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INFLUENCE OF OPERATING FACTORS ON TURBIDITY REMOVAL OF WATER SURFACE BY NATURAL COAGULANT INDIGENOUS TO TUNISIA USING EXPERIMENTAL DESIGN

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A systematic study of the influence of operating conditions on clarification process efficiency using Tunisian cactus cladodes powder (Opuntia ficus indica) was performed. A model of turbid water, using fibrous clay such as palygorskite, ranging from 50 to 500 NTU was investigated. The turbidity removal ability was assessed by the use of standard jar test measurements. A screening experimental design $3^{7}//16$ was implemented to screen 7 experimental input factors at 3 levels each in 16 experimental runs. Initial turbidity, pH, particle size and mass of sorbent-coagulant added, as well as the type of cactus treatment, the stirring speed and the settling time on turbidity removal were tested. With Starks screening matrix, this work demonstrated that turbidity removal is affected by 5 input factors: initial turbidity, settling time, powder size, slow stirring and pH. Cladode powder acts positively on the turbidity removal.

Keywords: experimental design, jar test, natural sorbent-coagulant, *Opuntia ficus indica*, turbidity removal.

1. Introduction

According to WHO recommendations [1] access to safe drinking water is essential to health, and a component of effective policy for health protection that prevents from waterborne diseases. Accordingly, quality water resources access is a fundamental right that must be honored by countries. Unfortunately developing countries face difficulties to centralize water treatment hampered by high fixed costs and are unable to provide an improved water access supply to rural communities. Therefore, in the recent years has emerged a considerable interest for the development of natural based coagulants.

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