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Coagulant potentials of *Moringa oleifera* seeds in water purification

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ABSTRACT

The main objective of this study is to confirm the potentials of *Moringa oleifera* seeds over alum for water purification. Various doses of *Moringa* seed powder 4, 8, 12 g/l were taken and checked for treatment of river and sewage water. After treatment of seed powder with water samples were analyzed for physico-chemical parameters like pH, Absorbance, TDS, TSS, Hardness, Chlorides, Conductivity, Turbidity, MPN and DO. Almost all parameters showed reduction with increasing dosage of *Moringa* seed powder. Similar doses of alum were checked with river water sample and were analyzed for above mentioned parameters. The results obtained showed that seed powder (natural coagulant) is more effective than conventional chemical coagulant., alum. The seed of *Moringa oleifera* is cheap, eco-friendly and non-toxic, can be effectively used as a coagulant for river and sewage water purification.

Figures : 03 References : 10 Tables : 03
KEY WORDS : Coagulant potentials, *Moringa oleifera*, Purification

Introduction

Potable water is one of the basic needs of all living organisms including humans. About 71% of the Earth's surface is water-covered. Out of this, only 2 ppm (0.0002%) of water is found in rivers across the world. Waste water is also generated from the river water which contains bodily wastes (faeces and urine), washing water, laundry wastes, *etc.* It is mainly termed as sewage water. Pollution of river water can lead to various water borne diseases like diarrhea, amoebiasis, typhoid, *etc.* Safe drinking water is essential to the health and welfare of a community and so water should be purified before consumption[4].

Various water treatment methods are used at small scale level like coagulation-flocculation, sedimentation, filtration and disinfection, often by chlorine, before distribution of treated water to consumers[9]. Nowadays aqua-technology containing RO water purifiers is widely used for water purification. But this technique is quite expensive for the common consumers.

The study is primarily focusing on *Moringa oleifera* seeds as a natural polyelectrolyte which can be used as a coagulant to clarify turbid river and sewage waters. *M. oleifera* is among the 14 species of trees that belong to the family Moringaceae[5]. The conventional method of using high levels of chemical coagulant alum (aluminium sulphate) is a risk factor for Alzheimer's disease[3]. The use of *M. oleifera* seeds has an advantage over the chemical treatment methods as it is herbal and less expensive.

This work was carried out to study the coagulant potentials of *M. oleifera* powder extracted from mature and dried *Moringa oleifera* seeds against the alum available from the market.

Materials and Methodology

Coagulants used

Dry *Moringa oleifera* (drumstick) seeds used in this study were collected from local fields of Karad town, Maharashtra. The shells covering the seeds were removed and fine powder was prepared using mortar and pestle. This dried powder was kept in hot air oven at 40^0C for one hour and was directly used as a natural coagulant. The aluminium sulphate (alum) crystal powder used in this study was obtained from local grocery store in Karad, Maharashtra.

Sample Collection

Ten liters of river water samples were collected from Krishna River, Karad and five liters of sewage water samples were collected from Krishna Canal, Karad. The water samples were collected in containers which were cleaned priorly by detergent to avoid impurities.

The untreated river and sewage water samples were immediately used for the study and before treatment various parameters were analyzed. These physico-chemical parameters include pH, Absorbance, Total Dissolved Solids (TDS), Hardness (total and permanent), Total Suspended Solids (TSS), Chlorides, Conductivity, Turbidity, Most Probable Number (MPN) and Dissolved Oxygen (DO). Before treatment characteristics of the