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A Review on Various Chemical, Biological, Electrochemical Treatments on Dye and Textile Waste Water

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ABSTRACT: Waste water treatment is important from environmental point of view. Steps involved in primary and secondary treatment of the waste water are reviewed. Such treatments include use of fungal species, bacteria, adsorbent and various salts. Effectively of reagent and biological species in reducing the various parameters such as COD, BOD, colour etc. Is important in treating it in order to comply with various standard of the pollution control board. Also it has to be seen that whether this type of industrial waste influent can be reused by proper implementation of treatment on water and choosing the correct method for treatment of dye waste water.

KEYWORDS: Activated charcoal, fungusfromspentmushroom, bacteria, fenton reagent,iron salt, rice husk..

I.INTRODUCTION

Water is the main component which is used in all type of the Industries. Water is used for different processes in the industries. It may be used for washing, dilution, formation and condensing the steam. But all water used in the different industry is not totally consumed. Generally, almost all the industries generate waste water that needs urgent attention. Water use in industry is a double-edged sword. On one hand it puts immense pressure on local water resources. On the other, wastewater discharged from the industry pollutes the local environment. Water is required, often in large volumes, by industries as process inputs in most industries. In other cases, like food and beverage and chloro-alkali industry, water is used as a raw material: turned into a manufactured product and exported out of the local water system. However, in most industries it is essentially used as input and mass and heat transfer media. In these industries a very small fraction of water is actually consumed and lost. Most of the water is actually meant for non-consumptive process uses and is ultimately discharged as Effluent

The textile units use a number of dyes, chemicals and other materials to impart desired quality to the fabrics. These units generates a substantial quantity of effluents, the quality of which in most of the cases is unsuitable for further use and can cause environmental problems, if disposed of without proper treatment. At present, due to the increasing resource constraints and the environmental requirements, these textile units need to adopt a sustainable approach, and wastes need therefore to be viewed as unutilized resources. Ways and means must be found to recover water and chemicals from these "waste" resources. Advanced treatment methods, like membrane filtration, appear to be promising because these methods not only help in reducing the pollution but also provide a scope for recovery and recycling of water and chemicals

II.RESEARCH ON DYE EFFLUENT TREATMENT

Tank et al [1] studied the treatment and characterization of waste water from various dying industry using various adsorbent. As dyeing industries had a large pollution potential, their research was based on treatment and characterization of dye industry effluent by using high adsorbent silica and activated carbon. The following parameters represents the dying effluent before treatment, Total dissolve solid was 14860 mg, dissolve oxygen was 8.1 mg/l, biological oxygen demand 362.03 mg/l, total hardness 166 mg/l, total alkalinity 70 mg/l, ph was 5.20. Following are characteristic after treatment total dissolve solid was reduced to 12800 mg/l, dissolve oxygen to 7.3

mg/l biological oxygen demand 287.3 mg/l, total hardness 176 mg/l, total alkalinity 25 mg/l this was achieved by high adsorbent silica. When treated with activated carbon Total dissolve solid was reduced to 7000 mg/l, dissolve oxygen 6.5 mg/l, biological oxygen demand 143.6 mg/l, total hardness 148mg/l, total alkalinity 50 mg/l. Thus by looking at the result after treatment thus we conclude that activated carbon is more effective in reducing total dissolve solid, dissolve oxygen, biological oxygen demand, total hardness. But alkalinity was reduced by high adsorbent silica.R.D. Patel and R.L. Patel [2] studied the effect of Fenton reagent and electro Fenton reagent on dye intermediate waste water. They collected waste water sample from ETP of a Reactive dye intermediate (J-Acid) manufacturing industry. Reagent used was hepta hydrated ferrous sulfate (FeSO4.7H2O) and hydrogen peroxide along with NaOH. They took 500ml of sample in round bottom flask and stirred it with help of magnetic stirrer. Reagent (FeSO4.7H_2O) and (H_2O_2, NaOH) was added to the sample and the optimum dose was determined by taking COD of some sample from flask at a regular interval. For other process they took 500 ml of sample in round bottom flask and stirred with help of magnetic stirrer. They took MSMS electrode and connected it with DC power supply was placed in flask, hydrogen peroxide and NaOH was also added. Then COD was estimated in regular interval of time. Result With increase in pH, COD was efficiently reduced for both processes. Thus optimum pH was 3.For Fenton process with increase in dosing of FeSO4.7H2O: H2O2, reduction in COD increased. For electro- Fenton process increase in electric current increase in reduction of COD from the sample. Sharma et al [3] reduced COD and removed colour with help of bacteria consortium from synthetic textile waste water. The bacterium such as Bacillus subtilis and Achromobacter xyloxidans was cultured with necessary nutrient medium. Synthetic textile waste water was made by adding acid red 151 dye with water .Then bacteria culture was introduced into the waste water and different parameter was checked for their changes. Temperature was varied for about 26 to 36 degree Celsius and pH of 5 was kept constant. Decolorisation was checked and result was as the temperature was increased from 26 to 32 degrees Celsius there was increased in decolorisation but as temperature exceeds 32 decolorisation decreased. 3^{rd} and 5th day for temperature changed as parameter showed a maximum decolorisation rate.pH variation was held under the range of 5 to 9 and temperature was kept constant at 32 degree Celsius .and optimum pH for decolorisation was 7 ,that is neutral temperature.COD of the waste water was also considerably removed to a greater extent.

