

## Applicability of Brown Seaweed Species (*Sargassum crassifolium*) for Treating Lobster Farm Wastewater

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Wastewater generation in aquaculture farms, including all lobster culture practices is a serious issue in the industry. The present study was carried out at lobster farm located at Northern Province in Sri Lanka. Approximately 756,000 L of wastewater is generated on this farm annually and discharges wastewater without proper treatment to the natural environment. The wastewater discharged from lobster farm consists of organic and inorganic chemical components that can be caused potential environmental problems. Present study focused to investigate applicability of Brown seaweed *Sargassum crassifolium* biomass to efficient removal of nutrients (nitrogen and phosphorous) from the lobster farm wastewater. The *Sargassum crassifolium* is an abundant species in Northern Province, Sri Lanka. Seaweed biomass optimization was performed using three different seaweed biomasses, viz 20 g, 30 g and 40 g and 20 g (1 g L<sup>-1</sup>) identified as the efficient seaweed biomass. Wastewater initial physicochemical parameters pH (7.9 ± 0.02), Temperature (29 ± 0.04 °C), Salinity (36 ± 0.03 ppt), Dissolved Oxygen (3.58 ± 0.02 mg L<sup>-1</sup>), Biological Oxygen Demand (115 ± 0.05 mg L<sup>-1</sup>), Ammonia (1.37 ± 0.01 mg L<sup>-1</sup>), Nitrite (0.143 ± 0.00 mg L<sup>-1</sup>), Nitrate (0.243 ± 0.01 mg L<sup>-1</sup>) and Phosphate (4.760 ± 0.02 mg L<sup>-1</sup>) were analyzed using the standard methods. Then wastewaters were collected from the farm and transferred to six glass tanks of 50 L capacity each. The seaweed was used at 1 g L<sup>-1</sup> density in each tank except in the control tank. Complete randomized design was used to the experiment. Three replicates were used. Ammonia, Nitrite, Nitrate and Phosphate were analyzed once in three days from beginning to the end of the treatment period (28 days) to investigate the initial wastewater qualities and quality changes after Phycoremediation. After phycoremediation physicochemical parameters pH (7.4 ± 0.06), Temperature (29 ± 0.03 °C), Salinity (36 ± 0.05 ppt), Dissolved Oxygen (5.74 ± 0.04 mg L<sup>-1</sup>), Biological Oxygen Demand (95 ± 0.03 mg L<sup>-1</sup>) were analyzed in wastewater. *Sargassum crassifolium* removed 1.19 ± 0.34 mg L<sup>-1</sup> of Ammonia, 0.12 ± 0.03 mg L<sup>-1</sup> of Nitrite, 0.14 ± 0.04 mg L<sup>-1</sup> of Nitrate and 2.40 ± 0.72 mg L<sup>-1</sup> of Phosphate. Nutrient removal amounts were significantly differed (P<0.05) between control and treatment tank. The weight gains *Sargassum crassifolium* during the study period was of 8.7 g thus, the seaweed has been utilized the nutrients present in the discharged waste waters. The results of the study concluded that the nitrogen and phosphorus in the lobster farm waste waters, can be effectively removed through *Sargassum crassifolium*.

**Keywords:** Lobster, *Sargassum crassifolium*, Seaweed, Phycoremediation