

The Potential Health Benefits of Chocolate:  
A Review of the Literature  
Jessica Westover

Abstract

This review discusses the opinions and beliefs of researchers considering the health benefits found in chocolate. Although chocolate has been consumed for centuries, recent interest in its potentially healthful qualities has made evident the wealth of contradicting opinions surrounding this topic. The first part of the review identifies the various chemicals that researchers have identified in chocolate, and provides a brief description of the effect scientists believe these chemicals have. Second, the various researchers' opinions on what quality of chocolate causes it to be craved and desired by many are discussed. Following is an exploration into the effects of the most debated chemical constituent of chocolate, its antioxidant properties, and several researcher viewpoints are presented. Last, an area of consistency in the research is discussed, leading to the conclusion that a final answer cannot be found based on research alone, but together with one's own judgment. The conclusion also suggests areas of further research that may help resolve the discrepancies and provide related topics of interest.

Introduction

The indulgence of chocolate is seen as an occasional and special treat in modern culture and has been viewed as such throughout civilization, dating back to its first taste. Chocolate, first discovered two thousand years ago by ancient cultures in the tropical rainforests of the Americas, was recognized from the beginning for its value and desirability. The Mayans are thought to have held cocoa to the highest value, equivalent to gold, and the Aztecs used cacao seeds as a form of currency. Modern chocolate, which is highly processed, promoted commercially, and sold for sale as an enjoyable snack, is very different from its natural state that these ancient civilizations were familiar with, cacao. Cacao is the most natural form of chocolate found in the pods of Cacao trees, from which cocoa is derived to make the chocolate that the modern world enjoys. Recent studies have highlighted the natural chemical components of chocolate and the wealth of health benefits that it can provide, but not all researchers agree on important topics surrounding these claims. Much research and experimentation has gone into questioning these components of chocolate, their potential effects, concentration levels, and their truthful level of benefit to the human body. As claims are made by some, and refuted by others, the common consumer is left to wonder how healthful the chocolate in their cupboard actually is.

The Chemical Components and Their Effects

The identity of the chemical qualities in chocolate is an area of research with little discrepancy, as modern technology provides the methods necessary to identify the varying chemical compound. Stephen Beckett, in his book *The Science of Chocolate*, identified the major substances found in chocolate to be the methylxanthines known as theobromine and caffeine, phenylethylamine, anandamides, polyphenols, and flavonoids. Theobromine, a relative of the more commonly known substance caffeine, is a mild stimulant believed to hold addictive, aphrodisiac, and myocardial stimulating qualities (McShea). Phenylethylamine, or PEA, and Anandamides are chemicals that naturally occur in low concentrations in the brain, and are believed to contribute to euphoria and pleasure by affecting dopamine and other neurotransmitter levels (Becket 209-213). Flavonoids and Polyphenols are chemicals both containing antioxidant properties, which "numerous studies suggest may promote good health" (Becket 213). Research shows that scientists have controversial

opinions when it comes to effects these chemicals have on the addictive quality of chocolate, and the truthfulness behind the claims surrounding its antioxidant power.

### The Cravings: Is It You or the Chocolate?

Many scientists believe a chocolate craving merely reflects a desire for taste, without underlying physiological cause, however not all agree with such belief. According to Beckett,

There are two major explanations of chocolate craving. First, it is said to result from a pleasant taste. Alternatively, it has been suggested to reflect physiological mechanisms, including increased serotonin production; the release of endorphins; the actions of methylxanthines, phenylethylamine, and anandamides; and the supply of magnesium. (205)

The physiological cause suggested involves the chemicals PEA and anandamides, measured at higher levels in chocolate than most foods, and believed to have effects similar to amphetamines; these effects include releasing dopamine and influencing mood (Beckett 213). However, the *Journal of Affective Disorders* states that “concentrations of these chemicals are too low to have significant psychoactive effect” and continues to point out that other, non-craved foods have these chemicals in even higher concentrations. If not the chemicals themselves, scientists believe our reaction to eating the chocolate plays a role: “[D]ata suggest the intake of highly-palatable foods, and the pleasure associated with eating...chocolate, is associated with the release of endorphins” (Beckett 213). Beckett goes on to convey that this sensory experience connected to doing something pleasurable, along with the cultural treatment of chocolate as an indulgence and the tendency to inhibit its consumption, highlights an alternative view that many scientists share: that no evidence relates chocolate to physical dependence, we simply “crave it because we resist its consumption” (Beckett 215).

