Color removal of aqueous dye solution using Selective Natural Coagulant

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***Abstract*—**Textile dying industry is very harm full to our environment. It produce heavy amount of wasteWater from different procedures in dyeing andFinishing. It's are different categories like syntheticFibres, cotton and fibre depending its raw materials.cotton is mostly used in maximum people. TheNatural coagulants are easily treated with low costAnd easily available in every place .naturalCoagulants like corn seed powder, tamarind seedPowder, basil seed powder, green bean powder etc.The major pollutants are cod, color, turbidity, ph. Italso calculated sludge volume index. NaturalCoagulants is better than other chemical coagulantslike (aluminum sulphate, alum, ferrous sulphate,Ferric chloride).

Keywords*—Coagulation, Natural coagulant, Reactive dye*

INTRODUCTION

Textile dyeing and finishing are most manipulators of drinking water as biological additives during different phases of textile processing. One of the most important step is Dying & finishing. This water is highly polluted in our environment also it harmful directly or indirectly effects of textile waste water. Toxic chemicals, high chemical Oxygen demand, Large amount of suspended solids, PH, High temperature, residual Dyes these are the effluent from textile waste water. Direct discharge of waste water harmful to human bodies or open Land because of its color and it is carcinogenic compound from the dye of decomposition of complex. It significantly residual dyes of color hamper sunlight transfixion, decrease aesthetic quality, affects the ecosystem of water as well as the photosynthetic activity. So that the textile wastewater must be fulfil the legal & the artistic standards before discharging it to municipal waste water treatment plant or to the environment. Basically the biological process are environmental friendly, low cost & simple also biodegradable organics are removed. It produce toxic by-products and oxidation process are connected with high cost. Chemical coagulation and flocculation are used for treatment of textile waste water .Physico chemical process like chemical flocculation and flocculation is the color removal of dye particle since textile waste water .lead is more harmful and toxic perfumed compound in textile waste water. Use various metallic coagulants are established in textile waste water having a mix with dyes only distilled water for research of synthetic textile waste water. The textile industry are different steps of processing like synthetic textile waste water comprising mostly chemical extracts. Toxic chemical are released from textile industry laterally with the combination of different dyes. Ferrous sulphate (FeSO4.7H2O), Magnesium chloride (MgCl2.6H2O), Polyaluminium chloride as well as Aluminum chlorohydrate (ACH) as coagulants and lime as coagulant Are decolourisation and COD depletion is used in textile waste water. Effect of pH and coagulant dosage on color removal efficiency and amount of sludge production are evaluated. (Akshaya Kumar Verma, Puspendu Bhunia, and Rajesh Roshan Dash)

Different types of dye are generate waste in textile industries reactive dye is most important of tww & it is used for private dying. Natural coagulants are used in this process and also it is low cost so can easily collect market or homemade. Natural coagulants are held for color removal, optimum PH, turbidity, COD etc. Natural coagulants like Moring seed powder, Maize seed powder, Green Bean Powder, Tamarind seed powder. UN behave of natural coagulants we can used aluminum sulphate, alum, lime or etc. Those are easily available in market but natural coagulants are the best for COD & color removal, optimum PH, turbidity.

In the world, India manufacture cotton & silk as a position of second highest. In the year of 2003-2004 total manufacture was 3051 kiloton. India produce for Garments 10000 and dying of bleaching 2100. (Ranganathan et al., 2007). The formatter will need to create these components, incorporating the applicable criteria that follow.

LITERATURE REVIEW

Ebeling, et al. (2004) determined optimum conditions for treating the backwash effluent from micro screen filters in an intensive recirculating aquaculture system. Tests were carried out to evaluate the dosages and conditions (mixing and flocculation stirring speeds, durations, and settling times) required to achieve optimum waste capture. The orthophosphate removal efficiency for alum and ferric chloride were greater than 90% at a dosage of 60 mg/L. He also reported the optimum turbidity removal was achieved with a 60-mg/L dosage for both alum and ferric chloride.

Sub hash Bhatia(2006) In this experiment by organic based coagulant to using an ecology friendly biodegradable and harmless natural coagulant Moring seed next oil removal could improve in this treatment besides gaining aids through the rescue Of water with negligible in future behavior . PH is used ph parameter with optimum effective. Jar test is useful in

experimental plant study by flocculants dosage. Ph, Ss, Tkn oil and grease these are the characteristics of pome. The advantages of by ecological friendly Moring coagulant laterally biodegradable flocculants in this treatment of removal sludge and it can be high cost effective as compare to chemical coagulants. Natural coagulants are low cost as compare to other chemical because seed is used mature and usually reduction from the tree. Moring coagulant is used for treatment of POME and it is economically.

Himanshu Patel (2010) Present study analyzed the feasibility of Congo red dye using naturally prepared coagulants viz. SSP, MSP and Chitosan. The various parameters like pH, coagulant dose, flocculation time and temperature were investigated in this study. The process optimization of these mentioned parameters was also intended and highest percentage removal of CR was achieved using it. So, SSP was more preferable than Chitosan and MSP, respectively. SVI and turbidity were evaluated for all parameters and it indicated that Chitosan was more preferable than SSP and Chitosan, respectively.

Chitteti et.al. (2012) discussed that Seeds of T. foenum-graecum contain materials that can act as effective natural coagulant. The natural coagulants present in T. Foenum-graecum shows its coagulation efficiency at neutral PH. Further, it was found that this natural coagulant is temperature and pH stable. It may not produce total coliform-free water. It is to be noted that even with well-designed and maintained systems it is unable to produce zero total coliform without chlorination. Prasad et al. (2013) reported that Moring Oleifera seed powder like 50, 100 and 150 mg/litre were taken and checked for the efficiency dose for various water samples. After treatment of water samples with the Moring Oleifera seed powder were analysed for the parameters like Turbidity and ph.

