

Effective use of tannin based natural biopolymer, AFlok-BP1 to harvest marine microalgae *Nannochloropsis* sp.

ABSTRACT

Harvesting, a challenging step of microalgae processing appears to be promising using flocculation method by the addition of tannin based natural biopolymer, AFlok-BP1. In this study, marine microalgae *Nannochloropsis* sp. was flocculated using AFlok-BP1 to evaluate its effectiveness in terms of flocculation efficiency, pH and dosages used, zeta potential, floc morphology characterization with comparison to the uses of aluminium sulphate and alkaline-induced pH. Oleaginous marine microalgae *Nannochloropsis* sp. was found to work effectively using AFlok-BP1 at an acidic pH 5 with more than 90% efficiency obtained at 160 mg/L. The finding was further supported with great instability of microalgae surface charge of -0.33 ± 0.27 mV, hence maximum destabilization of microalgae was believed to occur. The use of alum also effective to harvest *Nannochloropsis* sp. at neutral pH 7 with comparable efficiency as AFlok-BP1, but high dosage needed for more than 300 mg/L was at major concerns. Similarly, improved efficiency was observed for alkaline-induced pH for almost 100% efficiency. This would provide a better alternative for marine microalgae flocculation however, high concentration of minerals in the harvested biomass due to pH increase in need of further evaluation. To summarize, AFlok-BP1 would be a viable option to harvest marine microalgae *Nannochloropsis* sp. for the production of valuable compounds as it is an environmental friendly flocculant and provide no potential toxicity to the harvested biomass.

Keyword: Microalgae; Bioflocculant; Alum; Autoflocculation; Dewatering