

portionally more through the classical CN-sensitive pathway as flooding progressed than those from the more flood-intolerant MM 106 rootstock.

package atmospheres resulted in isozymes of ppo and po similar to heartleaves while air gave results similar to midvein isozymes.

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Rhizobi - mike Faust
(7) POSTHARVEST HORTICULTURE - USDA

Room 1 Grand Ballroom

Presiding: Walter E. Ballinger, N.C. State University, Raleigh

10:15 Postharvest Quality Characteristics of 4 Apple Cultivars

Watada, Alley E., Judith A. Abbott and R. E. Hardenburg, USDA, Agricultural Marketing Research Institute, Beltsville, Md.

Postharvest sensory and chemical characteristics of 4 apple cultivars were evaluated. Semi-trained panelists selected and scored 15 characteristics that were pertinent to quality. Scores of some of the texture and flavor attributes changed significantly with harvest date and storage period in 'Golden Delicious' and 'Rome Beauty' apples, but not in 'Delicious' strains and 'York Imperial' apples. Scores of several attributes were low and changed very little throughout the experiment. Soluble solids, titratable acidity and volatile composition differed among cultivars, and the contents changed more with storage time than with harvest dates. Scores of the sensory characteristics were correlated with certain combinations of flavor volatile components. Correlation coefficients were higher when soluble solids and titratable acidity data were combined with the volatile data.

10:30 Softening and Breakdown of 'Stayman' Apples Reduced in Air and CA Storage by Postharvest Dip in Calcium Chloride Solutions

Hardenburg, R. E., and R. E. Anderson, USDA, Agricultural Marketing Research Institute, Beltsville, Md.

Dipping 'Stayman' apples 2-3 weeks after harvest in 4% CaCl2 reduced both senescent and water-core breakdown following storage at 0°C. Use of CaCl2 plus Keltrol (0.3%), a food thickener, increased the effectiveness of the treatment in reducing breakdown and softening. Following 17-26 weeks' storage, apples dipped in CaCl2 and in CaCl2 plus Keltrol averaged 0.20 and 0.48 kg firmer than untreated fruit. Apples treated with CaCl2 plus Keltrol before CA storage were 0.49 kg firmer on removal than untreated CA fruit. The calcium-treated fruit from both air and CA storage remained firmer during 6 days at 20°. Use of 2700 ppm ethoxyquin (Stop-Scald) or 250 ppm benomyl combined with CaCl2 plus Keltrol controlled scald or reduced decay, respectively, while retaining the beneficial effects of calcium.

10:45 Response of Golden Delicious Apples to Carbon Dioxide in Controlled Atmosphere Storage

Olsen, Kenneth L., USDA-ARS, Wenatchee, Washington, Max E. Patterson*, Washington State University, Pullman

Golden Delicious fruit, given a pre-storage treatment of 18% CO2 for 10 days, was stored at 0, 2, 4 and 8% CO2 and 2.5% O2 for 3, 5 and 7 months. There was significantly greater retention of firmness in fruit held at 2% over none and at 4% over 2% CO2. All fruit held with 2, 4 or 8% CO2 retained more acid than fruit without CO2. No injury was observed even at 8% CO2 and 7 months of storage.

11:00 Atmosphere and Chemical Treatment Influence on Chopped Lettuce Discoloration

Bessey, P. M., F. E. Nelson, A. Y. Ali, and N. F. Oebker, University of Arizona, Tucson

Reduced O2 and increased CO2 in low permeability packages substantially lowered discoloration rates of chopped head lettuce (*Lactuca sativa* L.) in prolonged storage at 2-3°C. Several chemical treatments employed for physiological and microbiological impact were beneficial but to a considerably lesser degree than were modifications of atmosphere.

11:15 Polyphenoloxidase, Peroxidase and Protein Isozymes Relating to Discoloration of Chopped Lettuce (*Lactuca sativa* L.)

