Florida Cooperative Extension Service

PACKINGHOUSE NEWSLETTER

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Key Word Index Benlate, Color-add, Decay Control, Decay Fungi, Food & Drug Administration, International Society of Citriculture, Letters-Pesticides, Pesticide Letters, Resistant Molds, Sanitation, Thiabendazole.

COLOR ADD = CITRUS RED NO. 2

We have had a flood of calls and letters asking about the legal status of color-add (Citrus Red No. 2) following the FDA (Food and Drug Administration) banning of FD&C Red No. 2 (Amaranth), the Canadian government reportedly seriously looking into FD&C Red No. 2 and the NBC Today show, January 12 reportedly making broadly incorrect statements about citrus fruit color.

For many years we have answered letters on such matters referred to us by packers and others. (One time we had five copies of the same letter some agitated consumer had sent to a packer and four different agencies. All were referred to us). With regard to color-add, we give them the following information.

Citrus Red No. 2 (commonly called "color-add" by Florida citrus packers) is often confused with other products. FD&C Red No. 32, previously used to color oranges, has been out of use for 20 years. Citrus Red No. 2 has been almost universally confused by alarmists as being the same as FD&C Red No. 2 (also known as Amaranth) which is the red dye found in the cupboard of almost every household in the United States and is now banned by the FDA. Of course, Citrus Red No. 2 (used only externally on oranges) is not the same as FD&C Red No. 2 [Amaranth; $Na_3$1(-4-sulfo-1-naphthylazo)-2-naphthol-2,6-disulphonate] which is used in many, many foods and food products. FD&C Red No. 2 has been accused of being a carcinogen; and so, by implication, Citrus Red No. 2 has also been erroneously accused. The chemical name of Citrus Red No. 2 is 1-(2,5-dimethoxyphenylazo)-2-naphthol, and its physical state is a dry powder. The formulations sold to our citrus packers by any one of several chemical companies are liquid "dye concentrates".

Many people ask how much orange and yellow coloring is used in coloring citrus fruits annually in the state of Florida. No grapefruit are colored at all. Oranges and their hybrids, such as Temples and tangelos can be colored. This is because the development of natural orange color is dependent upon the weather. The orange and red pigments simply do not develop until we get at least a week of cold nights, which can be very hard to come by in Florida. To make the matter more difficult, late oranges go back green again when the weather warms up. As to the amounts used, that is very strictly limited by law.

Only one food color, Citrus Red No. 2, is allowed and the upper limit is 2 parts per million (ppm) based on the total fresh weight of the orange. Last year, less than 30% of the Florida orange crop was color-added and that amounted to about 4-1/2 million boxes or 405 million pounds of fruit. On the basis of 2 ppm, which would be the absolute maximum, 810 lbs. of dye could have been applied. In actual practice, probably less than 500 lbs. were used because maximum levels are not applied.

The color is a food dye, and it is permitted in a fantastically small quantity. The upper limit is 2 parts per million (ppm); very few nontechnical people can conceive how little a ppm is. It is $.01 in $10,000, or the thickness of a postage stamp compared to the height of the Washington monument, and it is all on the outside of the fruit.

Anyone wanting to try to strike a small blow on the side of sanity can make suggestions as to how the American consumer can be persuaded to buy citrus in the form in which the good Lord made it. They won't you know, and that includes farmers and produce handlers. Our biggest problem is that citrus fruits are originally all tropicals and under tropical conditions, color bears no correlation at all with ripeness. In Indo-China, where almost all our citrus fruits originated, most of them are marketed with a green peel regardless of whether they are oranges, tangerines, or anything else. In subtropical climates such as Florida, the color switches to and fro as the weather changes. It has been calculated that over a half a billion slips of paper had been sent out in packages of citrus fruits trying to explain this to the American consumer. Fantastic sums have been spent on advertising trying to explain that an orange doesn't necessarily have to be orange. For that matter, apples do not have to be red to be ripe, nor lemons yellow. A book of poems includes one by someone who says: "I have traveled near, I have traveled far, To all the lands where lemons are, But all the lemons I have seen, Are never yellow, they are green!" If you would like to be in touch with some of the people who are trying to get the facts of the matter over to the American consumer, we would be delighted to help.

We continue to answer letters sent to Florida citrus packers and growers on these and similar matters. Send us your letter and we will send you a copy of our answer.

Will Wardowski
Extension Service
Lake Alfred

Bill Grierson
AREC, IFAS
Lake Alfred

RESISTANCE OF MOLD TO TBZ AND BENLATE

Occurrence

Strains of green mold (Penicillium digitatum) can develop resistance to TBZ and Benlate. This resistance is effective against both materials so that one fungicide cannot be used to replace the other to control resistance. The occurrence of resistance in Florida has been restricted primarily to those packinghouses that have handled lemons that were cool-colored. In such a situation, fruit treated with either TBZ or Benlate may be held for as long as 3-4 weeks at 60°F for yellow color to develop. Sufficient time is therefore provided for sporulation and reinfection of treated fruit to occur by resistant strains that exist naturally in the mold population at a very low incidence. Apparently, a sufficient number of resistant spores can accumulate in such a situation to render TBZ or Benlate treatments ineffective even within one lemon storage season.