Jolly et al [4] studied the characterization of dye industry and tested it suitability for irrigation purpose. They collected sample from Bangladesh dyeing and finishing Industries Ltd situated at Karnapara, Savar. The sample was collected monthly starting from February 2006 to September 2006. Groundwater was also been collected. Hydrated lime and $fecl_3$ was used as chemical precipitating agent and was added to 500 ml effluent. AAS and Total Reflection X-ray Fluorescence (TXRF) were used for tracing heavy metal from untreated and treated effluent and groundwater. pH and EC of the samples was measured using a Jenwey 3051 pH meter and a Jenwey 4070 conductivity meter, respectively. The pH value of treated effluent was increased and was also greater than ground water.EC value decease for the treated effluent. After treatment the effluent became transparent .traces of heavy metal and toxic element was also reduced below the standard value. Hemiri [5] et al have investigated removal of dyes effluent by iron salts. They made a model dye solution of concentration of 6, 10 and 16 ppm for direct blue, sulfur black and vat yellow respectively. They then added Ferrous sulphate, Ferric sulphate, Ferric chloride and Calcium hydroxide all of technical grade as a coagulating agent to 1 litre of the solution for about 350 rpm at 27 degree Celsius and for 30 min. After this they filtered the solution and investigated solution by UV Spectrophotometer for dye concentration. By addition of ferrous sulphate FeSO4 a complete decolorisation occur for sulfur black dye, moderate for direct blue dye and less occur for vat yellow dye. Decolorisation occurs with small dose of calcium hydroxide and direct blue dye was moderately removed but sulfur black and vat dye was highly removed. Addition of ferrous sulfate increase removal of vat yellow dye but sulfur black and direct blue dye removal remain unchanged. Complete sulfur black dye removal occur by addition of ferric sulfate, direct blue dye and vat yellow dye also showed same removal effect as sulfur black dye. Addition of calcium hydroxide has no effect on sulfur black dye, as it was completely removed by ferric sulphate. Direct blue dyes showed a slight increased removal when followed by addition of calcium hydroxide, but vat yellow dye removal decrease with increase with addition of calcium hydroxide. Ferric chloride and calcium hydroxide is not suitable for sulfur black, vat yellow dye, and direct blue dye removal.

