

# Evaluating Resistance to Triclosan™ in Selected Bacteria and Aquatic Samples Isolated from Pre and Post Water Treatment Effluent

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Triclosan™ is a widely utilized chemical antimicrobial used to combat a wide range of pathogenic microbes; however, its use may cause environmental issues including the creation of dioxins and resistant strains of bacteria. This research evaluated Triclosan™ resistance in selected bacteria and identified resistant bacteria in aquatic samples collected from Arkansas River above stream and downstream from the effluent of a wastewater treatment plant. Assays used included disc diffusion, genetic identification of 16S rDNA, growth studies, and biofilm assays. The Kirby Bauer Disc diffusion test indicated *Pseudomonas* to be resistant to all test dilutions of Triclosan™ while *B. subtilis* showed the greatest sensitivity. T test analysis suggested a significant difference in zone of inhibition for all bacteria tested, except *Pseudomonas*. Triclosan™ inhibited the growth of planktonic cells in the highest concentration, the 10<sup>-1</sup> and 10<sup>-2</sup> dilutions yielded growth approaching the control group. Biofilm development was inhibited by the highest Triclosan™ concentrations. Environmental samples yielded multiple strains of relatively and significantly resistant strains. The upstream samples yielded colonies of different morphological characteristics with a distance from the highest concentrated disk of 4-9 mm. The downstream samples revealed similar morphologies and had distances from the highest concentrated disk 0.5-2 mm. 29 morphologically diverse and Triclosan™ resistant isolates were picked for DNA extraction. Amplified PCR products were cleaned and used as a template for sequencing 16S rDNA. The sequencing results revealed 6 different genera (*Pseudomonas*, *Stenotrophomonas*, *Yersinia*, *Carnobacterium*, *Sporosarcina*, *Staphylococcus*).

## Awards Won:

Fourth Award of \$500