social media users. From online demographics to the top 10 influencers on Facebook and Instagram, we see 52.3% most social networking groups are dominated by the millennial generation. (7) Top Facebook and Instagram and Twitter influencers in India are the most popular actors, cricketers and politicians which are the role models of this millennial generation. The usage of Whatsapp and Snapchat has grew 75% than 2018, with 55% of the audience being women, which makes it one of the extremely rare platforms with a female majority. Facebook and Youtube are the top most viewed Social sites in India.(8)

The Influence of Media on Young Girls and Women : Today researchers have started to empirically investigate the influence of social media on young girls and women and recent studies show mixed results. Teenage girls are using image-based social media platforms more frequently than their male counterparts; more than 61% of girls use Instagram versus 44% + of boys. This increase in usage of social media, especially Facebook and Instagram, negatively affect adolescent girls and young women in regard to their self-confidence and body satisfaction (9).

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When in a research young women were asked about their self-esteem and experiences with social media. It was found that, most of the women felt insecure. Many young women were obsessed over the number of "likes" they were getting, feared not looking beautiful in their photos, thought individuals would think they looked different on social media than in real life. It is a fact that women dedicate extensive amounts of time on thinking about the uploading the perfect image, photo shopping it and regularly checking their personal page to see the updated "like" counts, which in turn increases their own insecurities.

Even though many women are aware of these actions, they are consumed by their need to fit in on social media and struggle to disrupt their habits.(10) Numerous young women today live their lives via social media and regard media presence as more important than real life. This preoccupation with social media and the compulsive behaviors that follow may potentially contribute to body dissatisfaction. Some researchers have portrayed links between body dissatisfaction and eating disorders (11,12) and eating pathology(13) with exposure to fashion magazines or television shows in women.

Generally young women are comparing their appearance with an image on Instagram or whatever platform they're on, and they often judge themselves to be worse off. Their inspiration images typically feature beautiful people doing exercise, or at least pretending to, which make them feel more harsher on themselves.(14) 91% of women worldwide are displeased with their bodies and body image, leading them to diet in order to obtain their desired body shape. A mere 5% of women worldwide naturally possess the glorified female body image displayed in media. Teenagers/students who spend more time engaging in use of social media place greater value on physical appearance than those who refrain from over-consumption of social media use.(15)

Usage of Social Media And Body Dissatisfaction: With change of the nature of media consumption, the audience has also changed. Previously youth were just exposed to their surrounding peers, but they can now readily access the opinions, behaviors, and ideals of thousands of people instantly. Social media offers a collaborative space for social interaction with seemingly infinite numbers of people.(16) There are several benefits in relation to the routine use of social media platforms. The six key overarching benefits identified are;

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(1) Increased interactions with others,
(2) More available, shared, and tailored information,
(3) Increased accessibility and widening access to health information,
(4) Peer, social, emotional support,
(5) Public health surveillance, and
(6) Potential to influence health policy

But at the same time there are many online pages, groups, and hash tags that promote body image concern. Young girls not only deal with the body image of famous women's in the media, but their own bodies, as well as those of their peers, are often subject to body image concern through the posting of "selfies," a photograph taken of oneself and posted on social media.(17)

Pinterest and Body Image Dissatisfaction : In response to images viewed on the fitness boards on Pinterest, adolescent girls and young women initiate a process of self-reflection, which increases intention to engage in extreme weight-loss behaviors. Regarding this a study reveals that, social media environments influence adolescent girls and young women to engage in social comparison leading to feelings of inadequacy and body dissatisfaction (18).

Instagram and Body Image Dissatisfaction : Instagram is one of the most popular social media platforms (19). It allows users to communicate solely through posting and sharing photos. Researchers have looked at the role of Instagram on body image with adolescent girls and young women, the most frequent users of the social media platform. Studies on Instagram have mostly focused on fitspiration pictures and content in the young adult population. Fitspiration is a movement that promotes a healthy lifestyle, primarily through food and exercise.

Despite its good intentions, researchers have suggested dysfunctional themes in the images and messages. For instance, when over 600 fitspiration images were studied, one major theme regarding the female body emerged: thin and toned (20). Also, most images were found to contain elements objectifying the female body. However, we must wonder whether the blogs themselves are problematic or if the viewers are construing the content in a negative way. In

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to a plethora of mental and physical health problems, many of which can be fatal. In fact, anorexia nervosa is the highest-leading cause of death for females ages 15 to 24, with a mortality rate that is 12 times higher than any other cause of death among this age group. (28)

Today many people are beginning to use Instagram as a way to document their recovery and build a community of support and inspiration. Users in recovery post pictures of their weight gain progress and healthy-proportioned meals, along with lengthy descriptions of the various emotions, fears, challenges, and accomplishments of recovery. Those who use Instagram for recovery find comfort in sharing their story with a community, while still maintaining some degree of anonymity, often neglecting to include their last names or contact details. Others use the publicity of Instagram as a means of overcoming the immense shame and secrecy that often accompanies eating disorders.

Just as there are individual accounts of recovery on Instagram and other social media platforms, there are social media groups and pages that promote eating disorder awareness, advocacy, recovery, and prevention. For example, one community, Beating Eating Disorders, has more than 28,000 likes on its Facebook page, and another, Eating Disorder Hope, has more than 16,000 followers on Twitter. (29)

Inpatient treatment in a residential facility is often the best course of treatment for individuals with severe eating disorders. It provides patients with the opportunity to physically and mentally stabilize and work on developing healthy eating patterns with the support of treatment professionals and peers. Common treatment options available at inpatient facilities include:

- Individual counseling.
- Group therapy.
- Family therapy.
- Peer support groups.
- Nutritional counseling.

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- Meal assistance.
- Complementary and alternative therapies.

Strategies for Safe Social Media Use

- Research apps before you trust them
- Find a purpose to your screen time so that it doesn't become a pastime
- Be aware of the content you're consuming, and what that content seems to want from you
- Don't follow pages that trigger or encourage comparisons. It could be helpful to monitor your feelings, thoughts and attitudes to see if they start to shift and be less critical.
- Focus on what you really enjoy to avoid overuse
- Think twice before posting on social media
- If we come across a post including content that may be triggering or harmful to ourself or others, report the post. Facebook, Twitter and Instagram have an option to report individual posts and space to provide reasoning for this. The links included in 'Did You Know?' will help guide us.
- Logging time spent on social media can be eye opening
- Understand the pros and cons of social media
- Become a source of useful information
- Before posting or sharing personal stories or media articles discussing topics around mental health, read the Mindframe Guidelines to make sure the content is appropriate.
- If working in a professional capacity, become familiar with the above guidelines and other social media safety mechanisms to educate, evaluate and encourage appropriate use amongst your clients.

Conclusion

Educating not only you on how to best use the Internet and specifically, social media, but your parents and teachers as well will help everyone have a more realistic and productive view of what is being accessed, and understanding what impact it may have. As social media continues to play a central role in the lives of adolescent girls and young women, its influence on body image and the perception of beauty continues to grow.

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Media not only exposes young girls to certain beauty standards and cultural ideals of womanhood, but emerging research shows it may contribute to the development of eating disorders and body dysmorphia, in females as well as males. Social media and its influence on an individual's perception of body image, self-worth and physical appearance is a worldwide, growing issue. The correlation between social media and body image is undeniable, and as more research and studies are conducted and performed, more and more alarming statistics are revealed. Social media and body image is an issue that continues to worsen as the obsession with networking continues, and it is essential to acknowledge its future potential in order to attempt to determine a way to resolve this issue now.

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Socio-Economic Impact on Dietary Intake Patterns of Adolescents: A Study

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Abstract

Estimated 1.2 billion number of adolescents (10-19 years) are in the world. Around 253 million of them live in India. Today we are on the cross roads between losing out the potential of a generation or nurturing them to transform society. If we want to meet sustainable development growth and want to end poverty, hunger and achieve equality, the *adolescents of India should be flourished, along with their communities, and all of us have a collective responsibility in ensuring that adolescence does in fact become an age of opportunity. Improving adolescents' food habits is of great importance in addressing overweight and chronic diseases. Because food habits established in the early years tend to continue into adulthood. Generally it is seen that social inequalities in food habits are found to be less robust during teenage compared to other periods in life. But still Environmental and adaptable factors need to be considered to develop effective healthy-eating interventions. This study examines the contributions of different factors which influence adolescent food consumption patterns especially family socioeconomic status.*

Keywords: Diet pattern of Adolescents, Diet Pattern and Socio- Economic Status, Factors Effecting Diet Pattern of Adolescents

INTRODUCTION:

From last few decades, the quality of adolescent's diet has been declined and the energy intake has increased due to consumption of fast food, soft drinks, and salty snacks, also we could see the decreased fruit and vegetable intake (1–3). A significant change in the lifestyles and the dietary habits of urban Indians has been triggered by a complex mix of marketing, social, and economic policies and the Indian nutrition transition (1,2,3,4).

Because of the increased growth rate and changes in body composition associated with puberty, Nutritional needs during adolescence are increased. (1-3). Researchers have

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proved that Sound nutrition plays a important role in the prevention of several chronic diseases, such as obesity, cerebrovascular, high blood pressure, osteoporosis, caries, iron-deficiency anemia or a lower resistance to infections, coronary heart disease, certain types of cancer, stroke, and type 2 diabetes (5,6). So this makes nutrition an important objective for Healthy People 2020 campaign [7]. For prevention of diet-related chronic diseases, researchers have proposed to develop healthy eating behaviors in childhood and should be maintained during adolescence [8-11]. Variance of food consumption in Adolescents' is visible according to gender [9,10]. Studies have consistently shown that females' dietary patterns are healthier than those of males [11,12,13]. Women are more likely to avoid high-fat foods, consume more fruits and fiber and limit salt intake [11] than men.

It is evident that prosperity of family is a significant caution for daily fruit and vegetables consumption and breakfast intake among adolescents (14). It is observed that there is a close relation between parent's education and adolescents' fruit and vegetables consumption (15), soft drink intake (16) and being overweight (17). Food-related parenting practices in the home also affect diet consumption patterns of adolescents. (18,19,20). Economically disadvantaged parents tend to buy healthy foods (21) and have fewer healthy dietary-behaviors (22,23).

Along with socio economic status, adolescence need for increased independence is also important factor associated (24) with implications of food choices, (25). their school environment and their peers as they mature (26,27). Social networks can negatively affect adolescent eating behaviors (28,29).

PURPOSE OF STUDY

Estimated 1.2 billion number of adolescents (10-19 years) are in the world. Around 253 million of them live in India. Today we are on the cross roads between losing out the potential of a generation or nurturing them to transform society. For this it is important to examine socioeconomic status and eating behaviors of adolescent, as well as the role of the schools in health promotion. Environmental and adaptable factors need to be considered to develop effective healthy-eating interventions. This study examines the contributions of

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different factors which influence adolescent food consumption patterns especially family socioeconomic status.

MATERIALS AND METHODS

The present study comprised of assessing the nutritional status of adolescent girls belonging to 16-18 years of age group, studying in school and colleges. The study conducted covered different features influencing the nutritional status of adolescents.

LOCAL AND SAMPLE SELECTION:

The study was conducted in 11 talukas of Nanded district among 250 girls selected by stratified Random Sampling Method, belonging to 16-18 year of age group from three income groups.

DIETARY ASSESSMENT

For dietary assessment of adolescents from the overall sample a selective sample of 60 adolescents should belong to each the group. Further, care was also taken about, equal distribution of adolescents for different income groups. The dietary intake of adolescents included 24 hours recall method, using standardized local measures (cups, catories, table spoons and tea spoons). The information of food consumed was collected in terms of cooked food. The cooked food was converted into row foods and the nutrient intake was calculated using the nutritive value tables of ICMR (Gopalan National Institute of nutrition)

STATISTICAL ANALYSIS:

The obtained data was compiled into different categories based upon age, gender, socio economic status, nutritional status family environment and psychological status. The different statistical analysis test used were,'t' test. and correlation coefficients

RESULTS :

The table (1) indicates significantly low ($p > 0.01$) consumption of all foods except other vegetables and fats and oils in all income group adolescents. When compared with balanced dietary allowances of ICMR the food consumption of all adolescents was found significantly low. But the comparison of food consumption of adolescents belonging to

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different income groups indicated that cereal consumption in female adolescents of middle-income group was high (266.789 ± 3.538 gm) than others. Female adolescents of low-income group consumed more pulses (32.667 ± 1.017 gm) than that of middle and high-income group. Leafy vegetables and other vegetables were found to be consumed more by high-income group female adolescents (44.55 ± 2.026 gm), Also fruits were more consumed by female adolescents of high-income group (64.800 ± 2.147 gm) than females belonging to other income group. Milk consumption was found high in middle income group adolescents (144.211 ± 5.424 ml) with significant difference than low-income group females (61.46 ± 6.522 ml). Fat and oil consumption was found high in girls of high-income group with non-significant difference in income groups as well as when compared with standards. Meat consumption was found significantly low in female adolescents of middle income group. Sugar and jaggery consumption was found more in middle and low-income group females (34.158 ± 2.116 gm), which was positively significant with balance diet allowances. But groundnut consumption was low in all income groups except in middle-income group females (22.789 ± 0.832 gm).

Table (1) Dietary intake of female adolescents belonging to different income groups

Sr. No.	Food Consumption	Income group 1000-5000	T values	Income group 5000-10000	T values	Income group 10000-20000	T values	F' Value	C.D. Values	B.D.A
1	Cereals (gm)	262.23 ± 4.53	12.73**	266.78 ± 3.53	15.03**	249.35 ± 2.7	25.39**	5.79**	6.435	320
2	Pulses (gm)	32.66 ± 1.01	26.86**	27.94 ± .92	34.51**	26.15 ± 85	39.67**	13.19**	1.784	60
3	Leafy Vegetables (gm)	40.81 ± 1.26	78.38**	43.68 ± 1.61	47.67**	44.55 ± 2.02	42.25**	59.16 **	4.498	150
4	Other Vegetables (gm)	40.81 ± 1.26	7.23**	43.68 ± 1.61	3.91**	44.55 ± 2.02	52.02**	1.43 Ns	2.668	100
5	Fruits (gm)	40.85 ± 1.28	46.12**	46.26 ± 1.71	31.36**	64.80 ± 2.14	16.38**	52.77**	4.604	100
6	Milk (ml)	61.46. ± 6.52	54.17**	144.21 ± 5.42	65.59**	130.35 ± 4.71	78.35**	2.44 Ns	9.256	500
7	Fat oil (gm)	25.47 ± .97	4.66**	25.73 ± 1.37	3.10**	29.00 ± 1.23	0.80 Ns	2.72 Ns	1.962	30
8	Meat	20.47	25.0	6.57 ±	20.2	22.50 ±	8.07*	2.86	8.03	80

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	(gm)	± 2.77	1**	3.62	3**	7.12	*	Ns	1	
9	Sugar and jaggery (gm)	31.33 ± 1.45	5.97 **	34.15 ± 2.11	1.96 NS	25.50 ± 1.44	3.11* *	6.79 **	2.93 7	30
10	Graund nut	11.76 ± .960	29.3 8**	22.78 ± .83	20.6 6**	21.90 ± 1.02	17.60 **	18.6 3 **	2.35 5	40

BDAs = balanced dietary allowances
N.S.Non significant S.Significant at 1% **

When girls food consumption was co-related with mothers education (table – 2) it showed significant relation in consumption of pulses (0.295* gm.) fruits (r=0.428** gm.), fats and oils (r=0.254* gm.) and groundnut (r=0.505** gm.), also fathers education showed significant relation with consumption of pulses (r=0.389** gm.), fruits (r=0.459** gm.) and groundnut (r=0.493** gm.). Family income showed significant co-relation with almost all foods consumed by girls.

Table (2) Correlation of different socio-economic factors with dietary intake of Adolescent

Sr. No.	Socio-economic factors	Cereals (gm)	Pulses (gm)	Leafy veeitables (gm)	Other vegetables (gm)	Fruits (gm)	Milk (ml)	Fats and oils (gm)	Meat, fish and egg (gm)	Sugar Jaggery (gm)	Groundnut (gm)
1	Monthly Income	0.291*	0.511 *	0.310 **	0.221 Ns	0.782 **	0.192 Ns	0.27 9 *	0.27 7 *	0.310 *	0.58 3 **
2	No. of family members	0.011 Ns	0.062 Ns	0.104 Ns	0.051 Ns	0.134 Ns	0.069 Ns	0.01 3 Ns	0.11 3 Ns	0.212 Ns	0.08 5 Ns
3	Fathers education	0.218 Ns	0.389 **	0.205 Ns	0.147 Ns	0.459 **	0.041 Ns	0.11 2 Ns	0.04 5 Ns	0.180 Ns	0.49 3 **
4	Mothers education	0.199 Ns	0.295 *	0.218 Ns	0.215 Ns	0.428 **	0.152 Ns	0.25 4*	0.07 5 Ns	0.216 Ns	0.50 5 **

Ns :- Non significant
s :- significant at 1% :- **
s :- significant at 5% :- *

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These significant relations indicate that socio-economic factors do play an important role in food consumption of adolescents. Regarding parent's education it could be noticed that as educational status of parents increases the food consumption awareness which is reveled in the same table where parents belonging to high income group force their children to consume essential foods. Varieties of foods were consumed by families belonging to high and middle income group, adolescents belonging to large families consumed more cereals and pulses. Groundnuts were consumed more by families with less or average family members. Regarding other foods like leafy vegetables, other vegetables, fruits meat fish and eggs it was noticed that families with less and average members consumed these foods more than large families.

DISCUSSION:

The above table indicate that expensive foods like fruits, vegetables, oilseeds, and non veg items were more consumed by higher and middle income group and families with less and average family members. As the expenditure of money on these foods is high, low-income group families and large families could not afford these foods they consumed less expensive foods such as cereals and pulses. As the family members increased the use of sugar and jaggery, fats and oils, is increased which only provide carbohydrates. The consumption of milk was more but the members were more. Hence the sufficient amount of milk is not provided to all members respective of their needs.

Different foods are the sources of various nutrients, which are important factors of good nutritional status. There are various factors, which influence the food intake of adolescents. Factors related to food intake of adolescents were co-related with socio economic factors (table:2) which play an important role in food consumption. When different foods were co-related with family income, family size, father's education and mothers education, the co-relation was found significant.

Regarding parent's education it could be noticed that as educational status of parents increases the food consumption awareness also increases. Awareness regarding high consumption of fruits, vegetables, milk and milk products and nuts and oilseeds was significantly correlated with increasing educational status of parents. (1, 3, 5, 10, 23, 24) Higher education helps parents to practice healthy food practices (25, 26), and therefore they

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understand the importance of health and nutrition. Parents of lower education have poorer nutrition knowledge (27) and consider health less often while making food choices for themselves and their children (28). The increased educational status also increases income of family which ultimately affects on food consumption of adolescents. Hence the varieties of foods were more consumed by families belonging to high and middle income group.

From the table (1) of dietary intake of adolescent girls it was noticed that consumption of other vegetables, fruits, milk, meat, showed significant difference ($P<0.01$) in adolescent girls belonging to all three groups, from which it was observed that middle and higher income group adolescents consumed more nutritious foods than lower income group.

The above tables indicate that higher income (1, 29, 30) and families with less and average family members were positively associated with intake of foods like fruits, vegetables, oilseeds, and non veg items were. Income reflects the financial resources available for food purchasing, accessing resources and health professionals (31). As the expenditure of money on these foods is high, low-income group families and large families could not afford these foods they consumed less expensive foods such as cereals and pulses (31, 32, 33) As the family members increased the use of sugar and jaggery, fats and oils, is increased which only provide carbohydrates. The consumption of milk was more but the members were more. Hence the sufficient amount of milk is not provided to all members respective of their needs.

CONCLUSION:

From the study it was observed that Monthly income of parents, Number of family members, Education of parents were all associated with adolescent's dietary intake, in most situations families with low income status were being associated with poor dietary outcomes. Adolescence is a period of sudden growth and development. Because of various physiological changes in both girls and boys the need of various nutrient intake increases, but the inadequate diet of adolescent influence their nutritional status which results in various nutritional deficiencies and therefore researchers should consider multiple Socio Economic indicators when defining Socio Economic conditions in relation to Adolescents' eating.

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AJATNA PRAKASH

National Conference Women Empowerment: Opportunities and Challenges of Indian Women

I have great Pride to welcome all the delegates of one day multidisciplinary national conference sponsored by Dr. Babasaheb Ambedkar Marathwada University Aurangabad and Home Science Department, Mrs. K.S.K. College, Beed on 14th February 2020.

I hope the deliberations from various distinguished speakers will benefit the participants to update their knowledge. This conference will Provide opportunities to have valuable guidance to new comers in the field of research, through invited talks belonging to this area.

Women empowerment is vital to sustainable development and the realization human rights for all. Women is dominated in the field of service even though she is neglected and rejected. Today woman have faces many challenges and problems. Therefore this conference helpful to change social system and status of women in the society.

This conference will focus on the faithful discussion and outcomes through invited talks and paper presentation. The organizer would like to thanks Dr. . Babasaheb Ambedkar marathwada University , Aurangabad and hope for extending their kind cooperation and support. My Sincerely thanks to our management and principal Dr. Deepa Kshirsagar. I am thankful to our Vice Principal Dr. Hange A.B. and Dr. Kshirsagar for their guidance and cooperation. I also thanks to all college staff their valuable support and help.

Dr Nuzhat Sultana M. B.
Co-Coordinator

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CONTENTS OF ENGLISH PART - 1

7. Entrepreneurship Development of Rural Women; Role of Self-Help-Groups, Need and Remedies for its Promotion

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Abstract

Now days, women are becoming socially and economically empowered through generating their own business. A woman entrepreneur plays an important role in India to the wake of globalization and economic liberalization. Women entrepreneurship is very important concepts for development of rural areas. Rural Entrepreneurship can create new economic opportunities for rural women and contribute to overall growth and leaving from poverty. It also provides a great opportunity in current time for the development of rural or semi-rural people who migrate to urban areas. In this field rural woman entrepreneurs cannot be ignored. There is a substantial contribution of women rural entrepreneurs in the growth of developed rural areas but the development of women entrepreneurship in rural areas is very low because the rural women's are face more challenges and problems. Through this paper we have tried to study the problems, opportunities, scope and remedies of rural Entrepreneurship in India

Key Words: Need for rural entrepreneurship, Self Help Groups and rural Entrepreneurship, Problems for Rural Women Entrepreneurs, Scope of Rural Entrepreneur

Introduction

Nearly 70% of India's population resides in villages and their livelihood is supported by agriculture and allied activities. Thus the Indian economic development depends largely on the standard of living of the people who live in the rural areas and the level of development which has actually taken place there. Rural entrepreneurship is defined as entrepreneurship whose roots lie in the rural areas but has a lot of potential to drive various endeavors in business, industry, agriculture, etc. and contribute to the economic development of the country. Indian agriculture is exposed to low productivity, natural calamities, agriculture & cash crop mismatch, disparities in

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various public private partnerships. Since the land area for agriculture is limited, not everyone is employed. This leads to migration of people from rural to urban areas.(1)

Entrepreneurship plays an important role in generating employment opportunity for rural societies, providing self-employment for those who started-up their own business and improving the economic status of the rural area as well. (2) Women's are participating in the agriculture, business and trade without any social and other boundaries. But in India, there are many social and cultural limitations for rural women.

Self Help Groups (SHGs) are proved successful for the empowerment of rural women by the way of their entrepreneurial development which had put a major impact upon their social and economic life. (3) Generally it has been found that rural women are in front of the various problems like proper medical Facilities, lack of education, malnutrition, environment, health care etc. as compared to the urban women population. (4)

SHG's provides the benefits of micro-saving and micro-finance to rural woman to get rid off from the local money lenders, but it is not sufficient to compete in today's world or to accept challenges in the society empowerment of women in all spheres of life is very necessary. So Women Entrepreneurship development is the most effective way.

