

ORL-AAQ-11**Small Bubbles but Great Performance: The Potential Positive Implications of Nanobubble Aeration in Aquaculture**

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Aquaculture has shown higher levels of productivity and profitability than traditional agriculture subsectors, such as higher yields per unit area and faster growth rates due to the adoption of advanced technologies and good market demand for this commodity. Recently, aquaculture has adopted advanced aeration technology that addresses critical issues in aquaculture such as improving oxygen levels, improving fish health, and increasing productivity. This study investigates the application of advanced aeration technologies, particularly nanobubbles, in aquaculture. The experimental trials evaluated the performance of nanobubble technology in various aspects of aquaculture and the total productivity (measured as yield per unit area) increased to $25.37 \pm 0.83 \text{ kg/m}^2$ with nanobubble technology compared to $17.63 \pm 0.63 \text{ kg/m}^2$ in normal water, an improvement of 43.9% compared to conventional methods. The use of nanobubbles significantly improved the survival rates of live fish during transport, with rates reaching $97.3 \pm 0.1\%$. Furthermore, nanobubble aeration technology has effectively reduced the density of plankton four times and the concentration of geosmin two times, demonstrating its positive impact on aquaculture.

These results show that nanobubble aeration technology offers promising solutions to many problems in aquaculture. Nanobubble technology has led to significant improvements in fish health, productivity, and transport survival rates. In addition, it effectively reduces plankton density and geosmin concentration, making it a promising solution to challenges in aquaculture. The study suggests that nanobubble technology enables high-density fish farming in limited water resources by ensuring optimal oxygen levels by using high-quality water leading to higher growth rates, survival rates, improved fish fitness, and overall higher profitability in aquaculture.

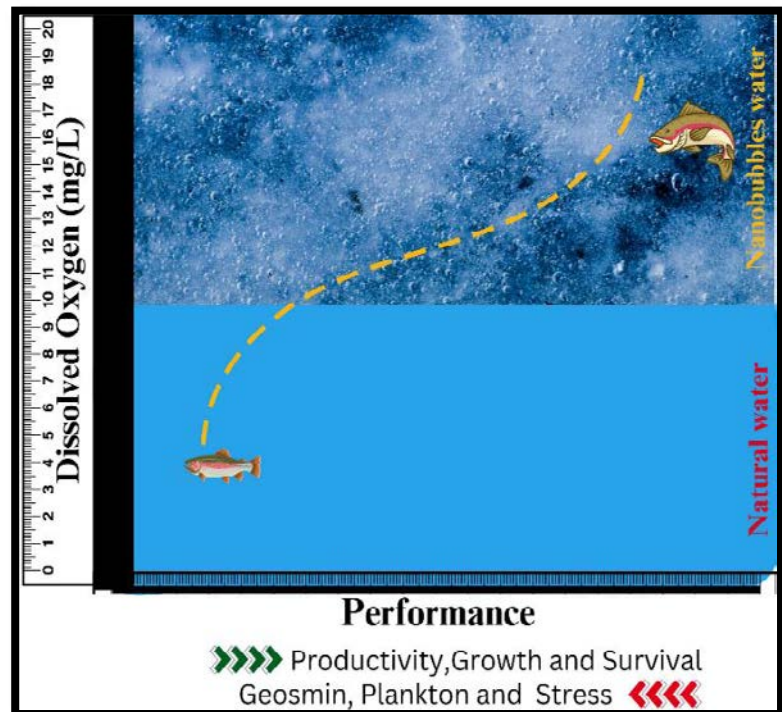


Figure: Summarized performance and role of dissolved oxygen of nanobubble water as compare to normal water in context of rainbow trout