Zuraida et al [6] studied use of Bacteria, Lactobacillus delbruckii, for removal of dyes from waste water. They prepared synthetic dye waste water by mixing Reactive orange 16 and Reactive black 5 respective dyes with distilled water. Lactobacillus Delbruckii subsp bacteria was used as it have ability to easily degrade azo dye they were maintained in their required culture medium at optimum temperature and pH . The dye concentrations was measured with a spectrophotometer UV-vis at intervals during the decolorisation process The decolorisation ability of bacteria was investigated for their biodegradability. In order to evaluate the effects of environmental factors, such as pH (3-8, 37°C, 50 ppm), temperature (30°C – 42°C, pH 7, 50 ppm) and initial dye concentrations (10 – 100 ppm, pH 7, 37°C) on bacterial decolorisation was investigated. Samples (5 ml) was withdrawn at regular time intervals and analysed for colour removal. Result: a) It was founded that contact time influenced the bio sorption to a greater extent. The maximum decolorisation for both reactive dyes was recorded at the 48 hours of incubation time at pH 6 and 37°C. b) Effect of pH on the decolorisation of RO 16 and RB 5 over a wide range of pH (3.0–8.0) after 48 hours cultivation. For both dyes, the best colour removal was achieved at pH 6 with 60% for RO 16 and 53% for RB 5, respectively. C) The decolorisation of the dyes was tested for wide range of temperature from 30°C to 42°C. It was observed that the optimum temperature for RO 16 and RB 5 were at 37°C, with 63% and 55% colour removal, respectively. Besides, increase in decolorisation of RO 16 and RB 5 were sequentially with increase of temperature from 30°C to 37°C, the percent removal of RO 16 and RB 5 was increased from 46% to 63% and 45% to 55%, respectively. d) The microbes could efficiently decolorize RO 16 and RB 5 with decolorisation percentage of 46% and 49% for 10 ppm, respectively. It was observed that decrease in percentage colour removal of RO 16 and RB 5 by Lactobacillus delbruckii until only 27% and 31% removal, respectively with increase in concentration condition.

Hassan et al [7] studied the use of chitosan for coagulation and flocculation treatment on waste water. Chitosan is a natural organic polyelectrolyte of high molecular weight and high charge density which is obtained from deacetylation of chitin. They collected waste water from a textile company which is situated in Kulai, Johor Bahru. They prepared chit son solution by dissolving 3g of chitosan in 96g of distilled water and 1g of acetic acid was also added. The jar test was carried out by adding chitoson solution to waste water which was agitated. pH was adjusted as chitoson is readily soluble in acidic medium than alkaline medium. Then it was allowed to settled after agitation Result 1) The effect of dosage was analyzed at pH 4, 250 rpm of mixing rate for 10 minute and 30 rpm of mixing rate for 20 minutes and 30 minutes of settling time for a range of chitosan dosage which varied from 12 mg/l to 66 mg/l. 2) The optimum chitosan dosage of 30 mg/l, chitosan recorded the highest reduction of parameters, which were the reduction of 94.90% and 72.50 % for turbidity and COD respectively 3) The effect of pH was analyzed at optimum dosage, 30 mg/l, with 20 minutes of mixing time, 250 rpm of mixing rate for 10 minutes and 30 rpm of mixing rate for 20 minutes and 30 minutes of settling time for a range of pH which varied from pH 2 to pH 10. 72.5 % COD reduction and 94.9 % turbidity reduction can be achieved at pH 4. 4) The optimum mixing time condition of the treatment is 20 minutes. Balasaraswathy et al [8] studied biodegradation and physic-chemical changes for treatment of textile effluent by various fungal species. They used six different fungi namely Rhizopus spp., Pencillium spp., Aspergillus niger, Trichoderma viride, Trametes hirsuta and Trametes versicolo, to change the chemical and physical properties of effluent. The six different fungi was culture by creating their favourable environment by addition of required nutrient. And thus all the strain of fungi was added with effluent and was aerated for 3 hour, kept in room temperature for about 10 days. After completion of period the effluent was analysed for dissolve solid, pH, electric conductivity, turbidity, dissolve oxygen. analysis of effluent shows a very clear change in pH as it attained neutrality ,electric conductivity also decrease ,total dissolve solid decrease rapidly but as fungi create biomass and various enzyme turbidity of effluent increase, dissolve oxygen also reduce as due to consumption of oxygen for the growth of fungi thus aeration was necessary. UV spectroscopy also showed that the colour reduction was due to biodegradation .

