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RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

Title: Partial Substitution of Balanced Feed by Chaya Leaves in Nile Tilapia Production: A Bio-economic Analysis

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Abstract: Tilapia culture in Yucatan State, Mexico, is largely semi-intensive. The producers are mostly poor farmers who receive government subsidies for purchase of fingerlings and balanced feed. Feeding practices are often inadequate (satiety rations), moreover, producers frequently suffer financial and resource shortfalls. During feed shortages producers are known to use empirical application of chaya (*Cnidoscolus chayamansa*) leaves, used traditionally in human and animal nutrition. A study was done of growth in juvenile tilapia using diets containing balanced feed with chaya (25 and 50% of substitution), complete, half-complete and satiety rations of balanced feed, during the warm season. The results were used to develop a bio-economic model and implemented in MS Excel program, with a one-day time step. In order to minimize the cost of tilapia feeding, and maximize the benefits by using a limited amount of balanced feed per cycle. In addition the analysis was completed using the Marginal Rate of Technical Substitution (*MRTS*). According to results from *MRTS*, it is necessary to add 2.51-3.91 units of chaya for each reduced unit of balanced feed, to maintain the same level of production. In a resource limited situation, substitution of 50% of balanced feed for raw chaya leaves generates a harvest size greater than complete and satiety rations of 24.8 and 28.8% respectively. When considering sale prices that are consistent with size at harvest and costs, treatments with chaya considerably maximized profits.

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