

“Wastewater Treatment by Natural Coagulant”

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Abstract - One of the major sources, which waste the environment is the wastewater produced from the different industries and from human activity. Coagulation and flocculation process are physical-chemical methods that widely used in the treatment of wastewater. Today the prime concern of the environment engineers is how to lower the coagulants and flocculants cost and improve the characteristics of wastewater. In this work natural coagulant such as Moringa olifera, Cactus, Sagarmatha, Colotropis procera, Prosopis juliflora, Nirmali, Trigonella foenum-graecum, Dolichos lablab, Okra used as coagulant in wastewater treatment. Inorganic Coagulant are Aluminum sulphate, Aluminum chlorohydrate, Polyaluminium chloride, Aluminum chlorohydrate used as inorganic coagulant in wastewater treatment. Through coagulation, wastewater treatment plants can remove the impurities in wastewater and further treat it to be usable again. Treated wastewater is also less harmful when returned to the environment.

Key Words: Coagulation, flocculation, Moringa, Prosopis juliflora, Nirmali, Trigonella

1. INTRODUCTION

The application of natural coagulants could enhance primary treatment in industrial and municipal wastewater treatment plant reducing the cost of the secondary treatment stage. Because of negative effects of conventional coagulants, the possibility of usage of natural coagulants, which are biodegradable and have no effect on health, on wastewater treatment, and their overall environmental impact, will be considered. Use of a natural coagulant is reported to have many advantages over chemical coagulant e.g. Alum. Use of chemical coagulant has constraints of pH and alkalinity. However, natural coagulant has been reported to be free of these constraints. Turbidity removal can be achieved with natural coagulant. Trigonella foenum-graecum, Cicer arietinum, Dolichos lablab, Pisum Sativum, Strychnos potatorum,

Moringa Oleifera, seed extract has shown promise as coagulant in the clarification of turbid wastewater.

2 Necessity

Water is undoubtedly the most vital parameter among the natural resources. Turbidity imparts a enormous problem in waste water treatment. In this present study, an attempt has been made to evaluate the effectiveness of locally available natural coagulant for reduction of turbidity in the quality improvement of wastewater. The dosing of water-soluble extract of natural coagulants at various concentrations obtained the reduction of turbidity in wastewater. It was found that natural coagulant worked better with turbid water. Highest turbidity reduction efficiency of about 78% was noticed. Influence of the pH on the system found to be significant on turbidity removal. The study clearly indicates that at optimum pH system conditions, there is significant reduction in coagulant dose required and in some cases a further increase in turbidity removal. Utilisation of locally available natural coagulant was found to be suitable, easier, cost effective and environment friendly for waste water treatment.

3 Materials and Methodology

In this study Cicer arietinum (Chickpea), Moringa oleifera (Drumstick seeds), and Cactus were used as natural coagulants. Cicer arietinum (Chickpea), Moringa oleifera were obtained from local market of Sangamner.



Cicer arietinum plant Moringa oleifera seeds

4 Methodology

1) Treatment of Wastewater using Cicer aretinum (NC1)

The effluent from wastewater was treated with Cicer aretinum seed powder with optimum dosage of 0.1gm/500ml at optimum pH=5.5 for the reduction of turbidity and COD. Variation in the COD at every 2,000mg/l concentration is carried out. The results obtained after the analysis are represented in Fig. for Turbidity and COD.

2) Treatment of Wastewater using Moringa oleifera (NCL2)

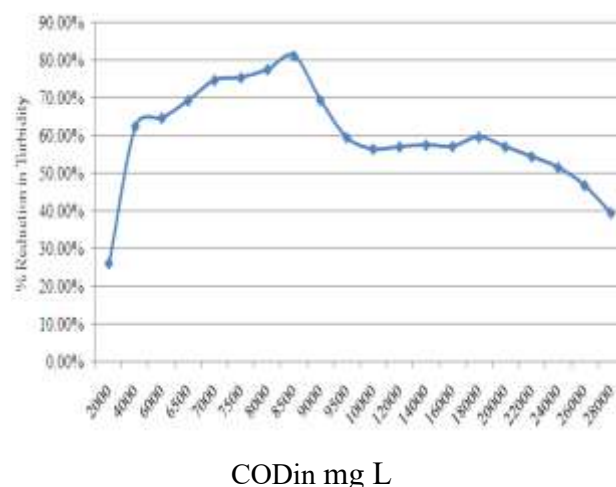
The effluent from tannery wastewater was treated with Moringa oleifera seed powder for the reduction of Turbidity and COD. Variation in the COD at every 2,000 mg/l is carried out with optimum dosage 0.3gm/500ml of Moringa oleifera and pH 4.5. The results obtained after the analysis are presented in Fig for turbidity and COD.

5 Result

Natural coagulant	Turbidity
Cicer aretinum	81.20%
Moringa oleifera	82.02%

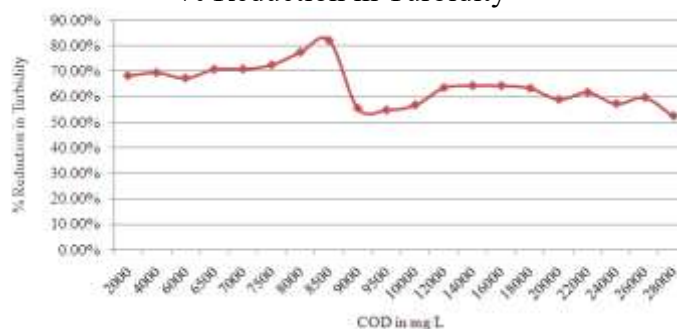
Table presents comparative results of Two natural coagulants; Cicer aretinum, Moringa oleifera in the reduction of turbidity with their optimum dosage at optimum pH value. From the table it is clear that, out of Two coagulants Moringa oleifera gave highest turbidity reduction of 82.02%.

% Reduction in Turbidity



Influence of Cicer aretinum on reduction of Turbidity

% Reduction in Turbidity



Influence of Moringa oleifera on reduction of Turbidity

6. CONCLUSIONS

- 1) Natural Coagulant does not have any effect on human health
- 2) Chemical coagulant Sludge produced is voluminous and non-biodegradable after treatment and therefore poses disposal problems leading to increase cost of treatment.
- 3) Chemical coagulant cost is increasing day by day.
- 4) Preparation of chemical coagulant required substitute chemical. Natural coagulant is easily manufactured.
- 5) All coagulants are easily available.
- 6) At the time of application of dose daily fresh solution should prepared.
- 7) Among the Two natural coagulants used in the study, maximum turbidity reduction is found to be 82.02% with Moringa oleifera.

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