



## A comparison of the efficacy of two strains of *Bacillus subtilis* and *Pseudomonas fragii* in the treatment of tannery wastewater

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Received 4 September 2012; Accepted 11 November 2012

### ABSTRACT

Tannery wastewater treatment using two isolated micro-organisms (*Bacillus subtilis* and *Pseudomonas fragii*) has been investigated in the present study. The growth patterns, pH normalisation and the abilities of these micro-organisms to reduce the concentrations of chemical oxygen demand (COD), total suspended solids (TSS) and chloride were studied using the shake flask apparatus. The specific growth rate and biomass concentration of *B. subtilis* and *P. fragii* were observed  $0.138\text{ h}^{-1}$  and  $3.01\text{ mg/l}$  and  $0.051\text{ h}^{-1}$  and  $2.34\text{ mg/l}$ , respectively, after 84 h. Both micro-organisms normalised pH of the wastewater. COD removal efficiency for *B. subtilis* was 87.6% while that of *P. fragii* was 85.2%. For TSS, *B. subtilis* caused a reduction of 91.7% (from 876 mg/l to 73 mg/l), while *P. fragii* reduced the solid concentration from 876 mg/l to 98 mg/l (88.8%). *B. subtilis* could only achieve 48.5% reduction in chloride concentration (from 127.08 mg/l to 65.39 mg/l compared to a reduction of 54.6% (from 127.08 mg/l to 57.72 mg/l) for *P. fragii*. From the results, it can be said that the bacteria present in tannery effluents have significant potential in treatment of tannery wastewater.

**Keywords:** Micro-organisms; Dissolved oxygen; Tannery wastewater; Growth kinetics; Shake flask; Microbial growth

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