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Actinobacteria as new probiotics for preventing fish diseases in aquaculture

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In order to meet the food needs of a constantly growing world population, aquaculture emerges as the fastest growing food production sector [1]. However, disease outbreaks due to opportunistic bacterial pathogens cause large losses [2, 3]. Antibacterial chemicals used indiscriminately have resulted in resistant bacteria and antibiotic resistance genes [4, 5]. Ecological solutions such as probiotics are needed [6]. Probiotics are microorganisms introduced into another organism that can have beneficial effects on the host as well as improve the external environment [7]. Actinobacteria are an important biotechnological resource, as they produce a great diversity of secondary metabolites with a high range of bioactivities, including antimicrobial [7]. The aim of this study was to explore the probiotic potential of some marine actinobacteria to prevent aquaculture fish diseases. For this, a screening of antimicrobial activity was performed using agar-based disk diffusion and Minimum Inhibitory Concentration (MIC) assays, against three Gram-negative bacterial fish pathogens: *Aeromonas hydrophila*, *Edwardsiella tarda* and *Pseudomonas anguilliseptica*. A total of 54 out of 103 actinobacterial extracts tested, presented bioactivity against these microorganisms, so that the growth of all three Gram-negative pathogens used was inhibited. The diameter of the inhibition halos varied between 8 and 20 mm. Tested extracts presented MIC values of 1000 µg/ml, except for *Isoptericola chiayiensis* (500 µg/ml). *Microbispora bryophytorum*, *Isoptericola chiayiensis* and *Nocardia nova* were some of the bacteria with the most promising results. Overall, actinobacteria associated with seaweed proved to be a potential source of probiotics to inhibit pathogens in aquaculture fish.

Keywords: Antimicrobial, aquaculture, marine actinobacteria, probiotics.

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