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The Living Conditions Optimization and Effect of Petroleum Hydrocarbon Degradation of Biosurfactant Bacteria in Tropical Waters

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Extended Abstract

The sea environment may be destroyed in Chinese Tropic Sea by oil pollution along with the increasing of the oil and gas production and conveyance in the South China Sea, The bioremediation technology is environmentally friendly by using of rich microbial resources in tropical waters. The surfactant bacteria Bsm(*Bacillus cereus*) was studied for its auxiliary effect on seawater oil pollution restoration, which was screened from the Chinese tropical waters by researcher in this paper.

Firstly, the living conditions of Bsm were firstly tested respectively such as inoculation (2%,6%,10%,14% as setting), shaking speed(120 r/min,150 r/min,180 r/min as setting), temperature(25℃,30℃,35℃ as setting), pH(7,8,9 as setting), salinity (1.5%, 2.5%, 3.0%, 4.5%, 5.5% as setting), carbon sources (20g/ of glucose, 20g/L of starch, 20g/L of paraffin oil 20g/L of diesel, 20g/L of oil as setting) and nitrogen sources (6g/L of $NaNO_3$、6g/L of KNO_3、6g/L of NH_4NO_3、6g/L of $(NH_4)_2SO_4$、6g/L of $CO(NH_2)_2$ as setting). Secondly, the auxiliary effect tests were carried out to study Bsm on the natural degradation of petroleum hydrocarbon in seawater while the oil as the sole carbon source. Finally, the effect tests were also carried out to study Bsm on petroleum degradation rate of hydrocarbonoclastic bacteria Rbsm (*arthrobacter sp*) which was screened from the Chinese tropical waters。

The conclusions were as the following:

1. The most suitable culture conditions of Bsm are 10% inoculation quantity, PH 8, temperature 25℃, the shaking speed 180 r/min, $(NH_4)_2SO_4$ as nitrogen source, soluble starch as carbon source, 3.5% salinity.
2. Bsm (10% of inoculation) has good accelerating effect on petroleum natural degradation as 32.6% of 15d degradation rate while 19.1% without Bsm added.
3. The results of mixed inoculants ratio test (1:3, 1:2, 1:1, 2:1, 3:1 as setting and 10% of inoculation) showed that the ratio of 1:2 and 1:1 were appropriate with good effect on degradation of petroleum hydrocarbon, and the 15d degradation rate of mixed inoculants were respectively 64.4% and 67.9% with 47% in control, while the ratio of 1:3 and 2:1 and 3:1 were respectively 53.9%, 40.2% and 30.3%.

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