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Sustainable Aquaculture for a Secure Future

Title: Rates of Fish Waste Production and Effluent Discharge From a Recirculating System (BIOFISH) Under Commercial Conditions

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Abstract: Application of the regulatory principle of 'best available technology' (BAT) to fish farm effluent control has, to some extent, been a driving force for the development of new culture and treatment technology. In Norway today, there are a number of farms for the production of Atlantic salmon, *Salmon salar* L., smolts and brown trout, *Salmo trutta* L., fingerlings that utilize microstrainers for the removal of particles from the effluent water. At least one commercial farm also utilizes a simplified recirculation system called BIOFISH as a demonstration of new and alternative technology for the production of brown trout restocking fish. In this paper, calculated effluent discharge and rates of waste production from the BIOFISH demonstration trials are compared to literature data and to measurements on un-treated as microstrained effluents from the production of Atlantic salmon smolts in a traditional flow through tank system. The results of these calculations show fish waste production rates that are low, but comparable to data found in the literature. Given the level of waste treatment that takes place in the BIOFISH tanks, the specific effluent discharge levels from those tanks, in terms of grams per kilogram biomass and grams per kilogram feed, are considerably lower than those found for salmon smolt production in traditional flow through tanks. There are also substantial differences in hydraulic self-cleaning properties of the two systems and a corresponding difference in the distribution for effluent discharge during normal tank operation and during the tank/effluent pipeline flushing. The results presented here give valuable information related to: (1) waste output characterization; (2) the long-term efficiency of commercially available particle separation systems; and (3) the capabilities of the simplified BIOFISH recirculation technology under field conditions.

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