Kuzhali et al [9] investigated use of fungus from spent mushroom for decolorisation of textile dye effluent. Decolorisation of textile dyes effluent by fungi namely Aspergillum Niger, Pencillium spp., Rhizopus spp which was isolated from spent mushroom substrate (SMS).SMS is SMS is the left over substrate after harvesting mushrooms. Above fungus strain was grown in necessary nutrient rich medium, one with normal carbon media and another with limited carbon. Then this culture medium was added with textile dye effluent and was studied for the decolorisation by use to spectrophotometer. After the treatment various parameter was check ,such as BOD, COD and PH and it was founded that they were highly reduced .The fungal strain with limited carbon medium showed great decolorisation and Aspergillums Niger showed greater reduction in colour among the all fungal strain.Babu et al [10] investigated use of electrochemical and biological process on dye waste water treatment. The azo dye used in this investigation was obtained from a textile-dyeing factory located in Tirupur, Tamil Nadu, and India. Waste water showed various characteristic: pH 11.4 2, Temperature (˚C) 32 3, COD (mg/L) 8060 4, Suspended solid (mg/L) 270 5, Conductivity (mho/cm) 2800 6, Chlorides (mg/L) 160. Chemical Oxygen Demand (COD) 3145 mg/L 5 Total Suspended Solids 836 6, Dissolved Oxygen 1.1 mg/L.The electro oxidation process consisted of a glass beaker of 500 ml capacity with PVC lid having provision to fit a cathode and an anode. Salt bridge with reference electrode was inserted through provided in the lid. Proper. The anode was made of mesh of titanium coated with RuO_2, stainless steel was used as cathode. The current was applied with density 2 A/dm2 and 400 ml of biologically treated combined dye house wastewater was taken in the glass beaker for further reduction of COD by electro oxidation. Stirring was done with a magnetic stirrer. During these processes samples was collected at different time intervals and the COD was measured. By this process about 70% of COD removed and 80% of colour was removed. For biological process Pseudomonas, phan- erochaete, Bacillus and tricoderma was used. These microbes was cultured in their required medium and then added to the waste water. At the end of 5th day, Pseudomonas putida gave the maximum reduction of COD as 92% and colour removal as 95% respectively. FTIR was analysis reveals that aromatic compounds degraded to aliphatic compounds which were easily biodegradable. The intensity of UV–Vis spectra was reduced drastically that clearly indicates azo dye degradation with electro-oxidation followed by biological treatment.Choudhary and Ojha [11] had carried out the research in the "Effects of the Chemical Dosing in Treatability study for the Textile based Industrial waste water". Removing Colour and organics from waste water was more important because the presence of small amounts of dyes is clearly visible and detrimentally affects into the water quality. In primary treatment process of textile based effluent, simple chemicals such as lime (10% sol.), iron salts (5% sol.), polyelectrolyte (0.1% sol.) gave good result and removed Colour, COD,BOD,TSS faster than physical processes. The analysis results according to Jar-test were depicted in the stage-wise performance of inlet and outlet effluent quality in ETP. The Chemical Oxygen Demand are 60% decrease, Total Suspended Solids 50% decrease, Hardness 20% decrease but Total Dissolve Solids ≈ 32% increase due to addition of Lime solution. The flock Produced by iron salt with lime at pH 10 to 11is heavier and can remove more percentage of Suspended Solids than Alum in a very short time period. Iron salt (ferrous sulphate and ferric sulphate) makes 90% treated water and 10% sludge. The Sedimentation of Sludge is very fast by Iron salt than Alum. They had analyzed the textile influent to find out to remove more organic material and suspended solids from textiles based waste water. It will be