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Master Thesis Defense

Entitled

*SOIL-PLANT INTERFACE, CARBON SEQUESTRATION AND THE ECO-PHYSIOLOGICAL GROWTH
OF SALSOLA IMBRICATA AND ZYGOPHYLLUM MANDAVILLEI USING LOCALLY GROWN
RHIZOSPHERE AND ENDOPHYTIC BACTERIA*

by

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Date & Venue

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Abstract

Salsola imbricata and *Zygophyllum mandavillei* are halophytic plants available widely in the UAE. These two species have important environmental services such as sand dune fixation which will potentially improve plant cover and help tackle the problem of desertification. The species were selected due to their availability and role in the desert environment of the UAE. Plants are also constantly involved in interactions with a wide range of bacteria in the soil. These plant-associated bacteria colonize the rhizosphere (rhizobacteria), and the internal plant tissues (bacterial endophytes). Endophytic bacteria are those capable of colonizing live internal plant tissues which can be isolated from surface-disinfested plant material, and that do not visibly harm the host plant. In the present thesis, *S. imbricata* and *Z. mandavillei* were cultivated with or without the incorporation of plant growth promoting endophytic bacteria that were obtained from *S. imbricata* and *Z. mandavillei* roots and soil. These plant growth promoting endophytic bacteria were selected based on their abilities to produce plant growth regulators such as auxins, polyamines and the enzyme 1-aminocyclopropane-1-carboxylic acid (ACC) deaminase in addition to their abilities to fix nitrogen and to solubilize phosphorus. The aim of the present work is to examine if these endophytic bacteria can promote *S. imbricata* and *Z. mandavillei* growth without using large quantities of water, and the plants' carbon sequestration potentials. The plant species physiological growth pattern was closely monitored. The inoculation was effective in some growth parameters in both species after the application of treatment. Inoculated *S. imbricata* plants had larger root weight than control plants after four months of treatment, 0.50g and 0.23g respectively.

Keywords: Halophytes, Plant Growth Promoting Bacteria, Water Stress, Soil inoculation.