THE SURVEY OF HEAVY METAL REMOVAL BY USING MORINGA OLEIFERA COAGULANT PROTEIN (MOCP) AS A NATURAL COAGULANT FROM AQUEOUS SOLUTIONS

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Abstract
Presence of aluminum residues in treated water has various health and environmental consequences such as neurotoxicity and possibly Alzheimer's disease. This study investigated the effects of coagulation/flocculation/sedimentation processes using alum as a coagulant in conjunction with *Moringa Oleifera* coagulant protein (MOCP) as coagulant aid on alkalinity and hardness as well as removal of metal ions and turbidity from turbid water. In this study, MOCP purified from the crude extracts by ion exchange (IEX) column chromatography and bath adsorption. IEX chromatography carried out in a 1 mL HiTrap CM sepharose fast flow cation exchange column on an akta explorer. A conventional jar test performed for the tests. Optimal dosage for MOCP was determined at pH of 7–7.5 for all turbidities. Maximum turbidity removal of 99% achieved. MOCP significantly reduced the required dosage of alum. The values of TOC in treated water in low, medium and high turbidity were 0.55, 0.5 and 0.65 mg L–1, respectively. The efficiency of metal ion removal in the present study was as follows: $Fe^{+2} > Cu^{+2} > Zn^{+2} > Mn^{+2}$. We demonstrated that this method is an efficient approach for optimization of the coagulation-flocculation process in the treatment of raw water.

Keywords: Coagulant, Metals removal, *Moringa Oleifera* coagulant protein (MOCP), Water treatment