

## Screening of *Bacillus* sp. to inhibit quorum sensing and the study on the protection rate to the carps infected with *Aeromonas hydrophila*

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Bacterial diseases are one of the main reasons to damage the health of aquatic animals. The traditional way to prevent and control bacterial disease is to use antibiotics. However, the issues of resistant strain changed the mind to use antibiotics and people want to find the new replacement agents of antibiotics and reduce the risks of food safety. It is a new research direction to prevent and control aquatic animal diseases by inhibiting the Quorum sensing (QS) that could regulate the pathogen virulence. The purpose of the present experiment was to screen the *Bacillus* sp strain to inhibit the QS of gram-negative bacteria, the *Chromobacterium violaceum* was used as the reporting strain to analyze the *Bacillus* sp strain F3-1, F3-2, F6-4, F6-5, X77, X93, X3914 that the isolations from carp intestine tract or preserved in the lab by using "T" type streak cultivation and filter-paper-diffusion. The results of "T" type streak cultivation showed that strain F3-1 could inhibit the production of violacein of *Chromobacterium violaceum*; and the results of filter-paper-diffusion indicated that the materials to inhibit the production of violacein of *Chromobacterium violaceum* was in the extracellular products of strain F3-1. and then, the crude extracts was taken from the culture of strain F3-1, and the OD<sub>585</sub> of violacein of *Chromobacterium violaceum* was determined at the concentration of crude extracts of 0, 50,100, 200, 300 mg/L, and the results indicated that the production of violacien significantly decreased with the increasing of crude extracts concentration ( $P<0.05$ ); there was no violacien observed in the test tube when the concentration of crude extracts reached 200mg/L. The protein of crude extracts was taken by the method of ammonium sulfate precipitation; the results showed that the extracellular protein probably was the material to inhibit the QS of *Chromobacterium violaceum*. The strain F3-1 was identified as *Bacillus pumilus* by 16Sr DNA sequence analysis. We also got the mutant strain FF1-2 by mutation breeding. The results of challenge test with *Aeromonas hydrophila* indicated that the protection rate of *Bacillus pumilus* FF1-2 on carps were 68% and 70% to the challenge ways of intraperitoneal injection and bath, individually. In a conclusion, the mutant strain FF1-2 could control and protect the infection of *Aeromonas hydrophila* on carps, which still need further research for strain FF1-2 as the alternative to antibiotics.

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