

**Title** Effect of superatmospheric oxygen concentrations on physiological and qualitative aspects of cold stored pomegranate fruit

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### **Abstract**

Exposure to high concentrations of O<sub>2</sub> can positively affect the quality of different commodities during their postharvest life. The objective of this experiment was to assess the physiological and qualitative response of 'Primosole' pomegranates exposed to normal atmosphere (NA; 21 kPa O<sub>2</sub> and + 79 kPa N<sub>2</sub>) or to atmospheres with high concentrations of O<sub>2</sub> (SAO; 50 kPa O<sub>2</sub> and + 50 kPa N<sub>2</sub> or 97 kPa O<sub>2</sub> + 3 kPa N<sub>2</sub>). Fruit were stored at 2°C in NA or SAO for 4 weeks plus 1 week at 20°C in NA to simulate the marketing conditions (SMC). At the end of cold storage no significant differences were detected in respiration between fruit exposed to NA and 50 kPa O<sub>2</sub>, while significantly lower values were detected in those held at 97 kPa O<sub>2</sub>. However, upon transfer to SMC, respiration increased to the same level as at harvest in all treatments. 24h after transfer to 20°C, the seeds of fruit exposed to high O<sub>2</sub> produced less CO<sub>2</sub> than those of controls, but after 1 week of storage there was no difference amongst the treatments. During storage electrolyte leakage increased in peel tissue of fruit exposed to 50 and 97 kPa O<sub>2</sub>, showing higher and lower values, respectively, than NA stored fruit. In contrast, electrolyte leakage of seeds was similar in NA and 50 kPa O<sub>2</sub> stored fruit and higher in those stored at 97 kPa O<sub>2</sub>. Exposure to SAO had no important effect on the main chemical parameters (pH, titratable acidity, total soluble solids) of the juice, although at the end of the SMC the concentrations of total soluble solids and titratable acidity were slightly lower in fruit stored at 97 kPa O<sub>2</sub>. Chilling injury appeared only sporadically, regardless of the treatments, but browning of the husk was very severe at 97 kPa O<sub>2</sub>, especially after SMC. Decay was inhibited during fruit exposure to SAO. Throughout cold storage only fruit exposed to NA showed some decay; however at the end of SMC the highest decay was detected in fruit stored at 97 kPa O<sub>2</sub>. The presented results indicate minor effects on the overall quality of pomegranates stored at 2°C in superatmospheric oxygen concentrations, especially at 97 kPa O<sub>2</sub>.