Need for rural entrepreneurship

"The need of the hour is to ensure economic activities at village level and facilitating rural entrepreneurship," the Union Minister for Rural Development, Panchayati Raj, Drinking Water and Sanitation said, Chaudhary Birender Singh Union Minister of Rural Development. (5) The need for and growth of rural industries has become essential in a country like India because of the following reasons:

1) Rural industries generate large-scale employment opportunities in the rural sector as most of the rural industries are labor intensive.
2) Rural entrepreneurship facilitates the development of roads, street lighting, drinking water etc. in the rural sector due to their accessibility to the main market.
3) Rural industries/entrepreneurship help to improve the per capital income of rural people thereby reduces the gaps and disparities in income of rural and urban people.
4) Reduce the number of migrants from rural to urban areas.
5) Balanced regional development.

5). Rural people are labor intensive so Rural entrepreneurship creates an avenue for rural educated youth to promote it as a career.

6). To remove the great disparity existing Rural and Urban people.

7). Rural entrepreneurship can promote rural handicraft and traditional art.

8). Rural entrepreneurship can reduce poverty, growth of slums, pollution in cities and agitations of inhabitants.

9). Rural entrepreneurship can stabilize the rural youth and increase the literacy rate of villages.

10). Rural entrepreneurship can develop an unaffective manner to build up village republic.

Problems for Rural Women Entrepreneurs

There are a number of bottlenecks which create difficulties in efficient working of the rural entrepreneurs. (6) Women entrepreneurs are facing so many problems at every stage in all over the country. The major problems are:

Social Barriers

In our male dominating society women entrepreneurs are always seen with suspicious eyes, attention in rural areas is too severe and it restricts women entrepreneurship.

Lack of Self

Confidence and Risk Bearing Capacity: Women have lack of self-confidence and always feel that they may not be successful and hence hesitate to take risk. Their risk bearing capacity is always less than male.

Psychological Factors and Lack of Family Support

Mostly women feel that she is "women" and less effective than men. Secondly, Family and home responsibilities is not meant for.

Lack of Technical and Practical Knowledge and Financial Problems

Women have lack of technical and practical knowledge, as they mostly live inside the four walls of home. Hence first barriers to establish her own enterprise.

Middle Man Exploitation

Women entrepreneurs have to face the problem of middlemen more as they generally depend on them. Middleman plays a role of bridge between the entrepreneurs and consumer.

Marketing Problems

Market for a small entrepreneur in a developing country can be quite a problem considering that the small entrepreneurs will be in competition not only with locally manufactured goods but even imports. Sometimes market is far away from their residence or they couldn't directly communicate with market, this problem is mostly facing in rural and remote areas.

Lack of Information

Women entrepreneurs have lack of information regarding advances and innovative technology. Even they lack of knowledge regarding govt. policies and subsidy or promotion women entrepreneurs. Hence, they can't evolve their market.

Scope and Challenges of Entrepreneur

Small scale business provides good scope for the growth of entrepreneurial activities and entrepreneurs but good opportunity and vast scope in selling service rather than manufacturing a product. The entrepreneur can achieve better results if the size of the business is small. It is for this reason that small firms have higher productivity, greater efficiency and low labor intensity.(7) The scope for entrepreneurial activities in small business sector can broadly be classified into:

Industrial Sector

Small scale industries occupy an important place in the industrial sector. The main objective underlying the development of small- scale are the increase in the supply of manufactured goods, promotion of capital information for development of indigenous entrepreneurial talents and skills and the creation of broader employment opportunities.

Agricultural and Allied Industrial Sector

There is a vast scope for entrepreneurial activities in the agricultural sector. By establishing a link between agriculture and allied industries, the rural entrepreneur can realize improvements in areas of farming, agricultural processing and marketing.

Service Sector

The service sector has gained importance for the entrepreneurs because of its vast expansion. Service sector includes all kinds of business and provides opportunities to the entrepreneurs in business such as hotels, tourist services, personal services such as dry-cleaning, beauty shops, photographic studios, auto repair, electric repair shops, watch/jig repair etc.

Remedies for Rural entrepreneurship Development

Establishing an industry by an individual is a difficult task same is developing entrepreneurship. Rural industries are facing a series of problems starting from inception till its operation. Therefore, to overcome the problems the following measures need to be suggested for developing rural entrepreneurship in the country (8)

Provision for adequate infrastructural facilities

Government should make adequate provision for strengthening and developing infrastructural facilities in the rural sector for proper movement and marketing of rural industrial products.

Provision for credit facilities

Banks and financial institutions must come forward to provide credit to rural industries at concessional and subsidized rate on easy terms and conditions.

Creation of strong raw-material base

Raw materials are must for any industry. Therefore, an urgent policy is called for to strengthen the raw material base in the rural sector on priority basis.

Common Production-cum-Marketing Centre needs to be set up

Marketing is another area where rural industries are weak. In order to solve the problem of marketing, common production-cum-marketing centres need to be set up and developed with modern infrastructural facilities.

Provision for entrepreneurial training

As most of the rural entrepreneurs join their entrepreneurial career not by choice but by chance, training is essential for the development of entrepreneurship. There is a need to develop entrepreneurial aptitude and competencies among the prospective entrepreneurs through training.

Creation of awareness of various facilities amongst the rural people

The rural people are not aware of the facilities available in setting up rural industries. Therefore, it is the need to disseminate information about what is available through vocational training, Entrepreneurs Development Programs, screening of Audio-visual films on various rural related enterprises, etc. The government should come forward to introduce entrepreneurial education in schools, colleges and universities in order to inculcate the entrepreneurial acumen and attitude in the minds of the rural people.

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दारिद्र्य निर्मूलनात शाश्वत विकासाची भूमिका

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दारिद्र्याची निर्माता नाही. जर स्वच्छेने दरिद्री राहु इच्छिणारा व्यक्ति स्वतःच स्वतःच्या दारिद्र्याचा निर्माता आहे. पचायला आणि पटायला अतिशय कठीण असे हे कटुसत्य स्विकारणे योग्य ठरेल.

भारताच्या बाबतीत सर्वात मोठी समस्या दारिद्र्याचीच आहे. याविषयी एकमत आहे. म्हणुनच स्वातंत्र्योत्तर काळात आर्थिक नियोजनाव्दारे लोकशाही तत्वानुसार गरीबी हटविण्याचे प्रयत्न विविध आघाडयावर चालू आहेत. भारतातील दारिद्र्य-पिडीत लोकांच्या संख्ये विषयी अनेक संज्ञानी वेळोवेळी अंदाज केले आहेत. ओझा यांच्या अंदाजाप्रमाणे १९६०-६१ मध्ये ग्रामीण लोकसंख्येच्या ५१.८ टक्के व शहरी लोकसंख्येच्या ७.६ टक्के मिळुन अंदाजानुसार दारिद्र्य रेषेखालील लोकांचे प्रमाण ग्रामीण भागात १९६०-६१ मध्ये एकुण ग्रामीण लोकसंख्येच्या ३८ टक्के होते व १९९७-९८ मध्ये ५३ टक्के पर्यंत वाढले. दांडेकर व रथ यांच्या अंदाजाप्रमाणे १९६०-६१ मध्ये ग्रामीण लोकसंख्येपैकी ४० टक्के व शहरी लोकसंख्येपैकी ५० टक्के लोक दारिद्र्य रेषेखाली होते.

दारिद्र्य म्हणजे काय ?

भारतातील दारिद्र्याचा प्रश्न अत्यंत अवघड व गुंतागुंतीचा आहे. भारताची लोकसंख्या प्रतिवर्ष अडीच टक्क्यानी वाढत असल्यामुळे अर्थव्यवस्थेच्या एकुण विकासाचा वेग प्रतिवर्षी जर तीन टक्केच राहीला तर एकुण राष्ट्रीय उत्पादना पैकी अर्धा टक्के इतकाच उत्पादन दारिद्र्याचा परिहार करण्यासाठी शिल्लक राहु शकतो.

व्याख्या

१) गिलीन आणि गिलीन :

दारिद्र्य म्हणजे व्यक्ती आपल्या स्वतःच्या मुलभुत गरजा (अन्न,वस्त्र,निवारा) या वस्तुंची पुर्तता करण्यानी क्षमता नसणे म्हणजे दारिद्र्य.

किंवा

केवळ जिवंत राहण्यासाठी ज्या आवश्यक त्याच मुलभुत गरजा अशी मर्यादित व्याख्या केल्यास उपासमारीच्या जवळपास टेकलेले लोक दरिद्री समजावे लागतील.

दारिद्र्याचे प्रकार :

१. **अल्पकालीन दारिद्र्य**
२. **दिर्घकालीन दारिद्र्य**
३. **दिर्घकालीन व्यक्तिगत दारिद्र्य**

संशोधनाची उद्दिष्टे :

१. दारिद्र्य निर्मुलनात शाश्वत विकासाची भुमिका स्पष्ट करणे
२. दारिद्र्य निर्मुलनावर उपाययोजना सुचविणे

संशोधन पध्दती :

प्रस्तुत शोध लेखासाठी तथ्य संकलनाच्या दुय्यम सामग्रीचा आधार घेण्यात आला आहे. त्यामध्ये संदर्भग्रंथ, शासकीय अहवाल, शोध प्रबंध, वर्तमानपत्रे, मासिके, इंटरनेट आदींचा आधार घेण्यात आला आहे. तसेच विश्लेशणात्मक व वर्णनात्मक अध्ययन पध्दतींचा आधारही घेण्यात आला आहे.

दारिद्र्य निर्मुलनासाठी उपाय योजना

१. **स्वर्ण जयंती ग्राम स्वच्छता योजना :** केंद्र शासनाने एप्रिल १९९९ पासून दारिद्र्य निर्मुलनासाठी स्वर्ण जयंती ग्राम स्वयंरोजगार योजना सुरू केली. या योजनेने केंद्र शासनाने विविध संस्थाकडुन मुल्यमापन केले असता सदर योजना दारिद्र्य निर्मुलनासाठी काही अंशी यशस्वी ठरली असली तरी बऱ्याच उणीवा केंद्र शासनाच्या निदर्शनास आल्या म्हणून केंद्र शासनाने गरीबीचे निर्मुलन करण्यासाठी नविन धोरण निश्चित करण्यासाठी प्राध्यापक आर. राधाकृष्ण समितीची स्थापना केली या समितीच्या शिफारशी विचारात घेवुन १८ जुलै २०११ मध्ये राष्ट्रीय ग्रामीण जीवनोन्नती

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अभियान (NRLM) सुरू करण्याचा निर्णय घेण्यात आला. या अभियानात गरिबांच्या स्वयंसहाय्यता गटांचे संघटन करून शाश्वत स्वयंरोजगार मिळवणे हा मुलभूत घटक मानण्यात आला आहे.

२. **राष्ट्रीय ग्रामीण रोजगार कार्यक्रम :**
सरकार परीसी समाप्त करण्यासाठी वेगवेगळ्या रोजगाराच्या संधी उपलब्ध करून त्याबदल्यात त्यांना खाण्यासाठी अन्नाची उपलब्धता करून दिली. परंतु ऑक्टो १९८० मध्ये कामाच्या बदल्यात अन्नधान्याची उपलब्धता ऐवजी राष्ट्रीय ग्रामीण रोजगार कार्यक्रम सारी हाती घेतला आणि १ एप्रिल १९९९ पासून जवाहर ग्राम समृध्दी योजना याचाने ओळखली जावू लागली.

३. **अन्तोदय योजना :**
या योजनेचे महत्वाचे वैशिष्टये म्हणजे प्रत्येक गावातून पाच गरिब कुटुंब निवडून त्यांना स्वयंपुर्ण व आत्मनिर्भर व्यवसाय बनविण्यासाठी त्यांना आर्थिक स्वरूपात मदत दिली जाते. या योजनेची सुरूवात २ ऑक्टो १९७८ राजस्थान सरकारने केली होती. नंतर उत्तरप्रदेश, बिहार, हिमाचल प्रदेश व अन्य राज्यात ही योजना सुरू केली.

४. **कृषि विकास :**
दारिद्रय संपवण्यासाठी हा महत्त्वाचा बदल मानला जातो. यासाठी शासनाने कृषि विकास या घटकाला सर्वोच्च मानले जाते. जर शेती जमीन मध्ये उत्पादन वाढविण्यासाठी खत,बी–बियाणे यासारखे घटकावर सब शिडीच्या माध्यमातुन शेतीचा विकास करता येवू शकतो त्या माध्यमातुन आर्थिक स्थिती दारिद्र आपोआप नष्ट करता येवू शकते.

५. **जलयुक्त शिवार :**
राज्याच्या काही भागात दर दोन वर्षांनी या ना त्या कारणाने निर्माण होणाऱ्या टंचाईवर मात करण्यासाठी मुख्यमंत्री देवेंद्र फडणवीस यांनी जलयुक्त शिवार अभियान ही नवी योजना राबविण्याचा निर्णय घेतला आहे. या महत्त्वपूर्ण योजनेमुळे जलसंधारणा अंतर्गत सर्व समावेशक उपाययोजने द्वारे एकात्मिक पध्दतीने शाश्वत शेतीसाठी पाणी आणि पिण्याचे पाणी उपलब्ध करून देण्यास प्राधान्य दिले आहे या योजनेद्वारे २०१९ पर्यंत संपूर्ण भागातील सर्व शेती महिलीखाली आल्यामुळे आर्थिक स्थिती निर्माण होण्यास मदत झाली व दारिद्र नाहीसे होण्यास मदत देखील झाली.

६. **शिक्षण :**
दारिद्र समुळ नष्ट करण्यासाठी शिक्षण हा खुप महत्त्वाचा घटक आहे. कारण शिक्षणाने माणसाची विचार करण्याची क्षमता वाढते तो आपल्या बुध्दीची जोरावर काहीही करू शकतो. म्हणुन आठव्या योजनेमध्ये ७४४३ कोटेड शिक्षणावर खर्च केलेनंतर नवव्या योजनेमध्ये २०,३८१.४६ कोटेड रूपये खर्च केले होते यामुळे दर्जेदार शिक्षण घेतल्याने नव–तरूणाना रोजगाराच्या संधी उपलब्ध होतात. नौकरीच्या माध्यमातुन त्यांची आपली उपजीविका भागवत असते.

७. **पोषनआहार कार्यक्रम:**
दारिद्रयातील जीवन म्हणजे कुपोषण, यामुळे त्यांची आपली स्वत:ची उपजीविका भागवण्यास क्षमता नसते तर कुटुंबाची स्थिती त्यामुळे तो कोणतेच काम करू शकत नाही म्हणुन सरकारने पोषण आहार कार्यक्रम सुरू केला त्यामुळे लहान मुले व गर्भवती महिलांना देखील याचा फायदा होवू लागला त्यामुळे होणारे अपत्य तंदुरूस्त होवू लागले यामुळे दारिद्र हटवण्यास मदत झाली.

८. **मार्शल योजना:**
दुसऱ्या महायुध्दानंतर युरोपची अर्थव्यवस्था कोलमडून पडली. पुष्कळ युरोपियन लोकांच्या डोक्यावर उपासमारीची टांगती तलवार लटकू लागली. युरोपमधील समाजवादाबद्दल लोकांचा दृष्टीकोन बदलतो की काय, अशी अमेरिकी सरकारला काळजी वाटत होती त्यामुळे युरोपमधील जे देश अमेरिकी योजना स्वीकारतील त्यांना औद्योगिक व शेतमालाचे उत्पादन पुर्ववत करण्याकरता अमेरिकी सरकारने चार वर्षापर्यंत आर्थिक साहाय्य केले. पश्चिम युरोपमध्ये अमेरिकेचा वाढता आणि जीवघेणी दारिद्र जवळजवळ नाहीसे झाले. मार्शल योजना यशस्वी झाल्यामुळे अमेरिकन सरकारने जगभरातील गरीब राष्ट्रांना, शेतमालाचे उत्पादन, आरोग्य सेवा, शिक्षण व वाहतुक माल विकास करण्यासाठी, आर्थिक साहाय्य देवु केले त्यामुळे दारिद्र नाहीसे होण्यास मदत झाली.

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लेवीय देवाने प्राचीन इस्त्राएल राष्ट्राला काही नियम दिले होते. या नियमाने त्यांनी पालन केले तर त्यांच्यातील दारिद्रय बऱ्याच प्रमाणात नाहीसे होणारे होते या नियमानुसार लोकसंख्या या राजकीय वंशा व्यक्तिरिक्त प्रत्येक कुटुंबाला जमिनीचा हिस्सा मिळाला होता. कोणत्याही कुटुंबाला त्याचा हिश्याची जमीन कायमची विकता येत नव्हती. जर कोणाला त्याची जमीन, आजारपण, विपत्ती किंवा आळशीपणामुळे विकावी लागली तर जोबेल वर्षी म्हणजेच ५० वर्षी त्याला पुन्हा दिली जायची दर ५० वर्षांनी सर्व जमीनी ज्यांच्या त्यांच्या मालकांना पुन्हा मिळायच्या यामुळे कोणतेही कुटुंब पिढ्यानपिढ्या दारिद्रयात रहात नव्हते यामुळे दारिद्रयावर मात करण्यासाठी उत्तम पर्याय होवू शकतो.

१०. गुलामगिरी:

कधीकधी कुटुंब्यातरी विपत्तीमुळे एखादयाने जर स्वत:ला गुलामगिरीत विकले असेल तर त्याच्यासाठी ही दयाळु तरतुद होती. या मणुष्याला त्याच्यावरील कर्ज फेडण्याकरता त्याने ज्या किमतीला स्वत:ला विकले होते तो त्याला आगाऊ मिळायची सात वर्षांनी जर त्याला स्वत:ला पुन्हा विकत घेता आले असेल तर त्याला सोडले जायचे. तसेच त्याने पुन्हा एकदा शेतीने काम सुरू करावे म्हणुन धान्य व गहु दिली जायची आणि एखादया गरीबाला जर कधी उधारीवर पैसे घ्यावे लागले असतील तर नियमशास्त्रानुसार ज्याने ज्याला पैसे दिले होते त्या पैशावर व्याज घेवु शकत नव्हता. नियमशास्त्रात असेही सांगितले होते की, गरीब लोकांना धान्य गोळा करता यावे म्हणुन ज्यांच्याकडे शेती होती त्यांनी त्यांच्या शेतीच्या कानाकोपऱ्यातील धान्याची कापणी करू नये त्यामुळे दारिद्रयन येत नव्हते.

मनिला बुलेटिन:

यातील एशिया डेव्हलपेट बँकेने असा अहवाल दिला की, आशिया २५ वर्षात दारिद्रयाचा नायनाट करू शकते. दारिद्रयाच्या खाईतुन लोकांना वर काढण्यासाठी या बँकेने अर्थव्यवस्थेत वाढ करण्याचे सुचविले. इतर संस्थांची आणि सरकारनी या समस्येवर तोडगा काढण्यासाठी उपाययोजनांची मोठी यादी मांडली आहे. त्यातील काही उपाययोजना, सामाजिक विमा कार्यक्रम, सुधारित शिक्षण, विकसनशील देशाना औद्योगिक राष्ट्राना दयावयाचे कर्ज माफ करणे, आयातातील अडथळे दुर करणे जेणेकरून गरीबांची संख्या अधिक मख्या असलेली राष्ट्रे सहजपणे आपल्या उत्पादनाची विक्री करू शकतील.

मनरेगा:

महाराष्ट्र शासनाने ग्रामीण भागात २००६ साली मनरेगा नावाची रोजगार की गॅरंटी योजना सुरू केली म्हणुन ग्रामीण भागातील प्रत्येक अकुशल, आर्थिक वर्गाला हाताला काम मिळाली त्यामुळे दारिद्रय नाहीसे होण्यास मदत मिळाली त्यामुळे प्रत्येकाच्या हाताला काम मिळाले ही शासनाची योजना वर्षभरात १०० दिवस काम मिळत होते.

जयप्रकाश रोजगार गॅरंटी योजना:

या योजनेचा महत्त्वाचा उद्देश म्हणजे देशातील सर्वाधीक हानी झालेल्या जिल्हयाला बेरोजगारी व्यक्तिला काम मिळाले हा उद्देश होता त्यामुळे ग्रस्त जिल्हयाला दारिद्रयातुन बाहेर येण्यास मदत झाली.

संपुर्ण ग्रामीण रोजगार योजना

ग्रामीण भागातील लोकाच्या आर्थिक स्थितीत वाढ होण्यासाठी व त्याचे जीवनमान उंचावण्यासाठी शासनाने संपुर्ण ग्रामीण रोजगार योजना सुरू करून त्यांना जगण्याचा मार्ग दाखविला. ही योजना सप्टें२००१ मध्ये सुरू केली. या योजनेचे वैशिष्टये म्हणजे खादय सुरक्षा, सामुदायिक, सामाजिक आणि आर्थिक या सर्व बाबींचा शासनाने ग्रामीण भागातील लोकांचे दारिद्रय संपवुन त्याच्या जीवनात आर्थिक उन्नती झाली.

प्रधानमंत्री ग्रामोदय पेयजल योजना:

ग्रामीण भागातील लोकांने जीवनमान उंचावण्यासाठी ग्रामीण भागात पेयजल योजना २०१६-१७ सुरू केली यामुळे ही योजना प्रत्येक राज्यात ग्रामीण भागात प्रत्येक घरात वर्ष २०१९-२० पाईपच्या माध्यमातुन शुध्द पाणी उपलब्ध करून दिले. यामुळे ग्रामीण भागात रोगराईला कोणताच थारा नव्हता. त्यामुळे आर्थिक स्थिती सुधारण्यास मदत झाली त्यामुळे दारिद्रयाला थारा राहीला नाही.

हुंडा प्रथाबंदी:

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विवाहाला एक धार्मिक संस्कार मानले जाते आणि प्रत्येक व्यक्तिला या अवस्थेतुन जावे लागले. परंतु आजकाल विवाह संस्था एक गंभीर रूप धारण करू लागली. जेवढा मुलगा जास्त शिकला असेल तेवढा जास्त हुंडा त्याचे वडील व सुन करण्याचा प्रयत्न करत असतात. कोणत्याही मुलीच्या वडीलांना आपली मुलगी चागल्या घरी गेलेल आवडेल त्या हव्यासापोटी मुलीचे वडील पैसे देत असतात. वेगवेगळ्या कारणांनी हुंडा वाढत असतो. मुलीचे वय वाढलेले असेल, या ना अनेक कारणानी हुंडा समस्या एक गंभीर रूप धारण करायला लागली आहे. ही बंद होणे गरजेचे आहे. कलम १९६१ नुसार कायदा करून या हुंडा समस्येला कायमाचा आळा घालुन आर्थिक स्थिती सुधारण्यास मदत होईल.

निष्कर्ष:

१. कृषि व्यवसायातील भुमिहीन शेतमजुरांना मालकीची जमीन मिळाल्यास व उत्पादन वाढविण्यासाठी आवश्यक ती मदत, साधने व मार्गदर्शन मिळाल्यास त्यांना आपल्या उत्पादनात भर टाकला दारिद्रयातुन बाहेर पडण्याचा मार्ग उपलब्ध होईल.

२. राज्यातील सर्व गरीब कुटुबापर्यंत पोहोचुन त्यांना कायमस्वरूपी उपजिवीकेच्या संधी उपलब्ध करणे व गरीबी रेषेपेक्षा वर येईपर्यंत त्याना मदतीचा हात देवुन त्यांचे जीवनमान उंचावण्यासाठी सर्वतोपरी मदत करणे अशा योजना सुरू करते.

३. लहान शेतकऱ्यांना त्यांच्या जमीनीची उत्पादकता वाढविण्यासाठी जरूर त्या सुविधा कृयशक्ती कमी करून तिचे सुयोग्य वाटप केल्यास गरिबांची कृयशक्ती वाढु शकेल.

४. केवळ राष्ट्रीय उत्पादनात व संपत्ती यांची वाढझाल्याने दारिद्रय नाहीसे करता येईल असे नाही.

५. दारिद्रयाचा परिहार करण्यासाठी अर्धबेकारांना आणि बेकारांना किफायतशीर रोजगार मिळवुन देणे हाच खात्रीलायक मार्ग आहे.

६. पतप्रधान इंदिरा गांधींनी १९७४ मध्ये पुरस्कारलेल्या वीस उत्यमी आर्थिक कार्यक्रमामध्ये दारिद्रयाचा परिहार करण्याचा दृष्टीने अनेक कार्यक्रम आहेत.