increasing the efficiency of treatment plants with using low cost chemicals. By the Jar test for the proper Dosing of Chemicals Lime 10% to 15% solution, Ferric sulphate 5% solution, and Polyelectrolyte 0.1% solution gave very good result. pH between 10.0 to11.0 after lime-ferrous dosing makes large size maximum flocks, which settled on its own by polyelectrolyte dosing. We observed that when pH below 10.0, quantity of flocks decreased and sludge did not settle properly. The removal of Colour from Red-Black or Dark green into Yellow or Light Green by proper dosing of chemicals and Chemical Oxygen Demand are 60% decrease, Total Suspended Solids 50% decrease, Hardness 20% decrease but Total Dissolve Solids 32% increase due to addition of Lime solution in primary treatment. Textile Dye Removal from Waste water Effluents Using Bioflocculants Produced by Indigenous Bacterial Isolates study carried out by Simphiwe et al[12] and they .Basically the study focuses on The bio flocculants produced by these organisms were ethanol precipitated, purified using 2% (w/v) cetylpyridinium chloride solution and evaluated for removal of wastewater dyes under different pH, temperature and nutritional conditions. Bio flocculants from these indigenous bacteria were very effective for decolorizing the different dyes tested in this study, with a removal rate of up to 97.04%. The decolorisation efficiency was largely influenced by the type of dye, pH, temperature, and flocculants concentration. A pH of 7 was found to be optimum for the removal of both whale and medi blue dyes, while the optimum pH for fawn and mixed dye removal was found to be between 9 and 10. Optimum temperature for whale and mediblue dye removal was 35 °C and that for fawn and mixed dye varied between 40–45 °C and 35–40 °C, respectively. These bacterial bio flocculants may provide an economical and cleaner alternative to replace or supplement present treatment processes for the removal of dyes from wastewater effluents, since they are biodegradable and easily sustainable. They had studied and computed that as the effect of pH and temperature on the removal of the dyes by the bacterial bio flocculants, respectively. A pH of 7 was found to be optimum for the removal of both whale and mediblue dyes for all the bacterial bio flocculants, with a slight decrease in removal rate at pH 6, 8, and 9 mediblue dye removal efficiency was observed for isolate E1, compared to the removal rate at the optimum ph. For fawn and mixed dye, the highest removal was observed at ph of 10, except for bio flocculants from isolates A14 and A17 with an optimum pH of 9 for fawn dye removal. There was an increase in the removal rate of fawn dye with an increase in pH. Similarly, the optimum temperature for whale dye. Karthikeyan and Anbusaravanan et al[13] has identified the presence of Bacteria capable of decolorizing textile effluents mixed with sewage (TES) were isolated. Based on the results of these various biochemical tests, the isolates were identified. The identification was con formed by 16s r -RNA sequencing. They were identified as Bacillus cereus AK1968 and Pseudomonas sp. AKDYE14. The sequences were deposited in GENBANK. The accession numbers were JN689235 and JN674167 respectively. The result has detected the presence of various bacteria in textile waste water as, five different colonies B1, B2, B3, B4 and B5 were found to be growing in the medium with TES and they were isolated. On the basis of spectrophotometer readings it was found that the isolates B3 and B4 showed maximum hydrolysis whereas B1, B2 and B5 isolates showed only slight hydrolysis in liquid broth, thus they were not selected for further study of the dye degradation. The desired bacterial strains with strong decolorizing ability on TES, B3 and B4, were isolated from TES and identified. The results of various biochemical characters .The colony of bacterial isolate B3 was circular, flat, and smooth. The bacteria of the isolate B3 was a gram positive rod

