International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 07 | July 2021 www.irjet.net p-ISSN: 2395-0072

WASTE WATER TREATMENT USING NATURAL COAGULANTS

Nandagopan s[1], Nongki Perme[1], Sruthy A R[1], Yugma V[1], prof.Jency Nadayil[2]

[1]B. Tech student, Dept. of Civil Engineering, Mar Athanasius College of Engineering, Kerala, India
[2]Assistant professor, Dept. of Civil Engineering, Mar Athanasius College of Engineering, Kerala, India

---

Abstract - water being important for human sustenance need to be used carefully. Today due to less availability of fresh water, waste water is being treated so as to meet human needs. In various process of treatment of waste water coagulation process in which coagulants are used so as to settle down the particles that do not settle under force of gravity. Most commonly used coagulant is alum which is synthesized chemically, most of the chemical coagulants are harmful for human. Because of that we are using natural coagulants like, hibiscus flower powder, tamarind seed powder, soyabean powder. We could infer that tamarind seed performed more efficiently to remove 31.19% at a dosage of 60 mg/l, while soyabean and hibiscus flower powder was efficient but not as tamarind seed powder.

***Key Words*: Turbidity, pH, Coagulants, tamarind seed powder, soyabean powder hibiscus flower powder**

1. INTRODUCTION

Water treatment is done using various methods like screening, sedimentation, coagulation etc. Coagulation being an important stage so as to settle down particles that do not settle plays an important role in treatment. Substance used for coagulation are coagulants. Commonly used chemicals for various treatment units are synthetic organic and inorganic substances. In most of the cases, these are expensive since they are required in higher dose and are not cost effective. Many of the chemicals are also associated with human health and environmental problems.so there is a need to adopt natural and more eco friendly coagulants. Through this project we are trying to determine the turbidity removal efficiency of natural coagulants like soyabean powder, hibiscus flower powder ,tamarind seed powder on kitchen waste water.

1.1 OBJECTIVES

- To reduce the level of turbidity using hibiscus flower powder, tamarind seed powder, soyabean powder as coagulants
- To make the water treatment process easier and environmental friendly for household applications.

1.2. NEED OF THE STUDY

- Many of the chemical coagulants are also associated with human health and environmental problems.
- So natural coagulants can be used for water treatment as they do not causes any problems which occur due to the use of chemical coagulant

2. METHODOLOGY

2.1 Materials

1.Tamarind Seed Powder

Tamarind, (*Tamarindus indica*), evergreen tree of the pea family (Fabaceae), native to tropical Africa. It is widely cultivated in tropical and subtropical regions for its edible fruit, the sweet and sour pulp of which is extensively used in foods, beverages, and traditional medicines.

2.Hibiscus Flower Powder

Hibiscus or rose mallow is a genus of plants with a flower of bright colors. Itgrows mostly in the tropics, but some species grow in cool climates. Hibiscus is a genus of flowering plants in the mallow family, Malvaceae.

3.Soyabean Powder

soybean or soya bean (*Glycine max*)is a species of legume native to East Asia, widely grown for its edible bean, which has numerous uses. Soy beans contain significant amounts of phytic acid, dietary minerals and B vitamins.

4.kitchen waste water

5. 600 µm sieve

6.Filter paper (whatman no.42,125mm dia)

2.2 Collection of kitchen waste water

Kitchen waste water was collected from the hostel of about 20 litres.the waste water had a turbidity of 93 NTU and pH of about 6.8.

2.3 Stock solution of natural coagulants

- The organic materials used are hibiscus flower powder, tamarind seed powder, soybean seed powder
- Hibiscus flower was collected and after cleansing with water it is sundried for seven days. After sun drying flower is turned into fine powder in mixer grinder.
- Tamarind seeds and soya bean seeds are also collected from market and kept for sun drying for seven days. Then it is transformed into fine powder in a mixer grinder.
- The grains of powder were maintained approximate size less than 600 µm by sieving through 600 µm sieve to achieve solubilization of active ingredients in the seed. Now add 1g of the powder into 200 millilitre of distilled water and stir the solution for 15-20 mintues filter out the solution and our coagulant mix is ready.

3.TESTS ON KITCHEN WASTE WATER

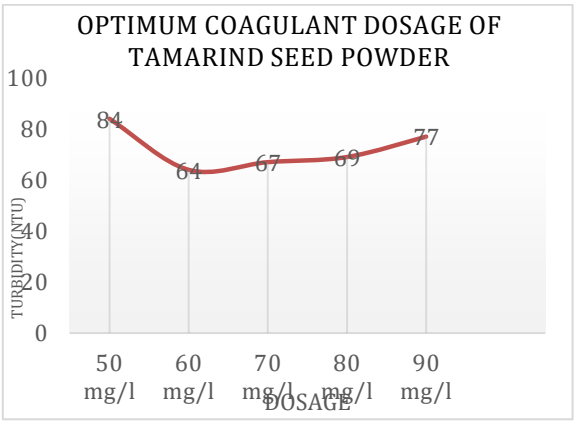
The physical properties pH and turbidity were evaluated after jar test was conducted.

