Irrigation strategies affect quality, mineral composition and internal rind browning of ‘Mollar de Elche’ pomegranate fruits

JULIÁN BARTUAL
Estación Experimental Agraria de Elche, STT, Ctra Dolores Km.1, 03290 Elche, Alicante, Spain

M BERNARDITA PEREZ-GAGO
Instituto Valenciano de Investigaciones Agrarias, Moncada Valencia, Spain

M JOSÉ NAVARRO-CANOVAS
Estación Experimental Agraria de Elche, STT, 03540 Alicante Elche, Spain

MANUEL ORTIZ
Estación Experimental Agraria de Elche, STT, 03540 Alicante Elche, Spain
Lluis Palou, Instituto Valenciano de Investigaciones Agrarias, Moncada Valencia, Spain

Water availability for irrigation is a scarce and limiting factor in the southeast of Spain, the country’s main pomegranate (Punica granatum L.) producing area. Therefore, it is necessary to optimize the use of this resource by studying different irrigation strategies in order to reduce water inputs with the least possible impact on fruit production and quality. On the other hand, a physiological disorder has recently been observed in Spanish ‘Mollar de Elche’ pomegranates that causes browning of the inner side of the rind, especially in fruits subjected to long-term cold storage. The purpose of the present study was to determine the effect of irrigation management (different irrigation doses and drip flow rates) on plant nutrition, fruit quality and postharvest internal rind browning. Applied localized irrigation treatments were T100 or control (100% ETc) and a sustained deficit irrigation (SDI) that established a restriction of 50% of the control regime. In addition, for each treatment, drip emitters with different flow rates of 8, 4 and 2 L per hour were used. The experimental design of the orchard was in random blocks of eight trees and three repetitions per treatment. Capacitive sensors (FDR) were installed, and midday stem water potential (Ψstem) measurements were carried out. The parameters measured in fruits were morphological parameters, peel and juice color (CIELab*), juice quality (SST, pH, AT, IM), mineral nutrient composition and the internal rind browning index. The results obtained showed that SDI increased the external coloration of the fruit and the maturity index but reduced the thickness of the rind and did not affect the color of the juice. No significant differences among types of dripper were found in fruits. Boron concentration in the albedo was affected by the irrigation regime. SDI reduced the incidence of internal rind browning, suggesting that this irrigation strategy can reduce this physiological disorder.