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Institute of Food and Agricultural Sciences

PACKINGHOUSE NEWSLETTER

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ROTARY (ROUND) WASHER

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There is rarely a truly innovative development in citrus packinghouses. *One such* innovation is a rotary (round) washer invented and patented by OMT Engineering, Inc., Dunedin, Florida.

The only two rotary washers in the world are in a citrus packinghouse in central Florida. The first commercial rotary washer was installed in the orange/grapefruit line at Waverly Growers Cooperative. After one season a second rotary washer was installed in their mandarin line.

There are no documented evaluations for these washers, only informal observations and experience over two seasons. The fruit is reported by the packer to be cleaner than for traditional washers and to be gentle to the fruit. Minimal operating problems have been encountered.

The washers have a solid bed of brushes (no valleys) around a central fruit delivery area, with an outer gutter to catch and discharge the fruit to a roller bed. The fruit discharge may be in any direction via an opening in the the outside gutter. The discharge is aided with a rotating brush.

This round arrangement is approximately 12 feet in diameter, eight feet of which is brush bed. The inner brushes are firm compared to the outer softer brushes. The round bed rotates about 12 to 18 rpm, clockwise one day and counter clockwise the next day, to avoid having permanent brush deflection. A set of long bristled brushes face down above the brush bed. The top brush bed does not turn, but can be vertically adjusted to keep pressure on large and small fruit. Cleaning using a hose and rake requires about 20 minutes at the end of each day, after the top brush bed has been raised.

Mechanically a round washer is simpler than a traditional washer. The first installation at Waverly Growers Cooperative had a 48 inch wide, 60 brush (120 bearing), five hp washer, which was replaced with a two bearing two hp washer. The second two bearing machine replaced a 48 inch wide, 46 brush (92 bearing) washer. Soap is applied to fruit before it is delivered to the center of the washer. Rinse water is applied around the outer portion of the washer. The machine is designed to collect rinse water for recycling, although that has not been implemented.

Fruit does not rotate on its axis (as it does on traditional brush beds) because there are no ridges in the round bed. Therefore, the tops, bottoms and sides receive equal amount of scrubbing, and the fruit ends are cleaned. Unlike traditional washers, the time on the brush bed is not controlled by the rate of fruit delivery. If the delivery is too fast, fruit simply piles up. The time on the brush bed (usually about 22 seconds) is controlled by the rpm of the bottom bed and the pressure from the top bed. Faster rpm and more pressure results in less time on the brushes.

The brush life is yet to be determined. By the end of this season approximately three million Florida field boxes will have been washed on the original washer. Perhaps a new brush bed will then be installed. The round washer is a development to keep watching.

HIGH PRESSURE WASHER

Frank Kelsey
FMC Corporation
Lakeland, FL

FMC's Freshgard System 1000 (high pressure washer) is designed to improve packinghouse efficiency during normal and sooty mold fruit processing. This system removes surface defects such as sooty mold and scale by delivering a high pressure spray solution to the fruit surface. Major benefits of the Freshgard System 1000 include increased packout of fresh citrus, enhanced quality in the packed carton, and improved packinghouse efficiency. In conjunction with researchers at the Florida Department of Citrus, we have studied high pressure washing on multiple varieties of citrus and found no apparent adverse physiological effects from high pressure cleaning using FMC's system under commercial conditions. Major benefits of the system are detailed below.

The standard Freshgard System 1000 is designed to clean sooty mold fruit at a rate of 1000 boxes per hour. This allows the packinghouse to improve efficiency by maintaining faster dump

rates and increasing packout without increasing man hours to pack the same volume of fruit. The Freshgard System 1000 typically increases fresh fruit packout by 5% or more compared to a standard washing treatment. Our customers have told us that this system can improve packout by 20% or more on loads with a heavy sooty mold problem.

The Freshgard System 1000 increases the quality of the packout as well as the quantity of packed fruit. The cleaning process removed surface defects, shifting fruit to higher grades and increasing the overall quality of the packout. The improved cleaning also results in improved grading, as the emphasis shifts from removing dirty fruit to removing punctured, plugged, and misshapen fruit. The end result of the Freshgard System 1000 cleaning process is increased production of a higher quality product.

