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"Competing pathways for equitable food systems transformation: Trade-offs and synergies"

Performance of *Poaceae* cultivated in soil degraded by chromite mining in Hidrolândia, Brazil

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Abstract

Phytoremediation is a bioremediation technique that consists of the direct use of plants for the transfer or stabilisation of all potentially toxic metals in polluted soils. Bioenergy is a sustainable energy source option, however, it is often criticised for indirect changes in land use, due to lack of high quality agricultural land and competing with food production. At the same time, contaminated areas remain unused. The present study aims to provide a sustainable solution to both problems, facilitating the decontamination of land through phytoremediation with the cultivation of plants of the *Poaceae* family for energy production. The objective of this work was to evaluate the energy productivity of plants of the *Poaceae* family used in the phytoremediation of a soil degraded by chromite mining in Hidrolândia, Goiás, Brazil. The experiment was carried out in a greenhouse at the School of Agronomy at the Federal University of Goiás, Goiânia, with a dystrophic Red Latosol with a clayey texture degraded by Cr exploitation. The experimental design was in randomised blocks, with 5 treatments and 4 replications. The treatments were composed of: sugar cane, energy cane, elephant grass, capiaçu grass and spontaneous plants. The plants were cut after 6 months of cultivation for elephant and capiaçu grasses, with the sum of two cuts being performed, for sugar and energy canes the cut was made after 12 months. Productivity in terms of dry biomass and energy potential were determined. The data were subjected to analysis of variance and when differences were found, the Tukey test was applied, both at 5 % error probability. Plants from the *Poaceae* family, energy cane, sugar cane, elephant grass and capiaçu grass have good growth and development, with good biomass production in an Oxisol with high levels of Cr and Ni, being plants with potential for phytoremediation of metal-contaminated soils.

Keywords: Chromium, nickel, phytoremediation, soil

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