Optimisation of Phenol Degradation of Antarctic Bacteria Consortium

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Aromatic compounds are among the most prevalent pollutants in the environment. Phenol, a substance that is extremely poisonous to most living organisms, is a contaminant associated with the products and wastes of chemical and petroleum industries. Contamination involving phenolic compound has been reported in extreme conditions such as the Antarctic. From phenol-contaminated environments, the use of indigenous microbes capable of degrading phenol was obtained to remediate phenol and has been proven successful even though phenol is toxic to most microbes. The degradation of phenol in cold polluted environments requires the use of microorganisms that can function at low temperatures and withstand the toxicity of phenol. This study focused on the ability of the Antarctic bacteria to degrade high concentration of phenol and survive in the said concentrations. The growth and degradation optimisation of phenol-degrading bacteria were carried out using the conventional one-factor-at-a-time (OFAT). The effects of pH, salinity, nitrogen sources, nitrogen concentration, temperature and phenol concentration on the rate of phenol degradation were examined. Observation revealed that the optimum conditions for phenol degradation were found to be at pH of 7, concentration of 2.0 g/L NaCl, nitrogen source of ammonium sulphate with concentration of 1.0 g/L and phenol concentration of 0.5 g/L at temperature of 15°C.

References

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