

Pesticide Storage: Keep It in the Container¹

Fred Fishel²

Accidents happen quickly, and so do accidents with pesticides. Anyone storing pesticides—especially in the presence of children—needs to take precautions by keeping them in their proper, original containers.

Chapter 53-2.00 of the Florida Pesticide Law regarding storage of restricted use pesticides states, “Restricted use pesticides shall be stored and maintained in a secure manner, such that they are not easily accessible to unauthorized persons.” Any Florida Department of Agriculture and Consumer Services (FDACS) inspector conducting a routine use investigation will inspect the pesticide storage area of any facility to determine if pesticides are stored in a secure manner. This secure manner is interpreted as products are contained in their sealed, labeled, and original containers.

Why is this so important?

There have been several accidental human deaths due to ingestion of pesticides. The primary reason has been people unknowingly drinking pesticides from containers that originally held soda, other beverages, or foodstuffs (Figure 1).

Is this accidental ingestion of pesticides a common occurrence?

The California Poison Control System and the Central California Children’s Hospital reviewed data from 1998–2009 and identified more than 1,400 cases of accidental poisonings caused by storage of non-food substances in soda

bottles, unmarked bottles, cups, or glasses. Several were deaths that involved the accidental ingestion of pesticides, including the commonly used herbicide paraquat. The American Association of Poison Control Centers (AAPCC) recently sent letters of concern to the Environmental Protection Agency (EPA) regarding a series of deaths from accidental ingestion of paraquat in the San Joaquin Valley of California. AAPCC cited 50 deaths from paraquat; at least 12 were from accidental ingesting paraquat from a beverage container.



Figure 1. Pesticides should never be stored in beverage or foodstuff containers

Credits: Fred Fishel, UF/IFAS

1. This document is PI255, one of a series of the Agronomy Department, UF/IFAS Extension. Original publication date April 2015. Revised February 2018. Visit the EDIS website at <http://edis.ifas.ufl.edu>.

2. Fred Fishel, professor, Agronomy Department, and director, Pesticide Information Office; UF/IFAS Extension, Gainesville, FL 32611.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. For more information on obtaining other UF/IFAS Extension publications, contact your county’s UF/IFAS Extension office.

U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.

In addition to California, have these accidents also occurred nationally?

Yes. The fatalities that resulted from paraquat products being transferred into beverage containers in California prompted EPA to investigate all reported cases nationally. EPA subsequently conducted an investigation of all reports of fatal and high-severity paraquat incidents outside of California, and they found 27 paraquat fatality reports to date in their Incident Data System (IDS). The IDS database contains all registrant submissions of adverse health effects from pesticide products, as required by federal law (FIFRA). More than 80% of all identified paraquat fatality cases reported to IDS was due to ingestion of the product. Though some of these cases were intentional (i.e., suicide), at least eight of these 27 deaths were due to the accidental ingestion of paraquat. All eight of these accidental deaths involved transfer of paraquat into a beverage container.

What is paraquat?

Paraquat is a commonly used non-selective herbicide for control of existing vegetation. It is registered for use in Florida and sold under several trade names, including the following:

- Bonedry
- Cyclone
- Devour
- Firestorm
- Gramoxone
- Helmquat
- Para-Shot
- Parazone
- Quik-Quat

Paraquat is highly toxic to humans; one small accidental sip can be fatal, and there is no antidote.

It has reported acute oral LD₅₀ values of 110 to 150 mg/kg in rats, meaning it is classified by EPA as Toxicity Class I, the most highly toxic category of pesticides (*acute toxicity* refers to the measure of harm caused by a single, one-time exposure event, and *LD* refers to the lethal dose that would kill 50 percent of those exposed to it). Because of its high acute toxicity, products containing paraquat as the active ingredient must bear the “DANGER” signal word along with the skull and crossbones on their labels. This is a

major concern to EPA, because paraquat is a Restricted Use Pesticide that should not be accessible to the general public and, as with all pesticides, should always be stored in the original container.

How does paraquat kill humans?

Paraquat poisoning results in pulmonary toxicity; that is, it destroys the lungs. Pulmonary toxicity's effects usually lead to death due to suffocation. The delayed toxic damage from pulmonary fibrosis (the usual cause of death) most commonly occurs 7–14 days after the ingestion.

Several of these cases have occurred recently:

- According to the South Carolina Office of the Attorney General, during June 2014 an individual stole a paraquat product. A second individual put the herbicide into plastic soft drink bottles labeled “Pepsi.” He then sold the bottles to two people. One buyer mistook the herbicide for a soda and drank some. This individual died less than two weeks later.

The California Poison Control System reported several incidents:

- In 2008, an 8-year-old child in California drank paraquat out of a soda bottle that he found on a window sill in the garage. He died in the hospital 16 days later. His older brother had used the product on weeds around the house and put it in the bottle in the garage. The older brother obtained the product from a family friend who is a certified Restricted Use Pesticide applicator.
- In 2003, a 49-year-old male took a sip from his coffee cup into which he had poured paraquat herbicide because the product's bottle was deteriorating. He realized his mistake and went to the Emergency Department. At that time, he was vomiting, cold, and sweating profusely. Aggressive supportive care continued until he died on the tenth day.
- In 2000, a 15-month-old boy ingested a paraquat product that had been transferred into a Gatorade container and stored inappropriately. The boy survived in the hospital for 13 days after the ingestion and received aggressive treatment but died after suffering acute kidney and liver failure.

How can such incidents be prevented?

The product labels clearly prohibit the transfer of paraquat into food or beverage containers. These labels include the prominently placed statements “NEVER PUT INTO FOOD, DRINK OR OTHER CONTAINERS” and “DO

NOT REMOVE CONTENTS EXCEPT FOR IMMEDIATE USE.”

It is the responsibility of all pesticide applicators to ensure that pesticide products are used safely and appropriately, which involves never transferring any pesticide product, including paraquat, into a beverage container.

To prevent the severe injury and/or death from paraquat ingestion, a paraquat product must:

- be used only by a certified applicator or under the direct supervision of a certified applicator;
- never be transferred to a food, drink, or other container;
- always be kept secured to prevent access by children and/or other unauthorized persons;
- never be stored in or around residential dwellings; and
- never be used around home gardens, schools, recreational parks, golf courses, or playgrounds.

Additional Information

United States Environmental Protection Agency
Office of Pesticide Programs. 2013. *Recognition and Management of Pesticide Poisonings*. 6th edition. <https://www.epa.gov/pesticide-worker-safety/recognition-and-management-pesticide-poisonings>