

OZONATION FOR WATER QUALITY IMPROVEMENT IN LOW EXCHANGE SALMONID RECIRCULATING SYSTEMS

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Evidence from previous un-replicated experiments at the Freshwater Institute indicates that rainbow trout mortality increases and health declines with low water exchange and feed loading rates (1.3-2.0 kg/d per m³/d of make-up water flow). The decline in fish health appeared to be ameliorated by ozonation and was unrelated to infectious disease. Typical water quality parameters were also within safe limits. To further investigate, a series of studies are being conducted in six replicated recirculating systems (RAS).

This study compared rainbow trout performance and water quality between three RAS operated with ozone and three RAS without ozone, with all systems at low water exchange (0.26 % of the total recycled flow). To begin, fish in the ozone and no ozone RAS were 294 ± 1 and 296 ± 2 g, respectively. During a one week period when fish were at maximum feed levels (6.6 kg/day/tank) and densities (80 kg/m³), water samples were collected across all unit processes to compare water quality and removal efficiencies. Mean feed loading rates were 4.66 kg/d per m³ make-up water flow.

Ozone resulted in substantially lower BOD, TSS, color, total particles, heterotrophic bacteria, higher UV transmittance, and appeared to remove dissolved copper. Unit process removal efficiencies were better with ozone. Ozone also provided conditions for improved growth. After five months, rainbow trout in the ozone and no ozone RAS were 1161 ± 6 and 993 ± 12 g, respectively ($p = 0.001$). Survival was not statistically different but was better for the ozone treatment. Results from a study comparing high exchange and low exchange RAS will also be presented.