

Evaluation of Flower of *Nelumbo Nucifera* As A Natural Coagulant For The Removal of Turbidity From Lakewater

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Abstract- Turbidity is caused by particles suspended or dissolved in water. High turbidity can significantly reduce the aesthetic quality of lakes and streams, having a harmful impact on our lives. Many aluminium salts are used to treat turbidity problem. The use of aluminium based coagulants has raised great concern about the release of aluminium into the effluent. Aluminium is linked with Alzheimer's disease as well as carcinogenic properties. In the context, natural organic coagulants has gained interest because they do not release any dangerous chemicals into water, because of high costs of conventional coagulants, natural coagulants are used in developing countries to treat turbidity problem. In the present research, the flowers of *Nelumbo nucifera* are used as natural coagulant to treat turbidity problem in natural turbid waters of Himayath Sagar and Osman Sagar. The tests were carried out taking the samples of Himayath Sagar and Osman Sagar and adding different doses of flower powder of *Nelumbo nucifera* and measuring the turbidity using the turbidometer. It was observed that the percentage of turbidity reduction increased with the increase in dosage. It was also observed that the water of Osman Sagar was more turbid than that of Himayath Sagar.

Keywords- coagulant, flower powder, *Nelumbo*, turbidity, water.

I. INTRODUCTION

Natural water resources used for portable purposes are characterized by different levels of purity depending on the type of water resources. Previously ground water was considered to be highly portable and quality of water was high. Population explosion, industrialization and economic growth has brought tremendous changes in the quality of surface and ground waters. The turbidity of a ground and surface water has been changing to a great extent due to discharge of industrial effluents into surface water and ground water.

Low turbidity (typically <10 NTU) surface water may be effectively treated by direct filtration where coagulants can be directly added.

When turbidity is highly (>10 NTU) specific steps for coagulation and filtration can significantly improve the turbidity removal. Coagulation process has been historically used in drinking water treatments to remove colloids from surface water in order to decrease the turbidity. Natural water has a lot of impurities varying in size by about six orders of magnitude from a few angstroms to few hundred microns. The coagulation process promotes aggregation of smaller particles into larger aggregates allow an effective separation from the water by subsequent sedimentation and filtration unit. The coagulation process has been primarily used in drinking water treatments to remove turbidity. Turbidity spikes result in the break through of pathogens and it is related to the electrostatic properties of the surface of some microorganisms.

Hyderabad has a glorious tradition of tanks build by rulers. As the twin cities of Hyderabad are build on the rocky terrain the potential for using ground water is limited. As a result, people are dependent on surface water. River Musi is now a open drain. The lakes of Hyderabad has become sewage dumps or they have been occupied. The surface water sources are Himayat Sagar, Osman Sagar, Manjeera barrage and Singur dam. The area covered by surface water is about 400 hectares. The turbidity of water for Osman Sagar-15-100 NTU, 20-1000 for Himayat Sagar, 480-520 for Manjeera Sagar, 480-520 was observed. To bring that factor, it should not exceed by 5-NTU, the study focuses on the removal of turbidity from the lake water by the flower of *Nelumbo Nucifera* which is a natural coagulant.

II. OBJECTIVES

The Objectives of the present study were

1. Analysis of turbidity of surface waters of lakes of Hyderabad to estimate the turbidity levels
2. Screening and evaluation of natural coagulants
3. Selection coagulant for removal of turbidity and studying the coagulation parameters for effect of coagulant dosage and concentration.

III. METHODOLOGY

TURBIDITY REMOVAL BY NATURAL COAGULANTS:

Natural coagulants (lotus flower powder), was grinded and sieved through the sieve, this powder will be washed thoroughly to remove the colour . It was kept under the sun for drying and then it was dried in a microwave oven for few minutes. This dried powder was added to the turbid waters of Himayath Sagar and Osman Sagar in different concentrations. Coagulation experiments were carried out . The effect of concentration of coagulant on turbidity removal was checked using a turbidity meter.



ITURBIDITY METER

IV. RESULT

Table 1 Turbidity reduction-Efficiency in different doses of coagulant in Sample I (Himayath Sagar)

• Coagulant	• Dose used mg/l ^t	• % of turbidity reduction
• Flowers of Nelumbo nucifera	• 50	• 27.7
	• 60	• 35.0
	• 70	• 48.2
	• 80	• 54.0
	• 90	• 72.8
	• 100	• 81.2

Table 2 Turbidity reduction-Efficiency in different doses of coagulant in Sample II (Osman Sagar)

• Coagulant	• Dose used mg/l ^t	• % of turbidity reduction
• Flowers of <i>Nelumbo nucifera</i>	• 50	• 18.4
	• 60	• 25.0
	• 70	• 32.4
	• 80	• 40.0
	• 90	• 49.2
	• 100	• 58.3

V. DISCUSSION

Water from all sources have some form of purification before consumption. Commonly used chemicals for various treatment processes are synthetic,organic and inorganic substances.In most of thr cases,they sre expensive as they require higher dose.

The history of use of natural coagulant is vast.Natural organic polymers have been used for more than 2000 years in India.These natural organic polymers are interestin because, compared to the use of synthetic polymers there is no risk of health danger and the cost of these coagulants would be less expensive.



The experiment focused on turbidity reduction efficiency using different doses of coagulant i.e. flower powder of *Nelumbo nucifera*. The percentage of turbidity was found to be reduced. In each case, various doses i.e. from 50-100 mg/l were used. The percentage of turbidity in Sample I (Himayath Sagar) was found to be less when compared to Sample II (Osman Sagar).

VI. CONCLUSION

Therefore the use of locally available coagulant like flower powder of *Nelumbo nucifera* (lotus) provides a better option for clean and safe water.

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