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Yield and Quality of Date Palm (*Phoenix dactylifera L*) Product under Deficit Irrigation Regimes in Dry Conditions

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Abstract

This study was conducted to determine appropriate irrigation amount, fruit quality and water-yield relationship for date palm under dry conditions. The research work was carried out in Alkharj, Kingdom of Saudi Arabia, for two consecutive seasons (2016-2017) and (2017-2018). The treatment contained four irrigation water amounts, (ETC 100%, ETC 75% and ETC 50%) of date palm tree water requirement and the amount of water actually used (control). A mature date palm trees (Segae variety) of the same age (10 years) were selected randomly to perform the experiment in both seasons. The experiment was organized in Complete Block Design (CBD) and the analysis was done using SPSS. The measured parameters were water productivity (kg/m³), yield parameter's (weight of date fruit /g and productivity kg/tree), and quality parameter's (moisture content (%), total soluble solid (TSS %), Brominated (%) of date fruit and Veneer (%)). Moreover, the quality of irrigation water used, was assessed and compared with FAO standard for irrigation water. The result showed that the water quality was found within the permissible level of FAO standard for irrigation water. The result also indicated that the amount of water using in the study area, is more than the actual amount of water needed by date palm tree (ETc100%) according to the local weather. Moreover, the water treatment (75% ETc) showed the highest significant differences (P \leq 0.05) of water productivity, moisture content, and (TSS%). While water treatment (100% ETc) revealed the highest values of productivity in both seasons followed by (75% ETc). Moreover, the Brominated and Veneer values were found within the recommended level according to the local standard. However, the water treatment (50% ETc) showed a high significant difference ($P \le 0.05$) in compared with others treatments. This study concluded that date palm can growth perfectly with high yield and product quality with water regime ETc 75%. Therefore, huge amount of water can be saved when adopting this regime for date palm production.

Keywords: Deficit irrigation; Date palm; Water productivity; Date palm fruit quality

1. Introduction

The Kingdom of Saudi Arabia, covered an area of 2.15 million km², is by far the largest country on the Arabian Peninsula. Saudi Arabia lies in the tropical and subtropical desert region. Therefore, it is facing great challenges due to its limited water resources for agricultural development and sustainability. Searching for new water resource in Saudi Arabia is too difficult and very expensive process, so the shortest way to maximize the water use efficiency through optimizing water use and determination the actual crop water requirements. The overestimation of water requirements result in wastage of precious

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