# TREATMENT OF SULLAGE WATER USING TAMARIND SEED POWDER AS COAGULANT USING COAGULANT PROCESS

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**Abstract:**

The potential of natural coagulants is highly sought nowadays as the use of commercial coagulants, aluminum sulphate (alum) affects the environment negatively. Hence an alternative coagulant is needed. Tamarind fruits are used for several nutritional and herbal purposes and the seed are disposed as waste. Antibacterial, antiviral as well as antifungal properties in addition to its coagulation potentials, tamarind seed and other parts of the plant showed a promising step in water treatment and purification and a potential solution tocurrent problem in developing countries. Tamarind seed powder has the capability of reducing turbidity in raw water. The present review is expected to aid in the selection of appropriate technologies for surface water rejuvenation under varying conditions and would lead to an addition in the existing knowledge base on surface water remediation methods enabling further research in this domain.

**Keywords:** Tamarind seeds, Coagulation, Turbidity.

**Introduction:**

As climate change progresses, droughts are expected to increase in frequency and severity in many parts of the world. The potential future risks of climate change, as well as increasing demand for water resources, has led to increased investment in wastewater recycling as a means of decreasing reliance on ground and surface water sources. Turbidity and impurities in water is caused by suspended matter in the form of clay, silt, finely divided organic and inorganic matter, soluble colo

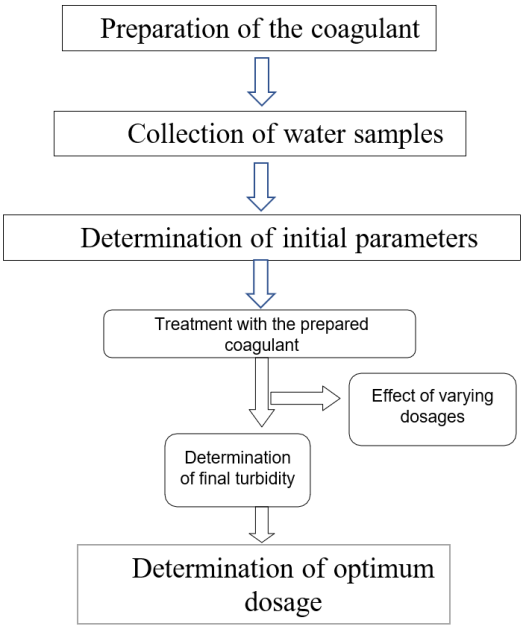
red organic compounds, zooplankton, phytoplankton and other microorganisms. Turbid water has cloudy appearance and makes it displeasing. Inorganic coagulants are more effective than organic coagulants, but in high doses, they may cause precipitates that are difficult to treat. This reason makes organic coagulant as an alternative to replace inorganic one. Naturally friendly organic polymers have been adopted for over the past 2000 years in most part of India, some part of

Africa and China as effective coagulants and coagulant aids in water containing high turbidity. Natural coagulants have bright future and are concerned by many researchers because of their plentiful source, cost-effective, eco-friendly. Tamarind seeds have high protein. This protein acts as a natural polyelectrolyte whose utility is similar to synthetic or in other words the conventional one.

**Objectives:**

1. To prepare the coagulant using tamarind seeds.
2. To determine the efficiency of sullage treatment using tamarind seeds ascoagulant.
3. To determine overall costs of the treatment using tamarind seeds.

**Methodology:**




**Preparation Of Tamarind Seeds Powder:**

1. The seeds are collected through various sources like local vendors or markets. The obtained seeds are sun – dried.
2. The sun - dried seeds are crushed using a miller.
3. The crushed seed powder is made to pass through 150 - micron sieves.
4. The powder is now ready for the analysis.

**Extraction Of Active Components Of The Coagulant**

1. The paste of tamarind seed powder is prepared with proper consistency.
2. This paste is later mixed with 0.5 M Nacl solution and stirred till the salt is dissolved.
3. The prepared solution is filtered through Whatman 41 filter paper.

**Collection Of Sullage Water**

For our analysis we have considered the water from collected from kitchen and initial turbidity is known by using turbidity meter.

**Treatment Of Sullage Water:**

1. The sullage water is treated by using the Jar Test Apparatus.
2. First, the initial turbidity of the water sample is determined by using the Nephelo turbidity meter.
3. The tamarind seed powder is added by varying the dosages.

**Determination Of Final Turbidity:**

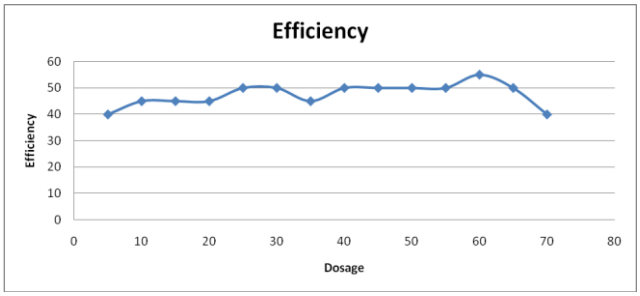
After the conduction of jar test the final turbidity of the water is determined by help of Nephelo-turbidity meter.

**Result:**

The results obtained as follows: Initial Turbidity: 20NTU.

| SL NO | Dosages(mg/l) | Final Turbidity (NTU) | Efficiency (%) |
|---|---|---|---|
| 1 | 5 | 12 | 40 |
| 2 | 10 | 11 | 45 |
| 3 | 15 | 11 | 45 |
| 4 | 20 | 11 | 45 |
| 5 | 25 | 10 | 50 |
| 6 | 30 | 10 | 50 |
| 7 | 35 | 11 | 45 |
| 8 | 40 | 10 | 50 |
| 9 | 45 | 10 | 50 |
| 10 | 50 | 10 | 50 |
| 11 | 55 | 10 | 50 |
| 12 | 60 | 9 | 55 |
| 13 | 65 | 10 | 50 |

Graphical Representation:




The efficiency of the coagulant in removing the turbidity of the sample is highest whenthe dosage is equal to 60ml which is the optimum dosage.

**Conclusion:**

In this study, the natural coagulant was used for the treatment of sullage water. The primary reason being it's economical, simple and requires less capital. In this investigation two different solvents such as water and NaCl with different concentration were used as extracting agent. The effect of coagulant dosage and pH were also studied. The results revealed that the tested natural coagulant works better in low turbid water than high due to limitation in coagulation mechanisms like hindered settling and Brownian movement makes natural coagulant unsuitable for high turbid. Low concentration of NaCl (0.5 M NaCl) seems to be suitable for extracting active-component from the natural coagulant thereby maximum removal of turbidity was observed, whereas high concentration of NaCl leads to the salting out effect. The maximum reduction of turbidity was observed at pH 7. Low and high pH condition is not suitable for coagulation, the reason being there is an imbalance of charged ions in the sample making it unsuitable. Thus, the natural tamarind seed can also be used as a coagulant to treat the turbid water.

**Future Work:**

As of now in this particular experiment we have only used tamarind seed powder from the naturally available tamarind seeds as Coagulant here we found up to the efficiency 55%, our future work will be using the mixture of other natural coagulants such as papaya seeds, moringa oleifera etc, to try to get better efficient value.