Shegani et.al. (2014) reported that it was proven that natural coagulants can treat tannery industry waste water efficiently. And also by using Moring olifera seed extract as a coagulant sludge volume index in treatment operation will be reduced when compared to other treatment processes and coagulants. In his study transmittance was increased to 76%, Color and odour were removed completely. Effluent samples were treated with coagulants CA (OH) 2 and FeSO4 .7H2O. The best advantages of this treatment included the removal of COD (81.60%), ammonia ions (98.34%), nitrate ions (92%), chromium hexavalent 13 (75.00%), phosphate (70.00%), chloride (69.20%), and H2S (50%). Results also indicated a high level of efficiency in the reduction of faecal pollution indicators. Unfortunately, only a modest reduction of sulphate (19.00%) and TSS (13.00%) and an increase in TDS (15.60%) was observed.

Patel H et.al. (2014) in their paper, "Comparison ofnaturally prepared coagulants for removal of CODand color from Textile Wastewater", checked thefeasibility of natural materials such as Surjana seedpowder, Maize Seed Powder and Chitosan ascoagulants. Comparative study was conductedbetween these and surjana seed powder was foundbetter than the other two. Various factors likeCoagulant dose, flocculation time and temperaturewas investigated in which coagulant dose was foundto be more preferable than other parameters forremoval of COD. And flocculation time wasconsidered effective than other parameters whenremoval of color was concerned.

NandkishorKumawat (2017) in this experiment usenatural coagulants like bean hyacinth, cactus andtamarinds indicia success in treatment of water. Inrainy season water is muddy and fully sedimentationin rural area and it is very difficult to clean. Naturalcoagulants are easily available in every place and italso cost effective and it easily used in rural area fordrinking purpose. It is economical, help ourenvironment and reduction illness and death fromborne diseases and finally develop in rural area forhuman health purpose. It direct connection with ourenvironment. Textile industry plays important rolein our country like total export India has one fourthrole. 70% pollutants contributes in textile industry.

Ali JwiedJaeel, Noor Shakir Ali (2018 ICASEA,Waist University, Kut, Iraq.) Capris Spinosa is used.The absorbance value is find out by UVspectrophotometer. Powder is more productivity fordye removal. The main parameter is ph. the highestnatural coagulants remove is 96%. Finally thispowder is used for dying removal in textile wastewater. It is very effective result in textile wastewater. (i.e. Ph. concentration of dyeing etc.)

POLLUTANT REMOVAL IN SPECIFIC

The chemical degradation, precipitation, filtration, adsorption etc. is possible various method. The major problem decolourization method by using absorption the color in sludge or by color scrap failure. It decrease bio-degradation in dyes with high soluble in water and big particle weight with biological cell membrane of diffusion. The remove pollutant is CO (chemical oxidation), precipitation, coagulation, filtration, osmosis, zonation and biological process from textile waste water. (PoedjiLoekitowatiHariani, Muhammad Faizal, Ridwan, Marsi, June 2013).

IMPORTANCE OF EACH MECHANISM

Color pollution can be most efficiently controlledby good source reduction particles, admistrative andengineering controls, process and product designand work practices. (By m josh, r Bansal in 2003)Chemical oxygen demand depends on the dyes usedin the production process. COD removal wasobserved in all zonation treatment cases. CODreduction observed from 73.5% to 77.5% (40 mg/LRB-5 initial concentrations) was achieved after 120minutes of treatment process. Similar CODreduction was found from 70.1% to 77.1% (100mg/L RB-5 initial concentrations) was achievedafter 300 minutes of treatment process.(by akshyaKumar verma in 2011) The pH value was measuredby a pH meter (WTW 720) . Turbidity is used(Eutech NT- 100) and it indicate in nephelometricturbidity units (NTU). The color values wereobtained by the ADMI tristimulus filter method viaa HACH spectrophotometer UV–vis DR 5000. CODmeasurements were carried out using high rangeCOD ampoules (HACH Chemical) with aspectrophotometer (DR 5000, HACH). Theconcentrations of other parameters of the wastewaterwere measured according to the standardmethods. (J Environ Health Sci Eng. v.11; 2013)

A. Results

B. Different type of coagulant dose

Test procedure:

1. Rapid mix 2 minutes for 100 to 120 RPM
2. Flocculation time 20 minutes for 30 to 35 rpm
3. Settling time 30 minutes

Color removal Efficiency = C0−CE /C0

∗ 100

SL. NO.	NAME OF THE COAGULANT	DOSE (gm/250ml)	COLOR REMOVAL %
1	CORN COB	0.5	88.02
2	GREEN BEANS	0.4	75.26
3	TAMARIND	0.4	73.34
4	POMWGRANATE PEELS	0.5	76.79
5	ALUM	0.5	81.93

CONCLUSION

Bio degradable is mostly developed and naturalcoagulants are eco-friendly. The successfulcoagulants are natural coagulants. The main factorsof coagulation are coagulant dose & coagulation PHalso most important is chemical dye shape. Ascompare to alum natural coagulant is the best intextile waste water. During the treatment processnatural alkalinity is not absorb and alum generateless sludgevolume. (KhanitthaCharoenlarpandPathumthipPrabphane)

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