Effect of low frequency ultrasonic cavitation, ultraviolet and their combination on the disinfection of aquaculture pathogen Aeromonas veronii

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Aeromonas veronii has been identified as a relevant pathogen in aquaculture causing high mortalities in a different range of species and farming environments. Being able to control outbreaks of pathogen in recirculation aquaculture systems (RAS) is highly important to maintain a productive system. Over the last 10 years a small range of studies have focused on the application of cavitation as a disinfection method in aquaculture. In this study a low frequency (24kHz) ultrasound (US) system was tested against *Aeromonas veronii* to understand the requirements and effects of ultrasonic cavitation on disinfection and water quality. Additionally, a comparison with ultraviolet (30mJ/cm2 at 75% UVT, 7.5 L/m) disinfection and its combined effect with US was tested. For all trials *Aeromonas veronii* was inoculated in clear autoclaved distilled water mixed with a combination of phosphate-buffered saline (PBS) and tryptic soy broth (TSB). US reveled to be 607 times more energy demanding when compared to ultraviolet (UV) to achieve 3 log reduction of the target microorganism. There were no significant differences in disinfection potential when combining the two methods of disinfection. UV did not have any effect on water characteristics, while US showed an influence on several parameters. i.e., pH, conductivity (?S/cm) and production of H?O? equiv. (mg/L). pH dropped from 6.55 ± 0.23 to 6.35 ± 0.07, conductivity increased steadily over the trial reaching 100 ?S/cm and H?O? equiv. reached concentrations of 2.76 ± 0.53 mg/L at the end of the trial. This study confirms the previously acquired knowledge on the high energy requirements of US for bacterial disinfection. UV systems showed to be more efficient, and its disinfection ability was not improved by pretreatment with US during the experimental trial. This study provides a better comprehension on the effect of ultrasonic cavitation on the water characteristics, allowing for better management of US technologies when used for disinfection in aquaculture systems.