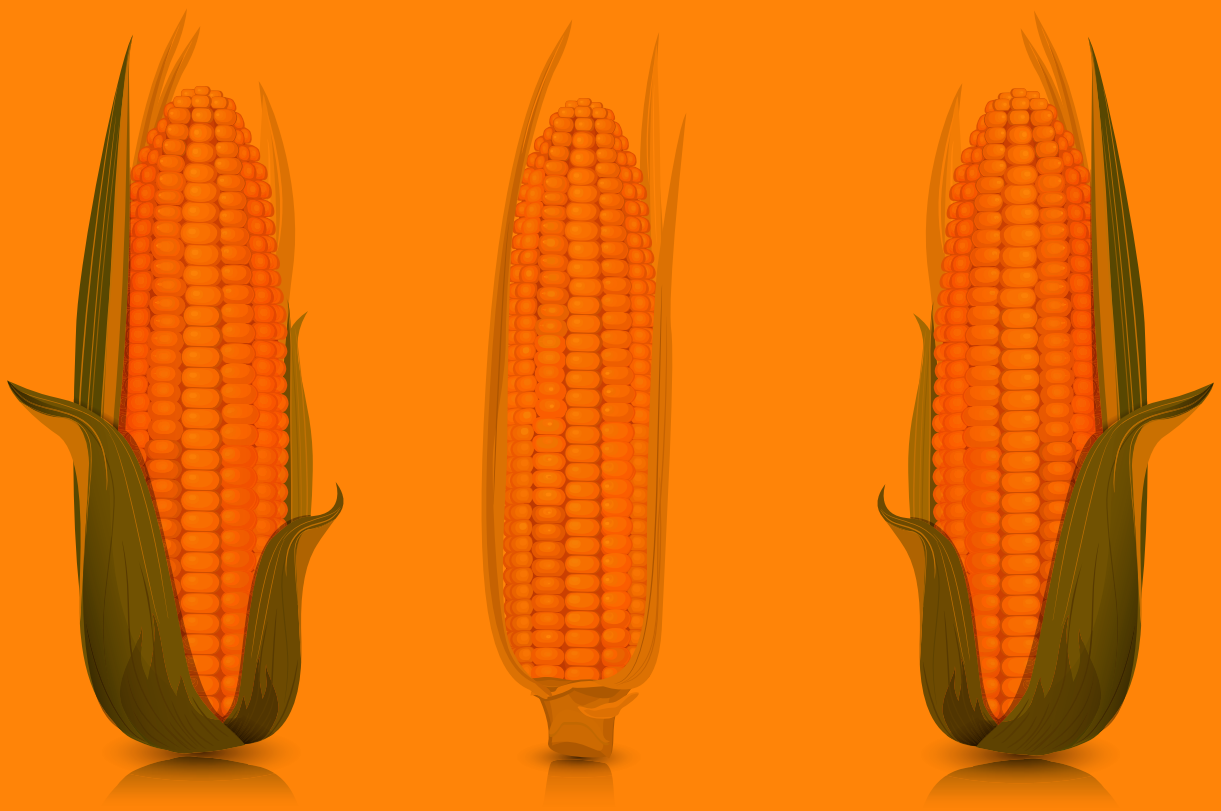
ANALYZING

3 OF THE MOST COMMON CORN PESTICIDES



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CORN IS AN IMPORTANT CROP in the United States. In 2010, farmers across the U.S. harvested more than 81 million acres of corn for 12.4 billion bushels, worth nearly $66 billion, according to the National Corn Growers Association. This corn is used for everything from eating off the cob to animal feed, plastics, fuel, sweeteners and glue.

But it is not just the U.S. that benefits from the versatility of corn: This crop has become a major source of food for developing countries. Southeast Asia and Africa grow a substantial amount of corn for human consumption as well as to feed livestock.

In order for corn to become such a major food source across the globe, farmers have relied on improved technology to increase yields year after year. A substantial part of these larger harvests have come from new pesticides that help exterminate weeds and insects that have ruined crops in the past. Here are a few of the most popular and important corn pesticides that farmers and chemists may be interested in.

GLYPHOSATE

Glyphosate herbicides are one of the most common pesticides for corn and other crops in the U.S. More than 180 million pounds were applied in 2007, according to the Environmental Protection Agency, making it the most used pesticide ingredient by volume. This organic chemical is best known by its commercial name, RoundUp, which is produced by pesticide giant Monsanto.

Glyphosate blocks one of a plant's enzymes, which leads to an inhibition of amino acid and protein production and then, ultimately, its death. Chemically referred to as

Atrazine has been applied to eliminate broad-leaved weeds and perennial grasses in U.S. corn fields since the early 1960s in the U.S.

