

## USE OF SALINE WATER FOR GREENHOUSE BELL PEPPER (*CAPSICUM ANNUUM*) PRODUCTION

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### ABSTRACT

A greenhouse experiment was conducted to study the response of bell pepper to quality of irrigation water and irrigation regimes. The main treatments included non-saline water (EC-0.5 dS m<sup>-1</sup>) and saline water (EC-3.5 dS m<sup>-1</sup>). The sub-treatments included three irrigation regimes (at 100, 80 and 60% of crop Evapotranspiration (ET<sub>c</sub>)) in combination with three crop growth stages (vegetative, flowering to fruit set and fruit development to harvest). Application of saline water significantly reduced marketable fresh fruit yield from 5.47 to 2.60 kg m<sup>-2</sup>. Irrigation at 80% ET<sub>c</sub> till the end of vegetative stage and at 100% ET<sub>c</sub> later significantly increased the yield (5.01 kg m<sup>-2</sup>). Irrigation with non-saline water at either 80 or 60% ET<sub>c</sub> till the end of vegetative stage and at 100% ET<sub>c</sub> later resulted in similar fresh fruit yield. Saline water irrigation at 80% ET<sub>c</sub> till the end of vegetative stage and at 100% ET<sub>c</sub> later, proved superior to all the other treatments. Use of saline water (3.5 dS m<sup>-1</sup>) for irrigation of greenhouse bell pepper resulted in an increase in soil electrical conductivity and caused a drop in the fresh fruit yield by 72% as compared to irrigation with non-saline water (0.5 dS m<sup>-1</sup>). Irrigation at 80% ET<sub>c</sub> in the vegetative stage and at 100% ET<sub>c</sub> in the other two stages (flowering to fruit set and fruit development to harvest) recorded significantly higher total (5.52 kg m<sup>-2</sup>) and marketable (5.01 kg m<sup>-2</sup>) fresh fruit yield than all the other irrigation treatments. Saline water irrigation improved fruit quality with higher TSS (10.80%), Vitamin C (228.66 mg<sup>-100g</sup>) and acidity (0.305%).

**Keywords:** Water Quality, Water Use Efficiency, Normalized Difference Vegetation Index, Canopy Temperature, Saudi Arabia

### 1. INTRODUCTION

The ever increasing demand for fresh water resources is a global concern. However, it is a serious challenge in Saudi Arabia, which is striving hard to attain sustainability of agriculture and ensure food security. To meet the growing demand for food, the country relies mainly on finite water resources from deep aquifers. Agriculture consumes about 90% of total water consumption in the country. The agricultural crops such

as wheat, alfalfa, Rhodes grass, potatoes, are grown under field conditions using center pivot irrigation systems. There is a growing fear that acute shortage of water may adversely affect agriculture. Thus, there is an urgent need to conserve natural resources and to increase the input use efficiencies to achieve agricultural sustainability in the Kingdom. Greenhouses offer an ideal alternative to traditional agriculture for meeting the urgent needs of the Kingdom; the carefully-controlled microclimates within greenhouses favour crop

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