

Chocolate

Theobroma cacao

As Easter approaches, our stores fill with hot cross buns and *chocolate*, chocolate eggs, chocolate rabbits and chocolate bilbies, of course.

Chocolate comes from the pods of cacao trees, *Theobroma cacao*, evergreen understory trees of tropical rainforests from southern Mexico through Central America to the Amazon. The scientific name comes from the Greek and translates as *food of the gods*. Chocolate is produced from the seeds in the pods, but the surrounding fleshy pulp is also edible, tasty and refreshing.

Cultivation of cacao trees goes back at least 5,300 years, first in equatorial South America (now Ecuador and Columbia) then later Central America. The names cacao, and *cocoa*, were derived from names used by indigenous Mesoamerican groups. These included *kakawa* from the Mayan and *cacahuatl* from Nahuatl, the language of the Aztecs, meaning *bean of the cocoa tree*. The preparation of chocolate as a drink by pre-Olmec people of Central America, now Mexico, can be traced back to almost 2000 BCE. The word *chocolate* comes from the Nahuatl word *chocolātl*.



Cocoa pods: Photo by Medicaster., Public domain, via Wikimedia Commons



Theobroma cacao - in the Americas.



Christopher Columbus brought cocoa beans back to Spain on his fourth voyage to Central America in 1502 but the first European encounter with *chocolate* occurred in 1519 at a meeting between the Spanish Conquistador Cortes with Moctezuma, the 9th Emperor of the Aztec Empire, in the Aztec Capital, Tenochtitlan. By the 17th century, a



Cocoa beans in a cocoa pod: Keith Weller, USDA ARS, Public domain, via Wikimedia Commons

chocolate drink made from chocolate imported into Europe was promoted as being good for the health, and to offset its bitterness, the Spanish added sugar and honey, sometimes pepper and other spices. In Europe, solid chocolate did not really take off until the early 1800s, with the addition of sugar and milk to reduce bitterness and to come close to the delicious addictive product we know today.

Theobromine is the principal alkaloid present in cacao beans and present in chocolate, of course Alkaloids are generally bitter-tasting, naturally occurring toxins produced to protect plants from herbivores. Dark chocolate contains the highest level of theobromine. While this alkaloid is *not usually* a problem for humans, it poses a serious risk to domestic animals, which are unable to effectively metabolise it safely. Don't be tempted to treat your dog with chocolate - your actions could have deadly consequences.

Caffeine is also present in cacao plants, most concentrated the cocoa beans to defend them from pests, but also in bark, leaves and roots. In Australia, caffeine in milk chocolate has been found to contain from as little as 6mg to 30g and cooking chocolate from 35 mg to



30g. Prior to 1945, most of the caffeine produced in the USA was extracted from cocoa using a methylation of theobromine.

Flowers are produced directly from the trunk of the tree and from larger branches, a characteristic known as *cauliflory*, and common trait of many of tropical Australian lillypillies. They are pollinated by midges rather than by butterflies or bees. Although *Theobroma*



Theobroma cocoa flowers. Photo: Vinayaraj, CC BY-SA 4.0
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Theobroma cacao tree growing in a display glasshouse.

cacao comes from the Americas, the bulk of world production now is from West Africa and South-East Asia.

Concerned about the impact of climate change on the availability of chocolate? The area of greatest cacao genetic diversity occurs in Ecuador and some of the surrounding countries. At the peak of the last Ice Age, 21,000 years ago, this area provided a refugium for *Theobroma* species. As the band of latitudes (20° north and south of the equator) narrows where cacao can be successfully grown without suffering heatwaves and droughts, moves are underway to use genetic selection to improve hardiness of cacao.



IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. Coffee, Tea, Mate, Methylxanthines and Methylglyoxal. 1991. Lyon (FR): International Agency for Research on Cancer. (IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, No. 51.) Caffeine. <https://www.ncbi.nlm.nih.gov/books/NBK507027/>

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Wikipedia: <https://en.wikipedia.org/wiki/Chocolate>

Wikipedia: https://en.wikipedia.org/wiki/Theobroma_cacao

Wikipedia: https://en.wikipedia.org/wiki/Cocoa_bean

Alison Downing, Brian Atwell, Karen Marais, Kevin Downing



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