Ali, A. Y., J. O. Anderson, and P. M. Bessey, University of Arizona Tucson

Isozyme analysis of polyphenoloxidase, peroxidase and soluble proteins showed additional bands from pink rib prone wrapper leaf midvein tissue while pink rib free heart leaves did not. Total protein bands were fewer from midrib tissues than from heart leaves. Increased CO2 and reduced O2 in

11:30 Postharvest Decay of Highbush Blueberries as Influenced by the Presence of an Attached Stem and Berry Ripeness

Ballinger, W. E., J. R. Mitchel, E. P. Maness, and W. F. McClure, N.C. State University, Raleigh

Blueberries (bb) were harvested with stems attached and stored overnight at 1°C. The next day, stems from half the bb were removed. All fruits were then light-sorted (700-840 nm) into 5 classes of ripeness. In Test I (Bluegray cv.) 12 reps of 50-berry samples were placed in pint, fibreboard containers and stored at 21°C and 90% RH for 9 days. Decay (DK; % by no.) of bb with stems attached, compared to DK of bb with no stems, ranged from 1/10 as much (9 vs 73% DK) for least ripe fruit to 4/10 as much (42 vs 97% DK) for over-ripe fruit. Test II (Jersey cv.) involved 10 reps of 100-berry samples and a 7-day storage period. Relative DK ranged from 1/11 as much (4 vs 45% DK) for least ripe bb to 1/3 as much (23 vs 74% DK) for overripe bb. In both tests, greater ripeness was associated with greater % DK.

11:45 Chemical and Non-Chemical Control of Sclerotinia and Pythium Decay in Postharvest Handling of Snap Beans

Hudson, D.E.* and W. H. Tietjen USDA-ARS-NAA, Rutgers University, New Brunswick, New Jersey

Growers of fresh market snap beans in southern New Jersey lose beans because of watery soft rot (*Sclerotinia sclerotiorum* (6.6) Lib DBy) and cottony leak (*Pythium butleri* subr.). Samples of harvested snap beans were sprayed with 1 liter solutions of either thiobenadazole (TBZ) or chlorine (CL) at 500 and 1000 ppm; other samples were dipped 30 seconds in hot water at 49 C then cooled by immersing 30 seconds in ice water. Replicated 1.5 kg samples were placed in polyethylene bags and stored at 13 C (about 55 F) for 7 to 10 days. After storage the beans were examined and the weight of decayed beans compared to the original sample weights. The hot water dip, TBZ and CL significantly reduced the development of both *Sclerotinia* and *Pythium* during post harvest handling.

(8) COLLEGIATE BRANCH FORUM - STUDENT PAPERS

Jade Room

Presiding: James (Sam) Erwin, President, Association of Collegiate Branches, ASHS; Purdue University, West Lafayette, Indiana

10:15 The Counteracting Effects of the Growth Retardant (P293) and Gibberellic Acid on Peas and Soybeans

Hernandez, Paul D., Washington State University, Pullman

Dwarf and standard garden peas and dwarf and vining soybeans were treated with single and sequential spray applications of the growth retardant P293 (Uniroyal Chemical) at concentrations of 0.25, 0.5, and 1.0% and gibberellic acid at 5, 10, and 20 ppm. The spray treatments were applied to the point of drip 30 and 36 days after emergence. Plant heights were recorded at weekly intervals until the plants were harvested for determination of fresh and dry weights. The effect of the two growth regulator sprays, alone and in combination, on these measurements will be discussed.

Preliminary review of the data collected indicates that the treatments had few consistent effects except the height promotion affect of the gibberellic acid. In no case did the gibberellic acid treatments overcome the inhibitory effects of the P293 sprays.

10:30 The Effect of CO2 on Pathogenic Decay and Metabolism of Potato Tubers

Cameron, Arthur C., and Milton Workman, Colorado State University, Fort Collins

The percentage rot in tubers of Russet Burbank potatoes inoculated with either *Erwinia atroseptica* or *Fusarium roseum* increased from below 20% in controls to as high as 60% with storage in 8% CO2. Metabolic changes were subsequently investigated over a two day period in tuber slices held at either ambient or 8% CO2 in air. Reducing sugars increased twofold by 12 hours in CO2 treated slices, whereas in the controls, a threefold increase was seen, but after 24 hours. Levels of nonreducing sugars in 8% CO2 slices remained essentially unchanged during the observation period;

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2" x 11" = 32

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100 ppm

10% from CA