Optimization of physicochemical parameters for phenol biodegradation by *Candida tropicalis* PHB5 using Taguchi Methodology

Bikram Basak\(^a\), Biswanath Bhunia\(^b\), Suprabhat Mukherjee\(^c\), Apurba Dey\(^a\),*

\(^a\)Department of Biotechnology, National Institute of Technology, Mahatma Gandhi Avenue, Durgapur, 713209, India
\(^b\)Department of Biotechnology, Bengal College of Engineering and Technology, Durgapur, 713212, India
\(^c\)Central Mechanical Engineering Research Institute, Durgapur, 713209, India

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**ABSTRACT**

The Taguchi orthogonal array (OA) design of experiments methodology, a quality optimization tool, was used to improve the phenol biodegradation potential of the yeast *Candida tropicalis* PHB5. At three levels, an OA was selected to analyze the effects of the different physicochemical process factors. Experiments were undertaken to confirm the effectiveness of this method and the main factors affecting the growth of *C. tropicalis* on phenol and its subsequent degradation were found, together with the optimal factor levels. Predicted results showed that biomass yield could be increased from 1,051.96 to 2,495.74 mg/l and the subsequent amount of phenol degraded could be increased from 879.42 to 2,386.43 mg/l. Based on Taguchi methodology, an overall enhancement of growth by 137.24% and phenol degradation by 171.49% could be attained. Validation experiments showed that the growth and phenol biodegradation was significantly improved by up to 132.4% and 165.64%, respectively.

**Keywords:** Optimization; Degradation; Phenol; *Candida tropicalis*; Taguchi DOE methodology

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*Corresponding author.

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