The precise reason for the health benefits of dark chocolate: Mystery solved

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Chocolate. Credit: Wikimedia Commons

The health benefits of eating dark chocolate have been extolled for centuries, but the exact reason has remained a mystery — until now. Researchers reported here today that certain bacteria in the stomach gobble the chocolate and ferment it into anti-inflammatory compounds that are good for the heart.

Their findings were unveiled at the 247th National Meeting & Exposition of the American Chemical Society (ACS).

"We found that there are two kinds of microbes in the gut: the 'good' ones and the 'bad' ones," explained Maria Moore, an undergraduate student and one of the study's researchers.

"The good microbes, such as *Bifidobacterium* and lactic acid bacteria, feast on chocolate," she said. "When you eat dark chocolate, they grow and ferment it, producing compounds that are anti-inflammatory." The other bacteria in the gut are associated with inflammation and can cause gas, bloating, diarrhea and constipation. These include some *Clostridia* and some *E. coli*.

"When these compounds are absorbed by the body, they lessen the inflammation of cardiovascular tissue, reducing the long-term risk of stroke," said John Finley, Ph.D., who led the work. He said that this study is the first to look at the effects of dark chocolate on the various types of bacteria in the stomach. The researchers are with Louisiana State University.

The team tested three cocoa powders using a model digestive tract, comprised of a series of modified test tubes, to simulate normal digestion. They then subjected the non-digestible materials to anaerobic fermentation using human fecal bacteria, according to Finley.

He explained that cocoa powder, an ingredient in chocolate, contains several polyphenolic, or antioxidant, compounds such as catechin and epicatechin, and a small amount of dietary fiber. Both components are poorly digested and absorbed, but when they reach the colon, the desirable microbes take over. "In our study we found that the fiber is fermented and the large polyphenolic polymers are metabolized to smaller molecules, which are more easily absorbed. These smaller polymers exhibit anti-inflammatory activity," he said.

Finley also noted that combining the fiber in cocoa with prebiotics is likely to improve a person's overall health and help convert polyphenolics in the stomach into anti-inflammatory compounds. "When you ingest prebiotics, the beneficial gut microbial population increases and outcompetes any undesirable microbes in the gut, like those that

cause stomach problems," he added. Prebiotics are carbohydrates found in foods like raw garlic and cooked whole wheat flour that humans can't digest but that good bacteria like to eat. This food for your gut's helpful inhabitants also comes in dietary supplements.

Finley said that people could experience even more health benefits when dark chocolate is combined with solid fruits like pomegranates and acai. Looking to the future, he said that the next step would be for industry to do just that.

More information: Impact of the microbiome on cocoa polyphenolic compounds:

Abstract
Flavanols such as catechin, epicatechin and polymers are abundant in cocoa products, however their fate in the lower gastrointestinal tract is not clear. We investigated the impact of the human gut microbiome on three different types of cocoa powders: lavado, Geekins Sienna, and Paragon. The cocoa powders differed in sources and processing methods. The materials were predigested in a gastrointestinal model and the non-digestible residues were anaerobically fermented in a human gastrointestinal model. Short chain fatty acids, changes in pH and phenolic profiles were determined at 0, 6, 12, 18 and 24 hours. Fatty acid production was compared to hi-Maize Resistant Starch (positive control). The pH dropped slightly between 6 and 12 hours and acetic acid, butyric acid, and propionic acid were found. The phenolic profiles suggested breakdown of larger molecules to simpler phenolic acids. Colonic fermentation may be responsible for some of the benefits of coca products.

Provided by American Chemical Society