

# Dark Chocolate Reduces Stress and Inflammation, Boosts Memory

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✓ Fact Checked

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## STORY AT-A-GLANCE

- › When it comes to chocolate, its cacao content – which is bitter, not sweet – the amount of sugar added, and the processing chocolate undergoes, makes a huge difference in terms of whether it has any health benefits
- › Raw cacao gets its bitter taste from the polyphenols present, and these plant compounds are also responsible for most of the health benefits associated with dark chocolate
- › The cacao bean contains hundreds of naturally occurring compounds, including epicatechin, resveratrol – two powerful antioxidants – phenylethylamine (which boosts mood) and theobromine, which has effects similar to that of caffeine
- › Human trial data reveal chocolate helps improve stress levels, inflammation, mood, memory and immune function, but it must contain at least 70% cacao and be sweetened with organic cane sugar
- › A number of other studies have confirmed cacao can benefit your heart, blood vessels, brain and nervous system, and helps combat diabetes and other conditions rooted in inflammation

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Throughout its history, which dates back at least 4,000 years,<sup>1</sup> chocolate has been a symbol of luxury, wealth and power. During the 14th century, the Aztecs and Maya even used cacao beans as currency. Modern research has also revealed chocolate has

significant health benefits — provided you're willing to give up the now-familiar sweetness of modern day milk chocolate.

Its **cacao** content — which is bitter, not sweet — the amount of sugar added, and the processing chocolate undergoes, makes a huge difference in terms of whether it has any health benefits.

Raw cacao gets its bitter taste from the polyphenols present, and these plant compounds are also responsible for most of the health benefits associated with dark chocolate. Milk chocolate, on the other hand, has few, if any, redeeming qualities, as it is loaded with sugar, containing very low amounts of flavanol-rich cacao.

## **Cocoa Contains Hundreds of Health-Promoting Chemicals**

The cacao bean contains hundreds of naturally occurring compounds with known health benefits, including epicatechin (a flavonoid) and resveratrol, the former of which has both antioxidant and anti-inflammatory properties, and is thought to help shield your nerve cells from damage.

Norman Hollenberg, a professor of medicine at Harvard who has spent years studying the Kuna people of Panama who consume up to 40 cups of cocoa a week, believes epicatechin is so important it should be considered a vitamin.<sup>2</sup>

The Kuna have less than a 10% risk of stroke, heart failure, cancer and diabetes, which are the most prevalent diseases ravaging the Western world.<sup>3</sup> Kuna elders also have very low rates of high blood pressure, a feature attributed to their high cocoa consumption.

Resveratrol, a potent sirtuin activator, is known for its neuroprotective effects and has been linked in many recent studies to work synergistically with NAD to increase longevity. It has the ability to cross your blood-brain barrier, which allows it to moderate inflammation in your central nervous system (CNS). This is significant because CNS inflammation plays an important role in the development of neurodegenerative diseases.

Research also shows resveratrol is an exercise mimetic, producing similar mitochondrial benefits as exercise by stimulating AMPK and PKC-1alpha, which increase **mitochondrial biogenesis** and mitophagy. Another compound found in cacao is phenylethylamine, which has been shown to boost mood in a way similar to that of tryptophan, which your body converts to serotonin.

Theobromine, meanwhile, has effects similar to that of caffeine, but without the jitteriness. Cacao is also rich in important minerals such as magnesium, which promotes muscle relaxation and is needed for bone health, iron for red blood cell production, and zinc, needed for cell renewal.

Just be careful and avoid the mistake I made. I assumed since cacao is so wonderful you can take it every day without a break. I used raw cacao nibs in my smoothie for the better part of a year and developed a sensitivity to it. It is best to take a few days off a week so you don't develop a sensitivity.

