INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
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PACKINGHOUSE NEWSLETTER

W. Wardowski, Editor
AREC
700 Experiment Station Road
Lake Alfred, FL 33850

Phone (813) 956-1151

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Key Word Index Chlorine, Fungicides in Wax

APPLICATION OF FUNGICIDES IN WATER WAXES

Water waxes are becoming more prevalent within the industry as use of solvent waxes is phased out. Application of fungicides with water waxes is quite popular because it is more economical and simpler than using two separate processes for fungicide and wax applications. However, decay control is better if fungicides are applied in water, providing that residues from water applications are not removed by polisher-drier brushes before application of the wax. Water fungicide treatments are better than wax treatments for control of stem-end rot in fruit degreened longer than 24 hours and for control of green mold that develops in small punctures where the more viscous wax does not penetrate as readily as water. Efficacy of the fungicides in waxes can be enhanced if concentrations are twice that of water treatments. By doubling rates in wax, it does not mean that fungicide use will double. Less wax than water is lost during application, therefore more fruit can be treated per volume of wax than water. If you are applying fungicides in wax, thiabendazole (TBZ) should be applied at 2000 ppm, Benlate (benomyl) at 1200 ppm, and imazalil at 2000 ppm.

Eldon Brown
Florida Department of Citrus
Lake Alfred

USE OF CHLORINE TO REDUCE INOCULUM OF DECAY FUNGI IN THE PACKINGHOUSE

Chlorine can be helpful if used properly to reduce inoculum of decay fungi within the packinghouse environment. Chlorine added to the water spray following the dry dump will kill spores of green mold on fruit surfaces before they become forced into injuries by the washing process where the fungus is more difficult to eradicate with fungicide treatments. If dump tanks or drenchers are used, chlorine should be added to kill green mold, sour rot and brown rot that accumulate in the water. Chlorinated water can also be used to wash down equipment and clean pallet boxes and storage rooms. Chlorine is corrosive to metal, however, so expect to see some evidence of this on your equipment.

The fungicidal activity of chlorine is a function of time, pH, and concentration of free chlorine. Much of the chlorine (approximately one-half of it in moderately dirty water) will react with the dirt and debris in the water and exist as combined chlorine. That which is not combined is in the free form, and this is the chlorine that is lethal to fungi. Total chlorine consists of the combined and free forms. Quite dirty water requires the addition of higher concentrations of chlorine because the dirt combines with a large proportion of the chlorine leaving little in the free form to kill the fungal inoculum.

Good fungicidal activity of chlorine is dependent upon hypochlorous acid which is formed when chlorine gas, sodium hypochlorite, or calcium hypochlorite are added to water. Hypochlorous acid is fairly stable near a pH of 7 where 75% of the chlorine exists in this form. Almost 100% of the chlorine exists as hypochorous acid at a pH of 5, but excessive chlorine is liberated to the atmosphere at this pH and thus a pH of 7 is more desirable. Chlorine gas tends to lower the pH and has to be buffered with alkali to raise the pH to 7. In contrast, liquid chlorine (sodium or calcium hypochlorite) raises the pH and has to be buffered down to pH 7 with acid.

The most effective use of chlorine is in a system where chlorine is continually metered into the water at a constant rate near a pH of 7. Such systems are available for purchase or lease from various distributors. In water rinses to dry furit after dumping, a spray containing 200 ppm of free chlorine at pH 7 is needed with the normal 10-15 seconds of contact time to kill green mold on fruit surfaces. This application will not kill all of the mold spores on sporulating lesions, spores in injuries, or sour rot which is associated with dirt and organic matter on the fruit surface. Because of the longer exposure time, a concentration of 50 ppm free chlorine will prevent build-up of fungal inoculum in soak tanks and drenches.

Eldon Brown
Florida Department of Citrus
Lake Alfred

CITRUS GIFT FRUIT DAY

The Third Annual Citrus Gift Fruit Day is scheduled Wednesday, May 9, 1984 at The Citrus Research and Education Center, Lake Alfred. The Florida Gift Fruit Shippers Association is once again co-sponsoring this meeting with the Florida Department of Citrus and the University of Florida Cooperative Extension Service. The meeting is open to everyone. At the request of the Florida Gift Fruit Shippers Advisory Committee the format of the morning program will be slightly changed to accommodate fewer talks with more details and more time for questions. The morning program will focus on Decay Control.

Equipment displays will be viewed in the afternoon as they have in the past two years. Commercial representatives interested in obtaining display space should contact W. Wardowski, CREC, 700 Experiment Station Road, Lake Alfred, FL 33850, phone (813) 956-1151.

Will Wardowski
Extension Service
Lake Alfred

AVAILABLE PUBLICATIONS

Available from Dr. W. Wardowski, AREC, 700 Expt. Stn. Rd., Lake Alfred, FL 33850

"Twenty-Second Annual Citrus Packinghouse Day" program and abstracts by W. F. Wardowski (ed.) (Program)

"Citrus *Decay Control*" by G. E. Brown. Citrus Packer Short Course. October 8, 1983, Lake Alfred, Florida. 14 pages.

Available from David J. Hall, Agri-Chem, Inc., P. O. Box 17477, Orlando, FL 32860

"Practical considerations of the Federal Insecticide, Fungicide, and Rodenticide Act for fruit and vegetable packers" by D. J. Hall. Reprinted from Proc. Fla. State Hort. Soc. 95:210-213, 1982.

Available from Dr. A. A. Kader, Dept. of Pomology, Univ. of California, Davis, CA 95616

"Physiological and compositional changes in orange fruit in relation to modification of their susceptibility to Penicillium italicum by ethylene treatments" by M. K. El-Kazzaz, A. Chordas, and A. A. Kader. J. Amer. Soc. Hort. Sci. 108(4):618-621. 1983.

Available from Dr. R. L. Kilmer, Food and Resource Economics Dept., 1157 McCarty Hall, University of Florida, Gainesville, FL 32611

"Grower's returns and marketing costs for Florida citrus" by R. L. Kilmer. Economic Information Report 167. September 1982. 37 pages.

Available from Mr. R. C. Hooks, Food and Resource Economics Dept., 1157 McCarty Hall, University of Florida, Gainesville, FL 32611

"Estimated cost of picking and hauling fresh Florida citrus, 1980-81 season" by R. Clegg Hooks. Economic Information Report 188. June 1983. 12 pages.

This newsletter is published at a cost of $ 90.34 or 6 cents per copy, to give the latest news to the packinghouse industry.

W. Wardowski, Editor
Professor
Extension Horticulturist