

Influence of 1-MCP and modified atmosphere on quality of hardy kiwifruit

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Introduction

Hardy kiwifruit (*Actinidia arguta*) are climacteric fruit which ripe under the influence of ethylene. When berries are harvested at a ripe maturity stage, sensory quality is considered as optimal. However, storage potential of such fruit is low, mainly due to a rapid softening and decay of the berries. To avoid fruit quality losses during conditioning, transport and storage, hardy kiwifruit are commonly harvested before they are vine ripened, at a time when they are still firm.

Objective

The aim of this study was to evaluate the benefice of 1-MCP treatment and modified atmosphere on the quality of hardy kiwifruit.

Material and methods

'Weiki' hardy kiwifruit grown in Thurgau (Switzerland) were harvested at two dates (H1: 4.9.2014 and H2: 15.9.2014), treated or not with 1-MCP [600 ppb] and stored at 0.5 °C under regular (RA) or modified atmosphere (MA) enriched or not with 6 % CO₂. Firmness and percentage of physiological disorders (skin darkening and brown spots) were analyzed as quality parameters.

Results

Firmness and skin darkening

1-MCP treatment and MA conditions slowed down fruit softening and limited development of skin darkening, especially for fruit of first harvest date (fig. 1). Despite similar values of firmness at harvest (H1: 98.3 and H2: 98.9 D₁₅₀), fruit of the late harvest (H2) softened rapidly and in a similar manner independently of 1-MCP treatment and MA conditions.

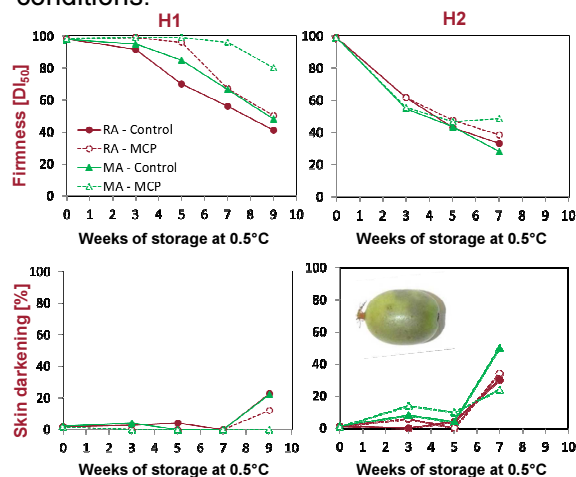


Fig. 1. Firmness and skin darkening of hardy kiwifruit, non treated (control) or treated with 1-MCP and stored at 0.5 °C under RA or MA.

Brown spots

This physiological disorder developed only on hardy kiwifruit of first harvest stored under MA enriched with 6 % CO₂ (fig. 2). 1-MCP treatment delayed the apparition of this disorder but was not able to prevent it.

Apparition of this disorder coincided with a CO₂ level higher than 15 % in the storage atmosphere (fig. 3)

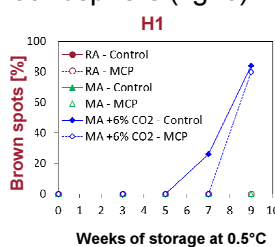


Fig. 2. Percentage of brown spots on hardy kiwifruit (H1), non treated (control) or treated with 1-MCP and stored at 0.5 °C under RA, MA and MA+6% CO₂.

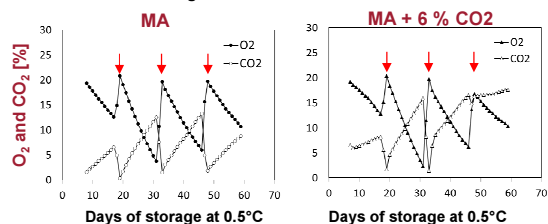


Fig. 3. O₂ and CO₂ levels in MA and MA + 6% CO₂ experiments. Arrows correspond to the samplings.

Conclusions

- 1-MCP treatment and MA highly improved storage of hardy kiwifruit by limiting softening and development of skin darkening.
- Harvest date influenced the efficacy of these storage methods as late harvest showed a rapid firmness decrease during storage independently of 1-MCP treatment or MA conditions.
- MA improved firmness maintain during storage as long as CO₂ level was below 15 %. When this CO₂ concentration was reached, brown spots developed on the skin of the hardy kiwifruit.