At present, we do not have any evidence that preharvest or postharvest pre-degreening applications of Benlate favor development of these resistant strains. Fortunately, the degreening process stimulates healing (at 90% RH or higher) of minor injuries causing them to resist infection by either resistant or susceptible mold strains. Also, the degreening temperature of 85°F retards the growth of green mold so that a lot of moldy fruit is usually not present following degreening.

Means of avoiding resistance

Several ways of avoiding green mold resistance to TBZ and Benlate can be suggested. One of the most important is to practice good packinghouse sanitation. Any rotted, moldy, fruit previously treated with TBZ or Benlate held in or near the packinghouse can provide a good source of resistant spores. All cull fruit should be removed daily and the area surrounding the packinghouse should be maintained in a clean condition. Successive treatments of TBZ and/or Benlate may have to be avoided. The use of 2 postharvest fungicide treatments, as long as it is not a TBZ and Benlate combination, could aid in preventing a build-up of resistant mold spores. Molds resistant to TBZ or Benlate do not seem to be resistant to sodium o-phenylphenate (SOPP, Dowicide A), diphenyl, or 2-aminobutane.

Removal of resistant spores

Eradication of resistant mold spores from the packinghouse following a severe build-up is not easy. Sprays of SOPP or 2-aminobutane on floors, walls, equipment, and pallet boxes to eradicate resistant spores can be used. However, we do not know the effectiveness of such treatments. Formaldehyde is used in California to combat resistance, and some details of its use under their conditions are available. We have eradicated resistant spores from our storage rooms by exposing the spores to 1% formaldehyde sprayed through the humidification system for a minimum of 3 hours. The use of formaldehyde does require certain precautions and adequate airing after treatment. Steam treatment of boxes and equipment can also be used and is effective.

We have conducted a fairly extensive survey of Florida packinghouses this season and, as yet, we do not find evidence of extensive resistance. Of 22 packinghouses, resistant spores were only recovered from one house. This particular packinghouse packed lemons last summer.

Eldon Brown, FDOC, Lake Alfred
Andy McCornack, FDOC, Lake Alfred
John Smoot, USDA, Orlando

CITRUS PACKINGHOUSE DAY

Citrus Packinghouse Day will be Wednesday, September 8, 1976 at the Agricultural Research and Education Center, Lake Alfred, Florida 33850. Reserve this day on your calendar, and send program suggestions to the above address.

Editor

PHNL ISC MEMBERSHIP APPLICATION, 1974-1977

NAME _____
(Last) (First) (Middle Initial)

ADDRESS _____

_____

OCCUPATION/AFFILIATION _____

_____

RENEWAL/NEW MEMBERSHIP: US $5.00 or Equivalent

Make payable to: INTERNATIONAL SOCIETY OF CITRICULTURE

Send to: Dr. H. D. Chapman, Dept. of Soil Science & Agricultural Engineering, University of California, Riverside, California 92502, USA.

1977 INTERNATIONAL CITRUS CONGRESS

The Second International Citrus Congress will be held at the Sheraton-Towers Hotel, Orlando, Florida the first week in May 1977. This meeting is a part of The International Society of Citriculture (membership application previous page). The meeting will include one day tours of the Florida citrus industry. The program will feature meaningful, interpretive reviews of national and international situations for the subjects selected. There is over one-half acre of indoor exhibit space, and commercial exhibits are expected to be extensive. The best way to receive program details is to join The International Society of Citriculture.

Will Wardowski
Chairman, Postharvest Section
International Citrus Congress

AVAILABLE PUBLICATIONS

Available from U.S. Horticultural Research Center, USDA, 2120 Camden Road, Orlando, FL 32803

"SADH-Cycloheximide effects on orange fruit abscission" by G. K. Rasmussen. HortScience 10(5):516-517. Oct. 1975.

"Effect of washing 'Hamlin' orange on chlorophyll and carotenoid changes during degreening" by Otto L. Jahn. J. Amer. Soc. Hort. Sci. 100(5):586-588. Sept. 1975.

Available from Food & Resource Economics Dept., 1157 McCarty Hall, University of Florida, Gainesville, FL 32611

"Socioeconomic dimensions of Florida citrus harvesting labor" by Gary F. Fairchild. ERD Report 75-2. Dec. 1975. 89 pages.

"Estimated costs of packing and selling fresh Florida citrus, 1974-75 season" by D. S. Tilley and W. H. Sherrod. A Preliminary Summary. 6 pages.

This newsletter is published at a cost of $81.85, or 8.2 cents per copy, to give the latest news to the packinghouse industry.

W. Wardowski, Editor
Associate Professor-
Extension Horticulturist