

Title Effect of oxygen level on skin spots disorder of Elstar apples in controlled atmosphere storage
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Abstract

In certain years, skin spots disorder of Elstar apples can cause economic losses of several million Euros in the Lower Elbe region. This spotted browning occurs only on green (unpigmented) areas of the fruit after long-term CA storage. Although this disorder first appeared in the mid-1980s its real causes remain unclear.

The purpose of this work was to measure the influence of different O₂ concentrations in CA storage on the intensity of skin spots disorder with and without previous SmartFreshSM treatments.

Fruit of the second picking were treated with SmartFreshSM (1-MCP) shortly after harvest and stored under different O₂

levels at 2 °C and 2.6% CO₂. Higher O₂ levels were adjusted immediately, whereas lower terminal O₂ concentration occurred stepwise. This applied to 0.4% (anaerobic condition), 0.6% (anaerobic compensation point) and 0.9% (aerobic condition). The anaerobic compensation point was determined by using a HarvestWatchTM sensor and by measuring the fruit alcohol content by gas chromatography. After a storage time of 200 days the incidence of the skin was recorded for 250 fruit per treatment using a severity index (0-4)

The intensity of skin spots disorder increased with higher O₂ concentrations. Apples treated with SmartFreshSM showed a higher incidence of skin spots than untreated fruit. Fruit stored at 5% O₂ responded to SmartFreshSM treatment by an increase in skin spots disorder index by 1.2 units. Almost no skin spots were detected on fruits stored under dynamically lowered O₂ level below 1.0% whether treated with SmartFreshSM or not.

Consequently, apples sensitive to skin spots should be stored under the lowest possible O₂ level, i.e. just above the anaerobic compensation point. In order to avoid anaerobic condition, the fruit alcohol content must be measured by GC or using the HarvestWatchTM sensor technology. Only insensitive fruit should be treated with SmartFreshSM and then stored under DCA conditions (Dynamic Control Atmosphere)