A Few Questions Answered about Chocolate

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"I find that chocolate conveys both a mental and a physical kick. The curve of consumption rises in direct relation to the quantity – perhaps to the quality - of my writing." - William Henry Chamberlin (Chamberlin 1943)

As I compose this article, I am seated on my couch with a small plate of carefully selected chocolates. My choices share a few similarities – they all claim a percentage of 70%, which qualifies them as dark chocolate, and they mostly boast smooth palates and fine origin stories. But chocolate is not merely a consumer experience. Nor can it be defined simply as a food product. Instead, chocolate should be understood as the culmination of five millennia worth of human contact. What is genuinely surprising is that, even with this lengthy history, people continue to be fascinated and entranced by chocolate, and there remains much to learn about this ubiquitous culinary delight.

All chocolate comes from a single tropical plant, *Theobroma cacao*, also known as the cacao tree. It grows to a height of 15 and 25 feet tall and prefers shady overgrowth and rainforest-like conditions (McNeil 2006, 3-4.) The oldest evidence of chocolate currently dates to roughly 3300 BCE, where traces of cacao were found on potsherds discovered in Ecuador. (Barras 2018, Coe and Coe 2013, 25.) Cacao has also been found on pottery in Chiapas, Mexico and northern Guatemala dated to 1800-1400 BCE (Coe and Coe 2013, 36.) Cacao seeds, also known as beans, are arranged in neat rows in cacao pods, which grow directly from thick stems found on the branches and trunks of the tree, a process known as cauliflory. The pods are roughly the size and shape of American footballs and can come in red, green, yellow, orange or brown.

Left: The author holding a fresh, unopened cacao pod from Puerto Rico. Right: The open pod, with rows of cacao beans entrenched in thick, white pulp. (KT Lowe)

Cacao? Chocolate? Cocoa?

Linguistically, the words referring to chocolate have something of a tangled history. The Mije-Sokean language, the ancestor of two indigenous languages spoken today in parts of southern coastal Mexico, developed the term **kakawa* by 1000 BCE (Coe and Coe 2013, 35; see also Kaufman and Justeson 2006.) **Kakawa* as a term spread throughout the gulf region of Mesoamerica over a period of 1600 years, adopted by numerous cultures and civilizations, including the Maya, who spelled it as *kakaw* (Kaufman and Justeson 2006, 117-119.) This is almost certainly the root term for the contemporary word cacao, which is used in the US to refer to unprocessed beans. The term cocoa in the US is reserved for processed, ground cacao, although it is also used on international commodities exchanges as the term for raw cacao beans (Coe and Coe 2013, 18)

The term chocolate, however, is less linguistically certain and subject to speculation. While Spanish missionary Jose de Acosta used the word in his writings by 1590, it is unclear where he picked up the word or chose that particular spelling (ibid., 137). One theory is that *chocolate* comes from the Nawa terms Chocol:atl or Chikol:atl, but this is difficult to determine for sure (ibid 134-5.) The words are both compounds ending in -atl, which means water, but past that there is little agreement about their meaning or how and when these words arrived in Mexico (ibid.) What we do know for sure is that the term chocolate was first published in 1580 and was disseminated primarily in Spanish texts (ibid; see also Coe and Coe 2013, 116-120, for an expansive discussion.)

Dark? Milk? White?

The US does not set any specific standards for what constitutes dark chocolate. However, the term "chocolate liquor", which consists of liquefied roasted cacao beans, is defined by the Food and Drug Administration and must include "no less than 50 percent nor more than 60% by weight of cacao fat [cocoa butter]" (FDA 2023) Presumably, the remaining 40% to 50% would consist of the rest of the cacao bean, what is often referred to as "cocoa mass". Chocolate liquor is often seen on packaging in the US and refers to processed cacao used in making chocolate products.

Another set of standards was developed by the National Confectioners Association, a trade group representing candy manufacturers. They suggest that chocolate bars possessing primarily chocolate liquor and sugar would be considered "dark, while a hefty proportion of added milk would make a "milk" chocolate (National Confectioners Association.) Chocolate expert Georg Bernardini refrains from using percentages in his criteria for judging chocolate. Rather, he looks at the overall ingredient list, determining the type, and occasionally the quality, of chocolate from the positions of the various ingredients (Bernardini 2015, 89-90, 123.) Still other sources suggest actual percentages. Harvard's T. H Chan's School of Public Health published an article which defined dark chocolate as possessing 50-90% cocoa solids (cocoa mass and cocoa butter) and milk chocolate as 10-50% cocoa mass plus milk (T.H. Chan School of Public Health, 2023). All of these sources agree, however, that white chocolate does not contain cocoa mass, but includes cocoa butter.

