



Optimization of culture condition for growth and phenol degradation by *Alcaligenes faecalis* JF339228 using Taguchi Methodology

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ABSTRACT

The optimization of five process parameters such as pH, agitation, temperature, inoculum percentage and incubation time were optimized by Taguchi robust design method for obtaining enhanced biomass and phenol degradation by the isolated *Alcaligenes faecalis* JF339228 from Durgapur steel industry (DSP), India. About 18 experiments were conducted with a different combination of factors and the results obtained in terms of growth of specific bacterial strain and phenol degradation rates were processed in the Qualitek-4 software to study the main effect of individual factors. The main effect, interaction effects and optimal levels of the process factors were determined using signal-to-noise (S/N) ratio. The effect of factors has been studied for bacterial growth and phenol degradation by *A. faecalis* JF339228. Optimization of the said parameters has been evaluated by Taguchi method and analysed by analysis of variance. Predicted results showed enhanced process performance such as biomass (131.78%) and phenol degradation (130.40%) with pH (7), temperature (37.5°C), agitation (150 rpm), inoculum percentage (6%) and incubation time (72 h). The optimum values of medium composition obtained for biochemical degradation of phenol by *A. faecalis* JF339228 could be used for phenol degradation using optimized process parameter by Taguchi's by this microorganism.

Keywords: Optimization; Phenol degradation; Taguchi robust design; Biomass and *Alcaligenes faecalis* JF339228

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