Mini review on phenol biodegradation in Antarctica using native microorganisms

ABSTRACT

Though Antarctica has once been considered as the most pristine land on earth, however, recently many literatures concluded that it is not a zone free from anthropogenic pollutants, which have been mostly associated with long-range atmospheric transport and deposition in the area. Numerous organic pollutants including phenol have been classified as the priority pollutants by the United States Environmental Protection Agency (US EPA) due to their high toxicity. The increased level of phenol concentration in the Antarctic environment poses a significant risk to the aquatic as well as terrestrial lives and public health due to its persistence, biomagnification and accumulation in the food chain. Therefore, bioremediation actions are significant to overcome this problem. Phenol degradation at cold climate needs the use of microorganisms that has the ability to thrive and function at low temperatures as well as withstand the toxicity of phenol. The utilisation of native microbes as phenol-degraders has proven the effectiveness of bioremediation even though phenol has anti-microbial properties. This paper discusses the sources and toxicity of phenol, existence and effect of phenol on the Antarctic environment, the potential method for eliminating phenol from the environment and suggestion for future prospect.

Keyword: Antarctica; Bioremediation; Cold-adapted microorganism; Mixed culture; Phenol