Impact of Heavy Metal Toxicity on Sugarcane Growth, Development and Productivity

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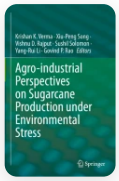

Agro-industrial Perspectives on Sugarcane Production under Environmental Stress

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Abstract

Sugarcane is one of the world's largest and extremely important crop. It plays a major role in the world economy and is the main source for sugar and ethanol production. The effect on crop growth and development due to soil and water contamination with toxic heavy metals is a serious environmental problem. Heavy metal accumulation in agricultural land is a threat to crop productivity and quality. Heavy metals such as As, Cd, Cu, Cr, Pb, Ni, Zn, Hg, etc., and their various sources like industrial effluents, wastewater irrigation, polluted soil, sewage sludge, and use of pesticides and excessive fertilizers are responsible for the contamination. Increasing levels of heavy metals in soil are absorbed by growing sugarcane, where they reach phytotoxic levels and could lead to severe impacts on plant development. Heavy metals have adverse effects on the ecosystem. The consumption of contaminated crop and juice also causes health issues in humans as the edible parts of crop show a higher accumulation of these toxic metals. This chapter highlights the impact of heavy metal toxicity on sugarcane growth, development and productivity. The focus is laid on sources of heavy metal exposure to sugarcane, their route of exposure, bio uptake, and mechanism of toxicity in the crop. The various toxic effects, symptoms of some heavy metals on sugarcane, and health risks are also discussed.