Effects of Natural Coagulants In Textile Wastewater

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Abstract- *Textile wastewater constitutes the major sources of various kinds of metal, non-metallic and toxic pollutants in natural water. Wastewaters generated from industrial treatment plant contain considerable contaminants. Their concentrations should be reduced to safe levels before being released into the environment. An option of natural coagulants can be used in wastewater treatment. The natural coagulants are most efficient that provide several benefits such as; prolific, exempt from physical and chemical changes from the treated water. The aim of this study is to find the possibility of using natural coagulants instead of chemical coagulant such as Alum and to minimize the cost of the coagulation process. In this study, the seeds of Hyacinth beans and Cucurbita Pepo will be used as natural coagulants. The dosage limits are varies from 2%, 4%, 6%, 8%, 10% and 12%. Out of this dosage limits, the optimum dosage level will be evaluated.*

Keywords- Wastewater, Natural Coagulants, Hyacinth beans, Cucurbita Pepo, Optimum dosage level.

I. INTRODUCTION

Removal of pollutants from wastewater has become a major concern in present days because of its ability to contaminate water bodies. The presence of contaminants in the environment has caused serious changes to the natural nutrient cycle between the living world and the soil, water, and atmosphere.

Textile industries are one of the largest water consuming industries. The effluent comes out from the dyeing industries contains many types of chemicals and coloring agents. It requires proper treatment, before discharging it into any water bodies.

Textile Printing and dyeing processes include pre-treatment, dyeing or printing and finishing. The pollutants are comes from the pre-treatment process of pulp, cotton gum, cellulose, hemicelluloses and alkali. Pre-treatment accounts for about 45% and dyeing/printing process accounts for about 50%~55% of the total wastewater production, while finishing process produces little.

In wastewater treatment, Coaguation is the process of adding chemicals to the wastewater to increase the size of the suspended and colloidal matter which leads to sedimentation. Various chemicals such as Alum, Ferrous Sulphate, Ferric Chloride, etc., are generally used as Chemical Coagulants.

On the other hand, Natural Coagulants are obtained from the branches, seeds, and leaves of the natural plants. Naturally occurring coagulants are good to the environment also.

Aim and Objectives:

The main aim of this study is to modify the physico-chemical characteristics of textile wastewater and also to remove chemical contaminants from it.

The objectives of this study is to,

1. Describe, evaluate and select cost effective technique for treatment of textile wastewater.
2. Characterize physical properties of natural Coagulants.
3. To use abundantly available natural Coagulants.
4. To minimize the skin diseases caused due to usage of Chemicals.
5. Reduce the level of turbidity from water by using a natural coagulant.
6. Making water treatment economical and environment friendly.

II. METHODOLOGY

2.1 Samples

The wastewater is collected from Balakumaran Dyeing Unit situated in Tirupur district which is a textile industry which has produce daily wastage of 20,000 lit. The entire consumption of 20,000 litres is converted into wastewater.

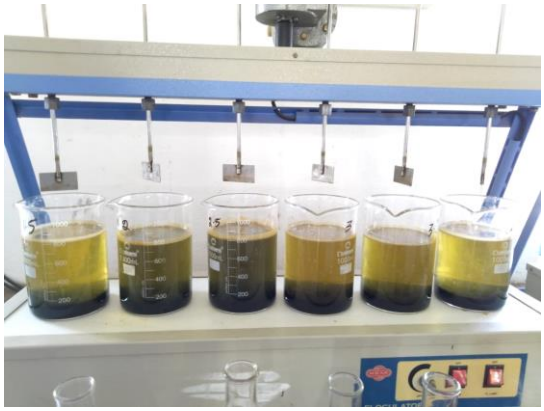
2.2 Coagulant Preparation

All the seeds were collected from local market in Tirupur then it was washed repeatedly by using distilled water to remove moisture and soluble impurities. Then beans were kept in oven at 110 ^{0}c, for 4-6 hours. Then it was crushed and

screened in 425 micron sieve and stored in the bottles. 10 g of bean powder were taken in a beaker and it was dissolved in 200 ml of distilled water. Then it is properly mixed by using jar test apparatus and filtered with the help of filtration assembly. The filtered solution was stored in bottles and then it was used as a coagulant.

2.3 Jar test equipment

The conventional jar test equipment was utilized in this experiment to coagulate sample of effluent victimization natural coagulator. It had been distributed as a batch; take a look at, accommodating a series of six beakers beside six-spindle steel paddles. Before beginning the take a look at, the sample was mixed totally. Then, the samples have to be compelled to be measured for muddiness, for representing an initial concentration. Coagulants of variable concentrations were accessorial within the beakers. The total procedures within the jar take a look at were conducted in several rotating speed.



