

Food safety: Reduce chemical hazards with good agricultural practices

By Michelle D. Danyluk, Keith R. Schneider, Renee Goodrich-Schneider and Timothy M. Spann

INTRODUCTION

Good agricultural practices (GAPs) represent general procedures that fruit and vegetable producers should follow to reduce the possibility of their products causing harm to consumers. Political and public food safety concerns have arisen in the aftermath of illnesses and deaths resulting from bacterially-contaminated fruit, non-pasteurized juices, vegetables and nuts. GAPs are primarily the documented collection of practices already performed by many growers as part of their normal operations. Foodborne illnesses usually occur when there is a breakdown in GAPs. A well-maintained GAPs program protects not only the health of consumers, but also the producer's investment in the product.

In general, GAPs programs address the potential risk of three types of contamination: biological, chemical and physical.

Biological hazards, including pathogenic bacteria, viruses and parasites, are the highest concern in citrus and citrus products. These organisms can lead to widespread foodborne illness if they are not excluded from the product or effectively killed if contamination takes place.

Physical hazards are typically defined as hard or sharp objects in food that can result in personal injuries. These items, if present, are often removed during sorting or culling of citrus.

Often overlooked, but no less important, chemical hazards have also been associated with foodborne illness or injury and their exclusion should be included in a well-designed GAPs program.

Although all three types of contamination described above are important, this article focuses on chemical hazards within the principles of GAPs as they relate to citrus production, primarily at the grove level. This document is not designed to provide guidance for best pest and disease management practices (see UF IFAS Citrus Pest Management Guide; http://edis.ifas.ufl.edu/topic_book_florida_citrus_pest_management_guide), but simply to raise awareness of the food-

safety risks associated with chemical use in the field.

CHEMICALS

Chemicals can become a chemical hazard if they contaminate or exceed residue limits on fruit or in juice through direct fruit contact or contact of the product with equipment surfaces containing the chemicals. All chemicals used in the field can become chemical hazards, including paint, plant growth regulators, nutrient sprays, defoliants, pesticides, etc. In terms of food safety, pesticides are defined as all chemicals used to kill pests — insecticides, fungicides, herbicides, sanitizers, etc.

These chemicals are closely regulated by the Environmental Protection Agency (EPA). EPA approval of each pesticide formulation includes specific limitations regarding the means by which the chemical may be applied, conditions of application, permitted concentrations, target organisms against which the chemical may be employed, use restrictions and requirements for the disposal of the pesticide and its containers. Additionally, each agricultural pesticide is approved only for use on specific crops. The use of any pesticide, including those used in a pest control program, must comply strictly with the instructions and information on the label.

In addition to determining what pesticide may be used on what crop, EPA also has the responsibility to determine tolerances or exemptions from tolerances for pesticide residues on raw agricultural commodities. Proper pesticide use involves close working relationships between citrus growers, packers and processors. Pesticides applied illegally or which exceed legal residue limits are considered food safety violations. An up-to-date table of maximum residue limits for fresh citrus fruit in domestic and several other markets is posted on the University of Florida Postharvest Resources Web site (<http://postharvest.ifas.ufl.edu>).

PESTICIDE USAGE

As part of GAPs documentation, labels of pesticides that are used must be kept on file and a detailed written

procedure for the application of all pesticides should be developed. Pesticide labels clearly state the allowable rate, method of application and the target organism for each chemical. Using a pesticide in any other manner, including for a purpose not identified on the label, constitutes a violation and could result in all fruit being deemed adulterated. Records showing when each pesticide is used, the quantity used, and where and how the application was made should also be maintained.

BEST PRACTICES

- Use only pesticides registered for the citrus variety to be treated.
- Use in a manner that complies with maximum residue levels (MRLs) established by the domestic or export market to which the fruit will be shipped, or in the case of fruit to be processed, meets MRL levels prescribed by the processor for juice and any essential byproducts.
- Follow all label requirements. Remember, "The label is the law!"
- Mandatory records of all pesticide applications must be current and available to the regulator, packer and processor of the fruit for compliance with audit laws and fruit contracts.
- Conduct random pesticide residue tests or if there is an indication the fruit may be out of compliance.
- Under state law, pesticide labels and use documents must be archived for at least two years after the application date (Florida Statutes 487.081 #6).

SUMMARY

It is essential to stay current with Florida and U.S. regulations governing chemical use, residue limits and record keeping. Growers, packers and processors must maintain good communication in order for a GAPs plan to succeed. Before the season begins, it is crucial for growers to meet with their packers or processors to understand the limits for potential chemical hazards a particular packer or processor may require for its supply chain partners and to meet the laws and requirements of the end user.

Michelle D. Danyluk and Tim Spann are assistant professors; Keith R. Schneider and Renee Goodrich-Schneider are associate professors — all with the University of Florida-IFAS.