POSTHARVEST TECHNOLOGIES

NPARR 3(1), 2012-0118, Effects of a phospholipase D inhibitor on postharvest enzymatic browning and oxidative stress of litchi fruit

Membrane lipid degradation catalyzed by phospholipase D (PLD) results in postharvest browning and senescence of litchi fruit. The effects of n-butanol, a specific PLD inhibitor, on enzymatic browning and oxidative stress during storage of litchi fruit at room temperature were evaluated. n-Butanol-treated fruit had a lower browning index and disease index than untreated fruit. n-Butanol treatment also decreased PLD activity. As a result, the decompartmentalization of litchi polyphenoloxidase and substrates was reduced. The conversion of substrates (−)-epicatechin and procyanidin A2 into quinones was slowed down and enzymatic browning of litchi pericarp tissues was lower after 6 d storage. Additionally, n-butanol-treated fruit possessed significantly lower malondialdehyde contents than untreated fruit after 4 d storage. Analysis of antioxidative enzyme activities showed that n-butanol treatment inhibited oxidative stress mainly by maintaining high catalase activity in litchi pericarp tissues. Consequently, senescence of litchi fruit during storage was moderated [Jian Sun*, Xiangrong You, Li Li, Hongxiang Peng, Weiqiang Su, Changbao Li, Quanguang He and Fen Liao (Institute of Agrofood Science & Technology, Guangxi Academy of Agricultural Sciences, 174 East Daxue Road, 530007 Nanning, China), Postharvest Biology and Technology, 2011, 62(3), 288-294].

NPARR 3(1), 2012-0120, Factors affecting the postharvest soluble solids and sugar content of tomato (Solanum lycopersicum L.) fruit

Although a large component of tomato fruit taste is sugars, the choice of tomato cultivar and the postharvest practices implemented by industry are designed to reduce crop loss and lengthen shelf-life and do not prioritize sweetness. However, because there is a growing recognition that taste and flavor are key components of tomato marketability, greater emphasis is now being placed on improving traits like sugar content. In this review the factors, both pre-, post and at harvest that influence sugar content in fruits sold at market are broadly outlined. Lines of investigation that may maximise the outcome of current practices and lead, long-term, to enhanced postharvest fruit sugar contents are suggested [Diane M. Beckles* (Department of Plant Sciences, University of California, One Shields Avenue, Davis, CA 95616, United States), Postharvest Biology and Technology, 2012, 63(1), 129-140].

NPARR 3(1), 2012-0121, Recent advances on the use of natural and safe alternatives to conventional methods to control postharvest gray mold of table grapes

Inoculum of postharvest pathogens can accumulate inside storage rooms and contaminate new batches of fruit and vegetables, but this chain can be broken by disinfecting storage facilities between storage periods. Quaternary ammonium (QA) has been known for over 50 years as an efficient disinfectant against microorganisms, with wide applications in the food industry. The aim of this study was to determine the efficacy of didecyldimethylammonium chloride (Sporekill, designated here as QA\textsuperscript{k}), against development of Botrytis cinerea after direct exposure or by ultrasonic fogging. Following direct exposure to a concentration of QA\textsuperscript{k} below 5 mg L\textsuperscript{-1}, a population of 10\textsuperscript{4} conidia of B. cinerea was inactivated after 2 min; ultrasonic fogging with QA\textsuperscript{k} at 500 mg L\textsuperscript{-1} took 30 min to achieve consistent inactivation. Fogging at 20°C was considerably more effective than fogging at 5°C, and similar results were obtained for three other postharvest pathogens, Penicillium expansum, Colletotrichum gloeosporioides and Alternaria alternata. These results show that conidia of B. cinerea are highly sensitive to direct exposure to QA\textsuperscript{k}, but that effective sanitation of a storage facility by ultrasonic fogging requires a QA\textsuperscript{k} concentration two orders of magnitude greater [Avinoam Daus, Batia Horev, Orit Dvir, Shahar Ish-Shalom and Amnon Lichter* (Department of Postharvest Science, ARO, The Volcani Center, POB 6, Bet Dagan 50250, Israel), Postharvest Biology and Technology, 2011, 62 (3), 310-313].
Gray mold, caused by *Botrytis cinerea*, is the main postharvest decay of table grapes. It can develop in the vineyard and spread rapidly among berries after harvest, during long distant transport, cold storage and shelf-life. In conventional agriculture, bunches are sprayed with fungicides after flowering, at pre-bunch closure, at veraison, and later, depending on the time of harvest. Harvested bunches are usually stored in the presence of sulfur dioxide. However, the use of synthetic fungicides and of sulfur dioxide is not allowed on organic grapes and the study of alternative methods to control postharvest decay has developed over several decades, along with the demand for safer storage methods. This review summarizes the results published in the field within the last 5 years (2006-2010). We can group these approaches as follows: (i) biocontrol agents; (ii) natural antimicrobials; (iii) GRAS type decontaminating agents; and (iv) physical means. Two biocontrol agents, *Mucodor albus* and *Hanseniaspora uvarum*, have shown equal or better effectiveness than conventional methods to control gray mold of table grapes in laboratory scale experiments. Currently, the bottleneck for the commercial use of biocontrol agents is that the registration process is comparable to that of fungicides, with similar costs but often with a narrower market. This delays their transition from experimental to practical use. Natural antimicrobials, such as salts, chitosan, and plant extracts, have demonstrated good results and often have been applied in various scales. Several GRAS-classified sanitizers have been tested to extend postharvest storage of table grapes, including acetic acid, electrolyzed oxidizing water, ozone, and ethanol. Physical technologies involving variations in temperature, UV-C irradiation, and pressure or changing atmospheric composition are all postharvest practices which require significant adaptation by an industry which is accustomed to minimal intervention during harvest. Overall, the use of ozone and of calcium chloride is two promising examples of treatments that are beginning to be adopted on a commercial scale. The requirements for the optimal treatment of grapes against gray mold before harvest or during storage are summarized [Gianfranco Romanazzi*, Amnon Lichter, Franka Mlikota Gabler and Joseph L. Smilanick (Department of Agriculture, Food and Environment, Marche Polytechnic University, Via Brecce Bianche, 60131 Ancona, Italy), *Postharvest Biology and Technology*, 2012, 63(1), 141-147].