

TREATMENT OF DAIRY WASTEWATER BY USING NATURAL COAGULANTS

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Abstract

The dairy industry is one of the major source of food processing. These industries produce a huge amount of wastewater. Such wastewater is to be treated by using naturally and easily available coagulants and then tests are to be carried to check the water different characteristics of waste water like BOD, COD, pH and turbidity etc. Natural coagulants to be used are Moringa oliefera, Azadirachta indica, Trigonellafoenum-graecum and cicerarietinum . Natural coagulant is a naturally occurred. plants based coagulant that can be used in coagulation-flocculation process of wastewater treatment for reducing turbidity. The objectives of this study were to assess the possibility of using natural coagulants as an alternative to the current commercial synthetic coagulant such as aluminium sulphate. The final effluent can be readily used for irrigation and sludge itself becomes a good fertilizer. The efficiency of reducing of turbidity by M.oleifera, Azadirachta indica, T.foenum graecum, c.arietinum are 61.60%, 71.74%, 58.20% and 78.33% respectively.

1. Introduction

At present, in order to decrease waste hazards and to restrict the resulted effects on the environment, investigators studying the possibility of using new methods and materials to treat wastewater. Coagulation and flocculation process are physical-chemical methods that widely used in the treatment of wastewater. The key concern of the environmental engineers is how to lower the coagulants and flocculants cost and to improve the characteristics of the produced sludge for safe utilizing. Flocculation and coagulation constitute the backbone process in most waste water and water treatment plants. Their aim is to increase the separation of particulate species in down- stream processes such as filtration and sedimentation. The increasing industrialization and urbanization with considerably increasing the rate of water pollution. Curtail in supplies of natural resources of water have made this a serious limitation for industrial growth and for a reasonable standard of urban living.

In order to decrease waste hazards and to restrict the resulted effects on the environment, research for the wastewater treatment is necessary. The applicability and possibility of using new methods and materials to treat wastewater is the demand. Coagulation and flocculation process are physical and chemical methods that are extensively used in the treatment of waste water. Presently, the prime concern of the environmental engineers is how to lower down the coagulants and flocculants cost and to improve the characteristics of the produced waste for safe utilization.

Scope of the Treatment

The dairy industry is generally considered to be largest source of food processing. These industries wastewater is characterized by high COD, BOD, nutrients etc. Such wastewater is to be treated natural coagulants and then tests are to be carried to check the water characteristics like BOD, COD, pH and turbidity,

etc. The initial pH, Turbidity, COD are 8.41, 289.5 NTU, 10000 mg/l respectively. An important concern of the environmental industries, is to lower the coagulants and flocculants cost and at the same time to improve the characteristics of the produced sludge to be safely utilized. To overcome this problem the use of natural coagulants are attempted to treat such kinds of wastewater.

2. Methodology

2.1 Material:

Wastewater was obtained from from Madurai aavin.coagulants were prepared from seeds of various plants by drying and powdering them and finally sieving them in 600 micron IS sieves.

2.2 Method:

Jar Test was carried out to evaluate the initial and final turbidity values (in NTU) before and after the coagulation process using natural coagulation. We have conducted 3 tests to take the average turbidity value for every coagulant dosage.

3. Result and Discussion

3.1 Optimum dosage:

The optimum dosage of coagulants are determined by varying the dosage of coagulants are 0.05gm, 0.1gm, 0.2gm, 0.3gm, 0.4gm, 0.5gm/500 ml at original pH of dairy waste water(Ph=8.41). The optimum dosage of *M.oleifera*, *Azadirachta indica*, *T.foenum graecum*, *c.arietinum* are 0.05gm, 0.1gm, 0.2gm, 0.3gm, 0.4gm and 0.5gm respectively.

3.2 Effects of natural coagulants on pH

After treatment of dairy wastewater by coagulants with the initial Ph, change in pH can be analysed and there is no significant change in pH due to natural coagulants. it is changing in decimal values so it is considered as almost negligible.

