

Enhancing Siamese Fighting Fish Performance through PSB-Enriched *Moina* sp.: Effects on Growth, Coloration, and Water Quality

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Abstract

This study investigated the effect of photosynthetic bacteria (PSB)-enriched *Moina* sp. on the growth performance, coloration, water quality, and environmental management of Siamese fighting fish (*Betta splendens*). *Moina* sp. was added into a PSB solution (5.0×10^4 cfu/mL) and subjected to exposure for 60 min, and then fed to the control and treatment fish. Ten red and bluefish (size 2–2.5 cm) were previously used and stocked unpaired into a 22 oz PET holder and fed once daily for eight weeks. PSB-fed *Moina* sp. had a higher carotenoid content of 3.38 ± 0.48 mg/g versus control *Moina* sp. with 2.54 ± 0.22 mg/g. Crude protein rose slightly from 65.99 ± 3.02 % to 65.98 ± 3.94 % and crude fat from 3.67 ± 1.34 % to 3.47 ± 1.41 %. The survival rates in red and blue fish fed enriched *Moina* sp. were 100 % in the red group of fish fed the control diet and 60 % in the red group of fish fed enriched *Moina* sp. In blue fish, red coloration was enhanced by 64% and green coloration by 34%; in redfish, both red and green coloration increased by approximately 34%. However, the control fish displayed 94 % red and 30 % blue coloration. There were no significant differences in some growth performance indices: weight gain (0.41 ± 0.23 g in red and 0.41 ± 0.22 g in blue) and specific growth rate (0.65 ± 0.26 %/day for blue and 0.68 ± 0.34 %/day for red). All water quality parameters were at optimum levels for the fish: pH 7.0–8.3. By decreasing nitrogenous waste in water due to PSB organic substrate usage and its effects on the food chain, environmental quality is influenced by PSB. This study shows that *Moina* sp. feeds containing PSB as an ornamental fish feed positively affect survival, coloration and density control, thus aiding in better environmental management in aquaculture facilities. This study highlights the viability of this strategy for increasing the sustainability and ecological integrity of fish farming.

Keywords: Photosynthetic bacteria, *Moina* sp., Siamese fighting fish, Carotenoids, Sustainable aquaculture, Environmental quality management