

Abstract

A trial was carried out using a new technology for monitoring the physiological status of fruit during storage (Harvest Watch System with FIRM Sensors, Atlantic, Canada, which was introduced following the studies of Prange (2002) about the effects of oxygen concentration on chlorophyll fluorescence in fruits: chlorophyll fluorescence increased when oxygen concentration decreased below a physiological limit. Two pear cvs were studied: Conference is well known as a long term storage cultivar, although in some conditions it can be affected by brown heart in CA, while Abbe Fetel is appreciated for its quality characteristics, but cannot be stored longer than 4 months in air, and in CA is often sensitive to a soft scald disorder. The fruit were stored in air at 0.5°C after harvest until 18 November 2002, then the fruits of each cv were stored separately in two CA containers. In each of the four containers there was a fluorescence sensor in a box with 6-7 fruits. One container per cv was kept with a standard CA (2% O₂, 0.7% CO₂), while in the other, after 3 weeks with standard CA, the oxygen concentration was decreased in order to observe the fluorescence reaction of fruit. On 10 February ten fruits per container were sampled, and gas exchange was measured. Measurements of gas exchange rates were carried out at -0.5°C on single fruit using gastight glass jars. Gas exchange rates were measured statically after a 4-day equilibration time at -0.5°C in known gas mixtures, and analyzing the change in gas composition after 24 hours using a MicroGC according to de Wild and Peppelenbos (2001). Gas mixtures used were: 100% N₂, O₂ at 0.1, 0.5, 2 and 21%, each with low (0 or 0.7%) or high (5%) CO₂ concentration. O₂ uptake and CO₂ production rates were expressed as nmol.kg⁻¹.s⁻¹ in standard conditions, considering the volume of the jar, the volume and the mass of the fruit, correcting for actual values of temperature in the cold room and the pressure in the jar at time = 0 and time = 24 h. At the end of storage, in April, the fruits were examined for disorders. A comparison is made between the two cultivars, which behaved differently as regards the effect of low oxygen atmosphere on fluorescence, gas exchanges and susceptibility to disorders. The use of fluorescence sensors for the management of CA storage is discussed.