كلية الزراعة
Faculty of Agriculture
قسم البساتين
Horticulture Department
جامعة الفيوم
Fayoum University

Eighth Article: (Sharing with another inside and outside the specialization-Published).

Article title	Enhancing sweet potato (*Ipomoea batatas*) resilience grown in cadmium-contaminated saline soil: a synergistic approach using Moringa leaf extract and effective microorganisms application.
Publishing date	23-4-2024
The Journal	Environmental Science and Pollution Research, 31, 32464–32479.
Impact factor	NA

Abstract

Raising soil contamination with cadmium (Cd^{2+}) and salinization necessitates the development of green approaches using bio-elicitors to ensure sustainable crop production and mitigate the detrimental health impacts. Two field trials were carried out to study the individual and combined effects of foliage spraying of *Moringa* leaf extract (MLE) and soil application of effective microorganisms (EMs) on the physio-biochemical, osmolytes, antioxidants, and performance of sweet potato grown in Cd^{2+}-contaminated salty soil ($Cd^{2+} = 17.42$ mg kg^{-1} soil and soil salinity ECe = 7.42 dS m^{-1}). Application of MLE, EMs, or MLE plus EMs significantly reduced the accumulation of Cd^{2+} in roots by 55.6%, 50.0%, or 68.1% and in leaves by 31.4%, 27.6%, or 38.0%, respectively, compared to the control. Co-application of MLE and EMs reduced Na^{+} concentration while substantially raising N, P, K^{+}, and Ca^{2+} acquisition in the leaves. MLE and EMs-treated plants exhibited higher concentrations of total soluble sugar by 69.6%, free proline by 47.7%, total free amino acids by 29.0%, and protein by 125.7% compared to the control. The enzymatic (SOD, APX, GR, and CAT) and non-enzymatic (phenolic acids, GSH, and AsA) antioxidants increased in plants treated with MLE and/or EMs application. Applying MLE and/or EMs increased the leaf photosynthetic pigment contents, membrane stability, relative water content, water productivity, growth traits, and tuber yield of Cd^{2+} and salt-stressed sweet potato. Consequently, the integrative application of MLE and EMs achieved the best results exceeding the single treatments recommended in future application to sweet potato in saline soil contaminated with Cd^{2+}.