

Statistical optimisation of diesel degradation with bacterial consortium

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Human activities in Antarctica are mainly fuelled by the combustion of diesel; however, due to the increased Antarctic expedition, the environment is now threatened by the pollution of diesel. Several alternatives have been taken to reduce the damaging effects of diesel pollution to the organisms in the region. These include the Madrid Protocol and heavy fuel oil (HFO) ban as precautionary steps, as well as some physical and chemical treatment methods. However, most initiatives taken were cost and labour ineffective. Therefore, bioremediation using indigenous organisms has been considered the wisest method to overcome the diesel pollution issue. Microbes such as bacteria, fungi and algae are being actively studied to determine the most efficient method in tackling this issue. In this study, optimisation of hydrocarbon-degrading ability was done using indigenous Antarctic bacterial consortium BS9 sampled from soil in General Bernardo O'Higgins Base. Its diesel degradation ability was maximised by studying the effects of salinity, nitrogen source and concentration, temperature, pH and initial diesel concentration. Observations revealed that diesel degradation was maximum at 0% (w/v) NaCl, 1 g/L NH₄Cl as sole nitrogen source, pH 7 and temperature of 10°C, where 90.79% of diesel was degraded within 7 days of incubation. This has proven the potential of bacterial consortium BS9 as a working agent in diesel bioremediation in Antarctica.

References

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