# MUNICIPAL WASTEWATER TREATMENT USING PLANT EXTRACT BY ADSORPTION TECHNIQUE

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**ABSTRACT**

*Mangalore, one of the fastest growing and developing city in Karnataka. Hence the risk of water contamination increases in many folds. In light of that, the study area selected for investigation is the municipal waste water from Alvas engineering campus. The collected samples of water were analysed for parameters like pH, Nitrates, Chlorides, Sulphate, Carbonates and Bicarbonates, Total dissolved solids, Hardness etc. Seed powders of Moringa oleifera, Neem, Tulsi, and Soybean as natural absorbent and environmentally friendly antimicrobial agent is used for purification of wastewater for various purpose. In present study various doses of Moringa oleifera, Neem, Tulsi, and Soybean seed powder like 2.5, 5, 7.5, 10, 12.5 mg/l were taken and checked for the efficiency dose on raw municipal wastewater.*

*After treatment of water samples with Moringa oleifera, Neem, Tulsi, and Soybean seed powder were analyzed for different parameter like pH, turbidity, TDS, TS, hardness, chlorides, alkalinity, and acidity. Application of this low cost seeds is recommended for eco-friendly, nontoxic, simplified water treatment where rural and peri-urban people living in extreme poverty are presently drinking highly turbid and microbiologically contaminated water.*

**Key words:** *water contamination, municipal wastewater*

## INTRODUCTION

The earth's surface is partially covered with 70% water is referred to as the earth's blood flowing through tributaries as arteries and veins in a human body. Water is a life giving universal solvent

Wastewater can be expressed as the objectionable changes in the chemical and physical properties of water which is harm to those living things.

Adsorption is the adhesion of atoms, ions or molecule from a gas, liquid or dissolved solids to a surface science.

Extracts of Drumstick seeds, Soybean, Neem and Tulsi are used as the natural adsorbents for the removal of different water quality parameters.

The drumstick seeds and soybean will acts as a good adsorbent where as neem will serve as a good disinfectant and tulsi will provide good odour to treated water.

## OBJECTIVES

- The main objective of the study is to check the potentially of low cost natural adsorbents (plant extract) on the removal of different water quality parameters by adsorption technique.
- To characterize the raw municipal wastewater and adsorbent (Moringa oleifera, Soya Beans, Neem and Tulsi extracts) for its physic-chemical properties.
- To conduct study for the removal of water quality parameters using different dosages of adsorbents.
- To determine the effect of various parameters like pH, adsorbent dosage and contact time on adsorption process.
- To conduct experiments to optimize the adsorbent dosage, pH and contact time of identified adsorbents.

## MATERIAL AND METHODS

**Materials:** Study area: - Moodbidri Town. Sampling sites: Hostel wastewater Shobhavan Campus Mijar, Moodbidri**.**

For this project we are used

- Neem leaf powder
- Tulsi leaf powder
- Drumstick (moringa oliefera) seeds powder
- Soybean powder

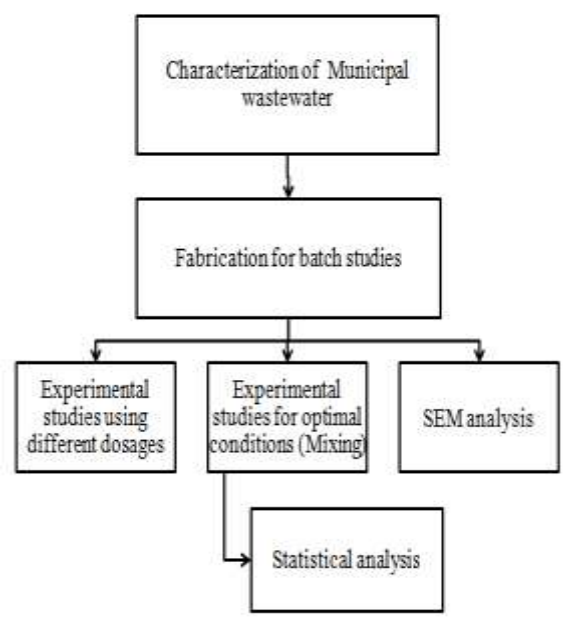


**Fig** : Block Diagram

Jar tests were conducted for waste water samples by adding all plant extracts separatly with different dosage 2.5,5,7.5,10,and 12.5 mg/l.Experiment were conducted to determine All physical and chemical parameters were checked for Neem, Tulsi, Soybean and Drumsticks.

## CONCLUSION

- Plant extracts were found to be useful in treatment of domestic wastewater.
- Quick treatment option is possible with short retention times.
- Moringa oleifera seeds acts as a natural coagulant for the treatment of wastewater. It reduces the Turbidity and COD. it increases chloride content and maintains pH.
- It is Eco-friendly and cheaper method of water treatment. Moringa seeds can be used in the rural areas where no facilities are available for the drinking water treatment. After the treatment the sludge settled at the bottom of tank, can be used as bio-fertilizers is an added advantage of this method in rural areas.
- Tulsi Leaf extract have great potential for the treatment of water. The treatment is simple, cost effective, eco-friendly but due to objectionable colour of treated water it cannot be used for domestic purposes.
- Neem Leaf extract have great potential for the treatment of water. The treatment is simple, cost effective, eco-friendly but due to objectionable colour of treated water it cannot be used for domestic purposes.

