

DESIGN AND DEVELOPMENT OF GEARBOX FOR INTEGRATION OF PADDLE WHEEL AND PROPELLER ASPIRATOR AERATORS FOR SHRIMP FARMING

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ABSTRACT

Paddle wheel aerators (PWA) are the most commonly used surface aerators in the aquaculture field to increase the dissolved oxygen (DO) level of the shrimp ponds. In Indian shrimp farming sectors, paddle wheel aerators are widely used though many types are available in the market. The paddles are efficient in increasing DO levels, but there are also certain disadvantages like time consumption to reduce the gradient formation due to temperature and dissolved oxygen levels in the pond's top and bottom water column. Also, due to the high water current created by the paddle wheel aerators, feeds get accumulated to the center of the pond and forms sludge. In the present scenario, high-density culture poses some severe issues like mortality during feeding due to reduced dissolved oxygen levels. In this research work, to overcome those issues, an aerator was developed by modifying the gearbox to integrate the paddle wheel and propeller aspirator aerators, and it was tested on the field for its efficacy. The energy consumption for the integrated aerator with two output and regular paddle wheel aerators is the same. Furthermore, the results showed a significant difference between the paddle wheel aerator (PWA) and integrated aerator (IA) in maintaining DO stratification, temperature stratification and water current.

Keywords: Aerators, Gearbox, Integrated aerator, Dissolved Oxygen, Temperature, Stratification, Water current, Shrimp Farming.

