



Effectiveness of *Moringa oleifera* as natural coagulant aid for waste water treatment of dairy industry

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SUMMARY : *Moringa oleifera* (MO) is a multipurpose, medium or small-sized tree, from regions of north west India and indigenous to many parts of Asia, Africa, and South America. Its pods have been employed as an inexpensive and effective sorbent for the removal of organics, and coagulant for water treatment. It is a non-toxic natural organic polymer. The main objective of this work was to use the MO seeds as a natural adsorbent for the treatment of dairy industry wastewater (DIW). Seeds of the plant species *Moringa oleifera* contain natural polyelectrolyte which can be used as coagulants to clarify turbid waters. The best removal was observed at pH 7.0-9.0 for all turbidities. Turbidity removal efficiency was resulted between 75.29 per cent to 85.88 per cent, BOD removal 60.17 per cent and COD removal 40.15 per cent by *Moringa oleifera* coagulant protein as coagulant aid. At 9.0 pH TDS reduction was 16.17 per cent with dose of 100 mg/l of *Moringa oleifera* seed. The antimicrobial effect of the coagulant showed that a reduction in the microbial load was 94.05 per cent. It is concluded that the MO seeds have the potential to be used in the dairy industry waste water treatment in an efficient way and with low cost.

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any coagulants are widely used in conventional water treatment processes, based on their chemical characteristics. These coagulants are classified into inorganic, synthetic organic polymers and natural coagulants. The two most commonly used primary coagulants are aluminum and iron salts (Okuda et al., 1999). In recent years, there has been considerable interest in the development of natural coagulants such as Moringa oleifera (MO) and Chitosan. By using natural coagulants, considerable savings in chemicals and sludge handling cost may be achieved (Diaz et al., 1999) MO is among the 14 species of trees that belong to the family Moringaceae (Folkard et al., 1999). MO seed kernels are biological coagulant consisting of significant quantities of low molecular weight water-soluble proteins, which in solution carry an overall positive charge. MO coagulant is safe and very effective in removing impurities.

Turbidity and colour removal is one of the important steps in a water treatment process, which is generally achieved using coagulants. Wastewater treatment methods include precipitation, coagulation/flotation, sedimentation, filtration, membrane process, electrochemical techniques, ion exchange, biological process, and chemical reactions. Each method has its own merits and limitations in applications because of their cost. Presently, there is an increasing trend to evaluate some indigenous cheaper materials for the removal of these pollutants and pesticides from aqueous solutions. A large number of cheaper materials including industrial and agricultural wastes have been used to remove different pollutants from the industrial effluents for their safe disposal into the biosphere (Akhtar et al., 2009). The major concern in the use of seed extracts for water treatment applications is the