Phenol removal via cellular immobilization: a review

ABSTRACT

Environmental pollution is one of the major concerns in the 21st century; where billions of tonnes of harmful chemicals are produced by industries such as petroleum, paints, food, rubber, and plastic. Phenol and its derivatives infiltrate the ecosystems and has become one of the top major pollutants worldwide. This review covers the major aspects of immobilization of phenol-degrading bacteria as a method to improve phenol bioremediation. The use of various forms of immobilization matrices is discussed along with the advantages and disadvantages of each of the immobilization matrices especially when environmental usage is warranted. To be used as a bioremediation tool, immobilized system must not only be effective, but the matrices must be non-toxic, non-polluting and if possible non-biodegradable. The mechanical, biological and chemical stability of the system is paramount for long term activity as well as price is an important factor when very large scale is concern. The system must also be able to tolerate high concentration of other toxicants especially heavy metals that form as co-contaminants, and most immobilized systems are geared towards this last aspect as immobilization generally provides protection from other contaminants.

Keyword: Phenol; Immobilization; Review; Matrices