

## Enhancing Land-Based Aquaculture Efficiency through Ozone Applications

Land-based aquaculture has gained prominence as a sustainable method for cultivating fish and other aquatic species. In this context, ozone is a valuable tool for enhancing overall efficiency and promoting the growth of aquatic organisms. Ozone, a powerful oxidizing agent, contributes significantly to various aspects of aquaculture management.

**Ozone's Mechanism in Aquaculture:** Ozone (O<sub>3</sub>) is known for its ability to break down organic matter and eliminate pathogens. In land-based aquaculture systems, the application of ozone serves multiple purposes:

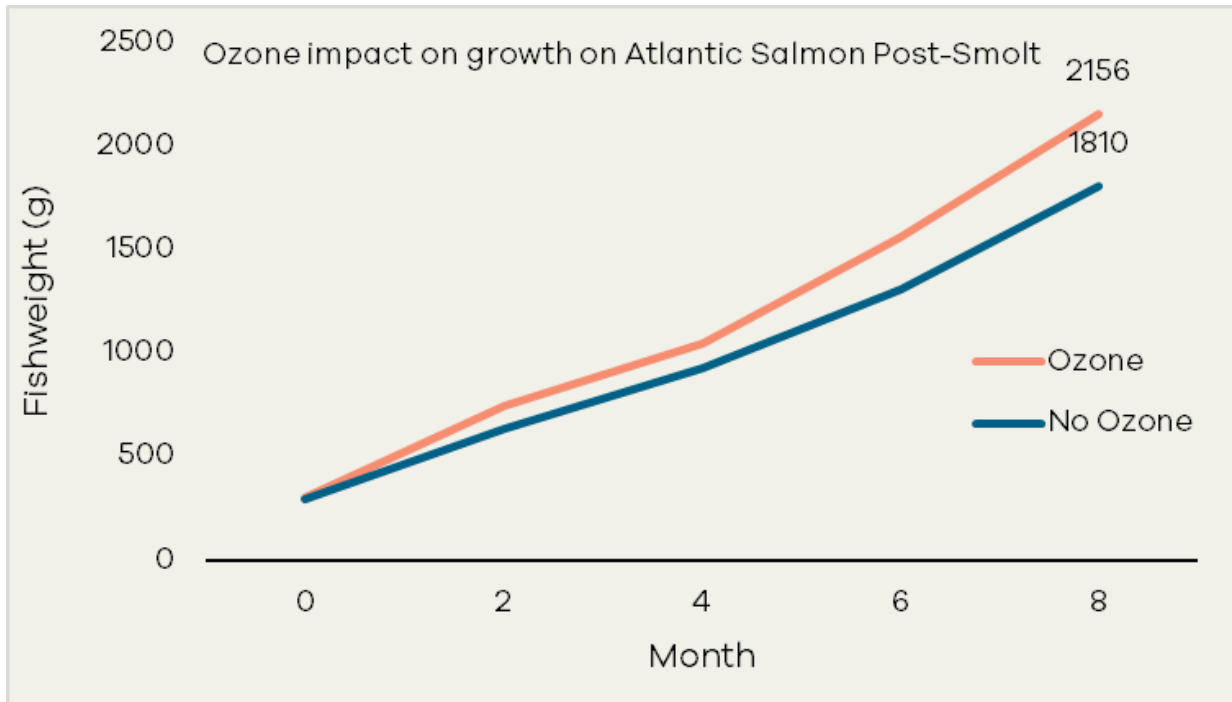
- **Pathogen Control:** Ozone effectively eliminates harmful pathogens, such as bacteria, viruses, and parasites, from the aquaculture environment. This reduction in disease-causing agents contributes to healthier fish populations.
- **Water Quality Improvement:** Ozone facilitates the removal of impurities and contaminants from the water. It breaks down organic compounds, including excess feed, waste, and decaying matter, thereby improving water quality.

**Promotion of Growth and Feed Efficiency:** One of the noteworthy benefits of ozone application in land-based aquaculture is its positive impact on the growth performance of fish. This is achieved through:

- **Feed Conversion Rate (FCR):** Fish subjected to ozonated water exhibit a significantly enhanced Feed Conversion Rate (FCR) in comparison to those in systems without ozone. The clarity of water in ozonated systems contributes to this improvement, facilitating better visibility of pellets and, consequently, optimizing the efficiency of feed utilization.
- **Reduced Stress:** By maintaining a pathogen-free and optimal environment, ozone helps reduce stress levels among fish. Stress has a detrimental effect on growth, and minimizing it contributes to enhanced overall health and growth.
- **Improved Specific Growth Rate (SGR):** Ozone's role in optimizing water quality and promoting favorable conditions directly correlates with an increase in the Specific Growth Rate (SGR) of aquatic species. This implies that fish grow faster and more efficiently under conditions where ozone is applied judiciously.

**Research Evidence:** A study by Davidson et al. (2021) investigated the effects of ozone on post-smolt Atlantic salmon in freshwater recirculation aquaculture systems. The study demonstrated an 18% improvement in growth compared to systems without ozone application.

### How does ozone impact the growth of post-smolt Atlantic Salmon?



*1 Graph from Davidson et al. (2021). Effects of ozone on post-smolt Atlantic salmon (*Salmo salar*) performance, health, and maturation in freshwater recirculation aquaculture systems. *Aquaculture*, 533, 736208.*

**ESG Contribution:** The incorporation of ozone in land-based aquaculture aligns with ESG principles through its contributions to environment. By reducing feed waste, improving growth rates, and ensuring a healthier aquatic environment, ozone application becomes an integral part of a holistic approach to sustainable aquaculture practices

In summary, ozone's positive impact on post-smolt Atlantic salmon growth suggests a potential reduction in the duration of market-size salmon production in land-based RAS. This outcome points towards lowered production costs, emphasizing ozone's role in enhancing efficiency and economic sustainability in aquaculture.