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Soil Quality in Mining Areas Undergoing Ecological Restoration

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Mining is one of the anthropogenic activities most impactful to natural resources, and can profoundly affect the resilience of ecosystems depending on the level of soil degradation. Ecological restoration has generated promising results even in situations of degradation as intense as those of mining. The aim of this study was to evaluate the quality of the soil in areas explored by the bauxite extraction undergoing restoration: recently mined, seven years, 20 years and native forest. The studied areas are located in the municipality of Poços de Caldas-MG, belonging to ALCOA Alumínio. The mined-out areas for seven and twenty years were uncompressed and received topsoil, liming and fertilization with nitrogen, phosphorus and potassium. Samples for chemical analyses of soil fertility were carried out at depths of 0-5, 5-10, 10-20, 20-40 and 40-60 cm. Soil quality was evaluated by pondered additive model. The parameters were considered organic matter (0.6) and bases saturation (0.4) for soil fertility function (0.6) and calcium (0.5) and aluminum saturation (0.5) for the function root development (0.4) - (the numbers in parentheses represent the weights attributed). Despite the high content, only the organic matter was not a parameter enough to classify the soil quality, once the native forest has very low base saturation (7%). The soil quality index(SQI) obtained allowed to classify the areas, being the first restored 20 years ago with SQI equal to 0.7 followed of the restored 7 years ago, native forest and newly mined with SQIs equal to 0.6, 04 and 0.3, respectively. The native tropical forests have low soil fertility, keeping by the cycling of nutrients. This demonstrates the need for the degraded areas, especially the mined, are uncompressed to allow storage of water and root development, in addition to the replacement of nutrients and soil acidity correction, especially high levels of aluminum saturation (66%) and low calcium (3 mmolcdm-3).