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PACKINGHOUSE NEWSLETTER

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The Packinghouse Newsletter is Going Electronic

Mark Ritenour, Indian River REC, Ft. Pierce

The Packinghouse Newsletter (PHNL) is moving into the electronic formats of e-mail and Internet access. These formats will enable more rapid delivery of future newsletters and greatly reduce printing and mailing costs. On the Internet, all PHNLs will be posted to a University of Florida postharvest web site currently under development (http://postharvest.ifas.ufl.edu). Information from previous PHNLs will be accessible through both an index page and a site search engine. In addition, other University of Florida postharvest information and links to postharvest sites around the world can be accessed from the site.

If you wish to begin receiving the Packinghouse Newsletter electronically, simply send me your e-mail address (see contact information above). For those who do not have access to e-mail or the Internet, you will continue receiving the newsletter via traditional mail.

RFID technology for use in handling fresh fruits.

Bill Miller, Citrus REC, Lake Alfred

RFID (radio frequency identification) is an emerging technology in automatic data collection for materials handling systems. Packinghouses may utilize them for identifying bins of incoming fruit or tracking palletized outgoing fruit or incoming materials such as drums of fungicides, waxes, etc. RFID tags are now as small as 1 or 2 cm and normally contain three elements: 1) a main processor chip that can interface with a reader or store data or both, 2) an antenna, and 3) a power source. Generally, short-range tags are termed passive devices, deriving power when the antenna is within a radio field. These passive devices have a typical range of 1 meter and can be packaged as

cards, badges and round or square tags. A reader (interrogator) is needed to both power and communicate with the tag. Long-range tags, termed active devices, have an internal battery to power the processor. Mobile assets (trucks, containers, etc) can be equipped with active devices having a range of 30 meters or more. In some cases, these units have been coupled with GPS (global positioning system) data storage. Integration of temperature and relative humidity data for loads of produce would be another possibility. For low-end asset tracking, RFID products that can be incorporated directly into paper and inks are under development.

With an emphasis on fresh produce traceability from the field to the consumer, RFID technologies have the potential for materials tracking in that they are non-contact, environmentally rugged, reliable and relatively inexpensive devices. Possible uses include pallet and tub tracking, fleet management, chemical inventory control, security identification and labor productivity assessment. Two commercial Web sites that may be of interest regarding this technology are:

http://www.aimglobal.org/
http://www.ti.com/tiris/

Hot Water Washing for Florida Citrus?

Mark Ritenour, Indian River REC, Ft. Pierce
Greg McCollum, USDA, Ft. Pierce

The 4th International Conference on Postharvest Science (Postharvest 2000) was held in Jerusalem, Israel this spring with over 400 researchers and industry leaders from 40 countries meeting to discuss the latest postharvest research and industry trends. The meetings included over three days of presentations, two poster sessions and a mid-conference tour visiting different production areas, research sites and commercial postharvest facilities. The next international postharvest conference will take place in Verona, Italy in 2004.

Among those topics potentially applicable to Florida's citrus industry was a hot water brushing system developed by Dr. Elazar Fallik and his colleagues at the Volcani Center in Israel. The treatment was originally developed in 1996 to clean the calyx area of bell peppers for export to Europe (Fallik et al., 1996; 1999). During the treatment, product is first washed on a brush bed with potable water at room temperature, and then washed on another brush bed sprayed (~30 psi) with heated water (122 to 158 ^{o}F). Commodities are usually in contact with the hot water for between 10 to 30 seconds depending on the commodity and growing conditions (e.g. field vs. greenhouse grown). In Israel, this system has been commercially adapted for a number of commodities including sweet bell peppers, organically-grown citrus, tomatoes, melons, sweet corn, mangoes, kumquats and litchi.

Besides its ability to remove dirt from commodities, the equipment has also been shown to reduce surface microorganism populations, resulting in up to a 4-log reduction (only 0.01% of the microbes left after the treatment). In contrast, washing produce with water alone at room temperature can result in up to a 2-log reduction (1% of the microbes left). Reduced microbial

populations result in less decay during transport, storage and retailing and may also play an important role in meeting buyer food safety requirements. For citrus, not only does the treatment reduce decay on fruit inoculated with *Penicillium digitatum* before treatment, but also when fruit were inoculated 1 to 3 days after the heat treatment (up to 95% less decay than untreated fruit). It appears that defensive mechanisms were induced within the fruit to inhibit the growth of decay-causing organisms. The treatment also re-deposits natural surface wax over microscopic cracks and openings (e.g. stomates), reducing water loss and entry routes for pathogenic fungi. This may be particularly useful for product sold organically. Heat treatments in general have been shown to reduce chilling injury (CI) of chilling-sensitive crops and such resistance to CI has also been induced in product cleaned with this system. Dr. Joseph Smilanick (USDA, Fresno, CA) has been experimenting with hot water system under California conditions.

