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RESEARCH PAPER

Effect of biosurfactant derived from *Vibrio natriegens* MK3 against *Vibrio harveyi* biofilm and virulence

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Abstract

Vibrio harveyi is a marine luminous pathogen, which causes biofilm-mediated infections, pressures the search for an innovative alternate approach to strive against vibriosis in aquaculture. This study anticipated to explore the effect of glycolipid biosurfactant as an antipathogenic against *V. harveyi* to control vibriosis. In this study, 27 bacterial strains were isolated from marine soil sediments. Out of these, 11 strains exhibited surfactant activity and the strain MK3 showed high emulsification index. The potent strain was identified as *Vibrio natriegens* and named as *V. natriegens* MK3. The extracted biosurfactant was purified using high-performance liquid chromatography and it was efficient to decrease the surface tension of the growth medium up to 21 mN/m. The functional group and composition of the biosurfactant were determined by Fourier-transform infrared spectroscopy and nuclear magnetic resonance spectroscopy spectral studies and the nature of the biosurfactant was identified as glycolipid. The surfactant was capable of reducing the biofilm formation, bioluminescence, extracellular polysaccharide synthesis, and quorum sensing in marine shrimp pathogen *V. harveyi*. The antagonistic effect of biosurfactant was evaluated against *V.* harveyi-infected brine shrimp *Artemia salina*. This study reveals that biosurfactant can be considered for the management of biofilm-related aquatic infections.

KEYWORDS

biosurfactant, *Vibrio harveyi*, biofilm disruption, brine shrimp, oil dispersant

1 | INTRODUCTION

Trade focus on high-value marine fish species is rising and early-life diseases of marine organisms are a major barrier to the growth of effective production in aquaculture. Diseases with opportunistic pathogens of the Vibrionaceae family, which subsist well in nutrient-elevated levels in dense cultures, seem to be the most prevalent and detrimental [1]. The noticeable fish pathogen in the family of Vibrionaceae is *Vibrio harveyi*, has been extensively documented as a serious infection causing pathogenic agent, which leads to the infections of crustaceans, molluscs, and fish, leading to high death rates and substantial economic losses [2]. Regarding its role as a severe marine animal pathogen, *V. harveyi*'s pathogenicity strategies are still to be completely addressed. Phenotypes that were found to be regulated by the *V. harveyi* quorum-sensing (QS) system in vitro,

