

# Five myths about the chemicals you breathe, eat and drink

May 20 2014, by Mark Lorch

---



Hate chemicals? Even this won't work. Credit: zoomar, CC BY-NC

All too often the use of the word "chemicals" in the [news](#), in [advertising](#) and in common usage has the implication that they are bad. You never hear about chemicals that fight infections, help crops grow or lubricate

engines. That is because the chemicals doing that job are called antibiotics, fertilisers and engine oil, respectively.

As a result of the emotive language often used in conjunction with "chemicals", a series of myths have emerged. Myths that [Sense about Science](#) and the Royal Society of Chemistry are debunking with the publication of [Making Sense of Chemical Stories](#). Here are five of the worst offenders.

## **1. You can lead a chemical-free life**

Despite the many products that claim otherwise, using the term "chemical-free" is plain nonsense. Everything, including the air we breathe, the food we eat and the drinks we consume, is made of chemicals. It doesn't matter if you live off the land, following entirely organic farming practises or are a city-dweller consuming just processed food, either way your surroundings and diet consists of nothing but chemicals.

## **2. Man-made chemicals are dangerous**

So we have established that there is no way to lead a chemical-free existence. But surely [natural chemicals](#) are better than synthetic ones?

Nope. Whether a chemical is man-made or natural tells you precisely nothing about how dangerous it is. Sodium thiopental, for example, is used in lethal injections but it's about as toxic as amygdalin, which turns up in almonds and apple seeds. What makes one of these chemicals dangerous and the other part of your healthy five-a-day is quite simply the quantity that you consume.

Granted there are many documented cases of man-made chemicals that

have been banned due to health concerns. But on balance chemicals have done far more good than harm. A good example is brominated flame retardants which are no longer used in furniture due to allegations of unpleasant side-effects. However these worries should be balanced against the estimated [1,150 lives saved](#) because the chemical stopped furniture fires spreading.

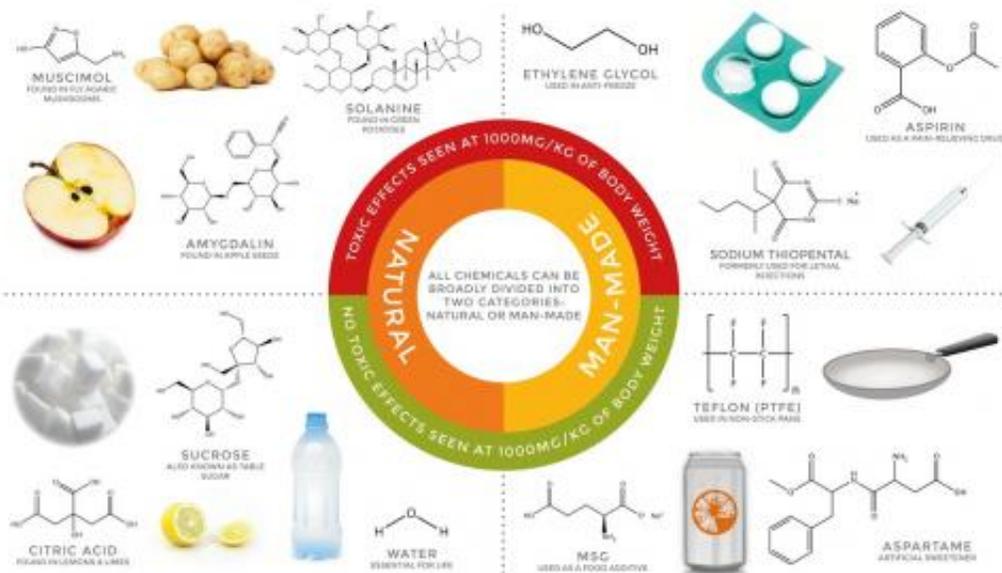
Even substances that are upheld as terrible cases of chemical pollutants, such the pesticide DDT, have their place. The [World Health Organisation support its use](#) for control of malaria transmitting mosquitoes stating:

DDT is still needed and used for disease vector control simply because there is no alternative of both equivalent efficacy and operational feasibility, especially for high-transmission areas.

### **3. Synthetic chemicals cause cancer**

## NATURAL & MAN-MADE CHEMICALS

A COMMON MISCONCEPTION IS THAT ALL MAN-MADE CHEMICALS ARE HARMFUL, AND ALL NATURAL CHEMICALS ARE GOOD FOR US. HOWEVER, MANY NATURAL CHEMICALS ARE JUST AS HARMFUL TO HUMAN HEALTH, IF NOT MORE SO, THAN MAN-MADE CHEMICALS.



