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Understanding the potential of energy crops in heavy metals contaminated soils

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Statement of the Problem: The increasing demand for biomass for the production of bioenergy is generating land-use conflicts which might be avoided through the establishment of dedicated energy crops on marginal land, e.g. heavy-metal contaminated land. Indeed, heavy metals contaminated soils might cause marginality of soils through the degradation of their quality, inducing the reduction of crop yields and the quality of agricultural products, desertification, and the loss of ecosystem services. But assessment of bioenergy from marginal land should take into account constraining factors, such as productivity and biomass quality. Therefore, the aim of this work was to study the effects of soils contaminated with heavy metals on growth and productivity of kenaf, a fiber crop with potential to be used as a feedstock for bioenergy and biomaterials. Methodology & Theoretical Orientation: The effects of different heavy metals (Cd, Cu, Pb and Zn) on growth, productivity and biomass quality of kenaf was evaluated in a pot essay. Plants were tested under different levels of contamination: no contamination (0), low level of contamination (L) and high level of contamination (H). The low levels of contamination tested were chosen based on the Portuguese Decree Law 276/2009 that indicates limit values for concentrations of heavy metals in soil (Cd: 4 mg/kg, Cu: 300 mg/kg, Pb: 450 mg/kg, Zn: 450 mg/kg). The high level of contamination was twice this limit values. Findings: yields were not significantly affected by contamination. Yet, biomass from contaminated pots showed higher ash content and heavy metals content which can be detrimental for its valorization. Conclusion & Significance: Overall, kenaf showed high tolerance to soil contamination and biomass can be used for bioenergy and biomaterials although its quality may hinder its valorization options.

Biography

I have a degree in Agronomy and a master's degree in Natural Resource Management. As an employee of the University of Zambezi, in recent years, in addition to coordinating the research and extension sector in the Tete delegation, I participated in the elaboration of projects for the sustainable management of natural resources and agricultural production to improve the problems of child malnutrition in some regions of Mozambique. At this moment I am coordinator of the project to create the Laboratory of Geoprocessing and laboratory evaluation and promotion of environmental health, and as a doctoral student in Bioenergy, I am evaluating the phytoremediation potential of contaminated soils using energy crops.

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