- Initial turbidity and pH of kitchen waste water

turbidity (NTU)	93
PH	6.8

1. Using tamarind seed as natural coagulant

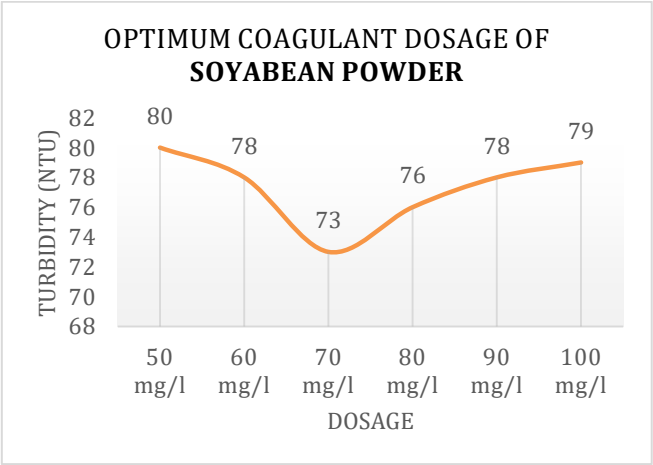
trial no.	coagulant dosage	Turbidity (NTU)
1	50 mg/l	84
2	60 mg/l	64
3	70 mg/l	67
4	80 mg/l	67
5	90 mg/l	77
6	100 mg/l	78



Optimum coagulant dosage of **tamarind seed** powder is **60 mg/l** for the taken dosages.

2. Using Soyabean Powder As Natural Coagulant

trial no.	coagulant dosage	Turbidity (NTU)
1	50 mg/l	80
2	60 mg/l	78
3	70 mg/l	73
4	80 mg/l	76
5	90 mg/l	78
6	100 mg/l	79

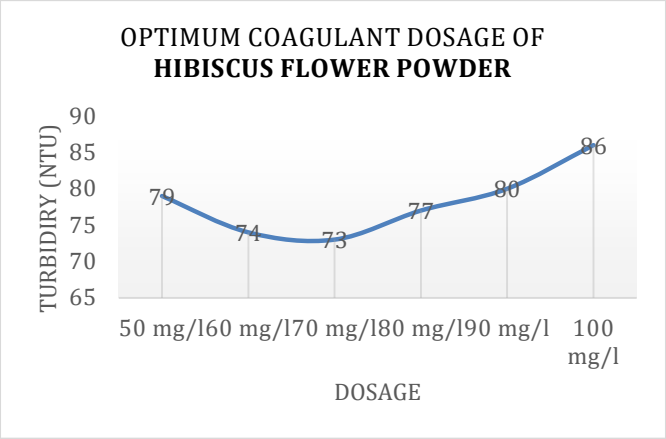


Optimum coagulant dosage of **soyabean powder** is **70 mg/l** for the taken dosages.

3.using hibiscus flower powder as coagulant

trial no.	coagulant dosage	Turbidity (NTU)
1	50 mg/l	79
2	60 mg/l	74

3	70 mg/l	73
4	80 mg/l	77
5	90 mg/l	80
6	100 mg/l	86



Optimum coagulant dosage of **hibiscus flower powder** is **70 mg/l** for the taken dosages.

4. CONCLUSIONS

- Natural coagulants can be used for the removal of turbidity from kitchen waste water.
- We could see that **tamarind seed powder is 31.19%** at a dosage of **60 mg/l** while **soyabean powder** had an efficiency of **21.50%** at a dosage of **70mg/l** and **hibiscus flower** had an efficiency of **21.5%** at a dosage of **70 mg/l** .
- Optimizing working parameter of the coagulants along with increasing shelf life and varying dosages will be a way for future research in this field.

5. REFERENCES

1) S. Gautam and G. Saini,(2020), Use of natural coagulants for industrial wastewater treatment, Global Journal of Environmental Science and Management,6,pp 553-578.
2) A.Krishnaveni, P.Kalaivani (2020), Treatment Of Contaminant Water By Using Hibiscus Rosasinensis As Coagulant, Pramana Research Journal,10,pp 149-164.
3) Dr.B G Mahendra, Ms. Firdous Sultana(2020), Treatment Of Waste Water Using Lemon And Banana Peel As Natural Coagulants, International Research Journal Of Engineering And Technology, 7 , pp 4688-4690.
4) M. Priyatharishini, N. M. Mokhtar, R. A. Kristanti, (2019),Study on the Effectiveness of Banana Peel Coagulant in Turbidity Reduction of Synthetic Wastewater, International Journal Of Engineering Technology And Sciences ,6,pp 82-90.
5) Pricilla D,(2019) Potential Application Of Natural Coagulants In Small Scale Sewage Treatment, International Journal Of Engineering Sciences & Research Technology,8,64-70
6) Manoj U. Deosarkar, Ashish G. Hakke, Nikam Krishna, Kathewad Kishan, Karmude Pratiksha, Mande Dnyaneshwar,(2019), Use of Natural Coagulants in Waste Water Treatment, International Research Journal of Engineering and Technology,6,pp 3427- 3431.