

Enzymatic Activity for Monitoring Soil Impacted by Iron Tailing

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The state of Minas Gerais has mining, especially iron ore, as one of the main economic resources of the state. The exploitation of iron ore often exposes the soils to situations of environmental degradation due to the generation of tailings in the beneficiation process that, exceptionally, can spread in the soil as what occurred in 2019 in the rupture of the B1 dam in Minas Gerais. Thus, the study and monitoring of these affected soils is crucial for verifying the quality of the soil during the recovery process, be it natural or through recovery practices of degraded areas. A promising strategy is the use of soil enzyme activity as microbiological bioindicators of soil functional quality due to its high sensitivity and speed in detecting changes over time. Therefore, the objective of this work was to evaluate the enzymatic activity of 21 soil samples collected in March 2022, September 2022 and March 2023, from area affected by the tailings spill and an adjacent unaffected forest area. For this purpose, the enzymes analyzed were acid and alkaline phosphatases, for β -glucosidase, arylsulfatase, and urease. The results were submitted to Kruskal Wallis analysis with Fisher's post-hoc at 0.05 significance, using the Agricolae package of the R software, comparing the area affected by the tailings (group 1) with the adjacent forest area as a reference (group 2). The results showed a significant difference between groups 1 and 2 for all enzymes studied in all collections, with values for group 2 being significantly higher than for group 1, possibly related to the presence of greater vegetation cover. When comparing the collections, within each group, there was no statistical difference for most of the enzymes in the two groups, except for urease, which in both groups showed an increase in activity values in the March 2023 collection compared to the others, being that in group 1 its values increased significantly from the September 2022 collection, indicating a possible improvement in soil activities over time and showing that the use of soil enzymes as bioindicators of quality is adequate.

Key words: Recovery; Monitoring; Bioindicators.

Atividade Enzimática para Monitoramento de Solo Impactado por Rejeitos de Ferro

A exploração do minério de ferro, muitas vezes, expõe os solos a situações de degradação ambiental sendo o uso das enzimas do solo, bioindicadores importantes de sua qualidade funcional. Sendo assim, esse trabalho objetivou avaliar a atividade enzimática de 21 amostras de solo de uma área afetada por rejeito de minério de ferro. Os resultados mostraram comparativamente diferenças significativas para as enzimas estudadas ao longo do período avaliado associadas a possível recuperação da área estudada.

Palavras-chave: Recuperação; Monitoramento; Bioindicadores.

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