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RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

Title: Management to Minimize the Environmental Impacts of Pond Effluent: Harvest Draining Techniques and Effluent Quality

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Abstract: An experiment was conducted to evaluate the amount of wastes discharged from fish ponds during harvest and to assess pond draining schemes and harvest techniques that may reduce waste loading in effluent water. Nile tilapia (*Oreochromis niloticus*) were cultured for 113–119 days in twelve 200 m² ponds with fertilization and supplementary pelleted feed. There were four treatments with three replicates each: (A) ponds were treated with teaseed cake at a rate of 10 ppm to partially anaesthetize tilapia 1.5 h prior to harvest by three seinings without draining ponds; (B) ponds were limed at a rate of 75 ppm calcium hydroxide 24 h prior to harvest and drained by sequential complete draining, and then tilapia were collected from a harvesting pit; (C) ponds were drained by sequential complete draining and tilapia were collected from a harvesting pit; and (D) ponds were drawn from 100 to 50 cm and tilapia were harvested by two seinings, followed by complete draining and collection of the remaining tilapia from a harvesting pit. Treatment D is the common practice in Thailand. The harvest efficiency was 97% in treatment A. Comparing the harvest efficiency for the first two seinings, there were no significant differences between treatments A and D. Liming in treatment B resulted in significantly higher concentrations of 5 day biochemical oxygen demand, total settleable matter, total solids and total phosphorus (TP) in the water discharged from the last 25 cm depth than those at both 100–50 and 50–25 cm depths, while there were no significant differences in effluent quality parameters among different depths in both treatments C and D. Concentrations of

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all effluent quality parameters in the water discharged from the last 25 cm depth in treatment B were higher than those in treatments C and D. Seining in treatment D resulted in the highest concentrations of all effluent quality parameters except TP at middle depth. Compared with the common draining practice, adoption of the sequential complete draining schemes (treatments B and C) caused 33–86% reductions for different effluent quality parameters except total nitrogen and TP in the discharged wastes. The present experiment showed that the use of teaseed cake to anaesthetize tilapia could allow effective harvest by seining, without draining the pond. Alternatively, the discharge of potential pollutants from ponds into the environment could be reduced by sequential complete draining of ponds and collecting fish from harvesting pit (treatments B and C), and can be further reduced by modification of sequential partial draining of pond water level to 25 cm above pond bottom and seining fish without further draining. The present experiment demonstrated that appropriate management in pond draining and fish harvest could minimize the environmental impacts of pond effluents.

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