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## Fertilising Effects of Combined Application of Sugar Cane Ash with Mycorrhiza Fungi and Compost in Different Cuban Soils

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### Abstract

Due to the high prices of imported chemical fertilizers Cuban soils are often inadequately low fertilized. On the other hand, in Cuba sugar cane ash, a residue of the sugar industry, is generated in enormous quantities and stored in outdoor piles, constituting an environmental risk. Adequate use of cane ash as an amendment for soils poor in phosphorus (P) and potassium (K) could contribute to plant nutrition. However, little research is in progress to utilize this residue. The objective of this work was to determine the adequate fertilization dosage of sugar cane ash alone, or with mycorrhiza and compost additions. Therefore, field studies and pot experiments were carried out with common Cuban soils (Eutric Oxisols and Inceptisols, including calcareous and non-calcareous soils) and different crops (maize and sugar cane). Results indicated that adequate cane ash dosages vary from 2.5 to 10 t ha<sup>-1</sup>, depending on the soil characteristics. Ash had notable effects on soil P and K pools of both soil types. Positive fertilizing effects of the moderate ash supply were also found for calcareous soils with high pH values. However, higher dosages may lead to excessive soil pH increases and should be avoided. The application of mycorrhiza together with ashes enabled optimal P and K availability, even if the average ash dose was reduced from 10 t ha<sup>-1</sup> to 5 t ha<sup>-1</sup>. A combined application of ashes with compost resulted in higher plant yields than compost application alone. Results also showed positive effects of cane ash on physical soil properties (soil structure, aggregate stability) and on soil microbial activity. Therefore we conclude, that sugar cane ashes can be an adequate substitute for high soluble P and K fertilizers in Cuban soils.

**Keywords:** Cane ash, environmental protection, fertilisation, mycorrhiza, organic soil amendments, phosphorus