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Entitled

SCREENING FOR ENDOPHYTIC ACTINOBACTERIA TO ENHANCE GROWTH AND SALINITY TOLERANCE OF TOMATO PLANTS IN THE UNITED ARAB EMIRATES

by

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Date & Venue

12:00 PM

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Building F3 – Room: 13**4**

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Meeting ID: 860 0406 9789

Abstract

Salinity is one of the most decisive environmental factors limiting the productivity of crop plants, mainly in arid and semi-arid regions. An eco-friendly technology can be used to boost crop production in saline areas by using plant growth-promoting bacteria. Endophytic actinobacteria that produce the enzyme 1-aminocyclopropane-1-carboxylic acid (ACC) deaminase (ACCD) can modulate the levels of ethylene (ET) in plants to reduce the effect of abiotic stresses including high salt stress. The main objectives of this study were to: (1) Evaluate endophytic actinobacterial isolates from healthy tomato plants cultivated in the UAE that are capable of producing ACCD *in vitro*; (2) test the isolated endophytic actinobacteria possessing ACCD for their potential of producing plant growth regulators (PGRs) *in vitro*; and (3) test the ability of tomato seedlings growing under high salt stress conditions using the most promising endophytic actinobacterial isolate producing ACCD in the greenhouse. To achieve this, twenty-five isolates of actinobacteria possessing the activity of ACCD were obtained from the roots of *Zygophyllum mandaveli* in Sweihan area, Abu Dhabi-UAE. *In vitro* screening demonstrated that two actinobacterial isolates produced ACCD, while tolerating up to 8% NaCl. In the greenhouse, the ACCD-producing isolate (referred to as Z3-40 isolate) significantly (P<0.05) enhanced growth of tomato seedlings in response to salt stress (120 mM NaCl). This was evident from the increase in the dry weight of roots by 2 -fold and the length of roots and shoots by about 25%. These results were also associated with the reduced levels of the endogenous ACC by 3- and 3-fold in both root and shoot tissues, respectively, in plants inoculated with Z3-40 isolate compared to those of control or non-ACCD-producing isolate treatments. In conclusion, the production of ACCD by the endophytic actinobacterial isolate and its ability to enhance tomato growth under saline conditions mitigate the effect of salt stress through the reduction of endogenous ACC as well as ET levels in plant tissues. This investigation is expected to contribute to the development of sustainable agricultural strategies for utilizing saline water for the primary production in the United Arab Emirates, allowing local crop growers to use the high saline groundwater for irrigation.

Keywords: ACC deaminase, ethylene, endophytic actinobacteria, plant growth promoting actinobacteria, tomato.