

Title Physiological aspects of the ripening blockage in conference pears treated with 1-MCP

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Abstract

1-methylcyclopropene (1-MCP) acts as an antagonist of ethylene and permits to delay the ripening of climacteric fruits. The commercial application of 1-MCP in some pear cultivars is problematic since some pears treated with 1-MCP do not recover their ripening ability after a period of storage. Pears stay very firm and do not reach an optimal quality for consumption. The objective of this research was to study the physiological aspects of this phenomenon in “Conference” pears treated with 1-MCP. In 2007 fruit were collected at optimal harvest, treated with 0 and 300 ppb of 1-MCP and then stored in air at 0°C during 4 months. During storage, ethylene metabolism was analyzed determining the levels of 1-aminocyclopropene-1-carboxylic acid (ACC) and 1-malonilaminocyclopropene-1-carboxylic (MACC) and the production of ethylene. Changes in antioxidant potential were also analysed, determining the levels of hydrogen peroxide, ascorbate content and activities of superoxide dismutase (SOD), catalase (CAT), and peroxidase (POX). In 2008, the emphasis was given on ethylene and ACC metabolism during shelf life at 20°C and on ACC synthase (ACS) and ACC oxidase (ACO) activities. During storage, fruit treated with 1-MCP presented a delay in the accumulation of ACC and MACC and did not produce ethylene. The fruit treated with 1-MCP compared to control did not show differences in antioxidant metabolism (SOD, CAT and POX) and in the amount of ascorbic acid or hydrogen peroxide. During shelf life, the 1-MCP treatment also caused an inhibition of ethylene production and ACC levels, ACS and ACO activity were also affected. Collectively these results showed that the incapacity of ripening observed in 1-MCP treated ‘Conference’ pear is more related to changes in ACC metabolism than to differences in oxidative processes.