७. पाचव्या पंचवार्षिक योजनेत या कार्यक्रमासाठी एकुण १०,३६४ कोटी रुपयाची तरतुद केली आहे.

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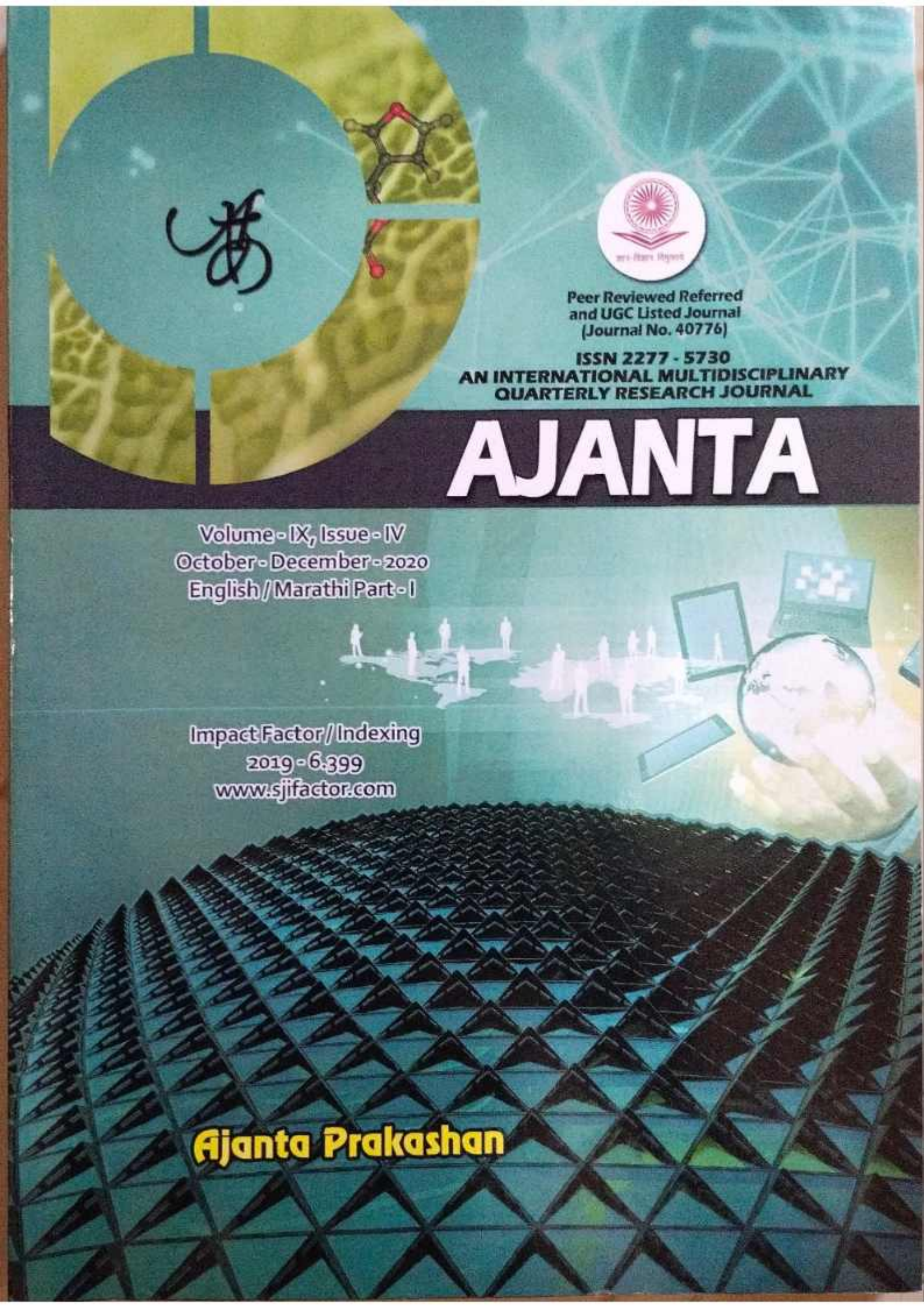

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२६. महात्मा फुले यांचे सार्वजनिक सत्यधर्म विषयक विचार

प्रा. नवनाथ ज्ञानोबा पवळे
मराठी विभाग, कालीकादेवी कला, वाणिज्य व विज्ञान महाविद्यालय, शिरूर (का).

प्रस्तावना

महात्मा जोतीराव गोविंद फुले यांचा जन्म १८२७ साली पुण्यात झाला. बहुजन समाजाला अंधकारातून वर्षानुवर्ष अंधश्रेच्या जोखडात आडकलेल्या समाजाला बाहेर काढण्याचे काम महात्मा जोतीराव फुले यांनी केले. जोतीरावांनी अनेक पुस्तके लिहिलेली आहेत. ''ब्राम्हणांचे कसब'', इशारा, शेतकऱ्यांचा असूड, गुलामगिरी, सार्वजनिक सत्यधर्म इत्यादी पुस्तकांच्या बरोबरच अभंगाच्या धर्तीवर 'अखंड रचना' केली. शिवाजी महाराजांच्यावर एक पोवाडा ही रचला. 'तृतीय रत्न' नावाचे नाटक लिहिले. काही प्रहसने ही लिहिली. फुलेंच्या सर्व साहित्यातून अस्पृश्य समाजाला स्वाभिमानाने जगण्यास प्रवृत्त केले आहे. जोतीरावांनी आपल्या सर्व चळवळींना व कार्याला १८६३ साली संघटीत रूप दिले. त्यांनी सत्यशोधक समाजाची स्थापना केली. सत्यशोधक समाजस्थापनेस जोतीरावांना अनेकांनी साहाय्य केले. सर्वश्री कृष्णराव पांडुरंग भालेकर, डॉ. विश्रामरामजी घोले, रामच्या व्यंकय्या अय्यावाश्र, ग्यानबा कृष्ण ससाणे, सदाशिव बल्लाळ गोवंडे, मोरो विट्ठल वाळवेकर रामचंद्र, विठोबा धामणकर इत्यादी मंडळींनी निरनिराळ्या जबाबदाऱ्या स्वीकारल्या म. जोतीरावांचे विचार जात, धर्म, राष्ट्र यांच्या मर्यादा ओलांडून मानवी संस्कृती पर्यंत गेलेली आहे.

सन १८९१ साली म्हणजे त्यांच्या मृत्युनंतर एक वर्षांनी त्यांच्या सार्वजनिक सत्यधर्म पुस्तकाचे प्रकाशन झाले. 'गुलामगिरी' व 'सार्वजनिक सत्यधर्म' या सारखा पुस्तकांची रचना करूनच केवळ त्यांनी नवी विचारक्रांती केली असे नव्हे तर त्या आधी जोतीरावांनी पददलित व शेतकरी यांच्या उद्धारासाठी कष्ट घेतले. मिशनरी शाळेत त्यांनी शिक्षण घेतल्यामुळे म. फुलेंवर ख्रिस्ती धर्माचा प्रभाव पडला होता. त्याचबरोबर त्याकाळची समकालीन हिंदुधर्माची संकुचित वृत्तीही नडली. कर्मकांड, वृत्त वैकल्ये, जन्मनिष्ठ जातिभेदातून निर्माण झालेली विषमता, भटब्राम्हणांची पुरोहितशाही व त्यातून निर्माण झालेली मानसिक गुलामगिरी, शिक्षणाचा अभाव, अशा परिस्थितीत जोतीराव फुले यांना नव्या विचारक्रांतीची बीजे रूजविण्याचे कार्य केले. थॉमस पेनच्या ''राईटस् ऑफमॅन'' या पुस्तकांचा प्रभाव फुलेंनवर होता. मानसाचे निसर्गसिद्ध हक्क माणसानेच हिरडून टाकावेत? त्यापेक्षा भीषण गुलामगिरी कोणती? या दास्यातून मनुष्य मुक्त व्हायचा असेल तर त्याला प्रथम शिक्षण दिले पाहिजे हे प्रथम फुलेंनी हेरले. १८६७ व १८७० साली स्थापन झालेला प्रार्थनासमाज, जोतीरावांच्या डोळ्यासमोर होता. ब्राम्हसमाज, आर्यसमाज यांची विचारसरणी त्यांच्या परिचयाची होती. दलितांना शिक्षण मिळावे, सर्व प्रकाराच्या दास्यातून त्यांची मुक्तता व्हावी. एकेश्वरी मताचा सत्यधर्म त्यांच्या आचरणात यावा म्हणून जोतीराव फुल्यांनी २४ सप्टेंबर १८७३ या दिवशी सत्यशोधक समाजाची स्थापना

केला. या समाजाचा मुख्य उद्देश "ब्राम्हण, भट, जोशी, उपाध्ये इत्यादी लोकांच्या दास्यात्यापासून शुद्र लोकांस मुक्त करण्यासाठी व आपल्या मतलबी ग्रंथांच्या आधारे आज हजारों वर्ष ते शुद्र लोकांस नीच मानून गफलतीने लुटीत आले आहेत. यास्तव समुपदेश व विद्याद्वारे त्यांस त्यांचे वास्तविक अधिकार समजून देण्याकरिता म्हणजे धर्म व व्यवहारासंबंधी ब्राम्हणांचे बनावट व कार्यसाधक ग्रंथापासून त्यास मुक्त करण्याकरता काही सुज्ञ शुद्र मंडळींनी या समाजाची स्थापना केली आहे." महात्मा फुलेंचे विचार तत्कालीन काळातही आवश्यक होते. तसेच आजही त्याचे विचार स्फोटक असेच आहेत.

व्यक्ति स्वातंत्र्य, दीन दलितांच्या उद्धाराची तळमळ, एकेश्वरी धर्माचे स्वरूप विश्वबंधुत्व मानवा मानवांतील समता इत्यादीही अधिक प्रांजळ व विचार प्रवर्तक विवेचन म. जोतीरावांच्या सार्वजनिक सत्यधर्म पुस्तकात आले आहे. सत्यशोधक धर्माचे स्वरूप म. जोतीरावांच्या मनात होते. तेच स्वरूप या पुस्तकांच्या रूपाने विस्ताराने आले आहे. मानवसेवा हीच खऱ्या ईश्वराची खरी पूजा त्यांनी मानली आणि त्या प्रमाणेच प्रत्येक मानवाने आपले आचरण ठेवून विचाराचे प्रकटीकरण केले पाहिजे. दलितांविषयी, पीडितांविषयी अपार सहानुभूती व त्यांच्या दास्यमुक्ती विषयी तळमळ हे म. जोतीरावांच्या सार्वजनिक सत्यधर्माचे सार आहे. "या आपल्या अमर्याद विस्तीर्ण पोकळीमध्ये निर्मिकाने अनंत सूर्य मंडलांसह त्यांच्या ग्रहोपग्रहांसहित तत्संबंधी सुंदर प्राणिमात्र उत्पन्न केले आहेत." त्यापैकी आपण सर्व मानवं स्त्री–पुरूषांनी त्याविषयी काय – काय करावे आणि आपण सर्व एकंदर मानव स्त्री पुरूषांनी त्यांचे स्मरण मनी जागृत ठेवून एकमेकांशी कोणत्या तऱ्हेरे आचरण केल्यामुळे त्यास आनंद होणार आहे. वास्तव मी त्यांच्या कृपेने एकंदर सर्व मानव स्त्रीपुरूषांच्या हितासाठी हा लहानसा ग्रंथ रचिला आहे."[१] असे त्यांनी आपल्या छोटया प्रस्तावनेत नमूद केले आहे. या पुस्तकात सुख, निर्माणिकर्ता,पूजा, नामस्मरण, नैवेध अथवा अन्नदान, अनुष्ठान, स्वर्ग, स्त्री–पुरूष, पाप, पुण्य, जातीभेद, धर्म, नीती, दैव, सत्य, आकाशातील गृह, जन्म, कन्या अथवा पुत्र, यांचे संस्कार, लग्न, मृत्यु, प्रेताची गती, श्राद्ध अनेक विषयावर जोतीरावांनी त्यांच्या नेहमीच्याच संवादात्मक पद्धतीप्रमाणे स्पष्टपणे विवेचन केले आहे.

सत्य वर्तनाशिवाय मानव प्राणी सुखी होऊ शकत नाही. असा त्यांचा विश्वास आहे ते म्हणतात. जगाचा निर्मिक अथवा निर्माणिकर्ता एकच असल्यास त्यांची नाना रूपे कल्पून भेदाचा पसारा मांडू नये. नानादेव, नाना धर्म यांतूनच मतभेद वाढतात व विषमतेस जाती आणि कलहास अवसर सापडतो. हे थांबविण्यासाठी फुलेंच्या मते एक ईश्वर, एक धर्म अशी सत्यधर्माविषयी कल्पना आहे. ते म्हणतात. "आपल्या सूर्य मंडळासह आपण वस्ती करणाऱ्या पृथ्वीच्या निर्माणिकर्ता जर एक आहे. तर तिजवरील अनेक देशातील लोकांचा एकमेकांशी वैरभाव मानून प्रत्येकामध्ये देशाभिमान व धर्माभिमानाचे खूळ व्यर्थ का माजले आहे? त्याप्रमाणे या पृथ्वीवरील अनेक देशांतील सर्व नद्या महासागरास मिळत असता त्यापैकी एका देशातील नदी पवित्र कशी होऊ शकेल?"[२] सृष्टीचा निर्माणिकर्ता अमर्याद अनंत असल्यामुळे त्यांचा शोध घेण्याचा प्रयत्न करण्यापेक्षा त्या दयानिधी निर्माणिकर्त्यास आपण येथूनच शरण जाऊन मोठया नम्रतेने साष्टांग नमस्कार घालावा असे जोतीरावांना वाटते या निर्माणिकर्त्याची पूजा कशी करावी? या प्रश्नाचे उत्तरदेतांना फुले

म्हणतात. "स्वपरिश्रमाने आपल्या कुटूंबाचे पोषण करून रात्रदिवस जगाच्या कल्याणासाठी झटणारे म्हणजे अज्ञानी बांधवास आपमतलबी व स्वार्थसाधू लोकांच्या जाळ्यातून मुक्त करणारे अशा सत्पुरूषांस फुलांच्या माळा करून नित्य ईश्वराच्या नावाने अर्पण कराव्यात म्हणजे पुष्पांचे सार्थक झाले."[3] महात्मा जोतीराव फुले या पुजेस उदात्त अशी पूजा मानतात. हीच खरी ईश्वर सेवा आहे असेही ते म्हणतात. निर्मिकाने निर्माण केलेल्या सर्व मानवांबरोबर छक्केपंजे न करता सरळ सात्यिक आचरण केल्याने मानव सुखी होईल.

नैवेद्य अथवा अन्नदानाचे स्वरूप वर्णन करताना ते म्हणतात. "एकंदर आपल्या कुटूंबाचे स्वकष्टान पालन पोषण करून ज्या सत्पुरूषांनी जगाच्या कल्याणासाठी आपले सर्व आयुष्य खर्ची घातल्यामुळे त्यास पदाकदाचित वृद्धापकाळी आपत्ती आली अथवा ते काही संकटात पडले तर त्यांस अथवा जगातील पंगू लोकांस अथवा पोरक्या मुलांस निर्मिकाच्या नावाने हवी ती मदत करावी म्हणजे त्यास नैवेध्य अर्पन केल्याचे श्रेय होईल"[4] जोतीरावांच्या सत्यधर्मात स्वर्ग कल्पनेस अवसर नाही. मानवांमध्ये स्त्री–पुरूष असे भेद असले तरी त्यांच्या सत्यधर्मात स्त्रीला जास्त महत्व आहे. पाप आणि पुण्यायां विषयीची जोतीरावांचे विचार अतिशय प्रगल्भ असे आहेत. स्वत:स मात्र सुख होण्याकरिता एकंदर सर्व मानवी प्राण्यांस आर्थिक व मानसिक पीडा दिली नाही म्हणजे त्यासच पुण्य म्हणावे. अशी त्यांची पुण्याबद्दलची कल्पना आहे. मानवी प्राण्यात मूळ जातिभेद नाही. असा त्यांचा सिद्धांत आहे. जोतीरावांनी कर्तव्य, उद्योग, व्यवसाय यापासून धर्म वेगळा मानला आहे. रामायन, भागवत ग्रंथातील नितिकल्पनांवर व भाकडकथांवर जोतीरावांचा बराच रोष आहे. या कथेत सांगितल्या प्रमाणे पाहिल्यास यांना निर्मिक म्हणणे आपणास शोभेल का? असा खडा सवाल ही जोतीरावांनी या सत्यधर्मात मांडला आहे. मरू घातलेल्या अवघड संस्कृत भाषेत वेद तयार केले. याचाच अर्थ असा की, एकदया भटब्राम्हणांच्याच उपयोगी यावेत, असा फुले यांचा तर्क आहे.

ज्या सत्यावर जोतीरावांचा नवा धर्मग्रंथ उभा आहे. त्याची एक तेहतीस कलमी रूपरेषाही त्यांनी सांगितलेली आहे. आपल्या निर्मिकाने सर्वांना समान निर्माण केले आहे. त्यापैकी स्त्री–पुरूष हे कोणत्याही प्राणी मात्रास उभयत: जन्मताच स्वतंत्र व एकंदर सर्व अधिकारांचा उपयोग घेण्यास पात्र केले आहेत. असे कबुल करणारे त्यास सत्यवर्तन करणारे म्हणवेत. ते कधी दगडाच्या किंवा धातूच्या मुर्तीसमान देणारे नसतात. ते कधी निरर्थक, पोकळ असे नामस्मरण करीत नाहीत. त्रास देत नाहीत. ते कोणावर जबरदस्ती सुद्धा करीत नाहीत. दुसऱ्यास पीडा देत नाहीत. एका स्त्रीस भार्या समजून एका पुरूषांस भाऊ समजून आपले आचरण करतात. दुसऱ्या धार्मियांसते कधीही नीच समजत नाहीत. त्यांचा छळ करीत नाहीत. धर्म, गावंकी, मुलकी यासंबंधीची प्रत्येक मानवाची स्वतंत्रता, मालमत्ता संरक्षण आणि जुलूमापासून बचाव त्यांचे ते रक्षण करतात. ते स्वत: लबाड बोलत नाहीत. लबाड बोलणाऱ्यास मदत करीत नाहीत. ते चोरी करत नाहीत. व्याभिचारापासून अलिप्त राहतात. ते कोणास कधी दास मानत नाहीत. ते शेतकऱ्यांचा आदर सन्मान करत. कोणताही धंदा ते तुच्छ मानत नाहीत. ते कोणाचीही फसवणूक रीत नाहीत. ते रोगी, पंगु अनाथ मुलांना नेहमी मदत करतात. शनी वगैरे गृह इतक्या लांबून पीडा देतील व भूर्त आर्यभट्ट जोशास दक्षिणा दिल्याने ती दूर होईल हे जोतीरावांना मान्य नाही. मुलाचा वा मुलीचा जन्म त्यांच्या नावाचा संस्कार, अन्नाचा संस्कार, शाळेचा

संस्कार इत्यादी विषयीही सत्यधर्मात जोतीरावांनी मार्गदर्शन केले आहे. मुलांतील दुर्गुणांचा त्याग व्हावा या विषयी ते तत्पर आहेत. सदगुणांशिवाय त्यांच्या अंगावर सोने, रूपे, रत्ने यांचे अलंकार घालु नयेत म्हणून जोतीराव म्हणतात. म. जोतीराव लग्नाविशायी म्हणतात. ''हरएक मानव पुरूष व स्त्री हे उभयता मरे पावेतो एकमेकांचे साक्षी व साहयकारी होऊन एक चित्ताने वर्तन करून त्यांनी सुखी व्हावे, म्हणून जी काही परस्परांशी कबुलायत करण्याची बहिवाट घातली आहे. त्यास लग्न म्हणतात.'' अशी व्याख्या ते करतात. वधु – वरांनी कोणती प्रार्थना करावी, कोणती शपथ घ्यावी; मृत्यु म्हणजे काय? मरणा समयी कष्ट का होतात. प्रेताची नंतर व्यवस्था, ही काय करावी. त्या समयी प्रार्थना कोणती असावी. श्राद्ध विधी कसा करावा. यांचाही विचार सत्यधार्मत सांगितला आहे.

समारोप

अशा प्रकारे आपणास महात्मा फुले यांनी सांगितलेले सार्वजनिक सत्यधर्म आपणास सांगता येतात. या सार्वजनिक सत्यधर्मात त्यांनी पाप–पुण्य, स्वर्ग, मानवाने आपले आचरण कसे ठेवावे. सर्व प्राणी हे सारखे आहेत. सर्वांशी एकोप्याने रहावे. सर्व सृष्टीचा निर्माण करता एकच आहे. नैवैध्य, निर्मिक शक्ती या सर्व गोष्टीवर त्यांनी या सार्वजनिक सत्यधर्मात प्रकाश टाकला आहे.

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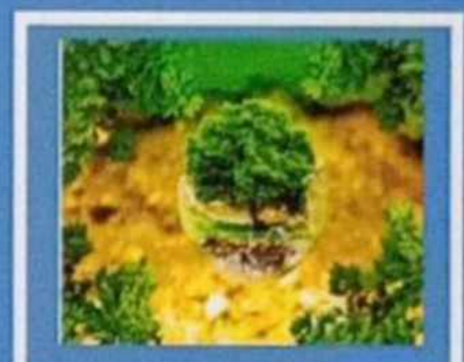

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Environmental Changes in COVID- 2019 Situation: A Geographical Review

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Abstract

The worldwide disruption caused by the COVID-19 pandemic has resulted in numerous effects on the environment and therefore the climate. The worldwide reduction in modern act like the considerable decline in planned travel was caused an outsized drop by pollution and pollution in many regions. In China, lockdowns and other measures resulted during a 25 percent reduction in carbon emissions and 50 percent reduction in nitrogen oxides emissions, which one earth systems scientist estimated may have saved a minimum of 77,000 lives over two months. Usually, the symptoms of COVID-19 infection include fever, chills, cough, pharyngitis, breathing difficulty, myalgia or fatigue, nausea, vomiting, and diarrhea. Several cases can cause cardiac injury, respiratory failure, acute respiratory distress syndrome, and even death. Older people along side other underlying medical conditions are at a high risk of mortality. Other positive effects on the environment include governance-system-controlled investments towards a sustainable energy transition and other goals associated with environmental protection

Key words - COVID- 19 , lockdowns, air quality, environment

Introduction

The outbreak of coronavirus disease-2019 (COVID-19) first emerged at the top of December 2019, from the Hunan seafood market in Wuhan City of China, and declared as a world public health emergency during a few weeks by the planet Health Organization. it's an communicable disease caused by severe acute respiratory syndrome coronavirus. Genomic analysis revealed that SARS-CoV-2 is phylogenetic ally related to SARS viruses, and bats might be the possible primary source. Although the intermediate source of origin and transfer to humans isn't clearly known, the rapid human to human transmission capability of this virus has been established. The transmission of the virus mainly occurred through person-to-person via direct contact or droplets produced by coughing, sneezing and talking. As of September 06, 2020; the virus has claimed to spread 216 countries, areas or territories with the death of 876, 616 humans from 26,763,217 confirmed cases and therefore the number is increasing rapidly.

Usually, the symptoms of COVID-19 infection include fever, chills, cough, pharyngitis, breathing difficulty, myalgia or fatigue, nausea, vomiting, and diarrhea. Several cases can cause cardiac injury, respiratory failure, acute respiratory distress syndrome, and even death. Older people alongside other underlying medical conditions are at a high risk of mortality. National and international authorities and experts suggest the utilization of non-pharmaceutical measures like wearing face masks and hand gloves, washing hands with soap, frequent use of antiseptic solution and maintaining social distance. Overall, the pandemic has caused huge global socio-economic disruption, which directly or indirectly affected the environment like improvement of air and water quality, reduction of noise and restoration of ecology. Moreover, the increased use of private protective equipment (PPE) (e.g., face mask, hand gloves, gowns, goggles, face shield etc.), and their haphazard disposal creates environmental burden. In these circumstances, this study intended to explore the positive and negative environmental consequences of the COVID-19 pandemic, and propose possible strategies as future guideline for environmental sustainability.