**"EVERYTHING IS POISON, THERE IS POISON IN EVERYTHING, ONLY THE DOSE MAKES A THING NOT A POISON."**

PARACELUS, 1493-1541, 'THE FATHER OF TOXICOLOGY'

ANY SUBSTANCE, IF GIVEN IN LARGE ENOUGH AMOUNTS, CAN CAUSE DEATH. SOME ARE LETHAL AFTER ONLY A FEW NANOGRAMS, WHILST OTHERS REQUIRE KILOGRAMS TO ACHIEVE A LETHAL DOSE.

CHEMICAL TOXICITY IS A SLIDING SCALE, NOT BLACK AND WHITE - AND WHETHER A CHEMICAL IS NATURALLY OCCURRING OR MAN-MADE TELLS US NOTHING ABOUT ITS TOXICITY.



© COMPOUND INTEREST 2014 - WWW.COMPOUNDCHEM.COM  
MADE ON BEHALF OF SENSE ABOUT SCIENCE (@SENSEABOUTSCIENCE) WWW.SENSEABOUTSCIENCE.ORG  
MISCONCEPTIONS ABOUT CHEMICALS ARE ADDRESSED FURTHER IN THE PUBLIC GUIDE, MAKING SENSE OF CHEMICAL STORAGE AVAILABLE HERE  
www.senseaboutscience.org/guide/making-sense-of-chemical-storage.html



Credit: Compound Interest/Sense About Science

News outlets are fond of reporting about research showing ["links" between particular chemicals and occurrences of cancer](#) and other diseases. Sometimes the stories even claim that a substance definitely causes cancer or definitely cures it.

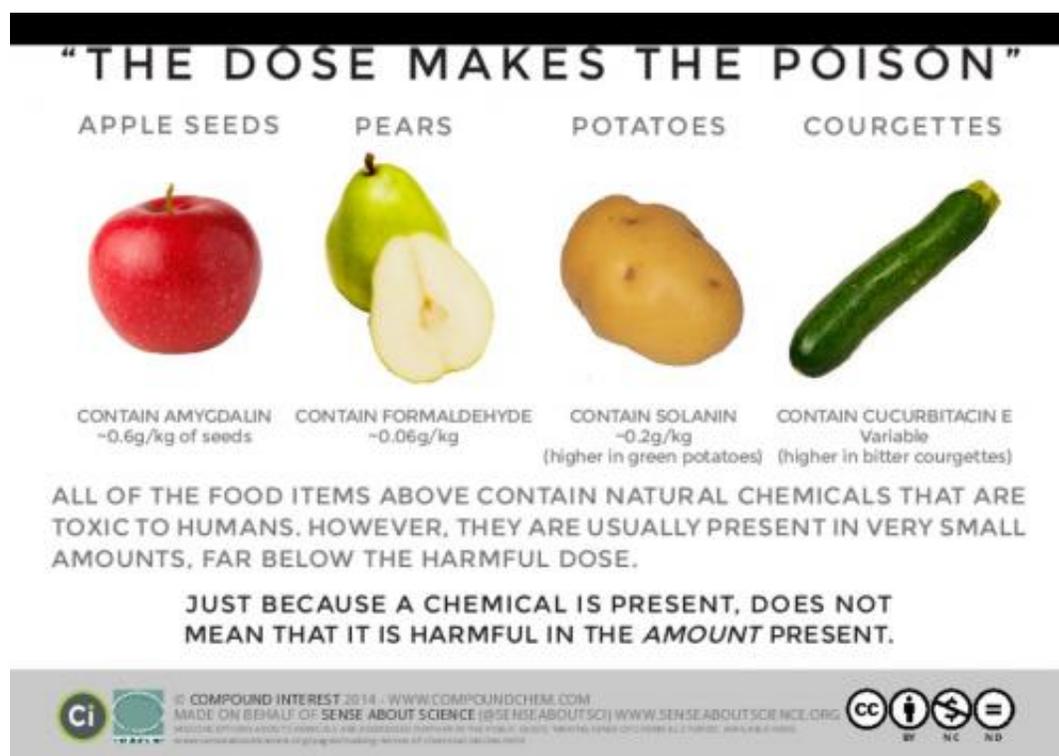
But more often than not these reports only cover part of the scientists' conclusions. They just mention that an effect on cancer (either positively or negatively) was seen in the presence of a chemical. This is what we

call a correlation, but it does not necessarily imply a causal link.

For example, the number of diagnosed autism cases [correlates with sales of organic produce](#), but no one would seriously suggest that man-made chemicals used on farms somehow protects people from autism.

The point is that correlation on its own isn't that useful, unless it is accompanied by other observations such as a plausible mechanism to explain it. But once a correlation is seen then scientists can start looking for that other supporting information.

