Biotransformation using resting cells of Rhodococcus UKMP-5M for phenol degradation

ABSTRACT

Phenol is a toxic compound that may be transformed into non-toxic compounds by the activity of microbial cells. The possibility of using biotransformation method for the degradation of phenol was studied using the whole cells of Rhodococcus UKMP-5M suspended in 250 mL shake flask with buffered liquid containing phenol. The cells of Rhodococcus UKMP-5M were produced by cultivation in Minimal Salt Medium (MSM) with the addition of phenol and/or glucose as carbon source. The biotransformation conditions to obtain the highest percentage of phenol degradation were as follows; pH 7.4, 0.5 g/L phenol in MSM as biotransformation medium, cells were produced by cultivation in MSM supplemented with 0.5 g/L phenol and the optimal cell concentration was 10%. The phenol degradation rate obtained in biotransformation using Rhodococcus UKMP-5M cells correlated well with phenol hydroxylase activity. The highest percentage of phenol degradation in biotransformation using suspended cells of Rhodococcus UKMP-5M was only up to 89%, which was slightly lower than those obtained in growing cell system (98%).

Keyword: Biotransformation; Phenol hydroxylase; Biodegradation of phenol; Rhodococcus UKMP-5M