

Title Comparison of CA, 1-MCP and ethoxyquin treatments in altering α -farnesene metabolism and reducing superficial scald of 'd'Anjou' pears

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Abstract

d'Anjou' pears were either pretreated directly after harvest with 1-MCP (300 nl L⁻¹ for 24 h at 20°C) or ethoxyquin (2700 g L⁻¹ line spray) and then stored in regular air (RA), or stored in low oxygen CA (0.8 kPa O₂ for 3 months + 2 kPa O₂/1 kPa CO₂ for 1 month) without pretreatment. Fruit stored in RA without pretreatment were left as control. All fruit were stored at -1°C for four months and α -farnesene, conjugated trienes (CTs), internal ethylene level and fruit firmness were monitored monthly during storage and superficial scald was evaluated 7 d after transferring the fruit to 20°C from cold storage. Superficial scald occurred in control fruit that were stored three months or longer. However, all three treatments of CA, 1-MCP and ethoxyquin prevented scald completely during four months storage. α -Farnesene in fruit peel increased immediately after harvest and remained at high levels in the untreated control fruit. CTs also increased continually in the control. CTs did not accumulate following the ethoxyquin application. However, α -farnesene increased to levels higher than those found in the untreated control. Both 1-MCP pretreatment and CA storage not only eliminated CTs but also significantly decreased α -farnesene accumulation. Both 1-MCP and CA also decreased ethylene production and losses of flesh firmness which ethoxyquin did not. The results indicate that CA, 1-MCP and ethoxyquin prevented scald at different metabolic levels. Ethoxyquin inhibited specific metabolism – the oxidation of α -farnesene to CTs. However, CA and 1-MCP were broad spectrum inhibitors which slowed down the whole metabolic system of fruit, including inhibiting the biosynthesis of α -farnesene. Fruit treated by 1-MCP treatment lost ripening ability.