Title The fruit quality of five plum cultivars '*Prunus Domestica* L.' related to harvesting date and ultra low oxygen atmosphere storage

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Abstract

Five plum (*Prunus Domestica* L.) cultivars 'Jubileum', 'Opal', 'Vallor', 'Victoria', and 'Vision' were harvested at four different dates according to their skin superficial color (40-90%), soluble solid concentration (SSC), flesh firmness, ethylene production and respiration rate, and stored for 5 weeks in five different condition (air: 21.0 kPa O_2+ 0.03 kPa, ultra low oxygen atmosphere (ULO): 1.0 kPa O_2+1.0 kPa CO_2; 1.0 kPa CO_2+2.0 kPa CO_2; 1.0 kPa O_2+ 3.5 kPa CO_2 and 1.0 kPa O_2+5.0 kPa CO_2). All plums were stored at 0.5ºC, 90% RH. After storage, plums were ripened for 5 days at 5, 10 or 15 ºC. Storage disorders and decay incidence were estimated. Weight loss, flesh firmness, skin and flesh color, SSC, titratable acidity (TA), and bioactive compounds (total phenols, carotenoids and ascorbic acid, were measured at harvest and after ripening. Only 'Jubileum' behaved as suppressed-climacteric fruit and have to be harvested after completed growth and coloration (more than 80%). The other four examined cultivars showed the typical climacteric ripening pattern and have to be harvested for ULO storage when they still grew. Measurements of color and firmness were the most practical methods to indicate optimum harvest date. Different cultivars responded differently to CO_2 concentration, whereas high levels (more than 3 kPa caused flavour deterioration and flesh brown, particularly in early harvested fruits. 'Opal', 'Vallor' and 'Victoria' were successfully stored on 1.0 kPa O_2+2.0 kPa CO_2, 'Jubileum' and 'Vision' on 1.0 kPa O_2+1.0 kPa CO_2. In these conditions pathogenic decay was suppressed and acceptable quality maintained. Effects of harvesting dates and storage methods on the bioactive compounds in either cultivar were reported for the first time.