Methodology

This study was performed by reviewing the available published literatures, case studies, and different government and non-government organizations information from reports and official websites. This study compiles and presents the info and knowledge which are relevant to the environmental effects of COVID-19.

Environmental effects of COVID-19

The global disruption caused by the COVID-19 has caused several effects on the environment and climate. Thanks to movement restriction and a big slowdown of social and economic activities, air quality has improved in many cities with a discount in pollution in several parts of the planet.

Positive environmental effects - Reduction of pollution and greenhouse gases emission
As industries, transportation and corporations have closed down, it's brought a sudden drop of greenhouse gases emissions. Compared with this point of last year, levels of pollution in Ney York has reduced by nearly 50% due to measures taken to regulate the virus. it had been estimated that almost 50% reduction of N2O and CO occurred thanks to the shutdown of heavy industries in China. Also, emission of NO_2 is one among the key indicators of worldwide economic activities, which indicates a symbol of reduction in many countries (e.g., US, Canada, China, India, Italy, Brazil etc.) thanks to the recent pack up. Usually, NO2 is emitted from the burning of fossil fuels, 80% of which comes from automobile exhaust. it's reported that NO2 causes acid precipitation with the interaction of O2 and H2O, and a number of other respiratory diseases suffered by humans. theecu Environmental Agency predicted that, due to the COVID-19 lockdown, NO2 emission dropped from 30-60% in many European cities including Barcelona, Madrid, Milan, Rome and Paris. within the US NO2 declined 25.5% during the COVID-19 period compared to previous years. the extent of NO2 demonstrated a discount across Ontario and located to be reduced from 4.5 ppb to 1 ppb. Up to 54.3% decrease of NO2 was observed in Sao Paulo of Brazil. it had been also stated that, the amount of NO2 and PM2.5 reduced by almost 70% in Delhi.. Overall, 46% and 50% reduction of PM2.5 and PM10 respectively, was reported in India during the nationwide lockdown. It is assumed that, vehicles and aviation are key contributors of emissions and contribute almost 72% and 11% of the transport sector's GHGs emission respectively. The measures taken globally for the containment of the virus also are having a dramatic impact on the aviation sector. Many countries restricted international travelers from entry and departure. thanks to the decreased passengers and restrictions, worldwide flights are being cancelled by commercial aircraft companies. as an example, China reduces almost 50–90% capacity of departing and 70% domestic flights thanks to the pandemic, compared to January 20, 2020, which ultimately deducted nearly 17% of national CO2 emissions. Furthermore, it's reported that 96% of aviation dropped from an identical time last year globally thanks to the COVID-19 pandemic, which has ultimate effects on the environment.
Overall, much less consumption of fossil fuels lessens the GHGs emission, which helps to combat against global global climate change. consistent with the International Energy Agency (IEA), oil demand has dropped 435,000 barrels globally within the first three months of 2020, compared to an equivalent period of last year. Besides, global coal consumption is additionally reduced due to less energy demand during the lockdown period. it's reported that, coal-based power generation reduced 26% in India with 19% reduction of total power generation after lockdown. Again, China, the very best coal consumer within the world, dropped 36% compared to same time of the preceding year (early February to mid-march). consistent with UK based climate science and policy website Carbon Brief, recent crisis of COVID-19 reduces 25% CO2 emission in China, and nonetheless below the traditional limit quite two months after the country entered lockdown.

Negative environmental effects

1. Increase of biomedical waste generation 2. Safety equipment use and haphazard disposal

3. Municipal solid waste generation, and reduction of recycling

Other effects on the environment

Recently, huge amount of disinfectants is applied into roads, commercial, and residential areas to exterminate virus. Such extensive use of disinfectants may kill non-targeted beneficial species, which may create ecological imbalance

Strategies of environmental sustainability: It is assumed that, all of these environmental consequences are short-term. So, it is high time to make a proper strategy for long-term benefit, as well as sustainable environmental management. The COVID-19 pandemic has elicited a global response and make us united to win against the virus. Similarly, to protect this globe, the home of human beings, united effort of the countries should be imperative. Therefore, some possible strategies are proposed for global environmental sustainability.

Sustainable industrialization:

Industrialization is crucial for economic growth; however, it's time to think about sustainability. For sustainable industrialization, it is essential to shift to less energy-intensive industries, use of cleaner fuels and technologies, and strong energy efficient policies. Moreover, industries should be built in some specific zones, keeping in mind that waste from one industry can be used as raw materials of the other.

Use of green and public transport:

To reduce emissions, it is necessary to encourage people to use public transport, [illegible] vehicles. Besides, people should encourage to use bicycle in a short distance, and public [illegible] system should be available for mass usage, which is not only environment friendly but also [illegible] for health and economic crises.

Use of renewable energy:

Use of renewable energy can lower the demand of fossil fuels like coal, oil, and natural gas which can play an important role in reducing the GHGs emissions. Due to the COVID-19 pandemic, global energy demand is reduced, which results in the reduction of emission and increased [illegible] quality in many areas. But, to maintain the daily needs and global economic growth, it is [illegible] to cut-off energy demand like a pandemic situation. Hence, use of renewable energy [illegible] solar, wind, hydropower, geothermal heat and biomass can meet the energy demand and [illegible] GHGs emission. ***Waste recycling and reuse:*** To reduce the burden of wastes and [illegible] pollution, both industrial and municipal wastes should be recycled and reused.

Behavioral change in daily life: The behavior in our daily life and optimum consumption of resources like; avoid processed and take locally grown food, make compost from food waste, switch off or unplug electronic devices when not used, and use a bicycle instead of a car for short distances during exercises regularly

Conclusion

The COVID- 19 taught to us how to behave to ourselves in the society. Human being is the most dangerous species on the globe. Who pollute the world than natural activity but nature can control it with its different types of power in that one of them that is the corona virus. Its damp overall world in the houses less than few warriors who stand in front of it. Human activity stop on the globe the nature became a pure ourselves in environment at everywhere. Hope so the vaccination will be come soon and its result is very good.

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सारांश :-

पर्यावरण हे मानवी जीवनासाठी अमुल्य अशी नैसर्गिक साधन संपत्ती आहे. पर्यावरणाच्या शाश्वत विकासासाठी त्याचे योग्य नियोजन व मुल्य जाणून घेऊन त्याचा वापर करणे होय. पर्यावरण म्हणजे मानवाच्या सभोवतालची परिस्थिती असते. यामध्ये पृथ्वी, हवा, वातावरण व जैवविविधता याचा समावेश होतो. तो मानवाने पर्यावरणातील नैसर्गिक साधनसंपत्तीच्या सहाय्याने आर्थिक विकास साधला. मात्र नैसर्गिक साधनसामुग्रीच्या अतिरिक्त अयोग्य वापरामुळे हवामान बदल व ग्लोबल वार्मिंग अशा अनेक परिणामांसमोर जावे लागत आहे. अशा मानवी कृतीमुळे आज पर्यावरणाचे व पृथ्वीचे संतूलन दिवसेंदिवस बिघडत चालले आहे. त्यामुळे उर्जा, पाणी, त्सुनामी, वादळे, अतिवृष्टी, दुष्काळ अशा अनेक समस्यांना भारतासह अनेक देशांना तोंड द्यावे लागत आहे. अशा अनेक पर्यावरणीय समस्यामुळे शाश्वत विकासाला धोका निर्माण होत आहे. त्यासाठी नैसर्गिक घटक पाणी, हवा, जमीन याचा योग्य वापर करुन शाश्वत विकासात येणारे अडथळे लोकसहभागातून व विविध तज्ञांच्या माध्यमातून सोडवणे गरजेचे आहे.

बीजसंज्ञा :- पर्यावरणीय शाश्वत विकास व समस्यांचा अभ्यास करणे

प्रस्तावना :-

पृथ्वीच्या पृष्ठभागावर मानव आणि पर्यावरण हे दोन्ही घटक परस्पर संबंधीत आहेत. कोणत्याही एका घटकाला स्वतंत्र अस्तित्व नाही. पर्यावरणाच्या सानिध्यातून मानवाच्या गरजा भागवल्या जातात. निसर्गाने विविध नैसर्गिक संसाधने उपलब्ध करुन दिले आहेत. उन, वारा, पाऊस, जमीन आणि पाणी आदी साधनाच्या विनामुल्य वापरासोबतच अन्न, वस्त्र, निवारा या मुलभूत गरजांची पुर्तता अव्याहतपणे मानव करत आलेला आहे. प्रथम मानवाने स्वत:चा विकास साधण्यासाठी आपल्या बुध्दीचा आणि विज्ञानाचा वापर करुन नैसर्गिक संसाधनांचा पाहिजे तेवढा वापर केला त्यावेळेस पर्यावरणीय साधनसंपत्ती प्रचंड होती. मात्र बदलत्या काळामध्ये जसजशी लोकसंख्या वाढत गेली तसतसे अनेक मुलभूत प्रश्न निर्माण झाले. उपलब्ध पर्यावरणीय साधनांचा उपयोग करुन स्वत:चे जीवन सुखी आणि समृध्द करण्याचा केलेला प्रयत्न म्हणजे विकास अशी संकल्पना रुढ होत गेली आणि या मानवी विकासात पर्यावरणीय संसाधनांचा अती वापर होऊन पर्यावरणीय समस्या निर्माण झाल्या. या समस्यांमुळे अनेक शास्त्रज्ञ एकत्र येऊन विचार विनिमय करु लागले. या संदर्भात इ.स. 1971 साली स्टॉकहोम येथे पहिली जागतिक परिषद झाली. सन 1992 ला रिओ दि जेनेरिओ येथे दुसरी वसुंधरा परिषद झाली. त्यानंतर जोहान्सबर्ग या ठिकाणी 2002 साली जागतिक शाश्वत विकास परिषद झाली. या परिषदेत आर्थिक विकास सामाजिक समता आणि पर्यावरणीय संवर्धन अशी त्रिसुत्री निश्चित करण्यात आली. त्यातून पर्यावरणीय शाश्वत विकास कसा साधता येईल याकडे विशेष लक्ष देण्यात आले. या शोध निबंधामध्ये पर्यावरणीय शाश्वत विकास व समस्या याची सविस्तर मांडणी करण्याचा प्रयत्न केला आहे.

शोध निबंधाची उद्दीष्टे :-

- पर्यावरणीय शाश्वत विकासाचा अभ्यास करणे
- शाश्वत जलसंवर्धनाचा अभ्यास करणे
- जागतिक हवामान बदलाच्या समस्येचा अभ्यास करणे
- पर्यावरणाच्या संबंधीग्रामीण भागाच्या समस्याचे विवेचन करणे
- शाश्वत पर्यावरणासंबंधी उपाययोजनांचा आढावा घेणे

शोधनिबंधाची गृहितके :-

- पर्यावरणीय शाश्वत विकास होत असलेला दिसून येत आहे.
- पर्यावरणीय शाश्वत विकासांतर्गत जलसंवर्धन शासकीय योजनेतर्गत चालू आहे.
- अनेक शास्त्रज्ञांच्या माध्यमातून हवामान बदलांच्या अभ्यासाला सुरुवात झाली आहे.
- विकसीत राष्ट्रांनी पुढाकार घेऊन कार्बन डाय ऑक्साईड रोखण्याचा प्रयत्न केला आहे.
- हवामाना विषयी समाजात जनजागृती केल्यामुळे शाश्वत विकासाला चालना मिळाली आहे.

संशोधन पध्दती :-

प्रस्तुत शोध निबंध तयार करण्यासाठी द्वितीय साधन सामुग्रीचा उपयोग करण्यात आला आहे. यासाठी विविध संदर्भग्रंथ, वर्तमानपत्रे आणि मासिके यांच्या माध्यमातून माहिती संकलीत करण्यात आली आहे.

विषय विवेचन :-

शाश्वत विकासाची व्याख्या

'शाश्वत विकास म्हणजे आर्थिक विकासाच्या प्रक्रियेतून अखिल मानव जातीचे कल्याण साधन्यासाठी नैसर्गिक संसाधनांचा योग्य पध्दतीने वापर करणे होय'

'पर्यावरणाच्या धारण क्षमतेच्या मर्यादित राहून मानवी जीवनमानाचा दर्जा उंचावून म्हणजे शाश्वत विकास होय'

मानवी जीवनमान उंचावण्यासाठी प्रत्येक व्यक्ती प्रत्यक्ष अप्रत्यक्ष निसर्गाचा वापर करत आहे. त्यामुळे त्याचा परिणाम प्रत्यक्ष परिणाम होत आहे. याचाच परिणाम म्हणून अनेक समस्या निर्माण होत आहेत. त्यामधे वाळवंटीकरण, उर्जासमस्या, लोकसंख्यावाढ, आवर्षन, महापूर, भूकंप इ. मुळे शाश्वत साधनसंपत्तीच्या विकासाला धोका निर्माण झाला आहे.

शाश्वत पर्यावरणीय विकासातील महत्वाचे घटक :-

- जलसंवर्धन

पर्यावरणीय शाश्वत विकासामध्ये जलसंवर्धनाला विशेष महत्व आहे. याबाबतीत शासनाच्या स्तरावर विविध योजना राबवल्या जात आहेत. नैसर्गिक स्रोतांना पुर्नरुजीवन देण्याचे काम जलयुक्त शिवार योजनेच्या माध्यमातून होत आहे. त्यासाठी योजनेच्या माध्यमातून तयार झालेली पुर्ण जलाशयाची योग्य निगराणी केली का नाही हे पाहण्यासाठी सर्वांनी जागरुक राहिले पाहिजे. जलयुक्त शिवाराच्या माध्यमातून अनेक कामे झालेली आहेत. त्यामध्ये नदी, नाले, ओढे यांचे खोलीकरण व रुंदीकरण, ओढे नाले जोडप्रकल्प लघू पाटबंधारेची दुरुस्ती, पाणी वाटप संस्थांचे बळकटीकरण, साखळी सिमेंट नाला बांधबंदिस्ती मोठया प्रकल्पाच्या क्षमतेच्या अधिकाअधिक वापर करण्याच्या दृष्टीने विचार करणे इ. कामे झाली आहेत. जलयुक्त शिवार अभियानातून मागास भाग असलेला बीड जिल्हयात मात्र ही योजना यशस्वीपणे राबवली गेली. या जिल्हयात एकुण 1403 महसूली गावापैकी 2014 ते 2016 या दोन वर्षासाठी 333 गावे या योजनेसाठी निवडण्यात आली. यापैकी 271 गावात शासनाच्या अलग अलग योजनांची एकुण 1074 कामे पुर्ण केली असून 1309 कामे सुरु असून त्यावर अंदाजे तीस कोटी दोन लाख रुपये एवढा खर्च झालेला आहे. याठिकाणी पावसाच्या पाण्याचे प्रमाण फारच कमी आहे. त्यामुळे येथे हमेशा दुष्काळाला सामोरे जावे लागते.

- जलव्यवस्थापन

पर्यावरणीय शाश्वत विकासासाठी भिन्न अशा प्राकृतिक प्रदेशात पाण्याचे व्यवस्थापन केले पाहिजे त्यामध्ये पावसाच्या पाण्याचे वितरण, वहन नियंत्रित करुन या प्रवाहामार्गात कृत्रिम बदल घडवून आणून पाणी मुरवणे व भुअंतर्गत जलपातळीत वाढ करणे, एकसंघ खडकामुळे जमीनीत पाणी मुरु शकत नाही त्यासाठी आज ट्रॅक्टरच्या माध्यमातून आवाज करुन खडकाला तडे निर्माण करुन जमिनीत भुजल पातळी वाढवण्याचा प्रयत्न केला जात आहे. शाश्वत पर्यावरणासाठी पर्जन्यकाळात पाणी विहीरीत व बोअर मध्ये सोडून भूजल पातळी वाढवली जाते व भविष्यात निर्माण होणाऱ्या जलसंकटात उपयोग केला जातो. यामुळे त्या प्रदेशातील भूजल साठयामध्ये वाढ होते. आज अनेक ठिकाणी नाला बांधकाम करुन पाणलोट क्षेत्रातील डोंगरमाथ्यावरुन वाहून जाणारे पाणी जमीनीत मुरवण्याची व्यवस्था करण्यात आली आहे. जशी की, राळेगण सिध्दी, हिवरेबाजार या गावाचाही लोकसहभागामुळे सर्वांगीण विकास झाला. अलीकडे जणसहभागातून कार्य करण्याचा अनेक ठिकाणी प्रयत्न केला जात आहे. यामुळे शासनाद्वारे केल्या जाणाऱ्या कार्यात होणाऱ्या पैशाच्या अपव्ययावर नियंत्राण आले आहे. पाण्याचे समस्येवर मात करणाऱ्या जर्मन आणि फ्रांन्स या देशांनी नदी, खोऱ्यामध्ये ज्या प्रकारच्या उन्नत व्यवस्था, जलसहभागाच्या तत्वावर आमलात आणल्या त्या प्रकारची जलव्यवस्थापन रचना अनुकरणीय आहे. फ्रांन्सच्या राजकीय संसदेने कायदा करुन येथील सहा खोऱ्यामध्ये स्वायत्त स्वरुपाची खोरीनिहाय 'पाणी संसदा' स्थापन केले आहेत. त्यावर पाणी वापरदाराच्या संघटना आणि पाणी वितरण करणाऱ्या यंत्रणा यांना प्रतिनिधीत्व असते. त्या त्या खोऱ्यातील पाण्याचे सर्व प्रकारचे नियमन आणि आर्थिक व्यवस्थापन या पाणी संसदाच्या आदेशानुसार चालते. यावरुन जलव्यवस्थापनातील जनतेचा सहभाग किती महत्वाचा आहे ते स्पष्ट होते.

- पर्यावरणीय शाश्वत विकासात येणाऱ्या समस्या

- जागतिक तापमानवाढ

शाश्वत पर्यावरणाच्या विकासासाठी तापमान हे पर्यावरणासाठी संतुलित असणे गरजेचे आहे. मात्रे तसे न होता जागतिक तापमानवाढ हे शाश्वत पर्यावरण विकासामध्ये समस्या बनली आहे. जागतिक हवामान शास्त्र संस्थेने आपल्या अहवालातून 2013 मध्ये कर्ब वायूची उत्सर्जनाची वाढलेली पातळी ही गेल्या 3 दशकांपासून सर्वाधिक असलयाचे म्हटले आहे. वाहनांची वाढती संख्या, बेसुमार जंगलतोड, सीएफसी वायूचे उत्सर्जन यामुळे पृथ्वीवरील शाश्वत पर्यावरणामध्ये घातक परिणाम दिसून येत आहे. सध्या तापमानवाढ ही

पूर्णत: मानव निर्मित असून मुख्यत्वे हरितवायू परिणामामुळे होत आहे. जागतिक तापमानवाढीत अमेरीकन संयुक्त संस्थाने, युरोप, चीन व जपान ही जबाबदार देश आहेत. याचे मुख्य कारण म्हणजे मोठ्या प्रमाणावरील उर्जेचा वापर व हरितवायूचे उत्सर्जन. यातील अमेरीका हा देश हरितवायूचे सर्वाधीक उत्सर्जन करणारा देश आहे. 'इंटर गव्हर्नमेंटल पॅनल ऑन क्लायमेट चेंज' (आयपीसीसी) याचे प्रमुख राजेंद्र पचौरी यानी सांगीतले की, हवामान बदल रोखण्यासाठी अतिशय अग्रक्रमाने कृती करण्याची गरज आहे. त्यांच्या मते तापमानवाढ 2 अंश सेल्सिअस च्या खाली असायला हवे व तेही कमी खर्चात होय.

- हरीतगृह परिणाम

कार्बन डायऑक्साईड, मिथेन, नायट्रोजन ऑक्साईड व पाण्याची वाफ हे प्रमुख वायू असे आहेत की जे उर्जा लहरी परावर्तीत करु शकतात. यांनाच इन्फ्रारेड लहरी असे म्हणतात. सुर्यापासून पृथ्वीला मिळणाऱ्या उर्जेत या लहरींचा समावेश होतो. या लहरी पृथ्वीवर दिवसा शोषल्या जातात त्यामुळे दिवसा तापमानवाढ सुर्य मावळल्यावर शोषण प्रक्रिया थांबते व उत्सर्जन प्रक्रिया सुरु होते. शोषलेल्या लहरी अंतराळात सोडल्या जातात काही लहरी पुन्हा वातावरणात परावर्तीत होतात त्यामुळे रात्रकाळात पृथ्वीला उर्जा मिळते म्हणून पृथ्वी भोवतालचे वातावरण उबदार असते.

या हरीतगृह परिणामाच्या माध्यमातून CO_2, CH_4, NO_2, O_3 हे दूषित वायू वातावरणात मिसळले जातात याचा परिणाम हा शाश्वत विकासावर होतो. तसेच वाहनाचा वापर कमी करणे, सौरउर्जेचा वापर वाढवणे, CO_2 वायूवर प्रक्रिया करणे सीएफसी चे प्रमाण कमी करण्यासाठी त्या साधनांचा वापर करणे, झाडे लावून त्याचा संभाळ करणे इत्यादी घटकांचा वापर केल्यामुळे शाश्वत पर्यावरणाचा विकास होईल.

शाश्वत पर्यावरण विकासात असे अनेक कारणे आहेत :

कृत्रिम पावसाच्या माध्यमातून वातावरणामध्ये जलबाष्पात रासायणीक फवारणी करणे, झाडांची संख्या कमी करणे, जलसाठायातील उपसा करणे, कारखान्यातील विषारी वायू हवेत सोडणे, वाहनाचा वाढता वापर, अल-निनो आणि ला-निनो वातावरणात वाढता प्रभाव इत्यादी अनेक समस्या आहेत.

पर्यावरणीय शाश्वत विकासासाठी उपाययोजना :-

- पर्यावरण संतुलन राखण्यासाठी राष्ट्रीय स्तरावर नियोजन करणे
- उद्योग व कारखाने या माध्यमातून कमी प्रदुषण होईल अशा मर्यादा घालून देणे
- खाजगी व सार्वजनिक जागेवर वृक्षारोपन व वृक्षसंवर्धनाचे प्रमाण वाढवणे
- पर्यावरण संरक्षणाची जनजागृती करणे
- 'पर्यावरणाचे रक्षण करणे' हे माझे कर्तव्य आहे या भावनेतून कार्य करणे.
- सांडपाण्यावर प्रक्रिया करुन हे पाणी पिकांसाठी वापरणे
- पाणी प्रदुषण करणाऱ्यावर कडक शासन करणे
- शेतीसाठी कृत्रिम पावसासाठी रासायनिक पदार्थांचा वापर न करता सेंद्रीय घटकांचा वापर करणे
- जैव तंत्रज्ञानावर आधारीत नवीन हरीत क्रांतीची संकल्पना जनसामान्यांत रुजविणे
- कचरा व्यवस्थापन करणे

अशा अनेक उपाययोजना सांगता येतील.

निष्कर्ष :

- नैसर्गिक उगमस्थानाना पुर्नरुज्जीवन देण्याचे काम जलयुक्त शिवार योजनेच्या माधमातून झाले आहे.
- बोअर पुर्नभरणाच्या माध्यमातून भूजल पातळीत वाढ होत आहे.
- लोकसभांमधून सर्वांगीण विकास करुन त्यामुळे पैशाचा अपव्यय कमी झाला आहे.
- प्रत्येकाने बुध्दीचा वापर करुन तंत्रज्ञानाच्या जोरावर प्रदुषण विरहीत पर्यावरण रक्षण केले पाहिजे हा प्रयत्न चालू आहे.
- पर्यावरण संरक्षण कायदा करुनही त्यांची अंमलबजावणी पुर्णत: होत नसल्याने वातावरणात कार्बन डायऑक्साईडचे प्रमाण कमी करण्यासाठी जनजागृती करणे महत्वाचे आहे.
- जलप्रदुषण त्याचे उगमस्थान कारणे आणि परिणाम माहिती असूनदेखील मानव ही समस्या निरसन करण्यात अपयशी ठरत आहे.
- कारखानदारीमुळे प्रचंड प्रदुषण वाढून त्याचा परिणाम शाश्वत विकासावर होत आहे.

