

Banning glyphosate: France may replace well-tested herbicide with pelargonic and other more toxic 'natural' chemicals

Josh Bloom | Genetic Literacy Project | January 4, 2018



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rench President Emmanuel Macron has declared he will ban the American herbicide glyphosate within three years, and sooner if a replacement is ready. [Italy has vowed to do the same](#). Activists have said the replacement is already available, and [it has been used in France since 1863](#) - a fatty acid called pelargonic (a.k.a. nonanoic, because of the nine carbon atoms) acid. Chemically, it's pretty close to a soap. Does this make any sense toxicologically? Is this another case of "natural = safe?" Or is something else going on? Let's take a look at the toxicological and environmental properties of both chemicals.

First, a qualitative look at safety

For a quick and dirty way to get a rough idea of the toxicity of a chemical, the National Fire Prevention Association (NFPA) maintains an enormous database of tens of thousands of chemicals. It is always a good place to start. A fire prevention database? Yes, because first responders need to know on a practical level what they're dealing with in the event of a chemical spill or fire, no endocrine disruptor or parts per billion nonsense. It classifies chemicals by toxicity, flammability, and water reactivity. Chemicals are placed into five toxicity categories, zero through four. In categories zero and one are things like salt, water, and baking soda. Harmless.

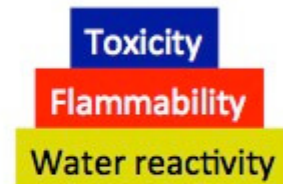
NFPA Safety Diamonds*



Pelargonic acid



Glyphosate



* National Fire Prevention Association

Group 2 hazards, where these two both reside, are slightly worse.

"Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given." - NFPA definition of a Group 2 toxin.

Members of this group include ether, benzaldehyde (almond oil), butyric acid (in rancid butter), and hydroquinone (skin bleaching agent). Like vinegar, you wouldn't want to drink a glassful, but they are unlikely to do serious harm with normal exposure.

Both pelargonic acid and glyphosate are characterized as Group 2 chemicals for acute issues but there is more to overall toxicity than a diamond will tell you so let's look at the animal toxicity data. One important parameter is called the LD₅₀ and that is the dose at which *half* the animals will die. The lethal dose data of pelargonic acid and glyphosate in animals is interesting...because they are both uninteresting. Neither compound has any appreciable acute toxicity.

Animal	Glyphosate LD ₅₀	Pelargonic acid LD ₅₀
Rats	5,600	2,000-5,000 (a)
Mice	1,500-10,000	15,000 (b)
Dogs	(Chronic) 500 /day (no effect) (c)	> 4,400 (c)
Rabbits	1,500-10,000 (b)	
Rabbits	2,000 (dermal application (d))	
Goats	1,500-10,000 (b)	

* Single oral dose unless otherwise noted

Relative toxicity of glyphosate and pelargonic acid.

By comparison, the LD₅₀ values in rats for aspirin, caffeine, and alcohol are approximately 200, 192, and 7000, respectively. Caffeine and aspirin are significantly more toxic than either herbicide. Alcohol is similar.

So neither glyphosate nor has worrisome acute toxicity in animal models. But what about the scary stories that environmentalists tell regarding glyphosate? Ignore the hysteria. It is one of the most thoroughly studied chemicals of all time because it is one of the top chemical boogeymen for environmental activists. While there are numerous methods for determining toxicity, carcinogenicity, etc., it doesn't cause cancer, even though IARC claimed it probably did and was even jeered by its own bosses at the United Nations for shoddy, agenda-driven work. (See "Glyphosate-Gate: IARC's Scientific Fraud," my colleague Alex Berezow's exposé of glyphosate [here](#).)

Both chemicals are so non-toxic that it would be impossible to eat enough of either to harm yourself unless you were really, really trying.

What about the environment?

Neither chemical poses much of a risk to the environment. According to Marin Municipal Water District Herbicide Risk Assessment:

- "Glyphosate poses... low risks to aquatic species. ([Chapter 3, Glyphosate](#))"
- Pelargonic acid poses low risks to ... aquatic and terrestrial wildlife. ([Chapter 7, Pelargonic acid](#))

Although the magnitude of toxicity of pelargonic acid and glyphosate toward various fish both [vary according to species](#), it is important to note at these low concentrations neither is harmful. Both products are approved for agriculture and even for human consumption at concentrations found in drinking water:

"Glyphosate... is the least toxic herbicide and the most widely used."

