

Effectiveness of salt-extracted freeze-dried *Moringa oleifera* as a coagulant

ABSTRACT

The effectiveness of freeze-dried *Moringa oleifera* (MO) seeds powder in the coagulation of synthetic wastewater was studied. Three modes of extraction were introduced, namely distilled water-extracted freeze-dried *M. oleifera* (FD-DW MO), salt-extracted freeze-dried *M. oleifera* (FD-KCl MO), and distilled water-extracted freeze-dried *M. oleifera* with salt addition (FD-DW MO + KCl). Jar test was used to evaluate the effectiveness of the extracted freeze-dried powder, in the coagulation of a synthetic municipal wastewater. The results show that FD-DW MO at an optimal dosage of 132 mg/l, increases the turbidity removal efficiency to nearly 93% as compared to distilled water-extracted MO which gave 76% removal at an optimal dosage of 300 mg/l. However, the comparison of FD-KCl MO with non-FD-KCl MO show that the freeze-drying neither improves the efficiency of salt-extracted *M. oleifera* nor the optimal dosage. On the other hand, adding KCl to the FD-DW MO in treating high turbidity synthetic wastewater at 200 ± 5 NTU improved the optimal dosage from 40 mg/l (without adding KCl) to 10 mg/l corresponding to 91% removal efficiency. As a conclusion, the freeze-drying process did not improve the coagulation efficiency with salt-extracted MO using KCL. But using the salt (KCL) solution for dilution of FD-DW MO causes the optimal dosage to decrease from 40 mg/l (using distilled water for dilution) to 10 mg/l. This is associated with a slight decrease in the efficiency from 92.73 to 91.32%.

Keyword: *Moringa oleifera*; Extraction; Freeze-drying; Coagulation; Turbidity