University of Baghdad	
Department	Environmental Engineering
Full Name	Samer JaLiL Ibrahim
Thesis Title	Use of non- conventional material to remove Cu+2 ions from aqueous solutions using chemical coagulation
Year	2014
Abstract	Coagulation - flocculation are basic chemical engineering method in the treatment of metal-bearing industrial wastewater because it removes colloidal particles, some soluble compounds and very fine solid suspensions initially present in the wastewater by destabilization and formation of flocs. This initiated a global interest in the search for suitable coagulants that will be safe from the stand point of health and economy. This research was conducted to study the feasibility of using natural coagulant such as okra and mallow and chemical coagulant such as alum for removing Cu and increase the removal efficiency and reduce the turbidity of treated water.Fourier transform Infrared (FTIR) was carried out for okra and mallow before and after coagulant to determine their type of functional groups. Carbonyl and hydroxyl functional groups on the surface of okra and mallow were the major groups responsible for coagulation process. By using alum (conventional coagulants), okra and mallow (as a primary coagulant or in combination with the other two primary coagulants) and by the jar testing, the optimum pH-value and dose of the coagulants were determined. The results indicated that the optimal pH values were 6.7, 8 and 6 for alum, okra and mallow, respectively when used as primary coagulants. In addition, the optimum dose of alum was 1400 mg/L with (50.85%) removal of Cu. The optimum dose of okra was 500 mg/L in which a removal of (52.34 %) Cu was achieved. For mallow, the optimum dose was 500 mg/Land a (58.93%) of Cu removal. The turbidity and conductivity showed a decreasing behavior as the dose was increased for the different coagulant combination experiments at their optimal pH. Mathematical modeling show significant results (sig.<0.05) for the % Cu removal (dependent variable) with respect to coagulant dose (independent variable) for the okra as a primary coagulant, alum with okra and alum with mallow as binary coagulants and alum, okra and mallow as ternary coagulants . Also gives significant results (sig.<0.05) for the % residual turbidity (dependent variable) with respect to coagulant dose (independent variable) for the alum , okra and mallow as a primary coagulants, alum with mallow as binary coagulants and alum, okra and mallow as ternary

	coagulants .