

# Ethanol vapor treatment inhibits apple ripening at room temperature even with the presence of ethylene

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## Abstract

The present study aimed to evaluate the effect of two ethanol vapor doses (250 and 500 ppm), 1-methylcyclopropene (1-MCP) (0.650 ppm) with or without ethylene application (150 ppm) on the aerobic and anaerobic metabolism and quality of 'Elstar', a fast ripening apple cultivar, and 'Nicoter', a slowly ripening apple cultivar, over 14 d of holding at room temperature ( $20 \pm 2$  °C). Fruit were subjected to treatments for 24 h and analyses performed after 0, 7 and 14 d holding at room temperature ( $20 \pm 2$  °C). For both cultivars studied, ethanol vapor treatments, especially 500 ppm, inhibited the ripening of apples even when combined with 150 ppm of ethylene, but not as much as 1-MCP treatment in 'Nicoter' apples. Fruit treated with ethanol vapor maintained lower electrolyte leakage, higher flesh firmness, greener color and had more healthy fruit. However, its application increased the pyruvate decarboxylase (PDC) and alcohol dehydrogenase (ADH) activity, acetaldehyde and ethyl acetate accumulation, but in concentrations below the odor threshold reported in the literature. The 1-MCP treatment increased decay incidence, reducing the healthy fruit amount in 'Nicoter' apples after 14 d, but maintained a very low ethylene production and respiration rate, which allowed higher acidity maintenance after 14 d holding at room temperature. There was no incidence of external and internal physiological disorders in both cultivars.