

## Evaluation of Coagulation Efficiency of Protein Extracts from *Lupinus Albus* L., *Moringa Stenopetala* Cufod., *Trigonella Foenum-Graecum* L. And *Vicia Faba* L. For Water Purification

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**Abstract :** Access to clean drinking water is a basic human right. However, an estimated 1.2 billion people across the world consume unclean water daily. Interest has been growing in natural coagulants as the health and environmental concerns of conventional chemical coagulants are rising. Natural coagulants have the potential to serve as alternative water treatment agents. In this study, *Lupinus albus*, *Moringa stenopetala*, *Trigonella foenum-graecum* and *Vicia faba* protein extracts were evaluated as natural coagulants for water treatment. The protein extracts were purified from crude extracts using a protein purifier, and protein concentrations were determined by the spectrophotometric method. Small-volume coagulation efficiency tests were conducted on raw water taken from the Legedadi water treatment plant. These were done using a completely randomized design (CRD) experiment with settling times of 0 min (initial time), 90 min, 180 min and 270 min and protein extract doses of 5 mg/L, 10 mg/L, 15 mg/L and 20 mg/L. Raw water as negative control and polyelectrolyte as positive control were also included. The optical density (OD) values were measured for all the samples. At 270 min and 20 mg/L, the coagulation efficiency percentages for *Lupinus albus*, *Moringa stenopetala*, *Trigonella foenum-graecum* and *Vicia faba* protein extracts were 71%, 89%, 12% and 67% in the water sample collected in April 2019 respectively. Similarly, *Lupinus albus*, *Moringa stenopetala* and *Vicia faba* achieved 17%, 92% and 12% at 270 min settling times and 5 mg/L, 20 mg/L and 10 mg/L concentration in the water sample collected from August 2019, respectively. Negative control (raw water) and polyelectrolyte (positive control) were also 6 – 10% and 89 – 94% at 270 min settling time in April and August 2019, respectively. Among the four protein extracts, *Moringa stenopetala* showed the highest coagulation efficiency, similar to polyelectrolyte. This study concluded that *Moringa stenopetala* protein extract could be used as a natural coagulant for water purification in both sampling times.

**Keywords :** coagulation efficiency, extraction, natural coagulant, protein extract

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