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**Master Thesis Defense**

Entitled

*THE EFFECTS OF SALINITY ON THE GROWTH AND FORAGE QUALITY OF CACTUS CULTIVARS*

by

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Abstract

Drought and salt tolerant alternate crops which can survive in adverse climatic conditions are crucial for sustainability of agriculture in arid and semiarid regions. Opuntia, the cactus pear, is an important forage in these regions and it has high productivity potential, drought tolerant, considerable survival in harsh conditions with efficient water use, and has multiple uses than other fodder plants. Therefore, drought and salt tolerant cactus would be a best alternative to replace traditional fodder species, with utilizing abundant brackish water resources in the UAE. This thesis is aimed to evaluate the salt tolerance of fifteen Opuntia varieties, and their productivity and nutritive composition under five salinity levels of irrigation water viz. control, 4000, 8000, 10000, 12000 ppm sodium chloride (NaCl). Experiment was carried out in completely randomized block design with three replicates under greenhouse conditions in pots at Al Salamat research station during the 2015 and 2016 growing seasons. Varieties were evaluated at each salinity treatment level, based on their plant height, number of cladodes per plant, and length, width, and thickness of each cladode. Parts of pads were collected for chemical analysis on the dry matter (crude protein, acid detergent fiber, sugar, ash percentage, macro elements, secondary elements, trace elements, heavy metals). At 12000ppm salinity level, plant weight, cladodes fresh weight, root fresh and dry weight were measured and analyzed for root dry matter. Results showed that both salinity and variety influenced on growth parameters (plant height, and cladode thickness, width), nutritive parameters (ash, sugar and ADF), macro mineral (K), secondary elements (Na, Ca, Mg, Na, S), trace elements (Fe, Cu, Mn, Zn, B), and heavy metals (Ni, Pb, Cr, Se). Moreover, only plant height and number of cladodes were significantly differed among the studied varieties under control condition. However, at 12000ppm plant weight, cladodes fresh weight, roots fresh weight and dry weight and root DM percentage were not influenced by variety, whereas plant height, number of cladodes per plant and were significantly differed among the studied varieties at 12000ppm. In conclusion, C26 out performed in both control and 12000ppm salinity, while C30 was the least performed cactus variety in both conditions. However, increase of K content at 12000ppm with compared to control was recorded minimum for both C26 and C30; while for Na content it was only in C30. To date, relatively few investigations have been conducted to evaluate the spineless cactus growth under different salinity conditions in the gulf region. This might be the first report of evaluation of Opuntia varieties for salt tolerance, productivity, growth and nutritive composition in the UAE.

**Keywords:** Cactus pear, cladodes, fodder, forage, heavy metals, macro mineral, salinity, salt tolerance, secondary elements.