The Freshgard System 1000 is a fully automated fruit cleaning system featuring a water recycle process and chlorination step which sanitizes the water to eradicate decay causing pathogens.

FMC was the first company to introduce the high pressure washer technology to the citrus industry in the United States. Today there are 20 members of the Florida Citrus Industry utilizing the Freshgard System 1000 to improve the quality of their products. FMC has patent pending on its high pressure washer technology.

Editor's note: In addition to the high pressure washers described above, there are at least five others operating in Florida citrus packinghouses. They were installed and are maintained by Fresh Mark Corporation, Mascotte, Florida, by Production Fresh Fruit Machinery, Vero Beach, Florida and by Hogan & Sons, Vero Beach, Florida for their own use. At this time, they are all said by the respective packers to be operating effectively.

INDUSTRIAL WASTE WATER DISCHARGE GENERAL PERMIT FOR CITRUS PACKINGHOUSES

David L. Lester, Manager
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Hesco, Waverly, FL

Approximately thirty-five percent of the Florida citrus packinghouses discharge their citrus wash water to a land application disposal system (percolation ponds, grove irrigation sprinklers and volume guns). Each citrus packinghouse must have an industrial waste water disposal permit to conduct this type of disposal activity. Waste water and monitor wells must be sampled for a variety of chemicals on a periodic basis (weekly, monthly, quarterly) to meet the specific conditions of their permit.

After 14 years of ground water sampling from monitor wells, it is evident that chemicals applied to the fruit in groves and packinghouses do not contaminate the ground water. This being the case, packinghouse wash water discharge may be permitted using the State of Florida F.A.C. 62-660

general permit rule. A two-page application form allows the state to issue a five-year permit with either limited or no water chemistry testing.

Florida Citrus Packers (FCP), HESCO and consultants are now in the process of preparing a report which will demonstrate packinghouse wash water will not impact ground water. The report will be sent to the Florida Department of Environmental Protection (FDEP) for review. FCP will write the general permit rule under chapter 62-660 for FDEP review. Upon FDEP staff endorsement, the FDEP Secretary will submit the draft rules to the Florida Environmental Resource Commission for approval. Upon commission approval the Citrus General Permit will become a Florida administrative code rule. FDEP district permit writers will no longer be allowed to apply costly specific testing conditions to packinghouse permits. We anticipate having a general permit in place by June 1998.

Editor's note: The above article is an update of David Lester's Citrus Packinghouse Day Abstract. The citrus packing industry will have continued benefits from Mr. Lester's work.

AVAILABLE PUBLICATIONS

Available from Dr. W. Wardowski, CREC, 700 Experiment Station Road, Lake Alfred, Florida 33850

Thirty-sixth Annual Citrus Packinghouse Day, by W. F. Wardowski (ed.). 1997. Cooperative Extension Service, Citrus Research and Education Center, State of Florida--Department of Citrus and in Cooperation with Florida Citrus Packers. 20 pp.

Oil Spotting (Oleocellosis) of Citrus Fruit, by W. F. Wardowski, P. D. Petracek, and W. Grierson. 1997. Univ. of Fla. Coop. Ext. Serv. Circ. 410. 3 pp.

Separation and Grading of Freeze-Damaged Citrus Fruits, by W. F. Wardowski, W. M. Miller, and W. Grierson. 1997. Univ. of Fla. Coop. Ext. Serv. Circ. 372. 8 pp.

Postharvest Citrus Peel Disorders — Postharvest Pitting, by Peter D. Petracek. Citrus Fruit Factsheet, Florida Department of Citrus, Scientific Research Department, Lake Alfred, FL. 1 p.

The Degreening of 'Fallglo' Tangerine, by Peter D. Petracek and Lymari Montalvo. 1997. J. Amer. Soc. Hort. Sci. 122(4):547-552.