

What's the Difference Between Steph Curry and Herbicide 2,4-D?

Posted on *April 7, 2016* by *Josh Bloom*



Answer: Steph Curry is deadly.

How deadly? Watch this:

The following video is hilarious. Curry, arguably the best shooter in the history of the game, is wide open behind the arc in the left corner. In this situation, there is *precisely* one thing that is going to happen. Curry knows it. The other players do too. His teammate Andrew Bogut is already jogging down to the other end of the court *before Curry even lets it go*. The others just stand there waiting for the inevitable.

Video Player

At the other end of the “science-basketball continuum” lies the Environmental Working Group (EWG). These guys are much more like the 10-68 Philadelphia 76ers.

Here's an example of one of *their* shots:

“The chemical 2,4-D has been linked to a number of health hazards, including disruption of hormones and reproductive functions, elevated risk of cancer and Parkinson’s disease.”

That one was an airball. Not even close to the rim. No, 2,4-D is *not* deadly.

Let's take a look at its chemical properties and you'll see why.

Acute Toxicity

The **acute oral toxicity** of 2,4-D is considered to be “moderate.” The table below shows its LD₅₀ (the weight of a single dose required to kill 50 percent of the test animals).

Other common substances are included for perspective.

Chemical	LD ₅₀ * Mouse	LD ₅₀ Rat	LD ₅₀ Human
Caffeine	127	192	192
Aspirin	250	200	357
Tylenol	338	2200	400
Rotenone**	350	800	282
<u>2,4-D***</u>	370	520	ND
Salt	4,000	3,000	12,000
Aspartame	>5,000	>10,000	>10,000

* mg of chemical per Kg body weight of animal. When a range was found, the average value is used

** Rotenone is a pesticide that is used in organic farming

***** Source Extension Toxicology Network**

From the data in the table, it is clear that the acute toxicity of 2,4-D is unimpressive. Not only is the chemical less toxic than three everyday products that we intentionally ingest, but, ironically, it is roughly equivalent to rotenone, a pesticide which can be used by farmers and still allow their crops to meet the standard for organic produce.

Carcinogenicity

Health Canada's **Pest Management Regulatory Agency** (PMRA) recently made a determination that 2,4-D-containing products are acceptable for continued registration (meaning that they will not be banned) as they are currently used.

One of the (many) reasons for the decision was the absence of any sound evidence from animal studies and epidemiological studies of humans that the chemical causes cancer:

“The overall weight of evidence indicates that 2,4-D is not carcinogenic in rats, mice, and dogs.”

And: Epidemiological studies provide “equivocal or no evidence for an association between exposure to 2,4-D (and other chlorophenoxy herbicides) and other human cancers, including prostate, breast, pancreatic, colorectal, and brain cancers.”

Reproductive effects

There is evidence that 2,4-D may cause birth defects in rodents, but these occur when the chemical is administered orally over time and at doses that are unrealistically high.

These findings suggest that there may be a theoretical chance that the chemical could affect humans. Again, from the EXTOKNET site:

“[The data] indicate that humans may be at risk with 2,4-D exposure though no direct evidence of reproductive problems associated with 2,4-D exposure exists.

These data show the importance of dose:

“Administration of drinking water dosed with moderate levels of 2,4-D (about 50 mg/kg) to pregnant rats did not result in any adverse effects on birth weights, or litter size.”

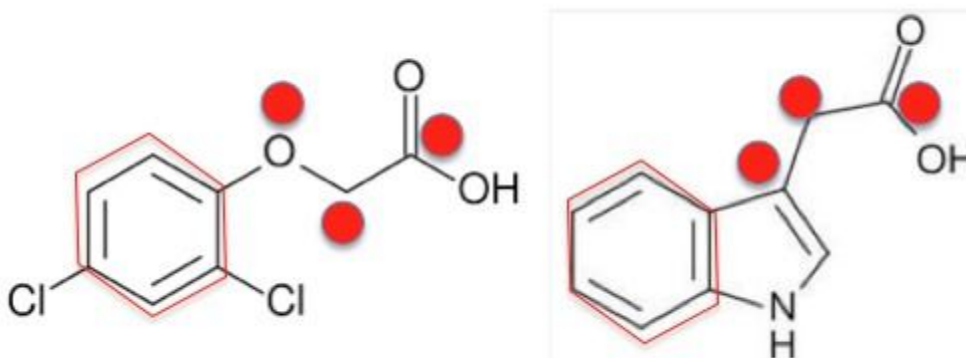
“Rats fed higher levels (188 mg/kg) had fetuses with abdominal cavity bleeding and increased mortality.”

An oral, chronic dose of 188 mg per kilo of body weight—equivalent to 13 grams (one tablespoon of sugar)—in no way reflects real life exposure. People do not swallow a tablespoon of weed killer every day.

A different kind of “poison”

When we think of poisons, chemicals like cyanide and strychnine (one of the rodent poisons) come to mind, but this concept does not apply to 2,4-D. It is technically not a poison, but rather, a plant growth regulator that makes weeds grow so fast that they die. There is no corresponding mammalian process, which explains the low toxicity.

The chemical is a synthetic version of the auxin indole-3-acetic acid (IAA). Auxins are plant hormones that are responsible for growth. Even a quick glance of the chemical structures of both chemicals reveals their structural similarity:



2,4-D (left) and IAA overlap very well, as shown in red

The 76ers were mercifully eliminated from the playoffs quite some time ago.

Unfortunately, the same cannot be said for EWG. They keep on playing—with science.

So, instead of breaking your back pulling up weeds, you could be watching what Curry's Golden State Warriors are going to do to whatever team gets between them and their second straight championship.

Swoosh.