

# Water Treatment using mixture of natural and chemical coagulant.

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*Abstract* : The cost of water treatment is increasing and the quality of river water is not stable due to suspended and colloidal particle load caused by land development and high storm runoff during the rainy seasons. Increase in rainfall results in increase in turbidity of water, increasing the cost of treatment which the water treatment companies cannot sustain. As a result, the provided water improperly treated. Thus the urge to find an natural alternative for treatment increases.

*IndexTerms* – Moringa Oleifera, Alum, Natural Coagulants, Alum.

## I. INTRODUCTION.

Among all living creatures especially humans water supply is an essential need. Various economically poor are facing potable water supply problems because of inadequate financial resources. At present around 1.2 billion people lack safe drinking water and more than 6 million children die from diarrhea in developing countries every year. Drinking water treatment involves various number of combined processes based on the water source such as turbidity, amount of salt present in water and the others include cost, machinery and availability of chemicals to undergo required level of treatment. Therefore, it is of great importance to find an effective alternative for water treatment.

## II. LITERATURE SURVEY.

Research examined to find out the optimum combination for MO, gram seed powder and alum using alum as a coagulant aid in household treatment of natural pond surface water for domestic use. The physico-chemical properties investigated for in the raw, settled and filtered water were Ph, Total Dissolved Solids (TDS), turbidity, color and total suspended solids (TSS). Combinations selected for undergoing water treatment of sample taking from dam include MO seed powder only (i.e., 100% MO), aluminum sulphate (alum) only (i.e., 100% alum), gram seed powder (i.e., 100% Gram seed powder) 20% alum, 30% gram seed powder and 50% Moringa oleifera seed powder, 40% alum, 30% gram seed powder and 30% Moringa oleifera seed powder, 50% alum, 25% gram seed powder and 25% Moringa oleifera seed powder; 60% alum, 20% gram seed powder and 20% Moringa oleifera seed powder; and 80% alum, 10% gram seed powder and 10% Moringa oleifera seed powder. From the seven combinations tried 5 gave acceptable turbidity reduction. Moringa oleifera seed powder when used as the coagulant, a filter was expected to obtain an acceptable turbidity value of 7.8 NTU. Moringa oleifera seed powder is useful in treating household drinking water or as a sole coagulant or else in combination with alum and gram seed powder as a coagulant aid. The settling time for the MO seed powder is longer than that of the combined coagulants if the same results are to be obtained. The suggested ratio for the combination of coagulant dose is 45% MO seed powder, 15% gram seed powder and 40% alum.

The jar test operations using different coagulants were carried out in different turbidity ranges namely higher- (90–120) NTU, medium- (40–50) NTU, and lower- (25–35) NTU of synthetic turbid water. The efficiency of the extracts

of *Moringa oleifera* and *Gram seed powder* made them used as natural coagulants for the clarification of water. The range of doses vary from 50 mg/L to 100 mg/L for present six beakers.

Turbidity was measured before and after treatment. It is considered that the raw water turbidity was 100 NTU.

*Moringa oleifera* is effective in higher-turbidity water than lower and medium-turbidity water. Turbidity reduction increases with increasing doses.

### III. OBJECTIVES.

1. To study the effect of natural coagulant and chemical coagulant on surface water.
2. To evaluate pH of water taken for the treatment.
3. To compare effectiveness between natural and chemical coagulants in terms of pH dependence on dosage of chemicals added.
4. To evaluate optimum alum dosage for required result by Jar Test.

### IV. ADVANTAGES.

It readily dissolves in water.

It does not cause the unsightly reddish brown staining on floors, walls and structures like ferric sulphates.

### V. FUTURE SCOPE.

1. Alum is effective only at certain pH range which is to be improved by using natural coagulant with chemical coagulant.
2. Alum can be costly as they are needed in a large amount for water treatment and it associated with human health and can affect the environment.
3. Preparation of natural coagulant is tedious and time consuming. Hence by mixing chemical and natural coagulant it will reduce up to in large extent.
4. Due to the low price, availability and abundance of natural coagulants many researchers believe in bright future of natural coagulants.
5. The most efficient mix proportion for low turbid and medium turbid water in various seasons can be find out in future.

### VI. Conclusion.

From the analysis of results obtained it is observed that the mixture of natural coagulants, i.e. powder of MO seed and gram seed powder with the chemical coagulant, i.e. alum is very productive. Cost of treatment of water can be reduced by using mixture of natural and chemical coagulant. Use of alum can be reduced in large extent by adding MO and gram seed powder. The diseases caused by use of alum are prevented simultaneously. 0.5: 0.5: 1 is the most effective proportion of Alum, Gram seed powder and MO for the low turbid, medium turbid and high turbid water. Mixture of MO powder and gram seed powder also affects on pH of water and turns it to the range of potable water, i.e. 6 to 7.5. It is also observed that these natural coagulants attracts flocks and helps in reducing flocks setting time of turbid water. In small scale water treatment or household water treatment use of natural coagulant is more efficient than chemical coagulant. This is the most suitable method to treat water in regions where MO is available in large extent such as South Asian region.

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