- जागतिक हवामान बदलाच्या समस्येवर विचार मंथनाला सुरुवात झाली आहे.
- पाण्याचा अपव्यवय टाहण्यासाठी अण्णा हजारे व पोपटराव पवार यांनी केलेला प्रयोग यशस्वी होऊन त्याचा सर्वत्र वापर होत आहे.

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• १९. जलसिंचनाचे व्यवस्थापन काळाची गरज

डॉ. मुळे पी. एम.
अर्थशास्त्र विभाग प्रमुख, कालिकादेवी कला, वाणिज्य व विज्ञान महाविद्यालय, शिरूर (का) जि. बीड.

प्रस्तावना

विश्वाच्या उत्पत्तीपासून या सृष्टीतील सर्व घटक परस्परांशी संबंधित व एकमेकांवर अवलंबून आहेत. त्यामुळे सृष्टीतील सर्वच घटक महत्त्वाचे आहेत. एखादा घटक कमजोर असल्यास तो सर्व सृष्टीलाच डळमळीत करू शकतो. तेवढे प्रचंड सामर्थ्य त्याच्यात आहे. त्यामुळे प्रत्येक घटकांचा समतोल राखणे आवश्यक आहे. सृष्टीच्या सर्व घटकातील एक महत्त्वाचा घटक म्हणजे पाणी किंवा जल होय. पर्यावरण राखण्याच्या दृष्टीने जलसंपत्तीला अनन्य साधारण महत्त्व असल्याने त्यादृष्टीने अनेक उपाय योजना करण्यात येत आहेत. आकारमानानुसार पृथ्वीचा विचार केल्यास पृथ्वीवर ७१ टक्के पाणी आणि २९ टक्के भूपृष्ठानी बनलेले आहे. तसे पाहिले तर येथे मुबलक पाणी उपलब्ध आहे. परंतू उपलब्ध ७१ टक्के पाण्यापैकी शेकडा ९३.३% पाणी समुद्राचे आहे. चलअचल सृष्टीला केवळ २.७ टक्के पाणी मिळते त्यापैकी २.८ टक्के पाणी नदया नाले सरोवरे इत्यादी नैसर्गिक साठयातून उपलब्ध होणारे भूपृष्ठातील पाणी तर ०.९०% पाणी आहे. परंतू पृथ्वीच्या एकंदरीत व्यास बघता हे पाणी काही कमी नाही. माञ हया उपलब्ध पाण्याचे स्थानिक परिस्थितीनुसार मोजमाप व नियोजनद्ध वापर करणे अत्यंत गरजेचे आहे. मानवांच्या विकासाबरोबरच जलव्यवस्थापनाला प्राचीन काळापासून महत्त्व आहे. गाव तेथे तलाव या प्रमाणे मोठया प्रमाणात तलाव निर्मिती चालू होती. कांही तलाव राजांनी बांधले काही लोकसहभागातून बांधले महाराष्ट्रात व भारत भर हजारो लाखो तलावाचे पाणी अडविण्याचे जाळे भौगोलीक रचनेचा विचार करून तयार केले होते.

संशोधनाची उद्दिष्टये

१) भारतातील जलव्यवस्थापणावर प्रकाश टाकणे.
२) महाराष्ट्रातील जलव्यवस्थापनाचा आढावा घेणे.
३) जलव्यवस्थापनावर उपाय सुचविणे.

संशोधन पद्धती

प्रस्तुत शोधनिबंधासाठी प्राथमिक व दुय्यम साधन सामुग्रीचा वापर केला असून त्यामध्ये प्रामुख्याने वर्तमानपत्रे, इंटरनेट, संदर्भग्रंथ, मासीके, शोधनिबंध, सांख्यकीय माहितीचा आधार घेण्यात आलेला आहे.

भारतात सुमारे ८८९ मिलीमीटर पाऊस पडतो. आपल्या देशाला पाऊस व बर्फ मिळून दरवर्षी ४००० अब्ज घनमीटर पाणी मिळते. तरी देशातील २० कोटी लोकांना पिण्यासाठी पुरेसे व शुद्ध पाणी मिळू शकत नाही. पिण्याच्या पाण्याच्या दाहोई उपलब्धतेच्या बाबतीत भारताचा क्रमांक १०८ वा क्रमांक लागतो

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इतकी भीषण आणि भयावह परिस्थिती आहे. शासकीय पातळीवर ध्येय धोरणाचा दुष्काळ आहे. त्याच बरोबर समाजाची उदासीनता तेवढीच घातक आहे. पाणी व्यवस्थापनातील या चुका एका पाण्याच्या संवर्धनाकडे केलेली डोळेझाक, पाण्याच्या पुनर्भरनाकडे दुर्लक्ष या गोष्टी पाण्याच्या दुर्भिक्षाला कारणीभूत आहे. ऑस्ट्रेलिया, इस्त्राईल हे आपल्यापेक्षा जास्त अवर्षण प्रवण देश म्हणून ओळखले जातात. परंतु आपल्या देशात पडलेल्या पाण्यापैकी जेमतेम १५% पावसाचे पाणी परिवर्तन करून उत्पादन व्यवस्थेत वापरात आणले आहे. याचा आपण विचार करून त्या दिशेने वाटचाल करण्याचा प्रयत्न केला तरच आपले भविष्य योग्य आहे.

महाराष्ट्रातील जलव्यवस्थापन

सन २०१४ मध्ये महाराष्ट्रात ७० टक्के पाऊस झाला महाराष्ट्र राज्यातील पर्जन्याचा जिल्हानिहाय तपशील बघता परभणी व नांदेड जिल्हयात ५० टक्के सरासरी पेक्षा कमी पाऊस पडला. २० जिल्हयात ५० ते ७५ टक्के पाऊस पडला राज्यातील एकूण ३५६ तालुक्यापैकी ५१ तालुक्यात आपला पाऊस पडला महाराष्ट्रात सरासरी १२०० मिलीमीटर पाऊस पडतो. राज्याचा एक तृतीयांश भाग पर्जन्य छायेत येतो सन १९७२ सारखे आपवादात्मक वर्ष वगळता या आर्वणग्रस्त भागात देखील ३०० ते ४०० मिलीटर पर्जन्यवृष्टी होते. वरील सर्व विवेचनाचा अर्थ लावला तर महाराष्ट्राच्या जलव्यवस्थापनाची दिशा लक्षात येते. १०० मीलीमीटर पाऊस म्हणजे हेक्टरी १०,००००० लिटर पाणी होय. राज्यातील अवर्षणग्रस्त भागात ३०० ते ५०० मिलीमिटर पर्जन्यवृष्टी होते. म्हणजे हेक्टरी ३० ते ५० लाख लिटर पाणी उपलब्ध होते राज्यातील दर चौ कि.मी. लोकसंख्या विचारात घेता माणसी १२ ते २० लाख लीटर पाणी मिळेल.

दर मानसी दररोज २०० लिटर या प्रमाणे एका व्यक्तीला वर्षाकाठी केवळ ७२,००० लिटर पाणी लागते एवढे पाणी उपलब्ध असताना महाराष्ट्रात मात्र सदैव पाणी टंचाई असते ही टंचाई नैसर्गीक कारणापैकी मानवी व्यवस्थापनांच्या आभावामुळे अधिक आहे. महाराष्ट्र राज्यात सरासरी पाणी उपलब्धता १६३८२० द.ल. घनमीटर आहे. सन २०१२–१३ च्या आकडेवारी नुसार आपण राज्यस्तरीय प्रकल्पातुन ३५८३८ द.ल घनमीटर पाणी आपण आडवू शकलो इतर लहान मोठी प्रकल्प यातुन आडवीलेल्या पाण्याचा साठा या पेक्षा कमी आहे. म्हणजे आपण मिळणाऱ्या पाण्यापैकी जेमतेम ५०% पाणी आडवू शकलो नाही. राज्याचा जलसिंचनाचा अनुषेश मोठा आहे. राज्यात एकूण भौगोलीक क्षेत्रफळापैकी लागवडीलायक क्षेत्र २२५ लक्ष हेक्टर (६०%) आहे. आजही राज्यात विहीर, कुपनलीका या मार्फत होणारे जलसिंचन ४०% पेक्षा जास्त आहे. याचा परिणाम भूजलपातळी घटत आहे. भूपृष्टावरील पाण्याच्या जलसिंचनात वाढ करणे आवश्यक आहे. यासाठी पर्जन्याचे पाणी आडवणे आवश्यक आहे.

जलव्यवस्थापनावरील उपाय

१) कमी पाण्याच्या पिकांना प्राधान्य

शेतकरी ऊस, केळी, संत्रे या जास्त पाण्याच्या पिकांना पैसे मिळविण्यासाठी प्राधान्य देतात परंतु त्याऐवजी बटाटा, उडीद, सोयाबीन सारखी कमी पाण्याची पिके घेतल्यास उत्पादन वाढेल ऊस, केळी या पिकाखालील पेरा क्षेत्र कमी करावे.

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२) नैसर्गिक खतांचा वापर वाढविणे

मृदजलाचे प्रमाण वाढविण्यासाठी व मातीतील ओलावा टिकविण्यासाठी शेतकऱ्यांनी नैसर्गीक खताचा वापर वाढवावा कमी पाण्यावरील पिकांना प्रोत्साहन देणे.

३) पावसाचे पाणी जिरविणे

पावसाचा प्रत्येक थेंब जमिनीत जिरविण्यासाठी मृदसंधारण, जलसंधारण पाणी आडवा पाणी जिरवा, डोंगर माथ्यावर पाणी जिरविण्याचे समतल चर खोदणे इत्यादी उपाय योजना करणे आवश्यक आहे.

४) शेततळी निर्माण करणे

प्रत्येक शेतकऱ्यांनी पावसाचे पडलेले पाणी आपल्या शेताच्या बाहेर न जाऊ देता उताराला अनुसरून शेततळी तयार करून पाण्याचा साठा करणे व या पाण्याचे वर्षभर पुरेल असे नियोजन करणे.

५) नदीजोड प्रकल्प

नदीजोड या सारखे प्रकल्प राबविले तर येथे दुष्काळ आहे तेथे पाणी पोहचेल आणि ज्या प्रदेशात महापुरामुळे मानवी व वित्तहानी होते त्याला आळा बसेल.

६) विहीर, तलाव, कालवे, धरण यांच्यातील गाळ काढणे

विहीर, तलाव, कालवे, धरण या मध्ये वर्षानुवर्ष मोठ्या प्रमाणात गाळ साचलेला असतो. त्यामुळे यामध्ये पाण्याचा साठा होत नाही. यासाठी वेळोवेळी यातील गाळ काढला तर पाण्याचा साठा मोठ्या प्रमाणात होईल.

७) कोल्हापूर पद्धतीने बंधारे

ज्या ठिकाणी नाल्याचे पात्र खोल आहे व पाया चांगला आहे अशा ठिकाणी कोल्हापूर पद्धतीचे बंधारे बांधता येतात व यांच्या माध्यमातून जलव्यवस्थापन केले जाते.

महाराष्ट्रातील जलपरिस्थितीचा आढावा घेतला असता महाराष्ट्रात जलपुनर्भरण करणे गरजेचे आहे. जलपुनर्भरणासाठी शासनाकडून, सामुहिकरित्या आणि वैयक्तिकरित्या प्रयत्न झाले पाहिजेत जलपुनर्भरण करून भूजल पातळी वाढविणे आणि पाण्याचा योग्य आणि काटकसरीने वापर करून देशाच्या विकासाला हातभार लावणे हे प्रत्येकाचे कर्तव्य आहे. पाणी हे जीवन आहे म्हणून पाण्याचे व्यवस्थापन करून सांडपाण्याचा योग्य वापर करून आणि जलपुनर्भरण करून या जीवनाला सुंदर बनवता येईल.

संदर्भ सुची

१. महाराष्ट्राची आर्थिक पाहणी २०१४–१५ अर्थ व सांख्यिकीय संचालनालय महाराष्ट्र शासन.
२. महाराष्ट्र शासन श्वेतपत्रिका २०१२ राज्यातील प्रगती, सिंचनातील वाटचाल.
३. जलव्यवस्थापन – प्रा. एच.एम. देसारडा
४. प्राचीन भारतीय जलशास्त्र – पंडित मनोहर देवकृष्ण
५. जलसिंचन आणि पर्यावरणातील बदल – डॉ. एस.व्ही. डमडेरे
६. पाण्याचे नियोजन – मारुती कच्छवे

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Mahatma Gandhi's ideology of Peace

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Abstract

Mahatma Gandhi holds a prominent position in the history of ethics and their application to contemporary concerns. He was an Indian revolutionary who used his power for political and social reform. He practiced what is moral, truthful and non-violence after thorough examination of those values. Gandhi an concepts such as, social equality, universal love, non-possession, purity of means, value oriented education, satyagraha, classless society, removal of Untouchability, global peace are having great relevance and significance in modern times. The modern society has become more violent, grasping, manipulative and forceful due to the limitation in the human institution. Violence is like a disease, aberration as it creates an atmosphere where the cyclic forms of reactionary violence continues. He wrote or said on various occasions when violence and warfare succeeded over nonviolence and peace in the world. It is detrimental to the harmonious and peaceful life of human beings. Therefore, peace is a state of affairs which includes all.

Early Life

Mohandas Karamchand Gandhi was born on October 2, 1869, in Porbandar. His affluent family was from one of the upper castes (in Indian Caste systems). He was the fourth child of Karamchand Gandhi is working as a diwan in Rajkot and Purtlibai, his fourth wife. Gandhi called his mother as anextremely religious woman who attended temple service daily. Mohandas was a small, quiet boy he has taken his primary education from his birth place. He disliked sports and he was only an average student. The qualities like honesty, truthfulness wear inculcated on is mined from his childhood. At the age of thirteen he did not even know in advance that he was to marry Kasturbai, a girl his own age. The childhood ambition of Mohandas was to study medicine, but as this was considered beneath his caste, his father persuaded him to study law instead. After his marriage Mohandas finished high school and tutored his wife.

In September 1888 Gandhi went to England to study. Before leaving India, he promised his mother he would try not to eat meat. He was an even stricter vegetarian while away than he had been at home. In England he studied law but never completely adjusted to the English way of life. He became a lawyer in 1891 and sailed for Bombay. He attempted unsuccessfully to practice law in Rajkot and Bombay, after too much time, he got one case of but could not present before the court satisfactory. Later he went South Africa in Africa he studied political politics thoroughly. When he came to India, on the advice of Gopal Krishna Ghokle, he joined Indian National Congress. He was influenced by three main author Ramchndar Bhai Patel, Ruskin and Leo Tolstoy. He was spiritual and great faith in Geeta, Kuran and Bible .He was Great saint and Philosopher and even great writer .The present paper focused on his Peace Philosophy. Peace is very important everyone's in day to day life.

Peace

Peace has always been among humanity's highest values--for some, supreme. Consider: "Peace at any price. "The most disadvantageous peace is better than the most just war."Peace is more important than all justice.""It is generally viewed in its negative and positive perspectives, aiming at the removal of direct and structural forms of violence respectively. Violence is like a disease, disorder, aberration as it creates an atmosphere where the cyclic forms of reactionary violence continues. It is detrimental to the harmonious and peaceful life of human beings. Therefore, peace is a state of affairs which includes all

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Positive aspects of harmonious life situation without altering the balance maintained by nature. Many of us use peace and non-violence as synonyms. But during the last few decades these words have transformed their meanings. Peace no longer means the absence of war. The Peace conveys the meaning of Peace with justice. In Modern approach to peace is mainly conceived at macro level i.e. societal level. It leaves behind the individual with less importance.

Whereas Gandhi distinguishes peace at two levels namely individual level, and societal level. In the process of peace education, Gandhi's prime concern is individual human being. He has had a strong belief that moral transformation in every individual would form the basic condition for the peaceful functioning of society. Gandhi accepts that good and evil rest in the human being. Truth and nonviolence form the bedrock of goodness in human being. Peace at personal level is an undisturbed state of mind, a state of serenity and tranquility with a love for fellow human and sub-human species. It is nonviolence and reverence for all life and nature. Gandhi envisioned a dynamic form of peace to be embedded in the heart of every human being. In his words: "I believe in peace. But I do not want peace that you find in stone I do not want peace that you find in graves but I do want that peace which you find surrounded in the human breast, which is exposed to the arrows of a whole world, but which is protected from all harm." Here, it can be said that Gandhi's expression of "protection from all harm", is nothing but the prevention of direct or personal and structural violence. Gandhi declared himself as a man of peace. Further he stressed the need for keeping peace in thought, word and deed. Gandhi says "You should be peaceful in thought and intent, while you maintain peace with the hand, you must also keep the tongue clean. Those who act peaceably ought to keep their speech clean. If we want to retain the anger that is in our hearts, then I must tell you "5 that it will be impossible to keep peace.

Nonviolence

Gandhian jurisprudence of non-violence is not an absolute or a static idea. It is a relative concept. He never tried advocating absolute nonviolence, because he thought that neither human life nor human institutions can survive on the basis of pure non-violence. However, he is of the opinion that we can reduce violence to the maximum extent, because most destruction is unnecessary and avoidable. He contends that we should commit to least violence, inevitable for the survival of human life. Violence, when it is unavoidable, must be employed in an ethical spirit, that is, for the sake of creating a more suitable environment for the growth of nonviolence.

Truth and nonviolence are the foundations of peace, where nonviolence is considered as the means to attain peace. Truth signifies existence. True existence implies the realization of peace. Very often, nonviolence is considered a negative one. Gandhi has applied nonviolence in a broader concept with the term 'ahimsa. It requires a broader and a positive meaning with all love, action, self-culture, discipline of one self with a concern for others even at the expense of self, positive attitude towards peace, and love for nature. In its negative form, it is non-war, on-exploitation and nonviolent action against social injustice. As Gandhi proved by his own life, that nonviolence was effective not only against overt violence but also a powerful force in overcoming the assorted and often subtle forms of structural violence that exist in the contemporary society. It demands proper training and acquiring of self-discipline of each and every human being who involves in it. Moreover, Gandhi equally emphasized nonviolence as the means to peace both at the individual level and the societal level as well. To attain peace "nonviolence should be the rule of conduct not only at the individual level but for society as such". Peace at social level is a state of freedom from direct and structural forms of violence between human beings. This level is extended to group, nation and international levels. Non-violence is a key concept in the intellectual frame work and practical aspect of Gandhi's life. His explanation of non-violence is his significant contribution. He is considered as a great votary of nonviolence. When there is so much of violence, terrorism, aggression etc. in the world right from the beginning of human civilization, Gandhi's advocacy of non-violence in all walks of life is a mark of sanity and civilized existence. October 2, his birth day is observed as the "World non-violence day" by the UNO.

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World Peace

In terms of world peace a lot is being spoken about development, human rights, ecological balance, basic needs and so forth. The most serious problem before humanity is war preparation coupled with heavily stock piled nuclear arms. While tremendous efforts are being taken by a few peace loving nations, peace movements and the hard labor of the United Nations, the possibility of a nuclear war cannot be ruled out. A change of attitude in favor of peace has to be established in the minds of humanity. The UNESCO preamble reads: "the defense of peace must be constructed in the human mind". This exactly coincides with Gandhi's view: "Hanger of sudden outburst of violence is always present so long as the violence of the heart is not eradicated the one lesson that western nations teach the world in flaming letter, is that violence is not the way to peace and happiness. Mahatma Gandhi explains: "My experience in non-violence daily growing stronger and richer tells me that there is no peace for individuals or for nations without practicing truth and non-violence to the uttermost extent possible for man. The policy of retaliation, has never been succeeded. We must not be confounded by the isolated illustration of retaliation, including frauds and force, having attained temporary and seeming success. Gandhi says, "It seems to me that recent events (dropping of atom bombs over Hiroshima and Nagasaki and the after-math) must force that belief on the great powers. I have an implicit faith that today burns brighter than ever, after half-a-century's experience of unbroken practice of that mankind can only be saved through non-violence."

Therefor Gandhian approach to peace education is not simply telling of the serious problems facing humanity and the nonviolent way out, but it is a dynamic integrative mixture of research, action (practice) and education.

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१२. राजर्षी शाहू महाराजांचे अस्पृश्योध्दराचे कार्य

विठ्ठल बाबूराव गुंडे
इतिहास विभाग प्रमुख, कालिकादेवी कला, वाणिज्य व विज्ञान महाविद्यालय शिरुर (का.).

प्रस्तावना

भारतात आणि विशेषत्वाने महाराष्ट्राच्या समाजसुधारणेच्या इतिहासात अनेक थोर समाजविभुती होऊन गेलेल्या आहेत, त्या परंपरेत शाहु महाराजांचे नाव कोणालाही वगळता येणार नाही. समाजाला मानवी समान संधीचे मुलभुत हक्क व सामाजिक न्याय मिळवुन देणारे ते थोर राष्ट्रपुरूष होते. २ एप्रिल १८९४ रोजी वयाच्या २० व्या वर्षी छत्रपती शाहू महाराजांनी कोल्हापुर संस्थानच्या राज्यकारभाराचे सुत्रे हाती घेतली आणी आपली प्रत्यक्ष राजवट सुरू केली. ही घटना कोल्हापुर संस्थानच्या इतिहासातच नव्हे तर महाराष्ट्राच्या इतिहासातही विशेष अशी होती. कारण या घटणेमुळे कोल्हापुर संस्थानाला प्रत्यक्ष कारभार करणारा छत्रपती लाभला होता. शाहू महाराजांना छत्रपती म्हणुन कारभार २८ वर्ष करता आला या कार्यकालानेच साऱ्या महाराष्ट्राच्या इतिहासाला कलाटणी देण्याचे कार्य केले. कारण छत्रपती घटणेमुळे कोल्हापुर संस्थानाला प्रत्यक्ष कारभार करणारा छत्रपती लाभला होता. कारण छत्रपती शाहू महाराज यांनी ध्येयवादी दृष्टीकोनातून व नियोजनपुर्वक केलेल्या बहुविध व सर्वकष सुधारणामुळे कोल्हापुर संस्थनातिल जनतेमध्ये दुरगामी परिणाम घडून आले. जनतेमध्ये सामाजिक क्रांती घडून आणि केवळ जन्माने श्रेष्ठ मानल्या गेलेल्या समाजातिल विशिष्ट लोकांना जे सुखसमृद्धचे जीवन उपभोगता येते, त्याच पद्धतीचे जीवन हजारो वर्षी अश्यपृश्यतेच्या बेड्या घालुन जगणाऱ्या बहुसंख्यांकांच्या वाट्याला आले पाहिजे व त्या दृष्टीकोणातुन त्यांच्यासाठी झ गडणारा व प्रयत्न करून अस्पृश्यांना मानसिक गुलामगीरीतुन मुक्त करूण त्यांना समाजाच्या मुख्य प्रवाहात आणण्याचे कार्य त्यांनी केले. त्यांची धोरणे आजही शासनाला मार्गदर्शन करण्याचे कार्ये करत असे म्हणू की शासनाला भुमिका ठरवतांना त्यांच्या धोरणाचा मागोवा घेणे क्रम प्राप्त ठरते.

चातुर्वण्य पद्धती

शाहु महाराजांनी सत्तासुत्रे आपल्या हाती घेण्या अगोदर समाजस्थिती अतिशय विदारक होती. परंपरागत ब्राम्हण्यवादाचा पगडा समाज जिवनाला काळीमा फासण्याचे काम करत होता. त्यांनी केलेली समाजाची विभागणी ब्राह्मण, क्षत्रिय, वैश्य आणि शुद्र यापैकी गुंडांची अवस्था अतिशय हिन दीन झाली होती. यांना शिक्षणाचा अधिकार नकारण्यात आला होता, पर्यायाने सुधारणेचा हक्क त्यांच्या पासुन घेण्यात आला हेता. भारतात इंग्रजी सत्तेची स्थापना झाल्यानंतर त्यांनी सर्वांना शिक्षणाची संधी उपलब्ध करून देण्याचे कार्य केले. असे झाले तरी परंपरागत शिक्षणाची मक्तेदारी ब्राह्मण वर्गाकडे असल्याने त्यांचे वर्चस्व फारसे कमी झाले नव्हते. पुढे महात्मा फुले यांनी चातुर्वण्य व्यवस्थेवर जोरदार हल्ले करून बहुजण समाजाला शिक्षणाच्या मुख्य प्रवाहात आणण्याचे कार्य केले. हिच रि पुढे ओढुण शाहुंनी इथलया विषमतावादी व शीर्षक समाजव्यवस्थेविरूद्ध आपला राजसत्तेचा आसुड उगारला.

