

Comparison of Periphyton Grown on Different Substrates as Food for Organic Tilapia Culture

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Abstract

Regulations regarding organic tilapia culture result in increased feed costs. To reduce such costs, experiments were conducted to enhance the natural production of periphyton, on which tilapia feed. Strips of substrates of different textures and colors were placed in the water column of tilapia culture ponds to induce periphyton growth. Some strips were placed in cages to protect them from fish grazing and some were placed in the open pond, accessible to the fish. Periphyton development was evaluated by the contents of chlorophyll, dry matter (DM), and ash free dry matter (organic matter) and by an autotrophic index. The first experiment tested growth on substrates of different textures including natural (palm leaves) and artificial (agricultural nets, plastic surfaces) materials. The second experiment tested the effect of different colored nets. The differences between periphyton grown in cages and in the open pond indicate that tilapia grazed on the periphyton. Palm leaves decomposed too quickly to be of practical use in large-scale aquaculture. Periphytic material seemed to be more easily dislodged from smooth plastic substrates than from rough nets, changing the structure of the residual attached periphyton. Growth was greater on nets with a fine mesh (5.3-9.6 mg/cm² DM) than with a coarse mesh (3.7-4.0 mg/cm² DM) or on smooth plastic surfaces (1.4-2.6 mg/cm² DM). The color of the substrate did not affect the chlorophyll content of periphyton but did affect its dry and organic matter content. The white substrate had 40% more dry matter (11.5 vs 7.9-8.2 mg/cm²) and 50% more ash free dry matter (2.1 vs 1.4 mg/cm²) than the blue and black substrates.

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