## RESULT AND DISCUSSION

Observations were made from analysis and results obtained are presented in the form of tables and graphical system and are shown below.

**Results of waste water Sample**

| SLno | Test | WHO Standards | IS Standards | Sample |
|---|---|---|---|---|
| 1. | pH | 6.5 to 8.5 | 6.5 to 8.5 | 6.1 |
| 2. | Total Hardness (ppm) | 200 | 200 to 600 | 160 |
| 3. | Calcium Hardness (ppm) | 60 to 120 | 75 | 126.67 |
| 4. | Magnesium Hardness (ppm) | 60 to 120 | 30-100 | 33.33 |
| 5. | Total Solids | 300 to 600 | 500 | 184 |
| 6. | Total Dissolved solids (mg/l) | 500 | 500 | 800 |
| 7. | Turbidity (NTU) | 7 | 1 to 5 | 50 |
| 8. | Chlorides (ppm) | 250 | 250 | 40.66 |
| 9. | Nitrate content | 10 | 45 | 0.8 |
| 10. | Sulphate content | 200 | 200 | 450 |
| 11. | chemical oxygen demand(mg/l) | - | - | 180 |

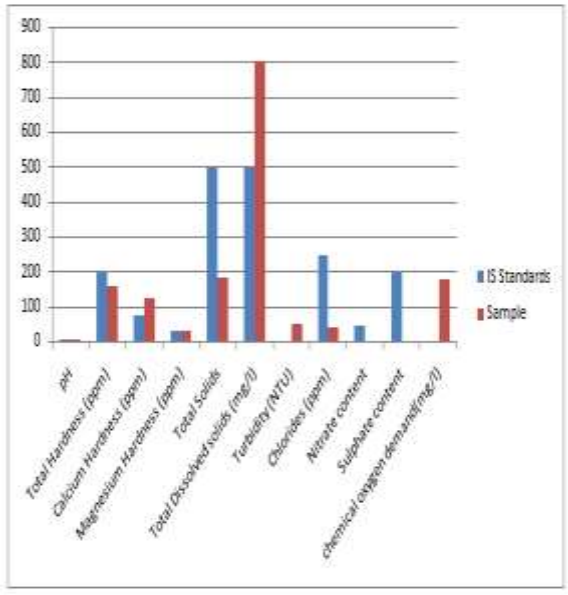


**Fig: -** Comparison of Variation of sample with IS standards

**Results for treated wastewater sample**

| Sl.no | Test | WHO Standards | IS Standards | Sample |
|---|---|---|---|---|
| 1. | pH | 6.5 to 8.5 | 6.5 to 8.5 | 6.99 |
| 2. | Total Hardness (ppm) | 200 | 200 to 600 | 172 |
| 3. | Calcium Hardness (ppm) | 60 to 120 | 75 | 48 |
| 4. | Magnesium Hardness (ppm) | 60 to 120 | 30-100 | 124 |
| 5. | Total Solids | 300 to 600 | 500 | 300 |
| 6. | Total Dissolved solids (mg/l) | 500 | 500 | 600 |
| 7. | Turbidity (NTU) | 7 | 1 to 5 | 33.1 |
| 8. | Chlorides (ppm) | 250 | 250 | 171 |
| 9. | Nitrate content | 10 | 45 | 0.96 |
| 10. | Sulphate content | 200 | 200 | 210 |
| 11. | chemical oxygen demand(mg/l) | - | - | 176 |

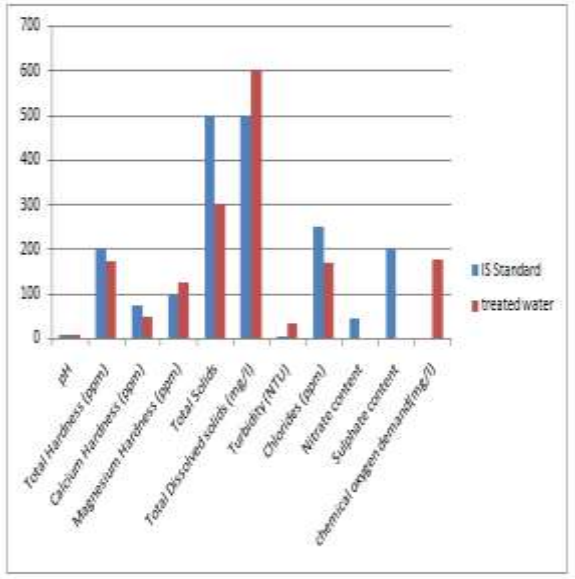


**Fig:** - Comparison of Variation of sample with IS standards

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