Harvesting of the microalga nannochloropsis sp. by bioflocculation with mung bean protein extract

Abstract

Harvesting microalgae from medium is a major challenge due to their small size and low concentrations. In an attempt to find a cost-effective and eco-friendly harvesting technique, mung bean (Vigna radiata) protein extract (MBPE) was used for flocculation of Nannochloropsis sp. The effects of parameters such as pH, flocculant dose, algae concentration, and mixing time were used to study the flocculation efficiency (FE) of MBPE. Optimum parameters of MBPE dosage of 20 mL L−1 and a mixing rate of 300 rpm for 6 min achieved a FE of >92% after 2 h of settling time. MBPE-aggregated microlga flocs were characterized by microscopy. Zeta potential values decreased with increasing flocculant dose, and the values obtained were −6.93 ± 0.60, −5.36 ± 0.64, and −4.44 ± 0.22 for doses of 10, 20, and 30 mL L−1, respectively. In conclusion, MBPE flocculants used in this study are safe, nontoxic, and pollution free, so they could be used for an effective, convenient, and rapid harvesting of microalgae in an eco-friendly approach. These methods are sustainable and could be applied in industrial scale for aquaculture nutrition.