

July 17, 1967

Harvesting and Handling Section

P A C K I N G H O U S E N E W S L E T T E R

FRESH CITRUS FRUIT DECAY REGULATION

To increase the storage life of fresh Florida citrus fruit, the Florida Fresh Citrus Shippers Association requested a regulation requiring fungicidal treatment of all fresh citrus fruit shipped by registered packinghouses. This regulation has been drafted and approved by the Florida Citrus Commission. A copy is attached. This newsletter is written to explain this regulation.

Effective date.--August 1, 1967

Fungicides.--Two fungicides are approved by the U. S. Food and Drug Administration for decay control of fresh citrus fruit.

Sodium o-phenylphenate (SOPP) is the fungicide commonly sold as "Dowicide A" and used in various washes, dips, floods such as Dowicide A-hexamine. It is also the fungicide in fungicidal water waxes. (It is the salt form of o-phenylphenol (OPP) which has the common name of Dowicide 1.)

Diphenyl (or biphenyl) is applied in pads or wraps. It vaporizes slowly into the air around the fruit and inhibits growth of decay causing organisms. Except for 'Dancy' tangerines, containers with limited ventilation are essential for this fungicide to be effective.

Combinations of fungicides.--Fruit treated with Dowicide A can be packed in cartons with diphenyl pads. The resulting decay control is better than with either fungicide alone.

Definition of terms

1. "Aqueous solution:" means water solution.
2. "Aqueous emulsion" means emulsified in water.
3. "Gaseous" refers to the application of a fungicide as a gas mixed with air. Diphenyl is given off gradually over a period of several days or weeks depending on the original diphenyl concentration of the pads, ventilation in the shipping container, and the storage temperature. Diphenyl controls decay for up to a week after the fruit is removed from the shipping container.
4. "Registered Packinghouse".--A licensed citrus fruit dealer holding a valid packinghouse registration certificate issued by the Florida Commissioner of Agriculture. (This regulation is not applicable to gift fruit shipments.)

5. "Fungicide"--Kills fungus in the fruit.
6. "Fungistat"--Doesn't kill the fungus but keeps it from growing.
7. "Tolerance"--Maximum amount of fungicide residue allowed in or on the fruit by the U. S. Food and Drug Administration.

Diphenyl..... 110 ppm
Dowicide A (analyzed as Dowicide 1).....10 ppm

8. "Residue"--Amount of fungicide or fungistat in or on the whole fruit.
9. "Minimum Residue"--Diphenyl 11.0 ppm
Dowicide A--All citrus except grapefruit....1.0 ppm
--Grapefruit.....0.5 ppm
10. "Grapefruit"--Because grapefruit has a larger volume in relation to the surface area, the minimum residue necessary to comply with this regulation is half that for other citrus fruit.
11. "ppm"--Means part per million.

Effectiveness of a fungicide

To be effective, a fungicide must enter scratches, other breaks in the peel, and cover the surface under the button. The fungi which cause stem-end rot are inactive under the button until a microscopic opening develops into the fruit. These openings develop from conditions that cause drying, such as low humidity during degreening and excessive delay between picking and a good wax application.

1. Dowicide applications of less than 1 minute are usually not effective in controlling stem-end rot fungi but result in some mold control. A 1-minute application of Dowicide A can result in fair decay control but a treating time of 2 to 3 minutes is more effective.
2. Diphenyl pads MUST be held in air-tight packages to retain their effectiveness.
3. Applications which do not allow the fungicide to diffuse under the button are not effective against stem-end rot fungi, but may give some control of mold decay.

Dowicide A alone can cause peel burn. Combining hexamine with Dowicide A practically eliminates the possibility of peel burn when used as directed. Solutions have been developed which contain Dowicide A without hexamine. These materials, when handled exactly as recommended, have given good decay control but, as with Dowicide A-hexamine, the fruit should be rinsed following treatment.

No experimental work is available indicating that a 2% Dowicide A solution (without hexamine) can be left on fruit without a possibility of peel injury. Dowicide A with hexamine can be left on with less danger of peel burn but shine will be reduced.

REGULATION 105-1.43

FUNGICIDE OR FUNGISTATÉ TREATMENT
REQUIRED FOR FRESH CITRUS FRUIT

Sec. (1) Effective August 1, 1967, all Florida fresh citrus fruit shipped by a registered packing house shall be treated with an approved fungicide or fungistat. For the purposes of this regulation, an approved fungicide or fungistat shall mean one approved by the U. S. Food and Drug Administration and the Florida Department of Agriculture for use on citrus fruit. Fungicides or fungistats shall be applied either in aqueous solution, aqueous emulsion or in the gaseous state.

Sec. (2) The residue or residues of fungicides or fungistats, applied as required in Section (1) hereof, in the whole citrus fruit shall be not less than 1/20 of the legal tolerance for grapefruit and not less than 1/10 of the legal tolerance for all other varieties but for all varieties the total residue shall not exceed the maximum tolerance established by the U. S. Food and Drug Administration..

When diphenyl is used, it is recognized that residues equal to 1/10 of the legal tolerance may not be absorbed by the fruit prior to its leaving the packing house. Therefore, the addition of diphenyl impregnated pads, wraps or liners so that a total diphenyl content of not less than 4 grams is used per 4/5 bushel container, or equivalent in other size containers, shall constitute compliance with this regulation.

If two fungicides or fungistats are used, the above residue requirements shall apply to each and shall not be cumulative.

Sec. (3) This regulation shall not apply to shipments of fresh Florida citrus fruit certified for export other than to Canada or Mexico.

Fungicidal waxes with Dowicide A, or Dowicide A with hexamine, are on the market. They can give effective decay control when applied so the wax diffused under the button and gives a complete coverage of the fruit surface.

Inspection

Dowicide A content of samples taken from packinghouses will be checked by the Division of Fruit and Vegetable Inspection. The procedure for sampling diphenyl has not been worked out but will probably be done by taking pads at random from the packing stations, and placing them in air-tight containers where they will be held until analyzed. Analytical work will be done by the Division of Fruit and Vegetable Inspection, Citrus Building, P. O. Box 1072, Winter Haven 33850 (Phone 294-3511).

Publications available

The following publications are available on request at the address listed below:

1. Recommendations for Control of Decay in Fresh Citrus Fruit.
2. Dowicide A-Hexamine Process for Citrus Fruit Decay Control Treatment.
3. Use of Diphenyl for Decay Control of Citrus Fruit, Newsletter No. 1.
4. Diagram of a suggested installation for applying Dowicide A-hexamine.
5. Labeling Containers of Fungicide Treated Citrus Fruit, Newsletter No. 6A.

I will be glad to meet with groups or individual packinghouse personnel to discuss complying with this regulation.

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