



## Characteristics of pyridine biodegradation by a novel bacterial strain, *Rhizobium* sp. NJUST18

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### ABSTRACT

Pyridine is one of the most widespread heterocyclic industrial contaminants. Due to rather tough safe level, thorough purification of wastewater containing this eco-toxicant is required. In this study, a novel pyridine-degrading bacterium, strain NJUST18, was isolated from the soil contaminated by pyridine and identified as a member of genus *Rhizobium*. The biodegradation assays suggested that strain NJUST18 could utilize pyridine as the sole source of carbon and nitrogen, at initial concentration as high as 2600 mg l<sup>-1</sup>. Pyridine depletion, biomass increase, TOC reduction, pH increase, and NH<sub>4</sub><sup>+</sup> release during pyridine biodegradation indicated that pyridine could be mineralized by strain NJUST18. Pyridine degradation at high initial concentrations or high initial pH values demonstrated that this biodegradation process was both pH and NH<sub>4</sub><sup>+</sup> dependent. Release of NH<sub>4</sub><sup>+</sup> into the alkaline medium led to the formation of free ammonia (NH<sub>3</sub>) accompanied by the delayed pyridine degradation. High concentration of NH<sub>3</sub> generated weakened pyridine biodegradation. A neutral to slightly alkaline pH was crucial for high strength pyridine degradation by NJUST18. *Rhizobium* sp. NJUST18 could degrade relatively high concentration of pyridine, offering bright prospects for bioremediation of pyridine contaminated environment.

*Keywords:* Pyridine; Nitrogen heterocyclic compound; Biodegradation; *Rhizobium*; Free ammonia

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