

Experimental optimization of *Moringa oleifera* seed powder as bio-coagulants in water treatment process

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ABSTRACT

The *Moringa oleifera* is an important commodity plant which has been traditionally used for the treatment of water in tropical area of the world. This study therefore investigated the use of *M. oleifera* seeds powder as bio-coagulant for water treatment. The effects of parameters such as dosage, high speed time, high speed, low speed and low speed time on the residual turbidity were evaluated using the response surface methodology. The results obtained from the preliminary studies conducted, provided three independent factors, viz low speed (40–80 rpm), low speed time (20–60 min) and dosage (0.25–1.25 mg/L) which were optimized using the optimal water turbidity. However, the high speed and the high speed time were fixed at 100 rpm and 6 min, respectively. The results obtained from experimental design placed the optimum condition at low speed, low speed time and dosage as 40 rpm, 60 min and 0.75 mg/L, respectively. Under this condition, the predicted (theoretical) residual turbidity was 4.73 NTU. The result of the ANOVA for the optimization of the residual turbidity showed that the quadratic model was significant at 95% confidence level ($p < 0.05$). Moreover, the low speed time (B) and dosage (C) were both significant, whereas the low speeds (A) were not significant factors in the optimization of residual turbidity. Finally, the result obtained therefore showed the potential of *M. oleifera* residue as natural coagulants in the effective treatment of water for drinking purpose. The lower turbidity (< 5 NTU) achieved from this study confirmed the potential of this important eco-friendly natural product for the treatment of water.

KEYWORDS

Bio-coagulant; Turbidity; *Moringa oleifera* residue; Water treatment

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