Optimisation for Enhancement of Phenol Degradation by *Arthrobacter* sp. Strain AQ5-15 from Antarctic Soil Using Conventional and Statistical Approach

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Phenol contamination becomes one of the most prevalent environmental pollution which should be taken into immediate consideration as they may cause negative impact on aquatic lives, plants and also human beings. This scenario can also be witnessed in the continent which once considered to be the most pristine and isolated continent, Antarctica. The continent's cold and harsh climate resulting in the natural processes that help remediate pollution in other parts of the world happen relatively slow, hence, pollutant like phenol has more of a chance to bioaccumulate in the Antarctica's simple ecosystem and most particularly, food chain. Therefore, actions of bioremediation are significant to overcome this problem. Although previous studies have reported the use of native microorganisms in phenol degradation, however, retrieving the eligible microbial population alone for the degradation of stated pollutant is not sufficient where enhancement of conditions is required for the viability of the bioremediation process. This study has revealed that bacteria *Arthrobacter* sp. strain AQ5-15 isolated from Antarctic soil was able to degrade phenol at low temperature. Study on the effects of significant factors including pH and temperature was carried out to optimise the conditions for phenol degradation. Finding revealed that this strain is psychrotolerant with optimum temperature at 20°C and prefer neutral or near-neutral condition for optimum phenol degradation. These conditions were further enhanced using response surface methodology approach which resulted in a better degradation with 99.42% compared to conventional one-factor-at-time approach with only 88.80% of degradation.

References

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