अस्पृष्य उद्योदाराचे कार्य

शिक्षण

शिक्षणाशिवाय अस्पृश्यांची सुधारणा होणार नाही. नोकऱ्या तसेच उद्योग, स्थानिक राज्यकारभार आणि सार्वजनिक संस्थान यामध्ये अस्पृश्यांना मोठ्या प्रमाणात प्रतिनिधत्व द्यायचे असे शाहूंना वाटत असे. त्यातुनच त्यांनी अस्पृश्यांच्या शिक्षणासाठी शाळांची संख्या वाढवली. शिक्षणाचा ओढा वाढावा म्हणुन २४ नोव्हेंबर १९११ रोजी एक आदेश काढुण राज्यातील सर्व अस्पृश्यांसाठी मोफत शिक्षण देण्याचो तरतुद केली. तसेच काही शिष्यवृत्ती ही जाहीर केल्या. १९१२ साली अस्पृश्यांच्या शाळांची संख्या २७ व विद्यार्थी संख्या ६३६ झाली वरिल धोरणांच्या परिणामुळेच विद्यार्थी संख्या मोठ्या प्रमाणात वाढु लागली.

इ.स. १९१९ च्या एप्रिल महिण्यात एक आदेश काढुण संस्थानातील अस्पृश्यांना पुस्तके, पाट्या, पेंन्सिली इ. शैक्षणिक साहित्य मोफत देण्यासाठी २५०० रूपये मंजुर केले. या दरम्यानच्या काळातच त्यांच्या लहान मुलांचे अपघाती निधन झाल्याने त्यांच्या स्मरनार्थ १०,०००/- रूपयाचा प्रॉमिसरीनोट तयार करून त्यांच्या व्याजावर मासिक पाच रूपायाच्या शिष्यवृत्त्या चालु केल्या.

हजेरी व वेठवरला पद्धती बंद

गुन्हेगार जातीतील माणूस म्हणजे जन्मजात गुन्हेगार असून त्यांच्यात कधीच बदल होणार नाही हे हिंदी समाजाचे व इंग्रज राज्यकर्त्यांचे समीकरण शाहू महाराजांनी स्विकारण्यास नकार दिला. माणुस इथुन तिथुन सारखाच मात्र परिस्थितीने तो 'साव' लिंग 'गुन्हेगार' बनतो. माणुसकीने, प्रेमाणे वागवले तर हिंस्त्र पशु देखील बदलतो तर माणसेला बदलनार नाहीत. त्यामुळे शाहु महाराजांनी ०३ ऑगस्ट १९१८ रोजी अस्पृश्यांवर लादलेली अमानुष अशी 'हजेरी' पद्धत कायद्याने बंद केली. महार, मांग, रामोशी या जातीच्या लोकांची हजेरी पद्धत बंद करण्यात यावी, यातील ते कोणी गुन्ह्यात सापडून शिक्षा झालेली असेल तर त्यांना हजेरीची माफी नसावी.

२९ सप्टेंबर १९१८ रोजी महाराजांनी हजेरी संदर्भात एक हुकुम आणखी काढला त्यात गुन्हेगार म्हणुन कपाळावर कायमच शिक्का बसलेला परंतु शिक्षा भोगुण झाल्या नंतर पाच वर्ष चांगले राहिला असेल तर त्याला हजेरतुन मुक्त करण्यात यावे. हजेरी प्रमाणेच महार समाजाच्या माथ्यावर वेठवरला ही अमानुष पद्धत लादली गेली होती तीही इ.स. १९२० मध्ये राजर्षी शाहू महाराजांनी कायद्याने बंद केली.

आंतरजातिय विवाह

जो पर्यन्त जातीची विषमता वादी चौकट मांडली जात नाही, तो पर्यन्त जातीयवादाचा प्रभाव कमी होणार नाही, तो पर्यनत जातीयवादाचा प्रभाव कमी होणार नाही. त्यामुळे राजर्षी शाहू महाराजांनी बेटीबंदीचा निर्बंध उठवण्याचा निर्णय घेतला. महाराजांनी आपल्या संस्थानात १२ जुलै १९१९ मध्ये आंतरजातीय व आंतरधर्मीय विवहास मान्यता देणारा कायदा लागु केला. नुसता कायदाकरूण ते थांबले नाही तर, त्यांनी केल्हापुर व इंदूर या दोन संस्थानच्या दरम्यान १०० आंतरजातीय विवाह ठरवुन त्यापैकी २५ आंतरजातीय विवाह घडवूनही आणले.

जाती आधारीत व्यवसाय बंदी

तत्कालीन समाजव्यवस्थेचा आणखी एक निर्बंध होता की जाती आधारित व्यवसाय बंदी होय. छत्रपती शाहूंनी हे निर्बंध ही रद्द ठरविला. त्यामुळे जाती निहाय व्यवसाय करणाऱ्यांना परंपरागत व्यवसाय करण्याची सक्ती राहीली नाही. प्रत्येकाला वाटेल तो व्यवसाय त्या पद्धतीने व वाटेल त्या ठिकाणी करण्याची मुभा मिळाली. याप्रकारे राजर्षींनी मागास जातींना व्यवसाय, संचार व निवासाचे स्वातंत्र्य देऊन जातीव्यवस्थेच्या तटबंदीला जबरदस्त हादरा दिला.

जातीवाचक आडनावे बदलली

छ. शाहुंनी अस्पृर्यांच्या उन्नतीसाठी व अस्पृश्यांना समाजात बरोबरचा दर्जा प्राप्त करून देण्यासाठी व्यक्तींची आडनावे बदलण्याची नामी शक्कल लढविली. त्यांच्या आश्रयाखालच्या महार पहिलवानाना 'जाठ' म्हणून तर चांभार पहिलवानांना 'सरदार' म्हणून कुस्त्यांच्या आखाड्यात पुकारले जाई. याबरोबरच भंग्यांना पंडित अशी नावे ठेवली.

महार वतन कायद्याने बंद केले

परंपरागत गाव गाड्यात महार समाजाला अस्पृश्य म्हणून महार वतनाच्या नावाखाली गावातील सर्व घाणीची व खालच्या दर्जाच्या कामे करावी लागत असत. ही वतन पद्धती म्हणजे एक प्रकारची गुलामगिरीच होती. त्यामुळे छत्रपती शाहूंनी अस्पृश्यांची या घृणास्पद प्रथे मधुन सुटका होण्यासाठी मे १९२१ मध्ये महार वतन पद्धती नष्ट केली परंतु पुढेही काही काळ महारात अनेक ठिकाणी ही प्रथा चालू होती, ती बंद करण्यासाठी डॉ. बाबासाहेब आंबेडकरांनी प्रयत्न केले. पुढे इ.स. १९५८ साली मुंबई प्रांताचे मुख्यमंत्री यशवंतराव चव्हाण यांनी हे महार वतन कायदा करून बंद केली.

समारोप

उपरोक्त विश्लेषणावरून असे दिसुन येते की, शाहू महाराज हे कर्ते सुधारक होते. अस्पृश्यता ही माणुकीला काळीमा फासणारी बाब आहे असे त्यांना वाटत होते. म्हणून त्यांनी आपल्या संस्थानातील अस्पृश्यतेचे उच्चाटन करण्याचा निर्धार केला. उक्तीला त्यांनी कृतीची जोड दिली एकामागून एक असे अनेक आदेश काढून अस्पृश्योद्धाराचे कार्य केले. महार, मांग, चांभार, ढोर या अस्पृश्य जातींची अत्यंत दयनीय अवस्था होती या जातीतील लोकांना पशुपेक्षाही हिन वागणूक दिली जात होती. त्यांची अवस्थेतुन सुटका करण्यासाठी त्यांना नोकरीमध्ये सामावून घेण्याचे कार्य त्यांनी केले.

त्यांनी केलेल्या कार्यामुळे कुठेतरी समाजात अस्पृश्यांना मानने सन्मानाणे वागण्यास संधी मिळाली. असे म्हटले तर वावगे ठरणार नाही.

संदर्भ ग्रंथ

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संक्षिप्त गोषवारा (Abstract) :

गांधीजींच्या मते, अहिंसा म्हणजे भेकडपणा नाही. तर उच्च नैतिक स्वरूपांच्या मनोधैर्यातून साकारलेले ते तत्व आहे. भित्री माणसे अहिंसेच्या तत्वाचा स्वीकार करतात कारण त्यांच्यात प्रतिकार करण्याची शक्ती नसते. त्यांना खरेतर हिंसा करण्यांची इच्छा असते. मात्र त्यांच्यातील भित्रेपणामुळे ती ते करू शकत नाहीत. गांधीजींनी भित्र्या लोकांचया अहिंसेला विरोध केला आहे. ते म्हणतात की, भित्र्या व्यक्तीची अहिंसा आणि हिंसा यापैकी मला जर एकाची निवड करावयांची असेल तर मी हिंसा करणे पसंत करीन.

Keyword: अहिंसा

प्रस्तावना :

महात्मा गांधींनी सतयाग्रमाने अहिंसेचा महत्व दिले आहे. त्याच्या मते, सत्याचा व अहिंसेचा मार्ग जितका सरळ तितकाच तो अरूंद आहे. तलवारीच्या धारेवर चालण्यासारखा तो प्रकार आहे. डोंबारी ज्या दोरीवर नजर खिळवून चालतो त्यापेक्षाही सत्य–अहिंसेची दोरी सुक्ष्म आहे. तेंव्हा यात गाफीलपना योग्य नाही. असे गांधीजींचे मत आहे.

अहिंसेशिवाय सतयाचा शोध अशक्य आहे. सत्य आणि अहिंसा एकमेकांना पुरक आहेत. एकाच नाण्याच्या त्या दोन बाजू आहे.

१) सत्याग्रमाणे अहिंसा हा आत्म्याचा गूण आहे. अहिंसेच्या मार्गाने सत्याग्रत जाता येते.

२) क्रोधाने स्वार्थासाठी तसेच दुसऱ्याला जाणीव पूर्वक त्रास देण्याच्या भावनेतून केलेली कृती म्हणजे हिंसा होय.

अहिंसा यांचा अर्थ हिंसा न करणे होय. या हिंसेत शारीरिक, मानसिक, वाचिक (काया, वाचा, मने) हिंसा गांधीजींना मान्य नव्हती गांधीनी अहिंसेचा अर्थ म्हणजे, 'पृथ्वीच्या पाठीवरील वस्तु मात्राला तसेच प्राणी मात्राला विचाराने शब्दाने तसेच वृत्याने संभावणारी दुखापत टाळणे असा अर्थ अहिंसेचा गांधीनी स्पष्ट केला आहे.

गांधीजींच्या मते, अहिंसा म्हणजे प्रेमाचा प्रतिशब्द असून, प्रेमात ज्या गूणांचा समावेश होतो ते सर्व गूण अहिंसेत अंतर्भूत असतात. दुसऱ्याच्या हितासाठी स्वत:च्या त्रासाची अगर कष्टाची पत्रवा न करता झटणे म्हणजे अहिंसा होय महात्मा गांधीनी अहिंसेचे तीन अर्थ स्पष्ट केले आहेत.

संशोधनाची उद्दिष्टये :

१)अहिंसा यामुळे राजकीय चळवळींचा नैतिक केंद्रबिंदू कसा बनला.

२) अहिंसेमुळे जगात प्रभाव पडला का?

३) गांधीजींच्या अहिंसा यामुळे देशात शांतता प्रस्थापित झाली का?

४) गांधीजीच्या अहिंसामुळे देशाला स्वातंत्र्य मिळण्यास हातभार लागला का?

५) अहिंसा हे एक साधन आहे या साधनाद्वारे सत्यापर्यंत पोहीचता येते का?

गृहितके १) राजकीय दृष्टीकोनातून अहिंसा यशस्वी झाली आहे.

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२) आर्थिक दृष्टीकोनातून अहिंसेचा काय उपयोगझाला.

३) सामाजिक दृष्टिकोनातून व समाजासाठी अहिंसेचा उपयोग आहे काय.

४) स्वराज्य मिळविण्यासाठी अहिंसा हा एक मार्ग आहे.

५) अहिंसा मुळे देशात ऐक निर्माण झाले काय?

संशोधन पद्धती :

सामाजिकशास्त्रामध्ये संशोधन करत असतांना संशोधन पद्धतीला अनन्य साधारण महत्व आहे.

मी माझ्या संशोधन विषयानी निवड करत असतांना व्यष्टी अध्ययन पद्धतीचा अवलंब केला आहे. यामध्ये उदा: व्यक्ती, समाज, संस्था, समुह या सर्वांचा अभ्यास केला जातो मी "महात्मा गांधीजींच्या अहिंसा या विचारांचा राज्यशास्त्रीय अभ्यास" करीत असल्यामुळे वरील संशोधन पद्धतीचा वापर केला आहे.

अहिंसेचे तीन अर्थ

१)कायिक / शारीरिक अहिंसा :

या अहिंसेत कोणीही, कोणाला शारीरिक त्रास देऊ नये इजा करू नये, हे गांधीजींना अपेक्षित होते. हातात शस्त्र घेऊन अथवा विना शस्त्राने इतरांना मारणे ही शारीरिक हिंसा झाली. अशा प्रकारची हिंसा गांधींना अजिबात मान्य नव्हती. या अहिंसेला गांधींनी सर्व श्रेष्ठ मानले आहे. निरपेक्ष अहिंसेच्या मार्गाने सत्याची म्हणजे ईश्वराची प्राप्ती होत असते. म्हणुन अहिंसेच्या तत्वाचे पालन करणे हे श्रेष्ठ तसेच सामर्थ्याचे मुख्य लक्षात आहे. यालाच ते महापुरूषाची अहिंसा असे म्हणतात.

अहिंसेचे उपप्रकार :–

गांधीजीनी अहिंसेचे तीन उपप्रकार सांगितले आहेत ते पुढील प्रमाणे आहेत.

१) सामर्थ्यवानांची अहिंसा :

महात्मा गांधीजीच्या मते, यात दोन व्यक्ती किंवा दोन राष्ट्रे यांच्यात संघर्ष झाल्यास व्यक्ती किंवा राष्ट्र सामर्थ्यवान असूनही प्रतिकारकरीत नाही. हिंसा करनाऱ्याला माफ करणे. त्यामुळे समोरच्या व्यक्तीचे हृदय परिवर्तन होते. अशी व्यक्ती सामर्थ्य असून ही प्रतिकार करीत नाही त्याला गांधीजींनी सामर्थ्यवानांची अहिंसा म्हटले आहे. म्हणजेच नैतिक आत्मबल व आंतरिक विश्वास याद्वारे व्यक्ती जेव्हा अहिंसेचा स्वीकार करते तेव्हा ती अहिंसा म्हणजे सामर्थ्यवानांची अहिंसा होय. अहिंसा जीवनाच्या सर्वत्र क्षेत्रांत आढळून येते. या अहिंसेत पहाड हलविण्याची शक्ती असल्यामुळे तीचे पालन हे वीर पुरूषांची लक्षण होय. हिंसा करण्याची पात्रता असुनही ते केवळ तत्व म्हणुन अहिंसेचा स्विकार करतात यालाच गांधीजी वीर पुरूषाचे लक्षण होय.

२) दुर्बलांची अहिंसा:

गांधीजींच्या मते, दोन व्यक्ती किंवा दोन गट यांच्यात संघर्ष होतो. या व्यक्ती किंवा गटातील एखादी व्यक्ती किंवा गट दुर्बल असेल म्हणजे त्यात प्रतिकार करण्यांची क्षमता नसेल तेव्हा त्यांच्या हातून हिंसाहोत नाही यालाच गांधीजीनी दुर्बलांची अहिंसा म्हटले आहे. यात जीवनातील काही क्षेत्रात काही व्यक्तीकडून काही गोष्टी डोळ्या समोर ठेवून या अहिंसेचा स्वीकार केला जातो. दुर्बल किंवा असहाय व्यक्ती जेव्हा एखाद्या गोष्टीचा तसेच व्यक्तीचा प्रतिकार करू शकत नाही तेव्हा ते अहिंसा या तत्वाचा आधार घेतात या अहिंसेला गांधीनी दुर्बलांची अहिंसा म्हटले आहे.

३) वाचिक अहिंसा :

यांचा अर्थ कोणत्याही व्यक्तीला टोचून बोलु नये तिला बोलुन दुखावु नये. तिच्याबदल अपशब्द काढु नये. अथवा भांडू नये. जेणे करून त्या व्यक्तीला वाईट वाटेल याला वाचिक अहिंसा म्हटले आहे.

४) मानसिक अहिंसा :

यांचा अर्थ दुसऱ्या व्यक्ती विषयी आपल्या मनात वाईट विचार येणे तसेच एखादया व्यक्ती विषयी द्वेष, तिरस्कार, स्वार्थ, अहभाव, मत्सरांची भावना बाळगणे ही सुद्धा मानसिक हिंसा आहे. अशा प्रकारे गांधीनी काय–वाचा–मने या तिन्ही अर्थाने अहिंसे चा अर्थ घेतला अहिंसेची संकल्पना व्यापक विस्तृत अर्थाने घेतली.

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गांधीजींनी अहिंसेचे तीन प्रकार सांगितले आहेत. ते पुढील प्रमाणे.

१) निषेधात्मक अहिंसा :

गांधीजींच्या मते व्यक्तीने आपल्या कर्याद्वारे तसेच शब्दाद्वारे इतरांना न दुखविणे म्हणजे निषेधात्मक अहिंसा होय. कोणालाही त्रास अगरदुध होईल असा विचार, आचार, उच्चार न करण्यावरोबर दु:ख न देणे तसेच कुनाची हत्या न करणे, कुणाला कठोर शब्द, अपशब्द न बोलणे, क्रोधीत न होणे व शत्रुबद्दल द्वेषाची भावना न बाळगणे याला निषेधात्मक अहिंसेचे पालन करणे असे म्हणतात.

२) विधायक अहिंसा:

केवळ दुसऱ्यांला दु:ख न होणे त्यांची हतया न करने यास न देणे म्हणजे अहिंसा नसून दुसऱ्यावर प्रेम करणे, त्यांच्या सुखासाठी झटणे याला गांधीनी विधायक अहिंसा म्हटले आहे. अत्याचारी व्यक्तीला रोखणे, जयांच्यावर अन्याय होत असेल त्याच्या मदतीला धावणे याला गांधीजी विधायक स्वरूपाची अहिंसा म्हटले आहे.

३)निरेपक्ष अहिंसा:

धर्माचे पूर्णपणे पालन करणे म्हणजे निरपेक्ष अहिंसा होय.

४) भित्र्याची अहिंसा:

गांधीजींच्या मते, जेव्हा एखादी व्यक्ती किंवा गट भित्रा असल्यास तो प्रतिकार करण्याऐवजी रणांगण सोडून जात असेल तर त्याच्या हातातून हिंसा होण्याचा प्रश्नच उद्भवत नाही. म्हणुन गांधीजींनी याला भित्र्यांची अहिंसा म्हटले आहे. याचाच अर्थ भीती व अहिंसा या दोन्ही गोष्टी एकत्र राहू शकत नाहीत. अशा प्रकारची अहिंसा मनुष्याला न शोभणारी असते. व्यक्ती जेव्हा परिस्थितीशी सामना करू शकत नाही. तेव्हा ती अहिंसेचा आधार घेते.

गांधीजींच्या मते, अहिंसा म्हणजे भेकडपणा नाही. तर उच्च नैतिक स्वरूपांच्या मनोधैर्यातून साकारलेले ते तत्व आहे. भित्री माणसे अहिंसेच्या तत्वाचा स्वीकार करतात कारण त्यांच्यात प्रतिकार करण्याची शक्ती नसते. त्यांना खरेतर हिंसा करण्यांची इच्छा असते. मात्र त्यांच्यातील भित्रेपणामुळे ती ते करू शकत नाहीत. गांधीजींनी भित्र्या लोकांचया अहिंसेला विरोध केला आहे. ते म्हणतात की, भित्र्या व्यक्तीची अहिंसा आणि हिंसा यापैकी मला जर एकाची निवड करावयांची असेल तर मी हिंसा करणे पसंत करीन.

अशा प्रकारे गांधींनी अहिंसेच्या संदर्भात आपले विचार मांडलेले आहेत.

या अहिंसेच्या प्रकारात सर्वात श्रेष्ठ अहिंसा ही सामर्थ्यवांनाची आहे. तर सवात कनिष्ठ अहिंसा भित्र्यांची आहे. रणांगणातू पळुन जाण्यापेक्षा देशासाठी वीरमरण आलेले केव्हाही चांगले, असा विचार गांधीजींचा होता. जी व्यक्ती सामर्थ्यवान असते उदार असते अशी व्यक्ती आदर्शापोटी हिंसा करत नाही. ती सर्वश्रेष्ठ असते. म्हणुन व्यक्तीने सामर्थ्यवानांच्या अहिंसे स्वीकार करावा असे गांधीचे मत होते.

निष्कर्ष :

१)अहिंसा या तत्वामुळे जनतेच्या मनात शांततेवर विश्वास निर्माण झाला आहे.

२) अहिंसेच्या मार्गाने भारताला स्वातंत्र्य मिळेल असे गांधीजींना वाटले.

३) अहिंसेच्या मार्गाने जनतेच्या मनात सत्य बोलण्याची शक्ती निर्माण झाली.

४) सत्य आणि अहिंसा हे स्वातंत्र्य मिळविण्यासाठी साधन आणि साध्य होते.

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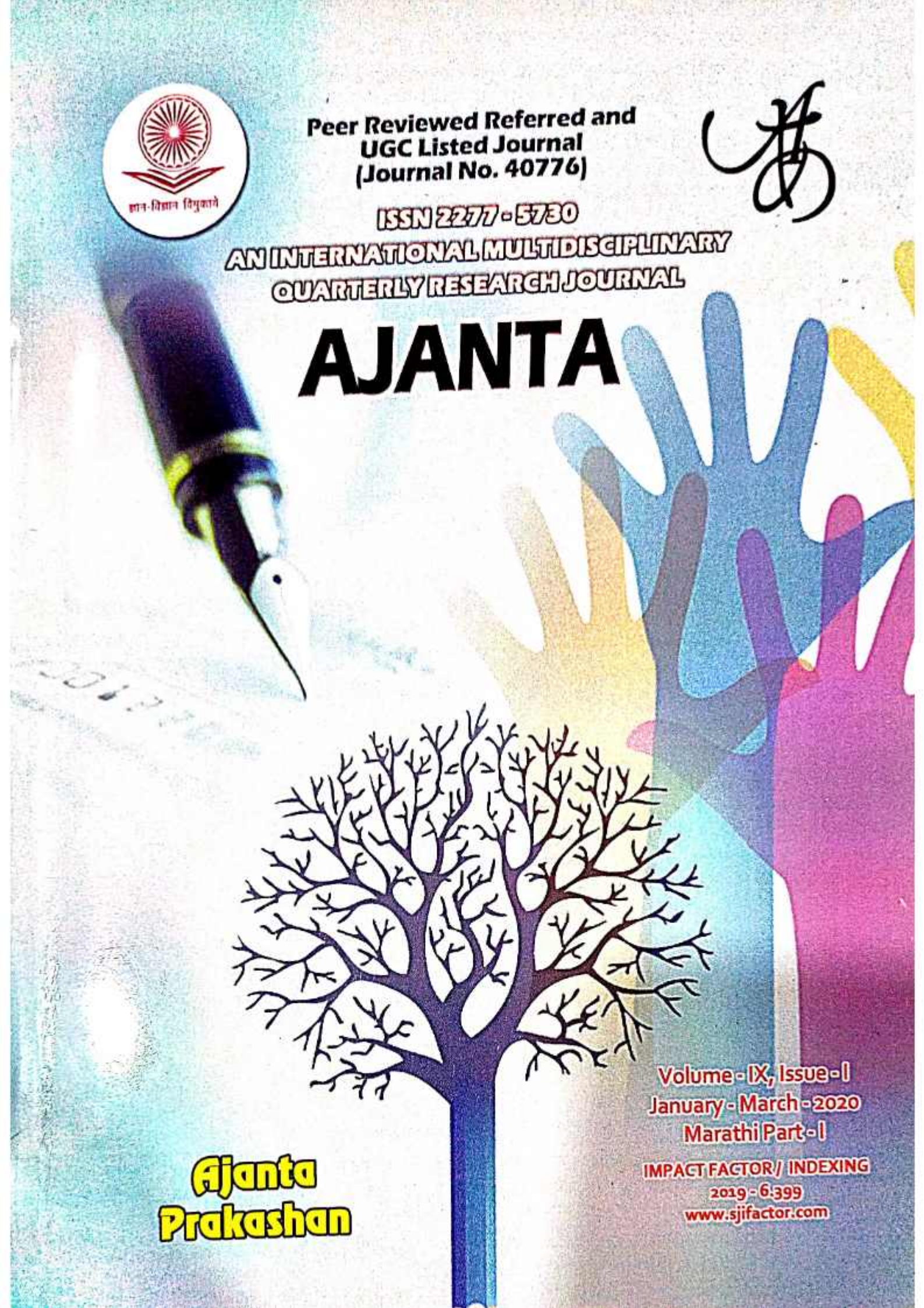

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१९. महात्मा गांधीजीच्या सर्वोदय संकल्पनेचा अभ्यास

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प्रस्तावना

मोहनदास करमचंद गांधी जागतिक शांततेचे महान दुत महात्मा गांधीजीच्या सर्वोदय या संकल्पनेवर जॉन रस्किनच्या तत्वज्ञानाचा प्रभाव पडलेला दिसून येतो. गांधीजींनी जॉन रस्किनचे अन टु दी लास्ट हे पुस्तक वाचले आणि त्याने ते इतके प्रभावित झाले की त्यांनी त्या पुस्तकाचे गुजरातीत भाषांतर केले व त्याला ते इतके प्रभावित झाले की त्यांनी त्या पुस्तकाचे गुजरातीत भाषांतर केले व त्याला सर्वोदय हे नाव दिले गांधीजींनी आपल्या सर्वोदयाच्या संकल्पनेत जॉन रस्किनने सांगितलेली काही तत्वे मान्य केली आहेत.