### The Antioxidant Debate

The indication that chocolate provides numerous health benefits due to its antioxidant content has researchers disagreeing on a few different levels. While some research suggests that the antioxidants in chocolate can benefit health in a multitude of ways (Acreman; Alspach; Buijsse ; “Chocolate Reduces”; Davis; McShea), other research denies these claims (Davis; Faroque; Gebel; Halliwell; Serafini). Some researchers present findings that the levels are too low or are degraded before they can provide benefit (Halliwell; Serafini), while others believe they are not (Acreman; Alspach; “Chocolate Reduces”). Also, some research suggests that antioxidants may not even provide health benefits at all (cf. Beckett). According to a study of the flavonoids in dark chocolate, they can provide possible protection against coronary artery disease, improve blood flow, impact aging and cerebral functioning, fighting against Alzheimer’s disease and dementia, and even interact with neurons to promote better survival and spatial memory (McShea). However, other research combats these claims, stating that “the thermal processing of cacao products can affect the final amount of polyphenols in chocolate” and that the harsh environment of the digestive system can degrade these antioxidants before they can reach the small intestine for absorption (Serafini). Other research has directly countered this claim as well, when an experiment studying the effects of gastric juices on the polyphenols in dark chocolate found that “it seems likely the gastric environment has minimal effect on polyphenols and that they transit with minimal modification into the small intestine” (McShea).

The contradicting claims made by researchers and their experiments create an exhaustive list of disagreements over the benefits of eating chocolate. An article by Carol Davis highlighted several of these key studies, showing the vast range of contradiction. According to her findings, “A small Dutch study found that older men who reported regular coca consumption had significantly lower blood pressure and were at less risk of cardiovascular disease” (Buijsse). This study, based on the belief that antioxidants could help with heart disease, high blood pressure, and stroke (Davis), is contradicted by an Australian study that “went on to

find that over six weeks, flavonoids-rich cocoa did not change vascular function in patients with coronary artery disease" (Faroque). Another important study to test the effectiveness of chocolate-derived antioxidants makes an important claim about the most commonly consumed chocolate, milk chocolate, finding that although flavonoids from chocolate may increase the antioxidant capacity and content in blood, "that benefit was cancelled out when taken with milk" (Serafini).

Another important topic of research that is encountered while studying the effects of chocolate is the debate over the actual effect of antioxidants themselves and whether they benefit or harm the body. Although some studies suggest antioxidants may promote good health "the most thorough human trials of antioxidants have given, at best, mixed results. And at worst, some antioxidant vitamins actually increase the risk of death" (Gebel). This same researcher also noted that "the number of products making antioxidant claims rose over 300 percent" in recent years, raising the question of whether these claims are "hard science or...the latest health craze?" (Gebel).

### Researchers Do Agree

One common thread among almost all research, articles, and studies encountered, was the warning of the negative qualities the processed chocolate modern cultures consume: the sugar and fat content. The British Dietetic Association points out the health benefits need to be taken into consideration along with its fat and sugar content, and dietitian Anne Suckling states, "if you're eating a lot of chocolate, then the negative aspects will outweigh the positive" (qtd. in Davis 16). A U.S. review of the studies of cardiovascular disease and the effects of chocolate concluded that "more research was needed into long term effects" before definitive claims were made (Ding 8).