## **Dark Chocolate Supports Brain Health**

Most recently, human trial data from Loma Linda University, presented at the Experimental Biology 2018 annual meeting in San Diego, reveal chocolate helps improve stress levels, inflammation, mood, memory and immune function. The caveat? It has to contain at least 70% cacao and be sweetened with organic cane sugar. According to Loma Linda University:<sup>4</sup>

*"While it is well-known that cacao is a major source of flavonoids, this is the first time the effect has been studied in human subjects to determine how it can support cognitive, endocrine and cardiovascular health ... These studies show us that the higher the concentration of cacao, the more positive the impact on cognition, memory, mood, immunity and other beneficial effects."*

In the first study, 70% cacao chocolate consumption was associated with upregulation of several intracellular signaling pathways that are involved in the activation of T-cells, the cellular immune response and genes involved in the signaling between brain cells

and sensory perception. In other words, not only was it found to improve immune function, but dark chocolate may also boost brain plasticity, improving your ability to learn, process and remember new information.

In the second study, which used 70% organic cacao chocolate, they assessed the brain's response to eating 48 grams of dark chocolate using electroencephalography (EEG); first 30 minutes after, and then two hours after. As in the first trial, the dark chocolate was found to enhance neuroplasticity.

## **Bitter Chocolate Is a Sweet Treat for Your Heart**

A number of other studies have confirmed cacao can benefit your heart, blood vessels, brain and nervous system, and helps combat diabetes and other conditions rooted in inflammation. As noted in a paper<sup>5</sup> published in the journal *Oxidative Medicine and Cellular Longevity*:

*"Cocoa contains about 380 known chemicals, 10 of which are psychoactive compounds ... Cocoa has more phenolics and higher antioxidant capacity than green tea, black tea, or red wine ... The phenolics from cocoa may ... protect against diseases in which oxidative stress is implicated as a causal or contributing factor, such as cancer.*

*They also have antiproliferative, antimutagenic, and chemoprotective effects, in addition to their anticariogenic effects."*

One 2012 meta-analysis<sup>6</sup> found that eating chocolate could slash your risk of cardiovascular disease by 37% and your stroke risk by 29%. Another meta-analysis<sup>7</sup> published that same year found that cocoa/chocolate lowered insulin resistance, reduced blood pressure, increased blood vessel elasticity and slightly reduced low-density lipoprotein (LDL) cholesterol.

A 2015 study<sup>8</sup> published in the journal *Heart* – which also included a systematic review of nine other studies – also found a correlation between chocolate consumption and a lower risk for cardiac events and stroke. The initial analysis included data from nearly

21,000 men and women and had a median follow-up of nearly 12 years. According to the authors:

*"The percentage of participants with coronary heart disease (CHD) in the highest and lowest quintile of chocolate consumption was 9.7 percent and 13.8 percent, and the respective rates for stroke were 3.1 percent and 5.4 percent ... A total of nine studies with 157 809 participants were included in the meta-analysis.*

*Higher compared to lower chocolate consumption was associated with significantly lower CHD risk ... stroke ... composite cardiovascular adverse outcome ... and cardiovascular mortality ...*

*Cumulative evidence suggests that higher chocolate intake is associated with a lower risk of future cardiovascular events, although residual confounding cannot be excluded. There does not appear to be any evidence to say that chocolate should be avoided in those who are concerned about cardiovascular risk."*

## **Flavonol-Rich Foods Can Be Beneficial for Diabetics**

Polyphenol-rich cacao can also be beneficial for diabetics. In one study,<sup>9</sup> patients consuming 100 grams of dark chocolate for 15 days showed decreased insulin resistance. In another, high-flavonol instant cocoa powder was found to lower the risk of cardiovascular disease in diabetics when consumed three times a day.<sup>10</sup> After one month, their blood vessel function was brought from severely impaired to normal.

In fact, the improvement "was as large as has been observed with exercise and many common diabetic medications," according to the authors, who believe the vascular improvement is largely caused by increased production of nitric oxide, which relaxes your blood vessels. It's worth noting that the cocoa beverage used here contained much higher amounts of flavonols (321 milligrams per serving) than what you'll find in your local grocery store.