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shaped, non-motile and facultative anaerobic spore forming bacteria. The optimum growth temperatures ranged from 30 to 50°C. They could grow at pH values of between 4.3 and 9.3. The organism produced heat resistant spores and these might germinate if cooling was too slow. They could hydrolyze casein, gelatin and starch, could reduce nitrate.Design of Effluent Treatment Plant by Ahmed et al [14] after studying Hundreds of Textile industries in Bangladesh produce wastewater as a bi-product of their production mainly due to dyeing and washing of garments. The effluent contains several organic pollutants and color producing substances, which cause severe environmental hazards on both aquatic life and human health. These pollutants can be reduced down to the permissible limit with the help of an Effluent Treatment Plant (ETP). Most of the industries having ETP are not operating their plant regularly due to excessive operational and maintenance cost as they are not designed properly. Thus the design evaluation and development of optimum design of a treatment plant has been adapted as the major objective of the study. The main wastewater quality parameters concerned in this study are Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD) and colour. Simple biological treatment process without prior to chemical treatment has been found suitable to reduce the COD and BOD at a level which comply with the Bangladesh Environmental Conservation Rule (ECR), 1997, provided that optimum operational conditions(aeration period, air flow rate, volumetric loading, F/M ratio etc.) are maintained. In this research the optimum design criteria have been developed and the ability of the chemical treatment process to reduce the pollutants has also been checked. A treatment option has also been recommended for the treatment of the liquid waste generated from textile industry; which is found to be most efficient and economic way to reduce COD, BOD and colour. Finally on the basis of the study result, necessary modification of different treatment units of an existing ETP has been proposed in order to increase its treatment capacity. The result has concluded following point (a) the pH value of the raw sample and treated sample varied from 6 to 9 which is required for safe aquatic life. So there is no requirement for initial pH adjustment. (b) An aeration period of 3 hours is sufficient to reduce the concentration of COD and BOD within the permissible limit. However an aeration period of 6 hours has been adopted considering the volumetric loading. (c) Biological treatment process prior to chemical treatment process showed better COD and BOD removal performance. (d) The rate of COD removal decreases with the increase of Food to Microorganism Ratio. So, an optimum range of F/M ratio (0.1-0.3) has been selected considering the COD removal. (e) Recirculation of sludge is required to maintain the desired F/M ratio. (f) A reasonable portion of colour producing substances was separated through simple air floatation process. Though there is not any limiting value for colour but the effluent colour value seems to be very low.Tüfekci1 et al [15] has carried out the Pollutants of Textile Industry Wastewater and Assessment of its Discharge Limits by Water Quality Standards, The wastewater treatment plants of 11 textile mills in the woven fabric and knit fabric finishing industry were investigated in this study. Performances of the treatment plants were evaluated by in situ inspections and analyses of influent and effluent samples. The cost of the existing treatment plants is also evaluated. For the treatment of textile industry wastewater, biological treatment, chemical treatment and combinations of these are used. Plants utilizing biological treatment rather than chemical processes claim that their preference is due to less excess sludge production, lower operational costs and better COD removal in biological treatment. Waste water parameters in the effluent of biological treatment plants were in compliance with the ISKI (Istanbul Water and Sewerage Administration) discharge standards. However, if sodium sulphate in dying process and sulphuric acid in neutralization processes are used before a biological treatment, sulphate in the effluent exceeds 1700 mg/l. This problem can be avoided by using HCl or CO2 rather than H2SO4 in neutralization and NaCl instead of Na2SO4, if the use of Na2SO4 is not necessary. The result concluded that BOD5 values are quite low implies that the sample might have taken from the supernatant of the final sedimentation tank. Despite some violations of the limits for BOD5 COD, Total sulphur and pH, it is seen that the treatment facility was operated efficiently enough. The treatment facility at mill D treats 300 m3/day industrial wastewater on top of 100 m3/day municipal wastewater. It works with high efficiency. However, the raw water characteristics of this treatment plant are not above the discharge limits. When the influent and effluent values are compared, it seems that a two-stage treatment may not be necessary for this mill. The analysis carried out at the treatment plant of mill E shows that TKN, COD and SS were above the discharge limits of ISKI at 50% of all times. Performance Evaluation of Effluent Treatment Plant for Textile Industry in Kolhapur of Maharashtra has been carried out by Desai P. A. and Kore V. S [16].The study main focus was on evaluating performance efficiency of an Effluent Treatment Plant (ETP) of a textile industry located in Kagal-Hatkanangale MIDC area, Kolhapur (Maharashtra). An effluent treatment plant is operating on biological treatment method (Fluidized Aerobic Bio-Reactor) with an average wastewater inflow of 2MLD has been considered for case study. The wastewater is analyzed for the major water quality parameters, such as pH, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Total Dissolved Solids (TDS). The effluent samples were collected on a daily basis for a period of one month. The raw wastewater pH was highly alkaline it