### Conclusion

Research into the potential health benefits of chocolate and the topics surrounding its chemical components unveils the uncertainty and contradiction present in the field itself. While some research suggests chocolate contains healthy components, has chemicals that induce euphoria and causes cravings, and contains vital antioxidants that contribute to several areas of overall health, other research presents findings that the chemicals are in concentrations that are too low to provide any benefit, and that the antioxidants not only are not able to confer these benefits upon consumption of chocolate, but that antioxidants in general may be exaggerated in their potential. The agreement that all chocolate has high sugar and fat content that takes away from positive effects provides a sliver of agreement among researchers, and basis on which to build the healthiest choices: consume in moderation. This research shows that, like most pleasures, chocolate comes with both positive and negative aspects that need to be considered. Further research into ways to manufacture satisfying chocolate without the harmful effects of the high sugar and fat content may rid this health debate of a significant amount of contradiction, and eventually provide researchers with the answer that chocolate is in fact a health benefit while remaining a pleasure. Also, independent of its healthiness, research into chocolate and its possible relation to the hormone levels in women is an area of future research that could interest many, and also may provide insight into its gender specificity towards woman and romance.

### Works Cited

Acreman, Sue. "A Chocolate Bar a Day ...: Sue Acreman Discusses New Research Which Shows That Chocolate May Be Able to Diminish Your Chances of Developing Cancer." *Cancer Nursing Practice* 7.6 (2008): 9. *Academic OneFile*. Web. 2 Nov. 2010.

- Alspach, Grif. "The Truth Is Often Bittersweet ... Chocolate Does a Heart Good." *Critical Care Nurse* 27.1 (2007): 11+. *Academic OneFile*. Web. 2 Nov. 2010.
- Beckett, Stephen. *The Science of Chocolate*. 2nd ed. UK: The Royal Society of Chemistry, 2008. Print.
- Buijsse B et al. "Cocoa Intake, Blood Pressure and Cardiovascular Mortality." *Archives of Internal Medicine*. 166, 4, 411-417. Print.
- "Chocolate reduces risk of stroke." *Community Practitioner* 80.5 (2007): 6. *Academic OneFile*. Web. 2 Nov. 2010.
- Davis, Carol. "Sweet Solution? Carol Davis Discusses yhe Nutritional Benefits--Or Otherwise--That Can Be Found in Chocolate." *Nursing Standard* 21.14-16 (2006): 21+. *Academic OneFile*. Web. 2 Nov. 2010.
- Ding, E.L. et al. "Chocolate and Prevention of Cardiovascular Disease: A Systematic Review." *Nutrition & Metabolism* 3. (2006): 2-12. Print.
- Farouque HMO et al. "Acute and Chronic Effects of Flavanol-Rich Cocoa on Vascular Function in Subjects with Coronary Artery Disease: A Randomised Double Blind Placebo Controlled Study." *Clinical Science*. 111, 1 (2006). 71-80. Print.
- Gebel, Erika. "More Questions Than Answers: What You've Heard about Antioxidants May Be Mostly Hype." *Diabetes Forecast* 62.10 (2009): 50+. *Academic OneFile*. Web. 8 Nov. 2010.
- Halliwell, Barry. "Plasma Antioxidants (Communication Arising): Health Benefits of Eating Chocolate?" *Nature* 426.6968 (2003): 787. *Academic OneFile*. Web. 2 Nov. 2010.
- Journal of Affective Disorders*. Volume 92. Section 1.2-3. Print.
- Kermani, Faiz. "Chocolate Medicines." *Pharmaceutical Technology Europe* 18.4 (2006): 29+. *Academic OneFile*. Web. 2 Nov. 2010.
- McShea, Andrew, et al. "Clinical Benefit and Preservation of Flavonols in Dark Chocolate Manufacturing." *Nutrition Reviews* 66.11 (2008): 630-641. *Hospitality & Tourism Complete*. EBSCO. Web. 22 Nov. 2010.
- Serafini, Mauro, et al. "Plasma Antioxidants from Chocolate." *Nature* 424.6952 (2003): 1013. *Academic OneFile*. Web. 2 Nov. 2010.