महात्मा गांधीजींची सर्वोदयांची संकल्पना काही मुलभूत तत्त्वावर आधारलेली आहे. मणुष्य स्वभाव निश्चित चांगला आहे. सर्व माणसे चांगली आहेत. हे तत्व सर्वोदयाचे आधारभूत तत्व आहे. हे तत्व म्हणुन गांधींनी स्विकारले आहे. मानवी समाजातील हितसंबंधाचा संघर्ष हा मणुष्य निर्मित आहे. योग्य अशा शिक्षणामुळे आणि प्रबोधनामुळे मानवी समाजातील हित संबंधाचा संघर्ष नष्ट केला जाऊ शकतो. यावर ही गांधीजींचा विश्वास होता. महात्मा गांधीजीची विश्वास्ताची संकल्पना ही संपत्ती बदल एक नैतिकदृष्टीकोन आहे. संपत्तीच्या एक आदर्शवादी दृष्टीकोन गांधीजी मांडला आहे. त्यादृष्टीने त्याचे विचार चांगले मांडले असले तरी विश्वस्ताची संकल्पना बरीच अस्पष्ट आहे. कारण त्यांनी गरजेपेक्षा अधीक संपत्तीची मर्यादा सांगितलेली नाही तसेच स्वतः मिळवलेल्या संपत्तीचा वापर स्वतः साठीच करणे हे स्वभाविक आहे. त्या विरूद्धचा विचार गांधीजीनी मांडला आहे. सत्यागृहामुळे श्रीमंतांचे हदय परिवर्तन होईल असे नाही.

महात्मा गांधीजींच्या एकंदर तत्त्वज्ञानात धर्म विषयक विचारांना महत्वाचे स्थान आहे. त्याच्या बालमनावर धार्मिक संस्कार झालेले होते. त्यामुळे त्यांच्या विचारात व कार्यात धर्माला प्राधान्य होते. ईश्वरांच्या अस्तित्वावर आणि त्याच्या सामर्थ्यावर महात्मा गांधीजींची नितांत श्रद्धा होती. त्याच्या मते ईश्वर ही एक गुढ अवर्णनीय शक्ती आहे. जी सर्व विश्वाला व्यापून टाकते.

गांधीजीच्या तत्वज्ञानात काही समकालीन तर काही चिरत किंवा कायम स्वरूपाची तत्वे आहेत. तसेच त्यांच्या कार्यात जसा तत्कालीन परिणाम झाला आहे. तसेच कायमस्वरूपी ही परिनाम झाला आहे. यादृष्टीने विचार केल्यास भारतीय विचारवंतांत महात्मा गांधीजींचे स्थान अद्वितीय आहे. म्हणून त्यांना महात्मा आणि राष्ट्रपिता म्हणुन गौरव केला जातो.

संशोधनाची उद्दिष्टये

१. महात्मा गांधीजींच्या सर्वोदय संकल्पनेचा अभ्यास करणे.

२. महात्मागांधीजीच्या सर्वोदय संकल्पनेमुळे सत्याचा शोध मिळतो काय?

३. सत्य आणिसंपत्तीचा काही संबंध आहे का?

४. सत्य काय आहे?

५. सर्वोदय संकल्पनेमध्ये स्वराज्य मिळेल काय?

संशोधन पद्धती

सामाजिक शास्त्रात संशोधन पद्धतीला अनन्य साधारण महत्व आहे. मी माझ्या संशोधन विषयाची निवड केली त्यासाठी व्यष्टी अध्ययन पद्धतीचा अवलंब केला आहे. उदा : व्यक्ती समाज, संस्था, समुह या सर्वांचा अभ्यास केला जो महात्मा गांधीजीच्या सर्वोदय या संकल्पनेचा अभ्यास करतअसल्यामुळे वरील संशोधन पद्धतीचा वापर केला आहे.

महात्मागांधीजीचे सर्वोदय विचार

१) सत्याची मुळे

मनुष्य अनेक चुका करत असतो परंतु माणसांच्या परस्पराविषयची भावना, प्रेम, सहानुभूती यांचा विचार न करता माणसाला एखादे यंत्र समजून जेव्हा त्यांच्यावर्तणुकीचे नियम तयार करण्यात येतात. तेव्हा माणुस सगळ्यात मोठी चुक करतो अशा प्रकारची चुक करणे माणसाकरिता असोभनीय असते अशाच प्रकारे माणसाने केलेल्या इतर चुका पाहत असताना होऊ शकतो की, त्याचुका नाहीत तेच बरोबर आहे. हीच गोष्ट लोकिक नियमांनाही लागू होते. लोकिक नियम तयार करणारे सांगतात की परस्पराबद्दलच्या भावना आणि प्रेम आकस्मिता गोष्टी आहेत. त्यांच्यामुळे सर्व साधारण स्वभाव असलेल्या माणसांच्या मार्गात अडसर निर्माण होते. परंतु लोभ आणि पूढे जाण्याची इच्छा या गोष्टी कायम राहणार असल्यामुळे परस्परांबदलच्या भाव आणि प्रेम कायम गोष्टी कायम राहणार असल्यामुळे परस्परांबदलच्या भाव आणि प्रेम यासारख्या आकस्मिक गोष्टी दुर ठेवून माणसाला केवळ पैसा गोळा करणारे यन समजले पाहीजे कशा प्रकारच्या श्रमाने आणि देवान घेवान माणुस जास्तीत जास्त पैसा गोळा करू शकेल. एवढाच विचार आपण केला पाहीजे. अशा प्रकारच्या विचारांच्या आधारे आपले व्यवहाराविषयची आपली धोरणे आखली पाहीजे. अशा प्रकारच्या विचारावर आधारीत धोरण आखल्यानंतर परस्परांचे हित असे पर्यंत भावभावनाचा उपयोग करून आपण सामाजिक व्यवहार करू शकतो.

आपण लक्षात ठेवले पाहीजे की देवान घेवानच्या नियमांच्या आधारावर कोणत्याही शास्त्राची निर्मीती करण्याचा प्रयत्न व्यर्थ ठरतो आपण जर निती मार्गाने चाललो तर त्यांचे परिणाम नक्कीच हितावहत होतील पण परिणाम कोणते होतील हे कशा प्रकारे होतील हे सांगता येणार नाही.

२) संपत्तीच्या रक्त वाहिन्या

रूपये व पैसे हे शरिरातील रक्त प्रवाहाप्रमाणे असते वेगात रक्त संचार होणे ही गोष्ट एक तर स्वास्थ व प्रकृतीचे व्यायामाचे लक्षण असते व लाजिरवाण्यागोष्टीचे अथवा तापाचे चिन्ह असते. शरीरावर आलेला लालीय ही स्वास्थाचे द्योतक असते. तर दुसऱ्या प्रकारचा लालिमा रक्तवित या रोगाचे चिन्ह असते आणि एका ठिकाणी रक्त गोळा होणे शारिरीक हानीकारक असते. त्याच प्रमाणे एका ठिकाणी संपत्ती गोळा होणे ही राष्ट्राकरिता हानिकारक असते.

कल्पना करा की एखादया जहाजांचे तुकडे तुकडे झाल्यामुळे दोन खलाशी एका निर्जन प्रदेशच्या काठावर येऊन पडले आहेत तिथे त्यांना श्रम करून स्वतः करिता अन्नधान्यांची निर्मीती करावी लागत आहे. याला आपण खरी संपत्ती म्हणु शकतो आणि दोघेही चांगल्या प्रकारे काम करत असतील तर त्या संपत्तीत दोघांचा वाटा सम समान राहील. अशा प्रकारे लागु होणाऱ्या शास्त्राप्रमाणेच त्यांना आपल्या श्रमाचे फळ सम प्रमाणत वाटण्यांचा अधिकार आहे. आता कल्पना करा की या दोघांपैकी एकाला समाधान वाढु लागले. त्यामुळे त्यांनी शेती वाटुन घेतली ते दोघेही वेगवेगळे काम करु लागले व एक जण आजारी पडला तरतो त्याला मदत करने उसने स्वरूपात आणि आजारी माणुस दुरूस्त झाला तर त्या व्यक्तीचे उसने श्रम त्याला करावे लागेल.

आपण पाहिले आहे की लोकांचे किती श्रम विकत घेता येऊ यावर पैशाची किंमत अवलंबुन असते. पेशा शिवाय लोकांचे श्रम मिळु शकते यांनी उदारहने आहेत. पैशाच्या शक्ती पेक्षा नैतिकतेची शक्ती पेक्षा नैतिकतेची शक्ती काम जास्त करते. पैशापेक्षा व्यक्तीच्या सदगूण जास्त काम करतो. माणसाकडून काम करून घेण्याची शक्ती पैसा आहे हे जरी आपण मान्य केले तरी माणुस जेवढा चतुर आणि नितिमान असेल तेवढ्याच प्रमाणात त्याचयासंपतीत वाढ हेते. खरी संपत्ती सोने - चांदी नाही तर मनुष्य ही खरी संपत्ती आहे.

३) जशास तसेच न्याय

असे म्हणतात की, ख्रिश्चन युगाच्या म्हणजे इ.स. वी सन काही शतकांपूर्वी एक ज्यु व्यापारी होऊन गेला त्यांचे नाव सालोमन होते. व्हेनिस मधील लोक त्याला एवढे मानतात की त्या लेकांनी त्यांचा पुतळा उभारला त्यांची शुभाषिते आजही लोकांच्या मनात आहेत. हे खरे असले तरी फार कमी लोक त्यानुसार आचारण करतात. उदा : जेलोक खोटे बोलून पैसा कमवतात ते अहंकारी असतात आणि तेच त्यांचे मृत्युचे चिन्ह आहे. आपण आपल्या जीवनात एवढे खोटे बोलतो या दोन्ही वचनात तो खोटे बोलणाऱ्याला तो म्हणतो की अन्यमार्गाने मिळवलेली संपत्ती म्हणजे मृत्यू आहे.

आपली संपत्ती वाढविण्याकरिता जो माणुस गरीबाचे छळ करतो तो शेवटी द्राद्रियात जातो व त्याच्यावर भिक मागण्याची वेळ येते. आजच्या युगात मड्यावरील लोनी खाणारे लोक भरपुर प्रमाणात जगात वावरत आहे. रस्त्यावर लुटमार करणे चोरी करणे हे काम सर्रास केले जाते. डाकु श्रीमंतांना लुटत असतो तर व्यापारी गरीबांना लुटत असतो. सालोमन नंतर आपलया निती वचनामध्ये म्हणतो की, श्रीमंत आणि गरीब दोघेही सारखे आहेत. ईश्वर त्याची उत्पत्ती करणारा आहे. तोच त्यांना ज्ञान देतो. श्रीमंताचे गरीबाशिवाय गरीबाचे श्रीमंताशिवाय चालु शकत नाही. एकमेकांची गरज दोघांना नेहमी पडत असते. कोणी कोणाला उच्च म्हणु शकत नाही. परंतु दोघेही आपली क्षमता विसरतात आणि ईश्वर आपल्या ज्ञान देणारा आहे. या गोष्टीचे ही त्यांना भान राहत नाही तेव्हा त्यांचे विपरीत परिणाम होतात.

धन नदी प्रमाणे आहे नदी सतत समुद्राकडे म्हणजे पूर्व किंवा खालच्या पातळीकडे पाहत असते त्याच प्रकारे जिकडे गरज असेल तिकडे गेले पाहिजे. परंतु ज्या प्रमाणे नदीच्या प्रवाहाची दिशा बदलत असते त्याच प्रमाणे संपत्तीच्या प्रवाहाची दिशा सुद्धा बदली पाहीजे. निती नियंत्राने संपत्ती गोळा करणे हीच उचीत गोष्ट आहे.

स्पर्धा राष्ट्राकरीता हितावहत असते ही अर्थशास्त्राची धारना चुकीची असल्याने अशा प्रकारे लक्षात येते त्यांचे म्हणणे आहे की, जसजशी स्पर्धा वाढत जाते तसतसे राष्ट्र समृद्ध होत जाते. वास्तवात हा भ्रम आहे. स्पर्धेचा उद्देश असतो. मजुरीचा दर

कमी करणे स्पर्धेमुळे श्रीमंत अधिक श्रीमंत होतात. गरीब अधिक गरीब होतात. त्यामुळे ही स्पर्धा राष्ट्राच्या [illegible] शकते.

सत्य काय आहे

गेल्या तीन मुद्यामध्ये आपण पाहीले आहे की अर्थशास्त्रांनी जे सर्व सामान्य नियम सांगितले आहे. ते [illegible] त्या नियमाप्रमाणे आचरण केल्यामुळे व्यक्ती आणि समाज दोघेही दुःखी होतात. गरीब अधिक गरीब होतात. श्रीमंत श्रीमत होतात आणि तरीही दोघांपैकी एक ही सुखी होत नाही.

अर्थशास्त्री व्यक्तीचा आचरणाचा विचार न करता अधिक पैसा गोळा करण्याचा ओढ आहे. समाजाची [illegible] पैसावर अवलंबुन आहे असे मानतात त्यामुळे कला कौशल्याच्या मार्गाने अधिक पैसा मिळविता येईल. [illegible] त्यांचे सांगने आहे अशा प्रकारच्या विचारामुळे इंग्लंड आणि इतर राष्ट्रांमध्ये कारखाने वाढले आहेत. [illegible] राहण्यासाठी धडपड करतात परंतु शहरातील पर्यावरण विघडत आहे असे असतांना लोकांची ओढ [illegible] औद्योगीकरणामुळे श्रीमंतीचे प्रमाण वाढले आहे. श्रीमंताच्या ऐषो आरामा करिता हे गरीब लोक गुलामाप्रमाणे [illegible] असतातकाही शिकण्या करीता काही चांगले काम करण्याकरिता त्यांना वेळच मिळत नाही या श्रीमंतांना पाहून गरीब [illegible] होण्यासाठी प्रयत्न करत असतो. परंतु त्यांना श्रीमंत होता येत नाही. तेव्हा ते दुःखी होतात त्यांना परवाताप होतो. [illegible] तोल जातो. मग ते भ्रष्टाचारांच्या बळावर पैसा मिळविण्याचा व्यर्थ प्रयत्न करतात अशा प्रकारे पैसा आणि मेहनत या [illegible] मधुन काहीही निष्पन्न होत नाही असे दिसल्या नंतर आपल्या सर्व कौशल्याचा उपयोग लोकांची फसवणुक करण्यासाठी [illegible]

वास्तवत खरे श्रम तेच असतात ज्यामुळे काही तरी उपयोगी वस्तू निर्माण होत असते. भरणपोषण [illegible] माणसांची भुक भागविण्याचे कार्य करते. नितीच्या मार्गावर राहुन आजीवन सत्कर्म करत राहण्या करीता प्रेरना [illegible]

निष्कर्ष

१. संपत्तीचे समान वाटप गांधीजींच्या मते संपत्तीच्या समान वाटपासाठी सर्वोदयांची संकल्पना उपयुक्त आहे. [illegible] व भांडवलदारांनी आपल्या गरजा मर्यादित ठेवण्यात आवश्यक तेवढीच संपत्तीस्वत:कडे बाळगावे. [illegible] सपत्तीचा विनीयोग समाजासाठी करावा.

२. स्वत:कडे बाळगावी जास्तीच्यासंपत्तीचा विनीयोग समाजासाठी करावा.

३. अहिंसच्यामार्गाने हृदय परिवर्तन श्रीमंत व्यक्तीचे हृदय परिवर्तन करून संपत्तीचा समाजासाठी उपयोग करणे.

४. स्वदेशीला महत्व स्वत:च्या वस्तुचा वापर करने.

संदर्भ सूची

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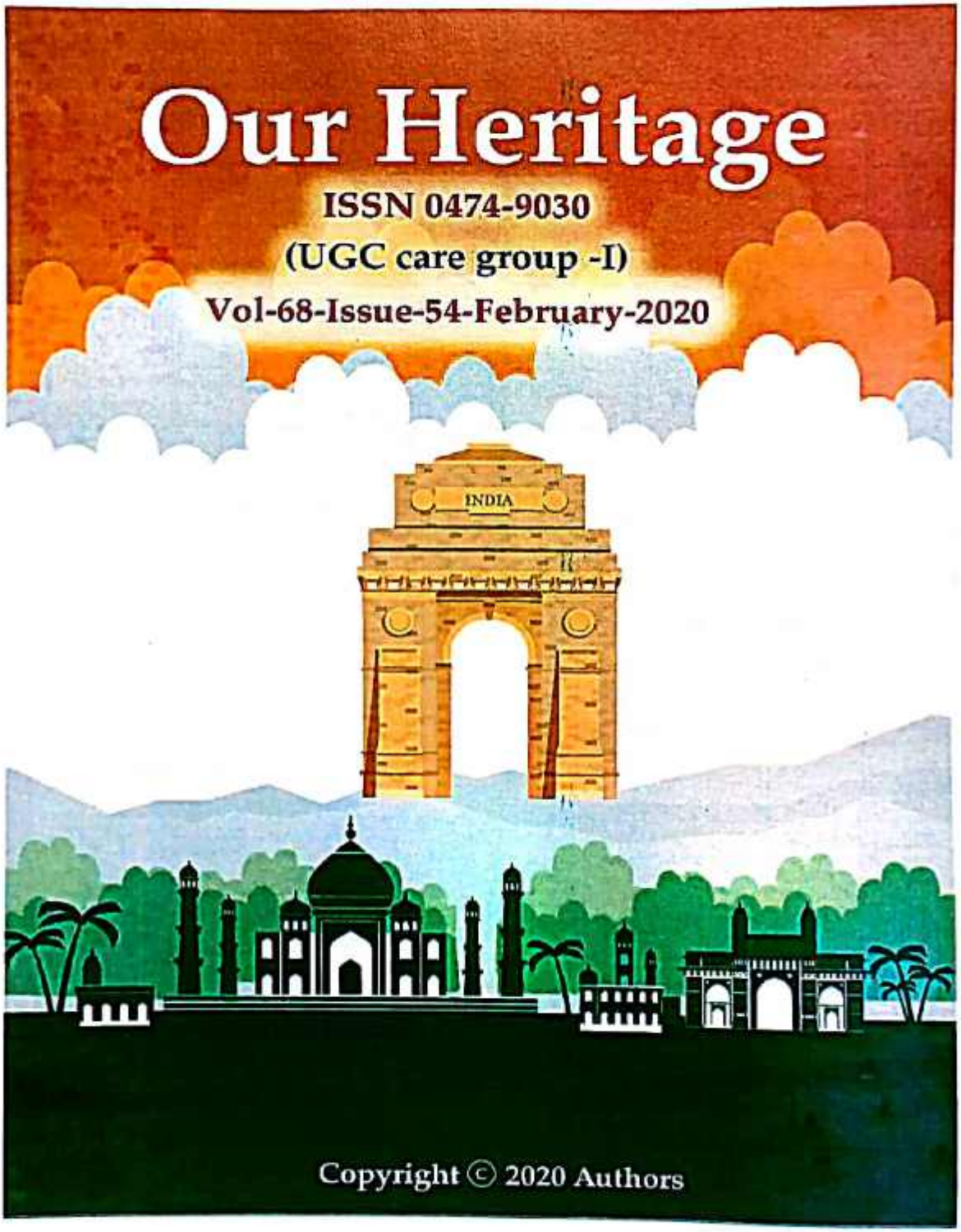

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Impact of GST on Various Sectors in India

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Abstract

A long awaited reform has become a reality in India on 1St July, 2017. Companies and business organizations wont to pay number of indirect taxes like excise duty, customs, central nuisance tax, service tax levied by central government and VAT, entry tax and octroietc levied by state government. GST goes to consolidate these multiple taxes into one as 'One Nation, One Market, One Tax'. Integration of products and services tax would definitely cause simple doing business and simplifies tax compliance. As it goes to scale back layers to taxes definitely results in boosting collection. GST aimed at creating unified market benefiting both corporate and economy. Several countries have implemented this tax system; France is the first country to introduce GST. This paper concentrates on benefits of GST and its effects on different sectors like automobile, FMCG, banking, insurance, financial services, Pharmaceutical sector, agriculture, real estate, Consumer durables, oil and gas, cement, telecom, real estate, airlines and gold. The findings of the paper revealed mixed effect on different sectors of the Indian economy.

Keywords:- One Nation, One Market, One Tax Pharmaceutical sector, agriculture.

Introduction

Goods and Services Tax (GST) was introduced within the Indian Constitution through the 101st (Hundred and One) Constitutional Amendment Act, 2016. After the enforcement of products and Services Tax (GST), many sectors faced some positive effects also as negative effects. The enforcement of the tax was for the future benefit. There were only a few sectors that received an instantaneous enjoy the implementation of products and Services Tax (GST). The future benefit requires the patience of citizens. Where one sector in the country faces a positive aspect, on the other hand, the other sector faced the negative aspect. It is very important to know how and to whom the Goods and Services Tax (GST) had impacted. In a country where the population is 133.92 crores, [Source: World Bank, United States Census Bureau], implementation of a new tax regime was not less a big hurdle. It was required that the authority first understand the concept then it will be easy for the citizens to under the concept of "One Nation One Tax".

Why Was GST Implemented?

GST (Goods & Service Tax) was adopted to enhance the gathering of taxes at every nodal point and to integrate the country through a consistent GST rate . By removing the lengthy list of indirect taxes levied individually by the states and therefore the center, the Indian economy would also receive a big boost. GST was implemented after these four bills were gone by the government: Goods and Services bill , Integrated GST Bill, Compensation GST Bill, and Union Territory

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GST Bill.

Objectives of the Study

1. To study about features of GST.
2. To study about benefits of GST
3. To review about the impact of GST on Various sectors

Methodology

This study is descriptive and uses the exploratory technique. The data for the study data was collected from secondary sources like magazines, articles published online and offline on various newspapers and websites\

Main features of GST.