As noted by lead author Malte Kelm, professor and chairman of cardiology, pulmonology and vascular medicine at the University Hospital Aachen in Germany, "The take-home message of the study is not that people with diabetes should guzzle cocoa but, rather, that dietary flavanols hold promise as a way to prevent heart disease."<sup>11</sup>

*"Patients with Type 2 diabetes can certainly find ways to fit chocolate into a healthy lifestyle, but this study is not about chocolate, and it's not about urging those with diabetes to eat more chocolate. This research focuses on what's at the true heart of the discussion on 'healthy chocolate' – it's about cocoa flavanols, the naturally occurring compounds in cocoa.*

*While more research is needed, our results demonstrate that dietary flavanols might have an important impact as part of a healthy diet in the prevention of cardiovascular complications in diabetic patients."*

## **Cocoa Benefits Mood**

As mentioned, cocoa also contains chemical compounds shown to boost mood. One study,<sup>12</sup> published in 2013, found the polyphenols in cocoa (a dark chocolate drink mix) helped reduce anxiety and induce a sense of calm when consumed daily for one month.

Participants received a cocoa drink standardized to contain either 500 milligrams or 250 milligrams of polyphenols, or a placebo drink with no polyphenol content. After 30 days, those receiving the highest dose reported significantly increased calmness and centeredness, compared to the placebo group. Those receiving the lower dose (250 milligrams) did not experience any significant effects.

## **The Difference Between Healthy and Unhealthy Chocolate**



While there's plenty of science vouching for the health benefits of dark chocolate, it's important to realize that none of these benefits are transferable to milk chocolate, which is what most people crave. As a general rule, the darker the chocolate, meaning the more cacao it contains, the more flavanols it contains, and this is the primary source of its health benefits.

Milk chocolate, which is low in cacao and high in milk and sugar, has little redeeming value and will only promote insulin resistance and related ailments. Additionally, the standard manufacturing process of milk chocolate destroys about one-quarter to one-half of the available antioxidants, thereby diminishing its benefits even further.

So, while you'd be better off getting your antioxidants from fruits, berries and vegetables, should you decide to indulge in chocolate, I recommend restricting your intake to dark, organic chocolate, which contains the most flavanols, and avoid milk chocolate. Your best option would be raw cacao nibs, which are relatively bitter since they contain no added sugar.

Additionally, consume chocolate in moderation, even the dark kind, and avoid even dark chocolate if you're struggling with serious disease such as cancer, which feeds on sugars.

## **How Cocoa Beans Are Transformed Into Chocolate**

Last but not least, you may be curious as to how chocolate is made. The International Cocoa Organization offers the following summary of the 11-step process required to turn cacao beans into a mouth-savoring treat:<sup>13</sup>

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**Step 1** – The cacao beans are cleaned to remove all extraneous material.

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**Step 2** – The wet beans are fermented by draining the pul for 36 to 72 hours.

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**Step 3** – The moisture content is further reduced from 55% to 7.5% through a drying process .

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**Step 4** – The cocoa beans are roasted.

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**Step 5** – The nibs are separated from the hulls.

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**Step 6** – The nibs are then ground, sometimes mixing them with granulated sugar to yield a liquor mixture resembling anything from a paste to a fluid.

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**Step 7** – The cocoa liquor is alkalized to modify the flavor. Also known as Dutch processing, this produces a that is light red to charcoal black.

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**Step 8** – Liquor pressing pumps hot cocoa liquor (392 degrees Fahrenheit) into cakes that are broken and milled to specific particle sizes, depending on their intended end use.

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**Step 9** – After a series of cooling steps, the cocoa is ground or milled into a tempered powder that is kept in a climate-controlled storage to maintain softness.

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**Step 10** – The mixture is pressed again to get the cocoa butter from it.

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**Step 11** – The final process produces the final three components of cocoa liquor, butter and sugar. Overall, the final manufacturing steps involve batching, particle



reduction, conching and standardization, where emulsifiers, flavorings and fats may be added.

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## Sources and References

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