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“Reconcile land system changes
with planetary health”

Exploring salinity management: Effects of potassium source on sweetpotato irrigated with saline water

JOHANNA VOLK¹, JAKUB ABELARD POSPÍŠIL², MARIA ISABEL ANDRADE³, FOLKARD ASCH⁴

¹University of Hohenheim, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Germany

²Czech University of Life Sciences, Department of Crop Science and Agroforestry,

³International Potato Center (CIP), Flagship 2 - Adapted Productive Varieties and Quality Seed, Mozambique

⁴University of Hohenheim, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Germany

Abstract

The salinisation of agricultural land is a typical result of land system changes such as agricultural intensification and urbanisation which degrade soils and push farmers into water-limited environments.

Sweetpotato, a critical food crop widely cultivated in the Global South due to its resilience and nutritional value is increasingly exposed to salinity. Unsustainable irrigation practices, climate change impacts, and its use on marginal soils and coastal areas make sweetpotato a focus crop for salinity tolerance studies.

Maintaining favourable potassium concentrations in plant tissue has been established as a key mechanism for improving salinity tolerance and sustaining productivity in saline environments. Increasing available potassium in the soil through the addition of fertiliser therefore is a potential salinity management strategy.

Despite its potential, to date limited information is available on effects of potassium fertiliser application on the salt tolerance of sweetpotato.

This study investigates the effect of three potassium sources (60 kg ha⁻¹ of KCl, K₂SO₄ and KH₂PO₄) on biomass production and potassium assimilation and partitioning in two sweetpotato varieties (CIP 188002.1 and CIP 189151.8) irrigated with saline water. The experiment was conducted in a controlled environment pot trial using drip irrigation to salinize the soil. Potassium fertilisers were manually applied in two splits.

Results reveal that the contribution of potassium fertiliser to salinity tolerance varies among sources. Linkages between potassium assimilation, partitioning and biomass production are discussed.

The findings underscore the potential of tailored potassium fertilisation strategies to support sustainable crop production in saline environments.

The study contributes to the dialogue on sustainable land management practices and their role in restoring soil productivity and promoting food security.

Keywords: Potassium fertiliser, salinity management, sustainable land use, sweetpotato