N-(phosphonomethyl)glycine, glyphosate is often mixed with other inert chemical compounds, including sorbic acid, methyl p-hydroxybenzoate and polyoxyethylene alkylamine, according to the Northwest Coalition for Alternatives to Pesticides.

Glyphosate salts are used as active ingredients for other specific farming tasks, the EPA explained. For example, the sodium salt of glyphosate is used to regulate peanut and sugar growth as well as make fruit ripen more quickly.

Because it is a non-discriminatory herbicide that works well on most vegetation, particularly broad-leafed plants and grasses, pure glyphosate would cause damage to crops when applied. However, since its introduction in the 1970s, Monsanto has worked to create glyphosate-resistant crops so that the herbicide kills only weeds and leaves the corn unharmed. This accounts for the pesticide's success and popularity as well as a strong safety record and low operation costs, according to the European Industry Task Force on Glyphosate.

Some weeds—including the horseweed in the U.S., poinsettia in Brazil and goosegrass in Malaysia—have become resistant to the chemical. The EPA has said that glyphosate has no risk of mutation and does not cause cancer. It has low risk of occupational danger or toxicity in normal levels in food. The EPA also found the effects of glyphosate on animals, water sources and the environment to be "minimal."

ATRAZINE

Second to glyphosate on the EPA's list of commonly used pesticides was atrazine. Between 73 and 78 million pounds of this herbicide were used in the U.S. in 2007, and much of that was on corn. Atrazine has been applied to eliminate broad-leaved weeds and perennial grasses in U.S. corn fields since the early 1960s in the U.S. Globally, it is popularly used on corn as well as pineapples, sugarcane and many other crops, although it has been banned for use in the European Union. Atrazine is even used for weed reduction in non-farming settings, such as railroads, The Journal of Pesticide Action Network UK explained.

Colorless, nonvolatile and minimally water-soluble, Lambda-cyhalothrin can come in a variety of forms, including pellets, powders, liquids and capsules, according to the National Pesticide Information Center.

Chemically referred to as 1-Chloro-3-ethylamino-5-isopropylamino-2,4,6-triazine, Atrazine prevents photosynthesis in weeds, starving them. The NCAP explained that Atrazine is sometimes mixed with inert chemicals such as ethylene glycol, sodium sulfite and ethoxylated nonyl phenols. There are a number of methods for application of the herbicide, including groundboom sprayers, backpack sprayers, lawn handguns, aircrafts, tractor-drawn spreaders and many others.

Atrazine has become such a major pesticide in the U.S. and across the globe because it is inexpensive, does not damage crops heavily and can be applied during a long window of time. However, this popularity has led to Atrazine being the most commonly detected chemical in water sources—groundwater, streams, lakes etc. It was banned in the EU in 2004 because of its prevalence in water, but the EPA has stated that it is not likely to be a human carcinogen, has low acute toxicity and is not dangerous in food. Since first being registered in the U.S. in 1959, there have been a number of studies and reviews of Atrazine's safety.

LAMBDA-CYHALOTHRIN

Lambda-cyhalothrin is an insecticide that exterminates a number of common corn pests. Better known by its commercial name, Warrior, lambda-cyhalothrin is a pyrethroid, man-made but designed to mimic natural insecticides. Karate and Demand are other commercial names for this insecticide. Its molecular formula is C23H19ClF3NO3.

Colorless, nonvolatile and minimally water-soluble, Lambda-cyhalothrin can come in a variety of forms, including pellets, powders, liquids and capsules, according to the National Pesticide Information Center. Lambda-cyhalothrin is very similar to fellow pesticide and pyrethroid, cyhalothrin. The two are used interchangeably in some testing, such as toxicity.

Herbicides are among the most common pesticides for corn farming, but there are a number of corn insects that can interfere with high crop yields too. The University of Kentucky's College of Agriculture, Food and Environment pointed to Warrior as an effective treatment for cutworms, armyworm, the European corn borer, the Southwestern corn borer, brown marmorated stink

Pesticide standards are critical for ensuring proper use of pesticides in large-and small-scale farming and corn production around the world.

bugs, corn flea beetles, silk clipping insects and Southern corn leaf beetles, among others. When insects touch or consume the pesticide their nervous systems are damaged, killing or paralyzing them.

The World Health Organization reviewed the use of lambda-cyhalothrin and found that it presents no danger to the general population, although there are safety guidelines for farmers and others who work with the substance.

Pesticides increase corn production

Because corn has become such an integral part of U.S. and global food production and consumption, the chemistry, safety and effectiveness of pesticides used on corn are also important.

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