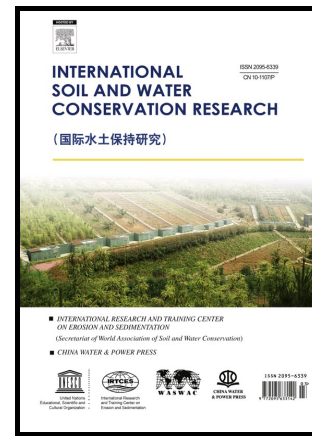


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Gabriela Menta Alvim, Patrícia Procópio Pontes



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Aeration and Sawdust Application Effects as Structural Material in the Bioremediation of Clayey Acid Soils Contaminated with Diesel Oil

Gabriela Menta Alvim; Patrícia Procópio Pontes

G. M. Alvim* ; P. P. Pontes

Department of Environmental Science and Technology, Federal Centre for Technological Education of Minas Gerais 5253, 30-421169, Belo Horizonte, Brazil.

gabrielamentaalvim@gmail.com

patriciaprocopio@yahoo.com.br

*Corresponding author:

Abstract

Soil contamination, due to the leakage of petroleum or its by-products, is a reason for concern nowadays. Technologies, such as bioremediation, have been developed to remove these pollutants from the environment. This paper aims to evaluate the bioremediation of clayey acid soils contaminated with diesel oil, comparing the effect of aeration use and the addition of different sawdust ratios (5% and 10%) as bulking material. This research was developed in three phases, with experiments of (a) natural attenuation (exclusively natural processes), (b) sawdust-amended soil and (c) aeration combined with sawdust addition. The manometric respirometry test was applied to monitor CO₂ production during biodegradation experiments and sodium hydroxide (NaOH) was used as an absorbent solution. The contamination of the samples was carried out by the addition of diesel oil (5% w/w (gg⁻¹)) into the soil. The results indicated that natural attenuation presented a slower bioremediation process when compared to the treatments with sawdust addition. The addition of 5% of sawdust was beneficial to the microbial activity of the soil, but a proportion above 5% caused a negative effect on the samples, reducing the microbial activity. Statistical analysis (*Kruskal-Wallis* test) showed significant oil removals on experiments with the combination of sawdust and aeration. The aeration was considered the main agent in increasing oil biodegradation in the soil. The degradation rate reactions followed a zero-order linear model. The highest contaminant degradation rate was observed in the samples with 5% of sawdust and aeration (24.79 mgO₂kg⁻¹drysoilday⁻¹), which also improved microbial activity and diesel oil removal.

Keywords: Bioremediation; Diesel oil; Contaminated soil; Sawdust; Aeration.**1. INTRODUCTION**

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