#### 4. Chemical exposure is a ticking time-bomb



**“THE DOSE MAKES THE POISON”**

APPLE SEEDS	PEARS	POTATOES	COURGETTES
			
CONTAIN AMYGDALIN ~0.6g/kg of seeds	CONTAIN FORMALDEHYDE ~0.06g/kg	CONTAIN SOLANIN ~0.2g/kg (higher in green potatoes)	CONTAIN CUCURBITACIN E Variable (higher in bitter courgettes)

ALL OF THE FOOD ITEMS ABOVE CONTAIN NATURAL CHEMICALS THAT ARE TOXIC TO HUMANS. HOWEVER, THEY ARE USUALLY PRESENT IN VERY SMALL AMOUNTS, FAR BELOW THE HARMFUL DOSE.

**JUST BECAUSE A CHEMICAL IS PRESENT, DOES NOT MEAN THAT IT IS HARMFUL IN THE AMOUNT PRESENT.**

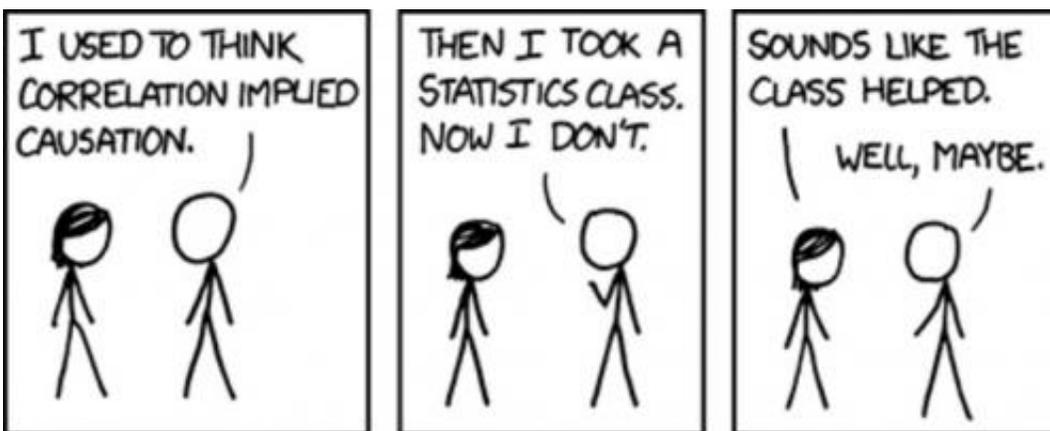
© COMPOUND INTEREST 2014 - WWW.COMPOUNDCHEM.COM  
MADE ON BEHALF OF SENSE ABOUT SCIENCE (@SENSEABOUTSCI) WWW.SENSEABOUTSCIENCE.ORG  
MEDICAL OPINIONS ARE ONLY FOR EDUCATIONAL AND RESEARCH PURPOSES. THEY DO NOT CONSTITUTE A DIAGNOSIS. ALWAYS CONSULT YOUR DOCTOR.  
www.senseaboutscience.org/your-tracking-service-at-senseaboutscience

CC BY NC ND

Credit: Compound Interest/Sense about Science

Phrases such as "[cocktail of chemicals](#)" and "[time-bomb](#)" are pretty emotive, and they certainly make for good headlines. But we permanently live among a cocktail of chemicals and have done so ever since life first evolved in a chemical soup.

So why have we suddenly become more aware of all the chemicals in our environment? In part, it is due to amazingly sensitive technologies that allow minute quantities of chemicals to be detected. It really isn't difficult for a chemist to find minute quantities of antibiotics in a swimming pool or [cocaine in water supply](#).



Credit: XKCD, CC BY-NC

## 5. We are subjects in an unregulated, uncontrolled experiment

There is no conspiracy. The reality is that the use, manufacture and disposal of chemicals are strictly regulated and controlled.

Each new synthetic [chemical](#) used as a food ingredient passes through a series of safety tests before it is allowed by the relevant body, such as the UK Food Standards Agency. New medicines go through clinical trials,

which are even more rigorous tests, before the drug agency, such as the US Food and Drug Administration, allows it to be marketed. Even the tiny amount of waste chemicals produced by university research labs are managed according to the hazardous waste management rules of local governments.

Chemists in academia and industry have to adhere to these regulations in the process inventing or manufacturing amazing new chemicals to better our lives.

*This story is published courtesy of [The Conversation](#) (under Creative Commons-Attribution/No derivatives).*

Provided by The Conversation

Citation: Five myths about the chemicals you breathe, eat and drink (2014, May 20) retrieved 7 July 2024 from <https://medicalxpress.com/news/2014-05-myths-chemicals.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--