



Adding spice to life

The beneficial and toxic use of plant poisons

SARAH BOON

MOST DELICIOUS POISON

From spices to vices – the story of nature’s toxins

NOAH WHITEMAN

304pp. Oneworld. £20.

TOXINS ARE POISONOUS SUBSTANCES produced by living organisms. Humans have used them for food, medicine and cultural and spiritual purposes for tens of thousands of years. Analysis of the teeth of a 50,000-year-old Neanderthal skeleton from Spain, known as El Sidrón Adult 1, revealed plant toxins in his tartar. This included DNA sequences from poplar – which provides salicylic acid, a chemical that can be used to make aspirin – and from moulds that produce penicillin. Since neither of these substances would have been a food source, the assumption is that he was treating himself for his ailments, which included an abscessed tooth and diarrhoea.

Most Delicious Poison by Noah Whiteman is an investigation into the abundance of plant toxins that surround us in our everyday lives. They can be found in spices, tobacco, tea and coffee, as well as anaesthetics and pain relievers, addictive drugs, antidepressants, antimalarials and more. As a demonstration of their ubiquity, the author begins with a toxin analysis of two of the plants in his wedding boutonniere (chrysanthemum and St John’s wort) and some of the compounds in his wedding ring (walnut wood and amber). Chrysanthemums contain a “bevy of toxins, including the terpenoid matricin”, which is connected to pain-relieving medicine, while St John’s wort contains the phenolic compound hypericin, widely used to treat depression and other mental health disorders. Walnut contains juglone, which can kill competing plants that live under walnut trees, and amber is the “fossilized resin of toxic terpenoids like alpha-pinene”, produced by trees to defend against attackers.

Whiteman’s interest is not only scientific, and the book contains many anecdotes that set the toxin under discussion in a wider context. When writing about coca leaves, for instance, the author mentions that they contain trace amounts of cocaine as well as salicylic acid – a combination that can effectively combat altitude sickness – but also discusses the creation of Coca-Cola in 1886. The company’s name came from the original recipe, which included coca leaf extract and caffeine extracted from kola tree nuts. It was marketed as “a temperance drink” and “an esteemed brain tonic and intellectual beverage”. By 1903 there was a public backlash against cocaine in the drink, so it was removed from the ingredient list. The caffeine, however, remained.

Most Delicious Poison also takes in the geopolitical role of plant toxins. Whiteman provides a short and fascinating history of the spice trade after the Ottoman conquest of the Roman Empire in the 15th century. He explains what spices each competing European faction held control over. By the sixteenth century the Portuguese held a monopoly on much of the spice trade from India, Sri Lanka and Indonesia, including black pepper and ginger. The Dutch East India Company, meanwhile, focused on clove, mace and nutmeg. All of these spices had antibacterial properties that kept meat dishes from going bad, while nutmeg was thought to cure the plague. Whiteman highlights the history of exploitation, colonization and aggressive profiteering behind many medicinal toxins. Those “who discovered the power of cocaine and curare never received compensation by the pharmaceutical companies that profited from them”. It is no wonder, therefore, that “many countries in Latin America and elsewhere in the global tropics now have biopiracy laws that strictly regulate the export of natural products”.

Whiteman states throughout the book that “plants didn’t evolve toxins for our benefit”. There is “a knife’s edge” between beneficial and toxic use of plant poisons, and the author quotes Paracelsus: “it is the dose that makes the poison”. For example, it is safe to consume the condensed tannin epigallocatechin 3 gallate (EGCG), which is found in green tea, in moderate amounts. But regularly consuming a large amount of EGCG pills, which have become a popular weight-loss supplement, can cause acute liver failure. Whiteman cautions that “there is nothing inherently healthy about natural products”. Some toxins have beneficial aspects, but can also be negative, regardless of the dose: nicotine and cannabis, for example, reduce parasites in the gut, but are addictive. Children are more susceptible to plant toxins than adults, and some toxins that adults can tolerate, including alcohol and nicotine, have negative impacts on the foetus in pregnant people.

Most Delicious Poison was written in part as a response to the death of the author’s father from alcohol use disorder in 2017. Whiteman weaves in stories about his childhood and his father’s shared connection to the natural world. He recalls his father teaching him to fish “in the dark eddies swirling below a waterfall that cut through the ancient basalt”. He found that nature calmed both of them, especially time spent in the forest, and credits his father for his interest in becoming a biologist.

Perhaps due to what Noah Whiteman notes is his tendency to retreat to an “intellectual refuge” when dealing with difficult topics such as his father, the book is sometimes bogged down with detailed chemistry. For readers willing to wade through sections of complex science, however, it provides a fascinating look at the background of some of our favourite foods, drinks and medications. ■

Coca, nutmeg and curare; from Köhler’s Medicinal Plants, 1887

“Whiteman cautions that ‘there is nothing inherently healthy about natural products’

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Trigger warning

Two billion people suffer from an allergy

DANIEL M. DAVIS

ALLERGIC

How our immune system reacts to a changing world
THERESA MACPHAIL
368pp. Allen Lane. £25.

CULTURALLY, WE BELITTLE THEM. Allergies are not a top-ten cause of death, so cancer and heart disease are taken more seriously. Many people with mild asthma, for example, no longer think of themselves as having an illness. Inhalers are a part of their everyday life. But even a mild allergy can be disruptive. About two billion people have been diagnosed with one – asthma, hay fever or eczema, for example – and that figure is rising. Theresa MacPhail is a medical anthropologist and science writer whose father, James, died from a bee sting in 1996, when he was forty-seven and she was twenty-four. The author says she has inherited her father’s curiosity, his regard for truth and his allergies. In *Allergic* she seeks to understand the effect allergies have on us individually and socially, as well as to explore the latest ideas for treatments and therapies.

Roughly speaking, allergies happen when the immune system mistakenly reacts to something that is not a threat. In detail, an allergic reaction often begins with a particular type of human antibody called immunoglobulin E (or IgE) locking on to the cause of the allergy, such as a protein molecule from a peanut or a dust mite, which triggers the release of the chemical histamine from immune cells. Histamine has a variety of effects on the body. In a food allergy it can trigger vomiting or diarrhoea as part of the body’s attempt to rid itself of the perceived danger. In hay fever it leads to a runny nose and itchy eyes. In allergic asthma histamine constricts lung muscles, narrowing the bronchiole tubes and making it harder to breathe.

Antibodies are vital components of our immune response in general. They are Y-shaped protein molecules, produced by immune cells called B cells, which circulate in blood and through the body’s organs and tissues. Each B cell produces one version of an antibody with a unique shape at the double-pronged end of the Y. This bit of the antibody sticks to its target, which would normally be a component of a germ, such as a bacterium or something produced by a virus. When antibodies stick to a germ they can stop it being infectious. Antibodies are also used as medicines. For example, they can be infused into a cancer patient to lock on to cells that have turned cancerous. When this happens the cancer cell is tagged by the antibody so that immune cells know to destroy it. But in an allergy the root cause of the problem is the production of antibodies that stick to something that is *not* dangerous. Allergy-prone people tend to have higher levels of IgE, or their immune cells are more sensitive to IgE levels, but our understanding is far from complete. As histamine, released by immune cells after antibodies have locked on to the wrong target, causes the symptoms of allergies, antihistamines work well, at least in mild cases. Drugs based on a stress hormone that dampens immune responses are another source of treatment for allergies.

There are also a number of allergic diseases that don’t relate to antibody levels. In other words