



## Characterization of profenofos degradation by *Pseudomonas plecoglossicida* strain PF1 using surface response methodology

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### ABSTRACT

Profenofos pesticide residue has been successfully removed via microbial degradation in laboratory experiment. Profenofos degradation by *Pseudomonas plecoglossicida* strain PF1 (PF1) under environmental influence was characterized using response surface methodology with central composite design method. The models were applied to investigate the effects of key environmental parameters including pH, temperature, and initial profenofos concentration on profenofos biodegradation performance based on the profenofos biodegradation kinetic rates. The result showed that profenofos removal percentages by PF1 at the different initial concentrations (5–20 mg L<sup>-1</sup>) were 50%–90% with the utilization rates of 0.17–0.78 mg L<sup>-1</sup> h<sup>-1</sup>. The biodegradation kinetic rates well fit the first-order kinetic equation. The kinetic rates increased with rising of pHs and profenofos concentrations. The optimum levels of the key parameters were pH of 5.89, temperature of 32.94°C, and profenofos concentration of 20.15 mg L<sup>-1</sup> with the highest profenofos biodegradation kinetic rates of 0.10 h<sup>-1</sup>. The interaction between pH and profenofos concentration obviously impacted the profenofos biodegradation kinetic rates.

**Keywords:** Biodegradation; Central composite design; Organophosphorus pesticide; Profenofos

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