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ABSTRACT

Bacteriocins are antimicrobial compounds that are produced by a diverse group of bacterial species that kill other bacterial species. Recent studies of the marine environment have shown that antibiotic-like substances are more likely to be produced by bacteria that are attached to particulate material than those that are free-living. This study tested the production of presumptive bacteriocins from bacteria attached to particulate material and free-living bacteria. Water samples were collected monthly over a twelve-month period from three freshwater and three saltwater sites near Wilmington in Southeastern North Carolina. Water samples were plated to determine total viable counts and the total viable population was screened for presumptive *Vibrio* and *Pseudomonas* spp. In freshwater samples *Pseudomonas* spp. predominated while in saltwater samples *Vibrio* spp. predominated. Free-living bacteria and bacteria adhered to particulate matter from both groups were screened for antimicrobial activity. Antimicrobial activity (presumptive bacteriocin) was common among free-living bacteria and bacteria attached to particulate material from both freshwater and saltwater samples. However, a higher percentage bacteriocins were produced from bacteria adhered to particulate material than from free-living bacteria in the surrounding water for both species. A higher percentage of bacteriocins were produced by bacteria isolated from freshwater than bacteria isolated from saltwater. Bacteriocins from *Pseudomonas* spp. displayed a narrow range of antimicrobial activity with over 68% of the bacteria showing antimicrobial activity against only one test organism, *E. coli*. *Vibrio* spp. bacteriocins displayed a broader range of antimicrobial activity with 90% of bacteria showing activity against one of three different *Vibrio* spp.: *V. vulnificus*, *V. parahaemolyticus* and *V. harveyi*.

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DEDICATION

I would like to dedicate this thesis to my parents whose continued support and encouragement along the way have meant more to me than they will ever know.

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