



INSTITUTE OF FOOD AND
AGRICULTURAL SCIENCES
UNIVERSITY OF FLORIDA

FLORIDA
COOPERATIVE
EXTENSION SERVICE

PACKINGHOUSE NEWSLETTER

W. Wardowski, Editor
AREC
P. O. Box 1088
Lake Alfred, FL 33850
Phone (813) 956-1151

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SEALPACKAGING OF INDIVIDUAL FRUIT IN FILM¹

A report from the Volcani Institute, Israel

A new packaging for perishable produce and the machinery to automatically utilize it has been developed. This package comprises a high density polyethylene film that produces a suitable microatmosphere for individually wrapped produce. The film is only 1/2 or even 1/3 the cost of other films used, such as polyvinyl chloride.

Special procedures were developed to pretreat the film or the fruit with the following applications:

- (1) Introduction of decay preventing materials, particularly those having high vapor tension.
- (2) Addition of ethylene absorbing materials that delay the ripening and senescence of the fruit.
- (3) Addition of materials that delay the production of off-flavors by the fruit.
- (4) Introduction of hygroscopic materials that prevent the condensation of water droplets in the package.

The package was demonstrated as doing the following:

- (1) Doubling and at times trebling the life of produce as measured by appearance, firmness, flavor and other keeping qualities; thus, sealed lemons kept for 9 months while non-sealed fruit only 3 months; sealed grapefruit kept for 6 months while control fruit lasted only 2 months at 17°C (63°F) and 85% relative humidity.
- (2) Reducing decay of several citrus fruit varieties from several tens percent to 0.7% for 4-6 months of storage, or of tomatoes from 80 to 0.5% for 2-3 weeks of storage.
- (3) Reducing weight loss by several-fold, e.g., sealed tomatoes lost 0.9% while non-sealed fruit lost 6% of its weight; sealed mandarins lost 1.4% while the control fruit lost 17%; sealed oranges lost 5% compared with the control fruit which lost 22%.

The results with citrus are promising with the following observations:

- (1) There is a possibility of substituting this packaging system for increasingly expensive refrigeration during export to Europe.
- (2) Alternaria (black rot) internal decay is sometimes a problem in extended tests over 6 weeks.
- (3) Marketing test of 4 to 6 weeks have resulted in no Alternaria, no off flavors and acceptable marketability.
- (4) Nesting as well as any form of secondary infestation is prevented by sealing each fruit from its neighbor.

¹ Pending patents in various countries for both the system and the machine.

This new packaging was awarded a "Special Commendation" at the 1979 ISPA International Packaging Exhibit in Tel Aviv on April 5, 1979.

S. Ben-Yehoshua
Division of Fruit and Vegetable Storage

D. Nahir
Institute of Agricultural Engineering
Bet Dagan, Israel

Editor's Note. Research in Australia reported by Dr. K. Gillespie with four lemons per polyethylene bag, and individually wrapped grapefruit and oranges confirm some of the work reported above for nonrefrigerated conditions.

DEGREENING ROOM HUMIDITY

The recommended relative humidity in Circular 389 (see Available Publications) for Florida degreening is 90 to 96% at 82 to 85°F (28 to 29°C). High relative humidity is the most difficult degreening room condition to maintain. Air in the above temperature and humidity ranges will contain 149 to 178 grains of moisture per pound of dry air (0.0214 to 0.0254 Kg moisture per Kg dry air), while ambient Florida air will contain much less [for example 75°F (23°C) with 60% relative humidity would contain 78 grains of moisture per pound of dry air (0.0112 Kg moisture per Kg dry air)].

Humidity is most efficiently added to degreening room atmospheres with steam or with pneumatic atomizing nozzles which mix water with air. The latter are most common and have the advantage of not adding heat to the room when it is at the optimum 85°F.

Recent tests at this Center have emphasized the importance of dry wood in complicating humidity control (nothing really new since this has been recognized as a problem in apple storages for thirty years). Wood walls and floors can take days to come into balance with the humidity. Dry wooden pallet boxes can also absorb a great deal of moisture, making it more difficult to obtain high relative humidity in degreening rooms.

Wetting down dry wooden pallet boxes at least a week in advance of the beginning of the season could be beneficial to the fruit during degreening and lower the energy used to humidify degreening rooms.

Will Wardowski
Extension Service

Bill Grierson
AREC
Lake Alfred

EXPORTED FLORIDA CITRUS FRUIT, 1978-79 SEASON

The ten countries with the greatest market during the 1978-79 season for Florida Fresh citrus fruit are listed below. The figures are for 4/5 bushel cartons, the standard Florida shipping container. This information is a part of this Division's Annual Report, now in preparation.

	<u>Grapefruit</u>	<u>Oranges</u>	<u>Tangerines</u>	<u>Total</u>
Japan	7,060,388	424,211	6,048	7,490,647
France	1,620,662	41,797	1,450	1,663,909
Holland	1,297,750	81,870	18,181	1,397,801
Puerto Rico	17,286	274,013	33,139	324,438
New Zealand	55,730	200,969	2,000	258,699
Germany	223,374	8,569	--	231,943
England	56,652	1	--	56,653
Italy	48,609	--	--	48,609
Sweden	39,753	946	--	40,699
Switzerland	21,411	--	--	21,411
Others	17,731	6,850	200	<u>24,781</u>
			Total	<u>11,559,590</u>

J. R. Willingham
Administrator, Statistical Section
Florida Division of Fruit & Vegetable Inspection
Winter Haven

The above figures exclude our second most important export country, Canada, for the 1978-79 season.

Figures for Canada offloads (below) were provided by Joe Brady, Florida Department of Citrus, Lakeland.

	<u>Grapefruit</u>	<u>Oranges</u>	<u>Tangerines</u>	<u>Total</u>
Canada	2,999,000	1,819,000	596,000	<u>5,414,000</u>
			Total Exports	<u>16,973,590</u>

Editor

A. H. WHITMORE FOUNDATION FARM FIELD DAY

This year's Foundation Farm Field Day will be held Tuesday, November 20, 1979, and the program will begin promptly at 1:00 p.m. at the A. H. Whitmore Foundation Farm, Leesburg. A guided tour of the farm is planned which will include several rootstock and breeding research plots. Special emphasis will be on the newly released 'SUNBURST' variety which will be ripe at that time. Growers will have the opportunity to see fruiting trees of 'SUNBURST' on several rootstocks. Staff from the U. S. Horticultural Research Laboratory, Orlando, will be on hand for consultation.

Roger Young
Laboratory Director
USDA, Orlando

AVAILABLE PUBLICATIONS

Available from Dr. W. Wardowski, AREC, P. O. Box 1088, Lake Alfred, FL 33850

"Recommendations for degreening Florida fresh citrus fruits" by W. F. Wardowski and A. A. McCornack. Florida Extension Circular 389. May 1973.

Available from L. A. Risse, USDA-SEA, 2120 Camden Road, Orlando, FL 32803

"Resistance to thiabendazole and benomyl of Penicillium digitatum and P. italicum isolated from citrus fruit from several countries by R. E. McDonald, L. A. Risse and B. M. Hillebrand. J. Amer. Soc. Hort. Sci. 104(3):333-335. 1979.

Available from Dr. R. Paul Singh, Dept. of Agricultural Engineering, University of California, Davis, CA 95616

"Energy use in citrus packing plants." by M. Naughton, R. P. Singh, P. Hardt and T. R. Ramsey. Amer. Soc. Agr. Engrs. 22(1):188-192. 1979.

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W. F. Wardowski
W. F. Wardowski
Associate Professor
Extension Horticulturist