1. GST is taxation system based on destination.
2. GST subsumed almost 17 types of taxes from previous system of taxation.
3. GST has implemented on win to win concept for both state and central
4. GST helped to avoid double taxation which was in VAT tax system.
5. GST not at all affect the big traders, but small vendors are burdened for monthly filing of return.
6. GST has different slabs which encourages trade in the economy.
7. GST strict yardstick to tax evasion.
8. GST bought more weightage to commerce in the essence of education.
9. GST bought many employment opportunities.

Benefits of GST (Goods and Services Tax)

• GST will harmonise and simplify the tax system within the nation. It will broaden the tax base.

• It'll improve tax compliance through the creation of a robust IT infrastructure

• There's an in-built mechanism in GST for giving incentives to traders who are tax compliant

• Rollout of GST will create a seamless and customary market in India

• It will also contribute towards economic growth

Impact of GST on Various Sector

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Automobiles Sector

Positive Impact

GST eases logistics hurdles, reduces time at check-posts, and subsumes local taxes. With fleet productivity increasing, operators might not feel the necessity to expand mid-term. Auto could slightly be a assortment because the impost will vary across categories. With the standardization of GST for automobiles at 28%, two-wheelers and little and medium cars may face a better impost. "While this might be slightly negative for players like Bajaj Auto, Hero MotoCorp, Maruti, etc, we believe that this may be passed on to consumers," Angel Broking said. Among the commercial vehicles space, Ashok Leyland may even see higher GST.

Negative Impact

Transfer of auto to other place are going to be responsible for GST if the transfer is within the surge of inter-state trade. GST license number is obtained for separate dealerships and therefore the supply transfer between such dealerships also will be responsible for GST.

Banking Sector

Positive Impact

Public and personal banking system is that the reflection of economy. After GST implementation, increase in credit pool is witnessed thanks to availability of GST credits on purchase of products. Also, banks witness an increase in operating expenses from this.

Negative Impact

The banking sector's net rate is 14% and by the effect of GST, the speed increased from 18% to twenty. The effective rate for free-based services at banks raised to 18% from the 15%. This moderately increased costs for loan processing and mastercard charges. For every transaction in GST, the bank must determine the place of consumption where GST are going to be paid.

Manufacturing Sector

Positive Impact

The manufacturing sector endures to realize quite losing with the GST implementation of India. Overall reduction within the cascading effect of taxes should have a positive impact on the worth of manufactured products. Read to understand more about Impact of GST on Indian Manufacturing.

Negative Impact

Concerns still arise on specific issues like the extra 1% original tax, increased income issues and increased costs due to exclusion of petroleum fuels from the GST realm. Although Input decrease are going to be available to be claimed but its realization will only occur once the ultimate supply is concluded. This impacts manufacturing segment thanks to disruptions in income .

Aviation Sector

Positive Impact

The lowering of rate on economy class travel is in accordance with the main target of the Ministry of Civil Aviation to form flying affordable for the crowds. Also, under GST, airlines can claim input decrease on all inputs on the business class; for the economy class, they will claim input decrease only on input services.

Negative Impact

The GST on the economy class aviation has been finalized at 5% and GST on business class aviation has been announced to be 12%, which is 3% more than the existing service tax rate.

Logistics

Positive Impact

The priority for Layered Service Provider (LSP) has remained on tax and administration optimization, mostly compromising on achieving higher operational efficiency through structured large warehouses

planned in centralized geographic locations that gives better connectivity. FMCGs that are currently paying around 24-25% of tax, including excise duty, VAT, etc. will only shell out 17-19% with GST, therefore generating lot of potential for progress and open doors for investment in the industry. The border checkpoints reduce transport hassles and enable logistics companies to deliver goods more efficiently and optimize delivery time. This leads to a reduction in distribution costs by 10-15%, thereby lowering the final price of the goods.

Negative Impact

State-border checkpoints negatively impact the overall production and logistics time. This accounts for approximately 60% of a truck's transit time. These sterile transit hours coupled with regulatory impediments reduce the efficiency of Indian manufacturers compared to their international counterparts.

Entertainment (5-Star Hotels, Casinos, Multiplexes and Cinemas)

Positive Impact

Well, the industry for sure doesn't see a positive impact with the highest tax rate of 28%. It is being said that this will directly hit the service provided.

Negative Impact

With the highest tax rate slab of 28%, the sector looks the most upset and says the government has probably categorized watching movies a 'sin'.

Telecom Sector

Positive Impact

The tax rate has been added as 3% on the existing which isn't a lot of change for the sector.

Negative Impact

The sector sees it as a bigger impact though and there is a lot of hue and cry for the increased 3%. It is expected that the call charges and data rates will go up.

Conclusion

The GST is a landmark amendment in the indirect tax regime in India that attempts to kill multiple birds with one stone. Designed to avoid the cascading of taxes, it implements a smoother tax structure in order to encourage better tax compliance. The important rule of GST is destination-based taxation that aims to subsume various existing indirect taxes like the excise duty, service tax, countervailing duty, etc. at the Central level and Value Added Tax (VAT), Octroi tax, Purchase tax, etc. at the state level.

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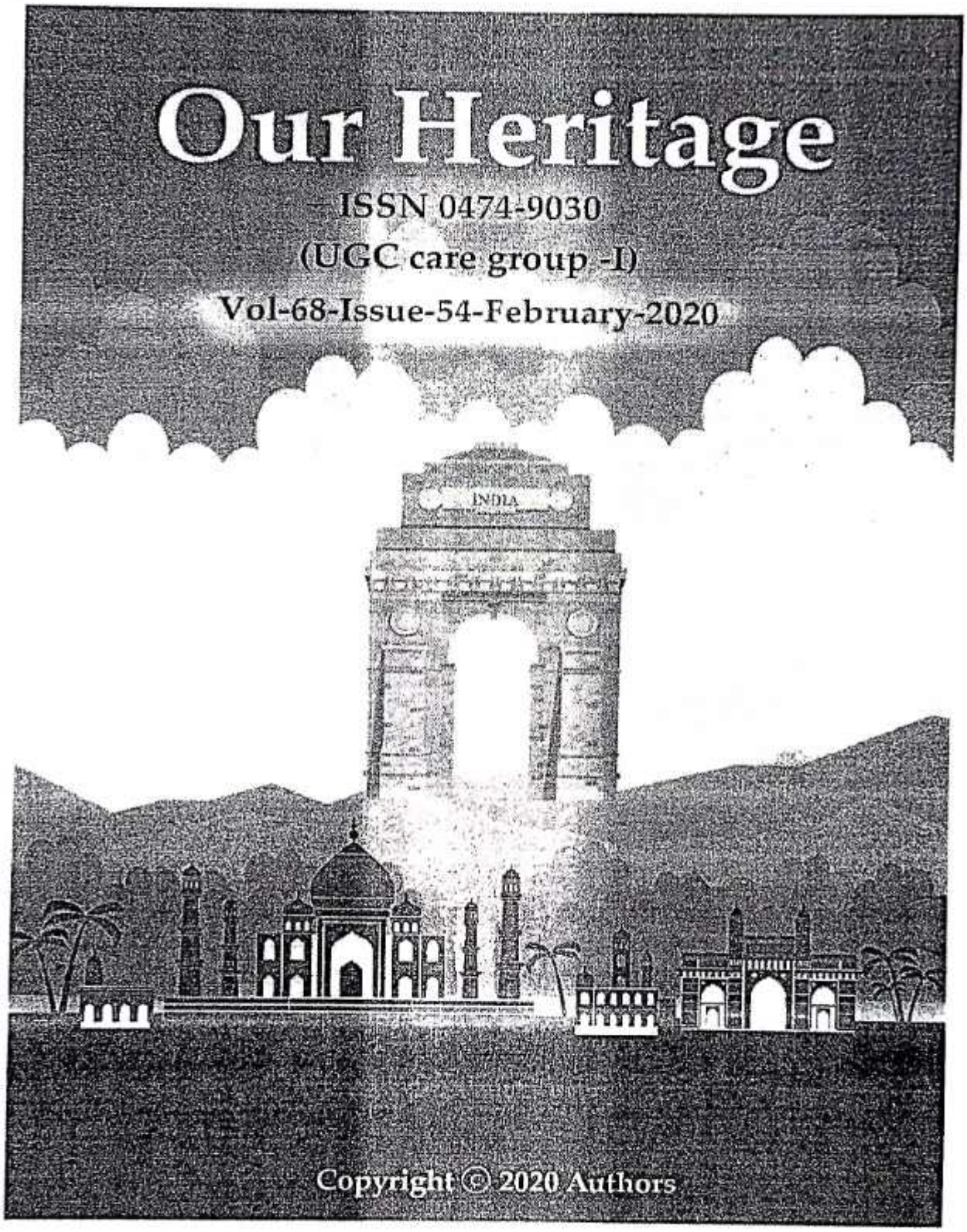

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Make in India Initiative': Success or failure

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Abstract

The Make in India initiative was launched by Prime Minister in September 2014 as a part of a wider set of nation- building initiatives. Devised to rework India into a worldwide design and manufacturing hub, Make in India was a timely response to a critical situation. By 2013, the much-hyped emerging markets bubble had burst, and India's rate of growth had fallen to its lowest level during a decade. The promise of the BRICS Nations (Brazil, Russia, India, China and South Africa) had faded, and India was tagged together of the so-called 'Fragile Five'. Global investors debated whether the world's largest democracy was a risk or a chance . India's 1.2 billion citizens questioned whether India was too big to succeed or too big to fail. India was on the brink of severe economic failure, desperately in need of an enormous push.

Keyword: *Economic, BRICS Nations, rate of growth.*

Introduction

In the recent few years India has witnessed an interesting structural transformation and is one among the fastest growing economies within the world. India is concentrated to embark upon an 8-10% growth trajectory over subsequent decade. Several new initiatives are launched by the govt within the last two years, like 'Make in India', 'Start-up India', 'Skill India', 'Digital India etc. with an aim to form India favorite destination for global FDI and to enhance 'Ease of Doing Business' in India. 'Make in India' initiative was launched on September 25, 2014 by the govt of India with the aim to market manufacturing in India. The program includes major new initiatives designed to facilitate investment, foster innovation, protect property , and build best-in-class manufacturing infrastructure. Make in India aims at 25 economy driving sectors including Biotechnology for GDP growth of the country. DBT has entrusted BIRAC with the responsibility of making a facilitating ecosystem within the country for promoting the manufacturing capabilities of the Indian Biotechnology sector. Hence, BIRAC has established a Make in India Facilitation Cell for disseminating the relevant information in context to form in India and attracting investments within the sector.

Objectives of the Study

1. To review about Make in India
2. to review about Status of the Make in India
3. To review about the Challenges in make in India

Methodology

This study is descriptive and uses the exploratory technique. the info for the study data was collected from secondary sources like magazines, articles published online and offline on various newspapers and websites

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Five Years of 'Make in India Initiative':Success or failure?

On September 25, 2014, the Indian government has launched the 'Make in India Initiative' so as to offer thrust to the manufacturing sector's rate of growth to 12-14 percent once a year , but after five years, the initiative has did not achieve its objective thanks to the varied parameters. what'sMake in India (Beginning of Indigenous Manufacturing): 'Make in India' may be a major national initiative that focuses on making India a worldwide manufacturing hub.

Objective:

The initiative motivated to extend the manufacturing sector's rate of growth to 12-14 percentonce a year so as to extend this sector's share within the economy.

• The initiative also intended to make 100 million additional jobs to the economy, in order that the general growth of the economy are often achieved.

• The other objective is to make sure that the manufacturing sector which contributes around 15% of the country's Gross Domestic Products is increased to 25% within the next few years.

• 'Make in India' also aims to make a conducive environment for investment, developmentof recent and efficient infrastructure, opening up new sectors for foreign investment

• **Key Thrust of the Programme:** The key thrust of the programme is oriented on loweringin delays in manufacturing projects clearance.

• And also develop adequate infrastructure and make it easier for companies to try to to business in India.

• **Key Sectors under the Programme:** The key sectors identified under the program are enlisted within the below sections:

• Automobiles, auto components, biotechnology, chemicals, defense manufacturing, electronic systems, food processing, leather, mining, oil & gas, ports, railways, ports, and textiles.

Status of the Make in India Initiative:

Name of the Sector	Programmed Launched	Progress so far
Automobile	• *Faster Adoption and Manufacturing of Hybrid andElectric vehicles (FAME)* • *National Electric Mobility Mission Plan 2020 (NEMMP) has been launched to promote electriccars.* • *National Automotive Testing and R&D Infrastructure Project (NATRIP) centers are set up* • *100?I under automatic route subject to all applicableregulations and law is available*	• *The top players have inaugurated manufacturing units namely:* • *ISUZU motors in Sri City Andhra Pradesh* • *Tata Motors & Fiat jointly have openedup in Ranjangaon, Pune* • *Suzuki Motors in Ahmedabad* • *Mercedes Benz In Chakan*

Aviation	• *Ude Desh ka Aam Nagrik (UDAN) was introducedfor regional connectivity* • *Incentives in the form of tax concessions areprovided* • *National civil aviation policy 2016 was announcedfor establishing an integrated ecosystem* • *Airports are being developed under the public-privatepartnership model to encourage private participation* • *GPS Aided Geo Augmented Navigation system(GAGAN) to support direct air routes*	• *The passengers carried by scheduled domestic airlines have increased by 29%* • *Common User Domestic Cargo Terminals have been operationalized in13 cities*
Bio-Technology	• *FDI Policy: 100? I for Greenfield Pharma via theautomatic route 100? I for Brownfield Pharma.*	• *Current Good Manufacturing Practices (CGMP) a plant was inaugurated in*
		2016 for the manufacture of Phytopharmaceuticals • *A virtual center was launched in order to develop and advance technologies in the area of biofuels* • *First indigenously developed and manufactured rotavirus vaccine 'Rotavac' was launched in 2015*
Chemicals and Petro-chemicals	• *The Assam Gas Cracker project is being initiated which is expected to produce about 2.8 lakh MT polymers per annum.*	• *The FDI equity inflows in the sector increased by 107%*
Constructions	• *100 smart cities missions with an intention to achieve infrastructure development* • *AMRUT initiated which concentrates on providing basic infrastructure facilities.* • *Swachh Bharat mission established to promote healthy sanitation practices.* • *Heritage City Development and Augmentation Yojana (HRIDAY) focuses on revitalizing the Indian Heritage sites.* • *The Real Estate (Regulation & Development) Act, 2016 has been the shining star of this sector.*	• *7 million houses have been constructed under Pradhan Mantri Awas Yojana (Gramin) houses.* • *The construction sector is the industry which stands 2nd in line in terms of providing employment, after agriculture.*
Defence	• *100?I* • *Upto 49% automatic route* • *Above 49% government route* • *A 'Make in India' portal for Defence Production* • *(www.makeinindiadefence.com)*	• *Various products manufactured in India like HAL Tejas Light combat aircraft by sourcing 95% of the resources required locally.* • *Defence equipment amounting to INR 2059.18 Crore have been exported to 28 countries in FY 2015-16.*

Electronic System	• The Modified SIPS scheme has been developed in order to attract investment into this sector. • Export incentives 2-3% are made available under the Merchandise Export from India scheme.	• Around 38 mobile manufacturing units have been set up which have created employment of about 38300 • Under Digital Saksharta Abhiyan(DISHA)around 99.56 lakh candidates have been enrolled for training • In 2017 this industry witnesses a remarkable jump of 27% wherein the total volume reached 1.57 Lakh.
Food Processing	• RBI has classified loan to food & agro-based processing units and Cold Chain under agriculture activities for Priority Sector Lending (PSL).	• The growth rate of Gross Value Added has increased from 1.91% in 2013-14 to 5.78% in 2014-15 at constant prices.
	• A special fund called Food Processing Fund has been deposited with the NABARD in order to provide funds to designated food parks.	• There has been an FDI equity inflow of USD 1.7 Billion from April 2014 to December 2016. • 88 cold chain projects have been operationalised out of the 134 projects which had been sanctioned. • The government had sanctioned 42 mega food parks of which 8 have been operationalised.
IT & IBM	• Favourable government policies and initiatives serve as an incentive to invest in this sector • The Digital India campaign has pumped in a lot of investment with digital delivery standing as a focus point	• Total FDI equity inflow in Computer software and hardware sector saw a major growth from 2.3 Billion to 5.9 Billion.
Leather	• The leather product sector is entirely de-licensed which serves as an icing on the cake.	• The FDI equity inflow amounted to USD 53.39 Million in this sector. • India boasts of being the 2nd largest producer of footwear and also the 2nd largest exporter of leather garments.
Mining	• The Mines and Minerals Development and Regulation Act 1957 (MMDR) had been amended with greater transparency as its motive. • District Mineral Foundation set up for grievance redressal and also to improve the image of mining.	• In terms of Gross Value Added this sector has grown by 10.5% in 2016-17 and 12.5% in 2017-18. • By November 2016 17 mineral blocks across 7 states have been auctioned. • Auctioned resulted in additional revenues amounting to INR 47551 Crores and total revenues of INR 59639 Crores.
		• In Gujarat India has invested in refineries especially for exports.

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Oil and Gas	• *Hydrocarbon Exploration & Licensing Policy (HELP) provides for a uniform licensing system* • *Additional depreciation of 15% on the installation of capital equipment acquired is permitted.*	• *The refining capacity of India has been expanded by 15 Million Metric Tonnes Per Annum due to the commissioning of Paradip Refinery In February 2016.* • *Crude Oil Strategic storage of 5.33 MMT capacity was built at Visakhapatnam, Mangalore and Padur.*
Pharmaceutica ls	• *The National Pharmaceutical Pricing Policy 2012 mainly focuses on the regulation of the price of drugs.*	• *Indian Drugs and Pharmaceuticals Limited has enabled the mass manufacture of products in various fields.* • *Pharma Jan Samadhan, a customer grievance redressal system launched in March 2015.* • *Pharma Sahi Dham provides real-time information on the prices of medicines.*
Ports and Shipping	• *New Berthing Policy for Dry Bulk Cargo for all major ports was introduced to facilitate the movement of higher cargo throughput from major ports.* • *Funds amounting to USD 25 Million for major ports and USD 21 million for minor ports have been earmarked.*	• *Under the Sagarmala project, a total of 173 projects with an investment of INR 4 Lakh Crore introduced during 2016- 17.*
Railway	• *Public-Private Partnership model to enhance passenger amenities.* • *Project Swarn targets on improving the passenger experience.* • *Mission Raftaar has at its core the doubling of an average speed of freight trains.*	• *A noteworthy achievement in the year 2017-18 is 51 trains have been speeded up by more than a hour.* • *The Gatimaan Express is the fastest train in India which covers a distance of 188 kms in 1 hour and 40 mins.*
Renewable Energy	• *A bouquet of fiscal incentives has been provided.* • *To promote clean energy co-operation a joint Indo- US PACE Setter fund has been established with a contribution of USD 4 Million.*	• *The world's largest solar power plant was commissioned in Tamil Nadu with a huge capacity of 648 MW.* • *34 Solar parks have been sanctioned to 21 states and INR 356.63 Crores has been provided to Solar Energy Corporation of India for the same.*
Space	• *GSLV III launched for satellites which are heavier in nature weighing about 4500 to 500 kg.* • *ISRO has entered into co-operative arrangements with 33 countries and 3 multinational bodies.*	• *Antrix Corporation Limited has undertaken various initiatives for the marketing of space products and services at a global level.* • *India is the first nation in the world to reach Mars successfully in the 1st attempt. The spacecraft was called Mangalyaan.*

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Thermal power	• *The revised tariff policy 2016 guarantees a good return on investment and ensures the safety of the investments to the investors.* • *The Ultra Mega Power Projects having a huge capacity of 4000 MW have been set up by the government of India.*	• *India boasts of having the fifth largest installed capacity in the world.* • *The electricity generation increased by 5.9%(2016-17 vs 2015-16).* • *April 2014 to October 2016 has witnessed an addition of 50471.41MW to the generation capacity.* • *98.8% of the villages have been electrified.*
Tourism and Hospitality	• *Swadesh Darshan scheme had been launched to serve mass and niche tourism.* • *The National Mission for Pilgrimage Rejuvenation and Spiritual Augmentation Drive had the beautification of pilgrimage sites as its focus.* • *The e-tourist visa facility has been extended to travelers of 150 countries.*	• *India crawled up 13 places from 65 to 52 as per the Travel and Tourism Competitiveness Index 2015 of the World Economic Forum.* • *This sector is among the top 10 sectors when it comes to the FDI inflow*

Make in India Initiative: Success or Failure

India has witnessed a rise in FDI from $16 billion in 2013-14 to $36 billion in 2015-16. But,since 2016, the FDIs have plateaued that interns not contributing to India's industrialization. The contribution FDI has been declining within the manufacturing sector as above $7 billion (2017), asagainst $9.6 billion in 2014-15.

Why 'Make in India' has did not deliver its objectives?

• No Direct Investment: there's no saying that an outsized number of FDI is neither foreignnor direct but comes from Mauritius-based shell companies.

• Recycling of Indian Black money: it's estimated by the Indian tax authorities that the majority of those investments were "black money" from India, which was routed via Mauritius.

• Low productivity of Indian factories: As per the Mackinsey report, the Indian workers are less productive as compared to its counterparts like China and Thailand.

• Insufficient Skills: thanks to the lacunae of insufficient skills, Indian workers four to 5 times less productive than their counterparts in Thailand and China.

• Small Size of commercial Units: one more reason is that the dimensions of the economic units is just too small for attaining economies of scale, investing in modern equipment and developing supply chains.

• Complicated Labour Regulations: Complicated labour regulation has made plants to equip themselves with only 100 employees.

• Other factors: There other factors for the slow growth of 'Make in India Initiative' that are mentioned within the below section:

• The infrastructure of the manufacturing industry isn't ok to compete with India's counterpart.

• Power outages are much higher in India and therefore the electricity cost is about an

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equivalent in India and China.

• Inconvenient transportation is one more reason for the slow growth of the initiative (transportation takes far more time in India)

• Bureaucratic procedures and corruption still make India less attractive to investors.

Challenges:

• Growing Service Sector: The service sector has been growing within the country tremendously which has leaped before manufacturing industry.

• Excessive Red Tape: Excessive bureaucratic procedure has been creating a deterrent for foreign direct investment that further led to the corruption level within the economy.

• Increasing Overseas Business: Overseas business has risen in recent years in India that makes hurdles for the domestic manufacturer.

An attempt made by India:

• Reduction of the corporate tax: Earlier, the Indian government has made a big move withthe reduction of the corporate tax from about 35 to about 25 per cent.

• The reform also aligned with the government's effort to compete with Southeast Asian countries, especially, to draw in FDIs.

• In the wake of US-China trade war, this competition has acquired a replacement dimension. Now, Trump administration increases tariffs on Chinese exports to the US.

• According to the Japanese firm, only three of the 56 companies that decided to relocate from China moved to India.

• Improving simple Doing Business: Government has also taken initiative to enhance the convenience of doing business within the country.

• Simplified Rules: Rules and procedures are simplified and variety of products are began licensing requirements.

• Encouraging Innovation: so as to offer thrust to the higher management of patent and trademark registration, Innovation has encouraged by leveraging various programme.

• Opening-Up various sector: Government has already opened variety of sectors for FDI. And, within the same scenario, the policy in defence sector has been liberalised.

What must be done?

• India must specialise in competitive advantages on the worldwide scale in sector where we've an outsized domestic market.

• India also must shift its priority on industries like Defence, electronics hardware, construction, health care and agro-industries.

• India must focused on creating favourable policy environment for manufacturing and wishes to foster skill development among the masses.

• A cooperative partnership must be built between government and therefore the private sector, both domestic and foreign cases.

• As the western world is concern about the technological parameter, India must leverage new technologies to resist the counterparts.

Conclusion:

In order to form India as a worldwide manufacturing hub, India should make administrativemachinery effective as India always became stringent when it involves regulatory clearances. A healthy business are often observed if India is in a position to make better procedural management and ready to provide easier approval of projects. India's SME sector has the best potential and mayplay an enormous role in making the country take subsequent big leap in manufacturing. India alsofocused on making this sector viable to satisfy its dream. to supply a greater challenge to Chinese counterparts, India also must give impetus to the research and developments.

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