

Title Combining deficit irrigation strategies and controlled atmosphere to maintain bioactive compounds in nectarine

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Abstract

Mediterranean agricultural systems are characterized by shortage of water and the low quality of the available resources. Therefore, the management of crops should be based on deficit irrigation strategies (DI). The effect of DI on the evolution of total phenolic contents, antioxidant capacity and vitamin C of 'Viowhite' Nectarines was studied. Three irrigation treatments were implemented: Control, watered at 100% of crop evapotranspiration (ET_c); Overirrigated, watered at 120% of ET_c; and DI, watered as the Control, except on the two most critical periods (fruit growth and pre-harvest phases), when the tree was irrigated at 60 and 80% of Control, respectively. After harvest, fruits were stored up to 14 days at 0 °C and 95% RH in air or controlled atmosphere (CA; 3-4 kPa O₂ and 12-14 kPa CO₂), followed by 3 days at 15°C in air (simulating a retail sale period). The ranges of total phenolic contents (in mg/100 g of fresh weight) were 53 to 62 (day 0), 56 to 66 (after 14 days) and 44 to 58 (14+3 days). Fruits from DI stored under CA reached the highest total phenolic levels after 14 and 14+3 days. DI fruits kept their initial antioxidant capacity level throughout the storage (57.27 ± 0.45 mg AAE/100 g FW), while in Control and Overirrigated, the antioxidant capacity gradually decreased (from 66 to 52 mg AAE/100 g FW). Concerning vitamin C (ascorbic + dehydroascorbic acids; AA + DHA), AA was transformed into DHA during storage and the DHA content was higher in CA-stored samples than in those kept in air (15 versus 10 mg/100 g FW). As main conclusion, cultivation under DI allowed important water saving and provided nectarines with good quality after storage both in air or in CA.