This is one of many technologies that were presented at the meetings that should be tested under Florida conditions to determine efficacy. Plans are underway by USDA and UF IFAS scientists to obtain a system for testing in Florida.

Literature Cited:

Fallik, E., S. Grinberg, S. Alkalai, O. Yekutieli, A. Wiseblum, R. Regev, H. Beres, and E. Bar-Lev. 1996. A unique method for simultaneously cleaning and disinfecting sweet pepper using hot water wash and brushes (in Hebrew with English summary). Gan Sadeh Vameshek 10, 38-42.

Fallik, E., S. Grinberg, S. Alkalai, O. Yekutieli, A. Wiseblum, R. Regev, H. Beres, and E. Bar-Lev. 1999. A unique rapid hot water treatment to improve storage quality of sweet pepper. Postharvest Biol. and Technol. 15:25-32.

Safe Handling of Ethylene

Mark Ritenour, Indian River REC, Ft. Pierce

The 2000-01 Florida citrus season is here and packinghouses are busy starting up their operations. One important postharvest citrus treatment, especially for early season fruit, is degreening with ethylene. Ethylene gas used for degreening is sold in compressed gas cylinders containing slightly less than 100% ethylene and has a mild sweetish smell. Though non-toxic, it can cause asphyxiation under very high concentrations as the gas displaces oxygen in the atmosphere. Ethylene is also explosive at concentrations between 3.1% and 32 % (by volume) in air. These are extremely high concentrations (3.1% = 31,000 ppm) compared to normal citrus degreening concentrations of about 5 ppm but may occur through accidental increases in ethylene flow or leaks in ethylene lines or regulators. Occasionally, one reads of an ethylene ripening room exploding that tragically kills and/or injures people. These serve as potent reminders that safety considerations are important when dealing with ethylene. Be sure to follow these important safety rules when working with ethylene:

- ✓ Do not move compressed gas cylinders without the cover cap in place (it protects the valve). Only remove the cap when the cylinder is in place and ready to be used. There are vivid stories of cylinders, turned rocket when the valve stem breaks, flying through masonry walls.
- ✓ Securely fasten cylinders to walls, holding cages or other non-tip structures.
- ✓ Check for gas leaks using a solution of soapy water. If the cylinder is leaking, contact your service provider and have it replaced.
- ✓ Verify that regulators of ethylene flow are operating correctly.
- ✓ Keep flames or spark producing equipment away from degreening rooms and ethylene cylinders. Post and observe no smoking signs in these areas. All piping should be grounded to prevent electrostatic discharge.
- ✓ Check ethylene flow often to ensure safe concentrations are maintained. Some ethylene monitoring equipment will sound an alarm if concentrations become too high.

Beware of Fire Ant Hitchhikers

Mark Ritenour, Indian River REC, Ft. Pierce

Last fall, reports surfaced of Florida citrus truckloads that were delayed or prevented from entering Arizona or California because of fire ants found in the container. In some cases, the finding of a single ant delayed or prevented movement of the shipment for several days until the ant species was identified. Thus, it is important to keep areas around packinghouses free of fire ants to prevent stowaways on shipments.

Red imported fire ants (*Solenopsis invicta* Buren), found in Florida, disperse and mate in spring and early summer. New colonies do not produce noticeable mounds for several months. Thus, areas around a packinghouse that were free of ants at the end of last season may contain one or more fire ant mounds by this fall. Areas to watched for fire ant activity include loading and unloading areas, storage areas (e.g. for cartons & pallets), and within the packinghouse staging area.

How can packinghouse managers prevent fire ants from hitchhiking on their loads of citrus? First of all, visually inspect trailers and equipment before loading. There are also several chemicals approved for fire ant control, none of which are approved for fruit contact. However, grounds and equipment that do not come in direct contact with fruit can be treated. Broadcast treatments around the packinghouse are the preferred method of control (compared to individual mound treatments, barrier or spot treatments) and take one to three months to kill 90% of the ant colonies. Both metabolic inhibitors and insect growth regulators (IGRs) are equally effective. Examples include Amdro® (hydramethylnon), Ascend™ (abamectin B1) and Logic® (fenoxycarb). Mound or spot treatments with contact insecticides act much more quickly, but require more labor and do not treat colonies that are not readily visible. More information on fire ant biology and control can be found in:

Oi, David H. and Philip G. Koehler. 1994. Imported Fire Ants on Lawns and Turf. UF IFAS, Florida Cooperative Extension Service, Fact Sheet ENY-226. Available at: http://edis.ifas.ufl.edu/