

## **Yield and Irrigation Water Use Efficiency Response of Chufa (*Cyperus esculentus* L. var. *sativus* Boeck.) to Drip Irrigation Management**

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Chufa, also known as tigernut, is a typical crop in Valencia, Spain, where it is cultivated in ridges with furrow irrigation. Its cultivation uses large amounts of water, in the order of  $10,000 \text{ m}^3 \text{ ha}^{-1} \text{ year}^{-1}$ , so different studies have been undertaken in order to maximize the irrigation water use efficiency (IWUE). One of these studies faced the application of drip irrigation in the chufa cultivation, comparing three different irrigation strategies. These strategies differed on the volumetric soil water content (VSWC) when each irrigation event started. Starting each irrigation when the VSWC dropped to 90% of field capacity (FC) led to the highest yield, while the highest IWUE was obtained when irrigation started at 80% FC. It can be stated that starting each irrigation event when the VSWC is between 80 and 90% FC leads to the best results in terms of yield and IWUE. However, these results may still be improved by defining the best strategy in the irrigation stop, which is the aim of the herein presented research. This investigation comprises the productive response of the chufa crop with drip irrigation, determining yield and IWUE. The VSWC was monitored using multi-depth capacitance probes, with sensors at 0.10, 0.20 and 0.30 m below the top of the ridge. Each irrigation event started when the volumetric soil water content at 0.10 m dropped to 85% FC. Three irrigation strategies were considered, T1: each event being stopped when the average of the VSWC values at 0.10, 0.20 and 0.30 m depth reached the corresponding FC value; T2: each event being stopped when the VSWC values at 0.20 m reached the corresponding FC value; T3 each irrigation event lasted 30 min (corresponding to 7.33 mm). The largest yield ( $P \leq 0.05$ ) was obtained in T2 ( $2.31 \text{ kg m}^{-2}$ ), with no statistical differences ( $P \leq 0.05$ ) between T1 ( $1.94 \text{ kg m}^{-2}$ ) and T3 ( $1.92 \text{ kg m}^{-2}$ ). The highest yield in T2 was obtained with the largest volume of irrigation water applied (722 mm), resulting in the lowest ( $P \leq 0.01$ ) IWUE ( $3.20 \text{ kg m}^{-3}$ ) in relation to T1 ( $4.78 \text{ kg m}^{-3}$ ) and T3 ( $5.4 \text{ kg m}^{-3}$ ), with no statistical difference ( $P \leq 0.05$ ) between them. T1. The average tuber weight, size and shape showed no differences ( $P \leq 0.05$ ) between the strategies.