Yet you'd never know any of this according to some activists. activists, which declare glyphosate harmful and pelargonic safe even though they are toxicologically similar. The Cleveland Museum of Natural History states "[T]he most common fatty acid, pelargonic acid, is considered to have very low toxicity and to be environmentally friendly" while also declaring glyphosate a cause of cancer.

How about cost?

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With regard to expense, the material cost of the alternative herbicides was more than the conventional herbicides, sometimes substantially more. The need for repeated applications of the alternative herbicides further increases the costs of their use

Source: "[Herbicide Alternatives Research](#)" Department of Plant, Soil, and Insect Sciences University of Massachusetts

Alternatives like pelargonic acid cost more. How much more? A whole lot, according to the [New York State Department of Transportation](#):

"Scythe (57.0% pelargonic acid a.i.) was mixed with water at a 10.0% volume to treat the guiderrails along the entire 8-mile section of Route 80, from mid-morning to mid-afternoon on July 22, 2014. ... Total area of treatment was 1.48 acres... Treatment costs were \$1,954 based on materials alone."

Compare that to:

"In comparison, estimated cost of Materials and Methods 3-3 materials for conventionally treating the same area using Accord XRT II herbicide (synthetic glyphosate as active ingredient) would have been \$18.24 total."

A lot more chemicals will be needed

Even if they are about the same toxicity, pelargonic acid requires a lot of more chemical, which means more runoff, which most environmentalists should be against. Pelargonic acid will only kill the green parts of the plant they contact, so most treated plants are able to recover [because the roots remain intact](#). Glyphosate and products like 2,4-D work better with far fewer applications they go to the

Does **anything** about French and Italian politics make sense here? Neither herbicide has any appreciable mammalian toxicity, that's good, but the "organic" pelargonic acid costs 100-times more and it works less on weeds.

If you're a farmer in France you may have no choice than to use it but if you're anywhere else and decide to switch to pelargonic acid simply because it is "natural" you may want to think twice. Instead of growing food you may end up selling it. At McDonalds.

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stevesavage • 12 days ago

Josh,

Good research. The real irony here is that the homeowner/landscaper version of Roundup sold in the US includes some pelargonic acid. It turns out that pelargonic actually somewhat improves the activity of Roundup and it also dings the plants a bit in a short time so that the applicator can better see what they did or didn't spray. A company I worked for in the 1990s, Mycogen, actually patented the combination and our best financial quarter ever was when we won a settlement with Monsanto in a patent dispute about this. Pelargonic is only suitable as a spot treatment option where you need to be able to not worry about a little bit hitting the plant of interest. BTW it smells pretty bad. Oh, more irony. It wasn't allowed in organic even though it is a

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Alok • 8 days ago

Most of the data on pelargonic acid's toxicity and potential risk of adverse health effects are in unpublished studies that are not available to the public. The EPA RED for soap salts and the Federal Register notices only provide very brief summaries of the primary toxicology data. There are no epidemiological studies of the effects of pelargonic acid in humans, but the fact that it is a natural component of humans' daily diet suggests that the active ingredient in this pesticide is not systemically toxic at doses that are likely to occur in the diet—up to several grams per day.

<http://bit.ly/2mfy4dD>

What!?! This can't stand, not enough human toxicology data. What about unknown consequences?

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Sereesh Kumar Reddy Vardhiredd • 9 hours ago

So glyphosate kills plant from top to root. Simple common sense, humans have to be careful in not exposed to this KILLER GLYPHOSATE

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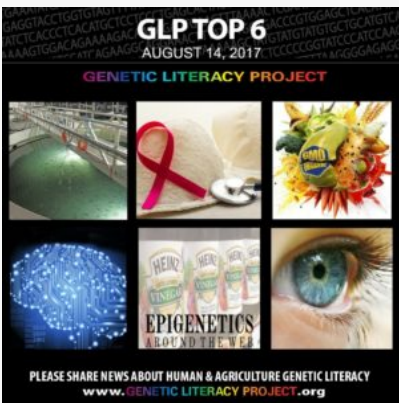
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