was then bringing down to neutral which was helpful for biological treatment. The BOD, COD of the treated effluent reduced significantly, whereas very small reduction was observed in dissolved solids. Most of all the parameters were within the permissible limits of Maharashtra Pollution Control Board, India. The result showed that the color of the effluent was brownish black. In- complete use and the washing operations give the textile wastewater a considerable amount of dyes. It has been documented that residual color is usually due to insoluble dyes which have low biodegradability as reactive blue 21, direct blue 80 and vat violet with COD/BOD ratio of 59.0, 17.7 and 10.8 respectively (Adel Al-Kdasi etal., 2004). The coagulation and flocculation helps to remove color of the effluent (Wong, 2007). The pH of the raw effluent is very high as the incoming wastewater is highly alkaline in nature. The bleaching agents used in the process are reasons for high alkaline wastewater. The pH correction is done with the help of HCL and brings down to neutral which is favorable pH for biological treatment. TDS are composed mainly of carbonates, bicarbonates, chlorides, phosphates and nitrates, calcium, magnesium, potassium and manganese, organic matter salts and other particles. No appreciable change was observed in values of dissolved solids in treated effluent. TDS detected could be attributed to the high color from the various dyes stuffs being used in the textile mills.SivaKumar et al [17] has carried out the research on Colour Removal of Direct Red Dye Effluent by Adsorption Process Using Rice Husk. The study main intention is how rice husk could be employed as low-cost and effective adsorbent for the removal of direct red 23 from dye effluent and also to study the effect of concentration of dye solution and the effect of amount of adsorbent on the percentage removal of dye. Azo dyes and their degradation products such as aromatic amines are highly carcinogenic. Adsorption of dyes is a new technology for treatment of waste water containing different types of dyes. Adsorption process is adopted for removal of direct red 23 dyes from the dye effluent using rice husk as the adsorbent in treated and untreated form. The process involves: washing and drying of rice husk at 105°C, followed by soaking in 0.6 M citric acid for 2 hours and heated to 120 °C. Further it is dried and washed repeatedly to obtain treated rice husk. This treated and untreated rice husk are used for removal of direct red 23 dyes. Dye red solutions of different concentrations were prepared and a known amount of adsorbent was added to study the Effect of concentration of dye solution and effect of amount of adsorbent on the percentage of removal of direct 23. The results obtained from the present investigation revealed the ability of rice husk in treating azo dye effluents, e.g. Direct Red-23 dye. It was found that adsorption is highly dependent on the contact time, adsorbent dose and dye concentration. The adsorption isotherm of DR-23 onto rice husk biomass is described by the Langmuir isotherm model. Kinetics of adsorption follows Lagergren first order kinetic model with film diffusion being the constitutive rate-controlling step. The monolayer adsorption capacity obtained from Langmuir isotherms for DR-23 was relatively higher for the citric acid treated rice husk compared to that obtained without chemical treatment. Consequently, safety can point to the use of this natural material due to abundance and very cheap biomass. This leads to its superiority as a potential sorbent in removal of some colored dyes from waste waters. Thus from the above conducted experiment It can be concluded that the rice husk can be used as a very effective absorbent in both treated and un-treated form. The experiment was conducted and the values were tabulated, from the tabulated values the following conclusions are being done.Decolourisation of Synthetic Dyes by Agricultural Waste- a Review Sharma et al [18] has studied Decolourisation of waste water has now become a major problem for the treatment plants in various industries. Many industries use synthetic dyes to colour their products such as textiles, rubber, paper, plastics, leather, cosmetic, food etc. Nearly 10-15% of synthetic textile dyes, used yearly are lost to waste streams and about 20% of these losses enter the environment through effluent from waste water treatment plant. Numerous techniques were used in the recent past for decolorisation of dyes. Among them adsorption technique has got maximum potential for the removal of dyes. Adsorption being a physical process, in-expensive and less time consuming, is widely accepted. It is evident from last 20-25 years that many researchers have studied the feasibility of low cost adsorbents derived from natural material, industrial material, agricultural waste and bio- adsorbents and resulted in innovative approach in this area. The current research is focused on the need to develop an efficient adsorbent with cost effectiveness and high potentiality. From the survey of about 80 -85 research papers, it was concluded that low cost adsorbents obtained from agricultural waste products were found to be having outstanding removal capabilities. This paper reviews the suitability of both raw and chemically modified agricultural products in the decolorisation of synthetic dyes.The result concluded following points that Bark is an effective adsorbent because of its tannin content (Bailey et al., 1999; Morais et al., 1999). Teak tree bark powder was used as attractive adsorbent for the adsorption of methylene blue by Satish Patil et al., 2011. The uptake by raw TTBP adsorbent was found to be 333.3 mg/g and increased with increasing pH.Biological Treatment of Textile Effluent Using Candida zeylanoides and Saccharomyces cerevisiae Isolated from Soil by Abioye et al [19] .This study evaluates the efficacy of yeasts isolated from soil in the treatment of textile wastewater. Two yeast species were isolated from soil; they were identified as Candida zeylanoides and Saccharomyces