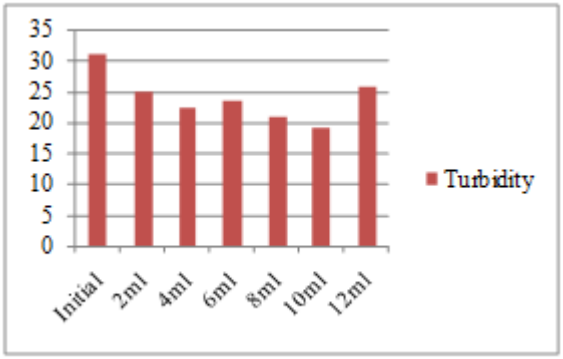
III. TESTING PROCEDURE

1. The dye waste is taken in a clean, dry 1000 ml beaker and its initial pH value is fixed. Coagulant which is pre-prepared is added into this with a dosage rate of 2ml, 4ml, 6ml, 8ml, 10ml and 12ml per litre.
2. Then put that beaker in jar test apparatus and Switch on the motor and adjust the speed of paddles to about 100rpm, and thus rapid mixing is done for 10-15 minutes.
3. Switch off the motors and allow it to settle for 20-60minutes. This corresponds to sedimentation or settling of impurities. Collect the supernatant from each beaker with the help of pipette, without disturbing the sediment and checked for its final turbidity levels.
4. All the tests are done in triplicate and the concordant values were taken for the results comparison.
5. Turbidity removals corresponding to various doses of natural coagulant ranging from 2 to 12 mg/l were measured and the least dose producing maximum removal was designated as optimum coagulant dosage.

IV. RESULTS

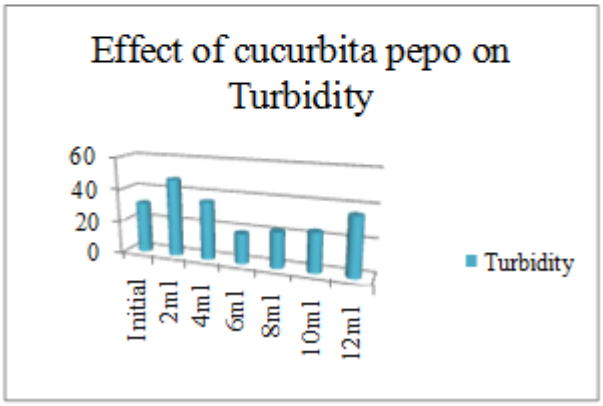
4.1 Effect of Hyacinth Beans on Turbidity

Initial Turbidity : 31.1 NTU	
Dosage	**Turbidity**
2ml	25.2
4ml	22.6
6ml	23.6
8ml	21.1
10ml	19.2
12ml	25.9



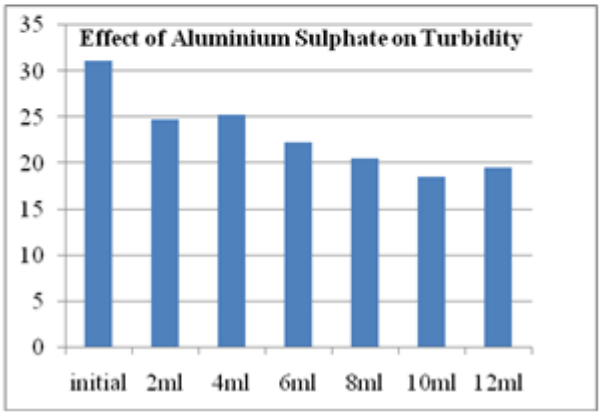
4.2 Effect of cucurbita pepo on Turbidity

Initial Turbidity : 31.1 NTU	
Dosage	Turbidity
2ml	47.5
4ml	35.5
6ml	18.4
8ml	22
10ml	24
12ml	35.6



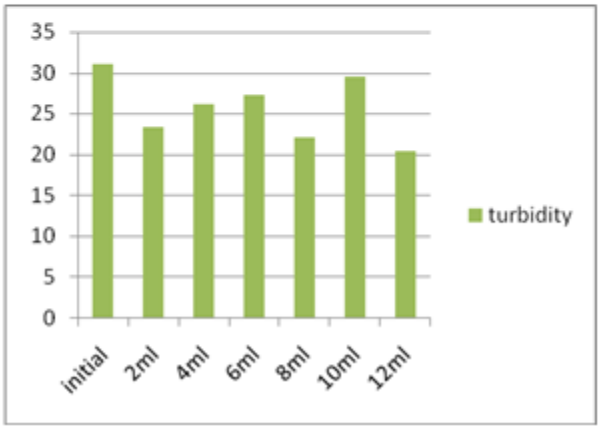
4.3 Effect of Aluminium Sulphate on Turbidity

Initial Turbidity : 31.1 NTU	
Dosage	**Turbidity**
2ml	25.2
4ml	22.6
6ml	23.6
8ml	21.1
10ml	19.2
12ml	25.9



4.4 Effect of Potassium Aluminium Sulphate on turbidity

Initial Turbidity : 31.1 NTU	
Dosage	**Turbidity**
2ml	23.3
4ml	26.2
6ml	27.2
8ml	22.1
10ml	29.5
12ml	20.4



V. CONCLUSION

From the higher than results, it's ended that

1. the most removal of murkiness for the sample was achieved as seventieth by exploitation the natural coagulants and fiftieth of cloudy contents ar removed as by exploitation chemical coagulants. So, it had been advised that, we will use domestically on the market natural coagulants and to treat the low cloudy effluent that is value effective and atmosphere friendly.
2. It's tried that natural coagulants have promising nature and potency in treating wastewaters. These coagulants are used for pilot scale studies, however they're applicable for industrial scale conjointly.

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