

Optimization of process variables for biodegradation of phenol by *Pseudomonas putida* (NCIM 2102) using response surface methodology

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Environmental pollution is considered as a side effect of modern industrial society. The presence of man-made (anthropogenic) organic compounds in the environment is a very serious public health problem. Phenol, an organic compound is toxic even at low concentrations and the toxicity of phenols for microbial cells has been investigated. Owing to the toxic nature and consequent health hazard of phenol, the need to remove it from waste waters. Harnessing the potential of microbes to degrade phenol has been an area of considerable study to develop bioremediation approaches, which is considered as “Green Option” for treatment of environmental contaminants. The optimum conditions for phenol degradation by *Pseudomonas putida* (NCIM 2102) were at inoculum size (6%v/v), pH (7), temperature (30°C), agitation speed (140 rpm), glucose (0.8g/l), ammonium sulphate (1.5g/l), peptone (0.5g/l), and concentration of metal ion Mn^{2+} (0.02 g/l). Central Composite Design (CCD) was employed combining with Response Surface Methodology (RSM) to optimize the physical, chemical parameters for the degradation of phenol by *P. putida* (NCIM 2102). Response Surface method was using three-levels of physico-chemical parameters like pH, temperature, agitation speed, carbon source (glucose), inorganic nitrogen source (ammonium sulfate) and metal ion (Mn^{2+}) concentration which also enabled the identification of significant effects of interactions for the batch studies. The experimental values are in good agreement with predicted values and the correlation coefficient of physico-chemical parameters was found to be 0.9871, 0.9028 respectively.

Keywords: : Phenol; bioremediation; *P.putida* (NCIM 2102); physical-chemical parameters and Central Composite Design.

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