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A Novel Method for Enhancing Strains' Biodegradation of 4-Chloronitrobenzene

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Highlights:

- A novel method for effectively enhancing strains' 4-chloronitrobenzene biodegradation rate was established.
- External nitrogen (not carbon) source could enhance the rate of 4-chloronitrobenzene biodegradation.
- The organic reductant and the substrate had synergistic effect on 4-chloronitrobenzene biodegradation.
- The method has a good prospect to enhance biodegradation of other nitroaromatic compounds.

ABSTRACT: This paper introduces a novel approach to enhance the strains' biodegradation of 4-chloronitrobenzene by utilizing the synergistic effect of the organic reductant mannitol and the substrate beef extraction. Our results demonstrate that 4-chloronitrobenzene could not be an available nitrogen source to support target strains' growth, which induced the limited 4-chloronitrobenzene biodegradation. In addition, the organic reducing agent and substrate had a better synergistic effect than inorganic reducing agent and substrate to enhance the strains' 4-chloronitrobenzene cometabolic biodegradation. Employing the synergistic effect of the optimal mixture (mannitol and beef extraction), the biodegradation rates of 50 mg L⁻¹ 4-chloronitrobenzene by seven of the ten target strains were enhanced up to 100% from

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