Table 3.1 change in pH value

Dosage in gm/500ml	Moringa	Trigonella	Cicer arietinum.	Azadirachta indica
0.05	7.25	7.35	7.43	7.5
0.1	7.4	7.26	7.45	7.3
0.2	7.35	7.16	7.31	7.4
0.3	7.14	7.25	7.5	7.2
0.4	7.26	7.14	7.32	7.1
0.5	7.45	7.15	7.56	7.62

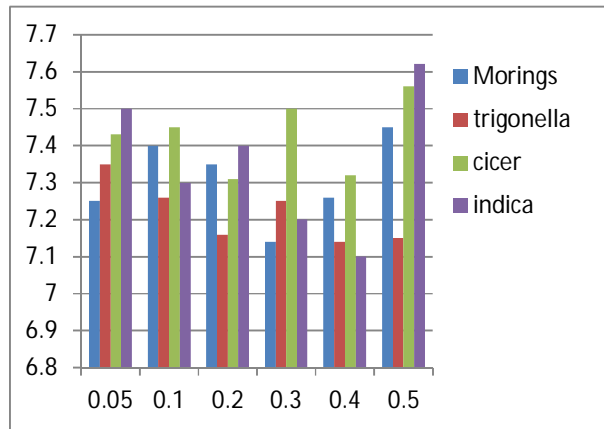


Fig.3.2 change in pH due to natural coagulants

3.3 Effect of natural coagulation on turbidity

After treatment with natural coagulants maximum reduction in turbidity takes place.

Table 3.3 Reduction in turbidity after treatment

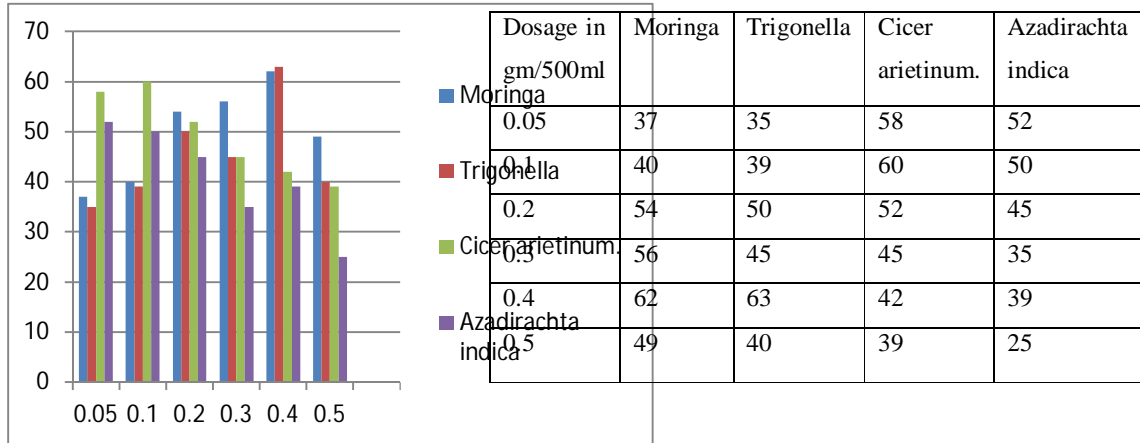


Fig.3.3 Reduction in turbidity after treatment

4. Conclusions

The dairy industry is the one of the leading industry in the world. But the effluent content leads to the some problems such as turbidity, oil and grease, organic content etc. If treating this effluent with some chemicals leads some health problems. So these can be overcome by using some natural materials. In this study using the two seeds an effective removal of turbidity is obtained. Coagulating with cicer aritinum seed attained 78.33% removal efficiency, while with the Azadirachta indica seed obtain a highly removal efficiency upto 71.74%.

Cicer aritinum seed can use as an effective coagulant in the dairy wastewater treatment mainly for the turbidity removal.

.From the experimental results, we have concluded that among the chosen natural coagulants, Cicer aritinum showed a better coagulation and turbidity removal for given dairy wastewater.

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