

Title Vitamin C, antioxidant activity and phenolics compounds of fresh-cut pomegranates cultivated under deficit irrigation strategy

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Abstract

The persistent water shortage, typical of the Spanish Mediterranean agricultural systems, has driven the production methods towards the use of deficit irrigation (DI) strategies. This may allow important water savings without affecting commercial quality. Pomegranate (*Punica granatum* L.), as a stress tolerant tree, is an interesting crop for areas with few and low quality water resources. In this study the effects of DI on individual phenolics compounds, antioxidant capacity and vitamin C content of fresh cut pomegranates were analyzed. Arils (cv. 'Mollar de Elche') were obtained from two irrigations treatments: T0 (control: watered 100% of potential evapotranspiration -ET_o) and T1 (scheduled DI during the crop representing 33% of T0). After being hand extracted, arils were immersed in chlorinated water (100 ppm NaClO, pH 6.5, 2°C, 2 min), rinsed with tap water (2°C, 1 min) and allowed to superficially dry. About 100 g of arils were packaged in 370 mL polypropylene (PP) baskets thermally sealed on the top with a bi-oriented PP film (30 µm-thick) and stored up to 14 days at 5°C. Atmosphere composition at the steady state was nearly the same for both treatments (12-15 kPa O₂ + 6-8 kPa CO₂), Initial total phenolics were similar for both treatments and tended to be constant along the storage period with 680.62 and 690.74 mg CAE kg⁻¹ f.w. for T0 and T1 respectively. Catachin was the predominant phenolic compound, followed by gallic acid, phloridzin and p-cumaric acid. Total antioxidant capacity was slightly higher for T0 (900.52 mg AAE kg⁻¹ f.w.) than for T1 (890.46 mg EAA kg⁻¹ f.w.), increasing at the beginning and then kept almost invariable. Related to vitamin C, ascorbic (AA) + dehydroascorbic (DHA) acid concentration was initially the same for both treatments, decreasing significantly during storage. However, values for T1 were moderately higher than for T0 after 14 days at 5°C. As conclusion, DI strategies allow obtaining arils with good quality, relatively richer in vitamin C and with good amounts of phenolics compounds and antioxidant activity.