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RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

Title: Effects of addition of maize starch on the yield, water quality and formation of bioflocs in an integrated shrimp culture system

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Integrated Multi-Trophic Aquaculture (IMTA) is an ecological and economic farming strategy that minimizes waste from culture systems, reduces the risk of diseases and provides additional income source. A trial was conducted to evaluate the effects of adding maize starch on the yield, water quality, formation of bioflocs and economic return in an IMTA system comprising white shrimp (*Litopenaeus vannamei*), spotted scat (*Scatophagus argus*) and water spinach (*Ipomoea aquatica*). Shrimp were randomly assigned to 12 cemented tanks (T1, T2, T3 and T4 with three replicates) and reared in monoculture (T1) without the addition of starch, or in polyculture (with spotted scat and water spinach) with (T3 and T4) or without (T2) the addition of starch. Shrimp in T4 were fed at 80% of the feeding amount of other treatments. The results showed that shrimp survival was higher in T3 and T4 (95.6% and 94.3%, respectively) than in T1 and T2 (51.1% and 56.5%, respectively) ($P < 0.01$). The shrimp yield was the highest in T3 (0.495 kgm⁻³), which also had the lowest feed conversion ratio (1.02) and best economic performance. The levels of nitrite-N (NO₂-N) were significantly lower in T3 and T4 at the end of the experiment than in other treatments ($P < 0.01$). Similarly, total ammonia nitrogen (TAN) was lower and total suspended solids (TSS) was higher in T3 and T4 than in T1 and T2 ($P < 0.05$). The results suggested that the addition of starch into the IMTA system of shrimp, spotted scat and water spinach improved productivity, profitability

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and water quality. The combination of the IMTA model and biofloc technology had a synergistic effect on overall FCR and economic return, and was more effective at improving shrimp survival, production and reducing nitrite-N and TAN than use of the IMTA model alone.

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