

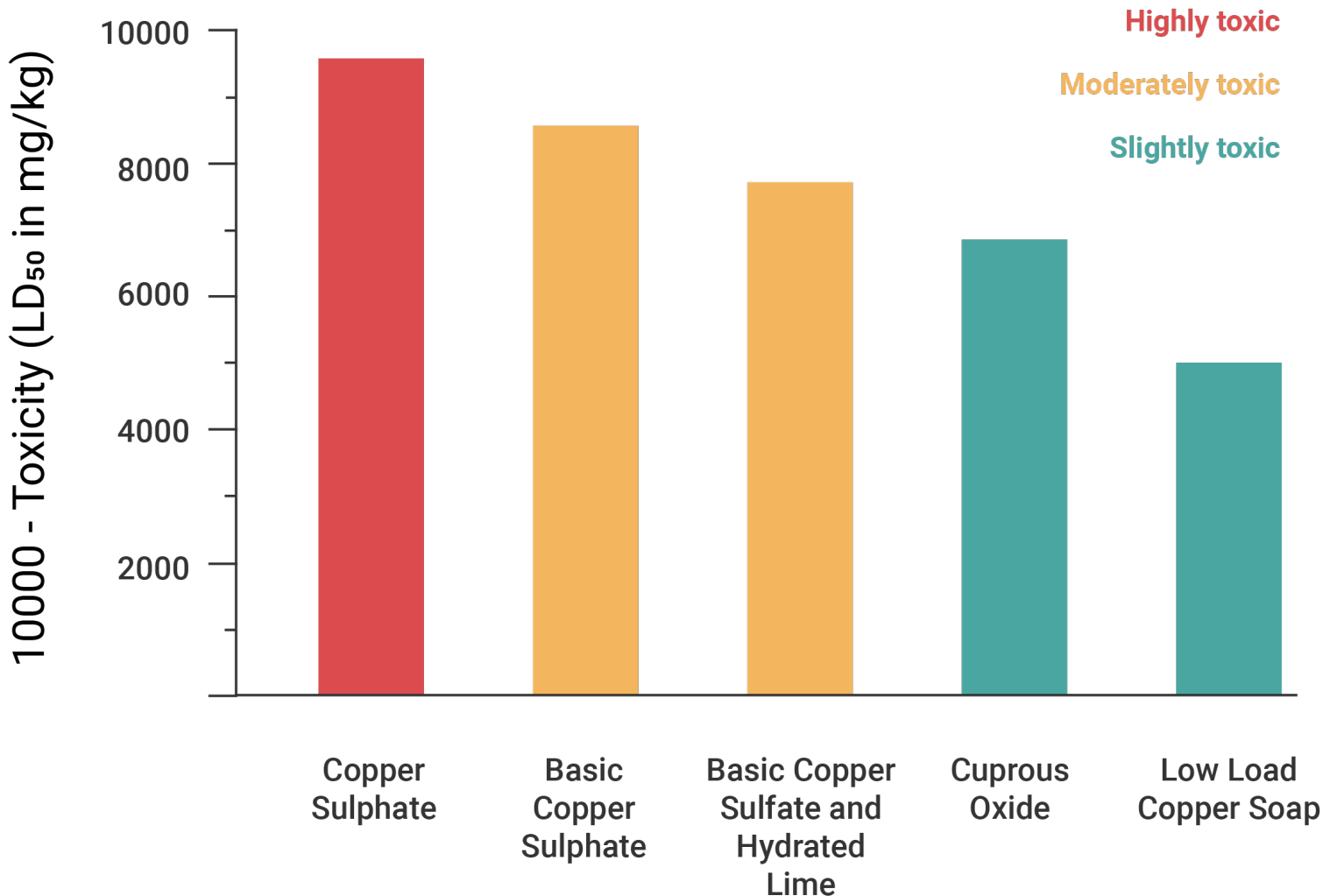
Pesticides and Food: It's not a black or white issue — How do organic pesticides compare to synthetic pesticides?

Many consumers choose to buy higher-priced organic produce because they believe organic foods are not grown using pesticides and therefore are healthier for humans and for the environment. However, organic farming can include any pesticides derived from natural sources. This distinction does not mean organic pesticides are necessarily less toxic than synthetic pesticides. The reality is more complicated. **Editor's note: This is part four of a six-part series on pesticides and food. Read [part one](#), [part two](#), [part three](#), [part five](#), and [part six here](#).**

How do organic pesticides compare to synthetic pesticides?

There is a large variation in pesticide toxicity and environmental impact, within and between organic and synthetic pesticides. For example, even within copper fungicides, which are permitted in organic farming and used by conventional farmers as well, there is a large variation in toxicity.