cerevisiae. The yeasts were inoculated into flask containing effluent and incubated for 15 days. Saccharomyces cerevisiae showed the most significant treatment capacity with a 66% reduction in BOD; this was followed closely by Candida zeylanoides with 57.3% reduction in BOD and a consortium of the two species showed the least remediation potential of 36.9%. The use of Saccharomyces cerevisiae and Candida zeylanoides in treatment of textile wastewater will help to limit the adverse environmental and health implications associated with disposal of untreated effluent into water bodies. The result has concluded following points Decolourization Assay At day 5 the absorbance of all the samples was high (0.524); subsequently their absorbance reduced with Saccharomyces cerevisiae showing the most significant treatment rate with absorbance of 0.391 while a consortium of both Candida zeylanoides and Saccharomyces cerevisiae showed the least absorbance of 0.502. Physicochemical Characterization of Textile Effluent shows the physicochemical parameters of the raw textile waste water (effluent) and the parameters following treatment by Candida zeylanoides (sample A), Saccharomyces cerevisiae (sample B), and a consortium of both (Sample C) at the end of days 5, 10, and 15, respectively. Percentage BOD reductionthe percentage BOD reduction by Candida zeylanoides, Saccharomyces cerevisiae, and the consortium. The percentage BOD reduction concentration was observed in treatment by the consortium was 38.9% while Saccharomyces cerevisiae showed the highest percentage BOD reduction (66%), followed by Candida zeylanoides (57.3%)..Fungal treatment of industrial effluents by Kumar et al [20] has studied that Water pollution through industrial discharges, which is mainly in the form of effluent or wastewater, is one of the biggest problems. These effluents have strong concentrations of chemical oxygen demand (COD), phenol and its derivatives and often contain metals, inorganic nutrients, organic compounds, proteins, cyanides, chlorinated lignin and dyes. Bio- remediation of toxic industrial effluents by microorganisms serves as an effective method to substitute the conventional recovery and removal processes. Fungal biomasses have huge capability of treating effluents discharged from various industries. White rot fungi are ubiquitous in nature and their adaptability to extreme conditions makes them good biodegrades. Their enzyme producing activity makes them effective decolorizes; they remove toxic metals by biosorbtion ultimately rendering the effluents more eco-friendly. The results main focused on that Fungi not only produce various metabolites like citric acid, homogeneous proteins, heterogeneous proteins, per- oxidizes but have shown their effectiveness for removal, reduction and detoxification of industrial effluents ingredients. Therefore in this review paper an attempt has been made to bring out the capabilities of fungi for bioremediation of industrial effluents. Bioremediation refers to the productive use of microorganisms to remove or detoxify pollutants, usually as contaminants of soil, water or sediments that otherwise threaten public health. Micro-organisms have been used to remove organic matter and toxic chemicals from domestic and industrial waste discharged for many years. Fungi especially the white-rot fungi produce enzymes laccase, Mn peroxidase and lignin peroxidase (Lip), which are involved in degradation of lignin in their natural lignocelluloses substrates. This lignin lytic system of white rot fungi is directly involved in the degradation of various xenobiotic compounds and dyes. The ability of the white rot fungi to degrade dye can be directly correlated with its ability to degrade lignin; the dye molecules are degraded along with lignin. Use of white rot fungi is the most unique technology. Heavy metals in water bodies cause several health problems. Heavy metals such as mercury, cadmium and chromium can accumulate, and they enter the food chain and biomagnifies to toxic levels. Several fungal species have developed a high resistance to heavy metals and developed a variety of mechanisms to remove ions, such as to cell surfaces. Akthar and Mohan (1995) used biomass of Aspergillums Niger to remove Zn^{2+} andCd^{2+} as the low affinity of the resident Ca^{2+} and Mg^{2+} ions of the biosorbent makes them excellent counter ions for the heavy metals that form more stable complexes.

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III.conclusion

Water is one of the most important substances on earth. All plants and animals must have water to survive. If there was no water there would be no life on earth. As an ancient Greek philosopher Empedocles held that water is one of the four classical elements along with fire, earth and air, and was regarded as the ylem, or basic substance of the universe. Thales, who was portrayed by Aristotle as an astronomer and an engineer, theorized that the earth, which is denser than water, emerged from water. This shows the significance of water. Today due to industrialization million litres of water are used in various industries such as dyes, pharmaceutical, textile chemicals etc and are polluted .The polluted water without proper treatment are discharged into water streams this leads to contamination of potable water used f for primary purpose which result in shortage of potable water. The above following review of dyes, textile waste water is to see that whether this type of industrial waste influent can be reused by proper implementation of treatment of water.

The above review reveals that the waste water is treated by various methods such as dying industry using adsorbent, biodegradation and physic-chemical changes for treatment of textile effluent by various fungal species, fungus from spent mushroom for decolourisation of textile dye effluent.etc.

The above review is an initiative to achieve the ultimate goal of:

- conserving
- sustainable development

Of one of the most important resource -----WATER!!

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