Is chocolate healthy?

Chocolate contains numerous trace minerals, including iron, copper, magnesium and phosphorus (T.H. Chan School of Public Health, 2023). It also contains other beneficial elements, such as polyphenols, which can help reduce cancer, and theobromine and endorphins, which can assist in balancing mood and allowing consumers to feel more energetic (Bernardini 2015, 68.) Chocolate also contains flavanols, which are the subject of studies done on the indigenous Kuna People of Panama. Flavanols are a group of chemicals which can act as antioxidants or antivirals, and are present in large amounts in chocolate. These studies suggest that consuming dark chocolate regularly can lead to lower levels of heart disease as a result of its flavanol content (National Institutes of Health 2021.) Dark chocolate in particular may also assist with insulin resistance and help with skin damage recovery as a result of exposure to sunlight (Katz et. al. 2011).

More recently, however, reports that cadmium and lead have been found in chocolate samples have come to light. This claim should be examined in detail. Tests run between 2019 and 2022 by Consumer Reports showed that, in their sample size of 28 dark chocolate bars, 23 contained more of these metals than others (Loria 2023.) It appears that cacao trees leach cadmium from the soil they grow in and transmit them to the cacao, while lead exposure occurs after the pods are cut from their trees (ibid.) Yet it should be noted that the data as presented by Consumer Reports leaves out some details. As Bernardini notes, some cacao-growing nations have higher levels of cadmium naturally occurring in their soil, and lead exposure may be the result of the continued use of leaded gasoline in some cacao-growing nations (Bernardini 2015, 69-70.) Consumer Reports does not reveal the source of much of the cacao they sampled, and many of the bars' labels or websites do not list where their cacao grew, either. Therefore, it is difficult to impossible to determine what growing regions in particular will produce cacao with more heavy metal content, at least with the bars tested. It should also be noted that Consumer Reports is using California state standards for heavy metal levels, and they admit that "CR's scientists believe that California's levels are the most protective available" in the absence of federal standards (Loria 2023.) Therefore, while heavy metals may be present in some chocolate bars, it may not be as much of a concern as Consumer Reports states, owing to the stricter standards they applied in their testing and the lack of information regarding the cacao's origins. Still, it is generally a good idea to consume chocolate in moderation regardless of the presence of heavy metals due to its relatively high sugar and fat content.

Where can I get exquisite, ethical chocolate?

Cacao grows in many countries located in the tropics, with some nations becoming known for growing very high quality cacao. Furthermore, some chocolate manufacturers are intent on locating and refining extremely rare, highly flavorful beans, while others focus more on fighting child labor and eliminating slavery from the cacao fields. With these trends in mind, it has become easier to locate delicious, ethically sourced chocolate. I regularly purchase chocolate bars from these sources:

- Monger's Provisions, a Detroit-based company which sells award winning chocolate bars from Roszavolgyi, Zokoko, Solstice, Crow & Moss and up to 150 others at any time
- Zingerman's, the nationally recognized deli, which carries an excellent selection of chocolate from Pralus, Michel Cluizel, Askinosie and Fruition, along with other chocolates
- Bar and Cocoa, a mail order company which sells extremely hard-to-acquire chocolate, such as Soma, Chocolat Bonnat and limited edition bars from Goodnow Farms, in addition to its numerous other offerings
- Peace on Fifth, a Dayton, Ohio-based seller who focuses on slave-free, ethically sourced and socially conscious chocolate such as Dandelion, Zotter, Stranger and Chequessett.

Theobroma cacao, the taxonomic name for cacao, translates to "Cacao, food of the gods" and may have earned this name due to its prominent role in numerous Mesoamerican religious practices spanning at least 1100 years. For centuries, people from many cultures have enjoyed the merits of chocolate, whether as a hot, spicy drink like the Aztec, a simple dessert like many 20th century Americans or as a single origin bar like many connoisseurs today. Whatever your preference, may chocolate be a delight to you always.

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