Copper Fungicide Toxicity Comparison



The graph above shows the [median lethal dose](#) (LD₅₀), one way to measure acute toxicity of chemicals. This value is the dose required to kill half the members of a tested animal population after a specified test duration. This means that a high LD₅₀ represents a low-toxicity substance – the higher the number, the lower the toxicity. For the purpose of this graph, I subtracted the LD₅₀ from 10000 so that a high value would represent a high-toxicity substance.

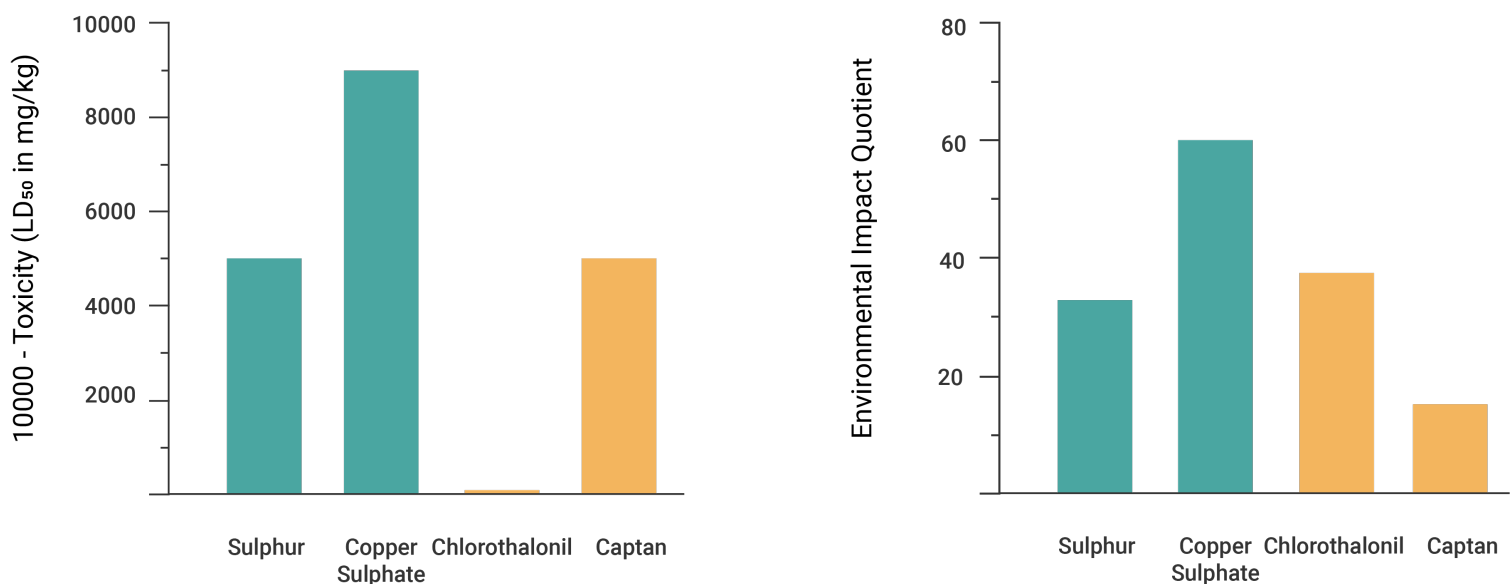
There are some organic pesticides that are very safe and have a low impact on the environment. There are also some synthetic pesticides that are safe and environmentally-friendly.

For example, here is a comparison between two insecticides, one organic (Bt) and one synthetic(diazinon):

Three graphs showing a comparison of acute toxicity, half-life, and environmental impact quotient for two pes

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In the case of Bt and diazinon, the organic pesticide is less toxic and is less likely to negatively harm the environment. However it's not always the case that the organic option is the most environmentally-friendly. Here is a comparison between two organic fungicides and two synthetic fungicides:



It is clear that toxicity and environmental impact varies quite a bit within both organic and synthetic pesticides.

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Much of the information about pesticides online focuses on hypothetical dangers of synthetic pesticides and represents organic farming as a pesticide-free alternative that is better for the environment. However, this dichotomy is misleading. The only overall difference in pesticide use between organic and conventional farming, is that organic farming uses only pesticides from natural sources.

Individual pesticides must be compared to understand differences in toxicity and environmental impact because there is so much variability in both organic and synthetic pesticides. This is also true for farming practices. Organic farming practices can be more sustainable, but this is not always the case. In the next post, I will give a specific example of when organic farming practices can be less sustainable than conventional farming.

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