



HMT Newsletter

The science behind chocolate

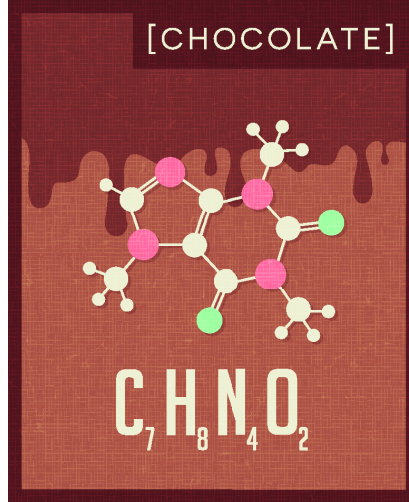
Valentine's Day just isn't the same if there's no heart shaped chocolate box. That assortment of caramels and cremes actually has some science behind it, and it isn't just a tasty treat.

Chocolate as we know it is nothing like it's precursor, the cacao bean, which grows in pods on the cacao tree. Upon harvesting, the pods are quickly opened and allowed to ferment for 5-7 days. Surface yeasts get to work first, breaking down the pulp by metabolizing sugars to ethanol. Bacteria come in next, metabolizing ethanol to acetic acid, carbon dioxide, and water. This process naturally generates heat, while acetic acid kills the bean. The breakdown of the pulp and bean allows for the mixing of previously separated components. This process, now coined the "curing" phase involves the enzymatic break down of proteins to amino acids and oxidation. The next phase involves roasting the beans, creating that browning color and converting the flavor compounds into aldehydes, esters, lactones, and pyrazine.



But what does chocolate do to our brain? Lets take a look at some of the main metabolites in chocolate.

HMT Spotlight: Chocolate



Theobromine

Key Points:

- Commonly found in teas, coffee, and the kola nut, it's richest source is chocolate
- Alkaloid compound that actually contains no bromine, it's name comes from the Cacao tree- *Theobroma*
- Theobromine is one methyl group away from caffeine, which is why chocolate is known to give the brain a little boost.
- Both caffeine and theobromine are highly toxic to dogs, so be sure to keep that chocolate box away from fido.

Anandamide

Key Points:

- Member of the endocannabinoid system and an essential omega-6 fatty acid
- It's effects are mediated by cannabinoid receptors CB1 and CB2 found in the central nervous system and periphery respectively
- Often associated with the pleasure center of the brain, anandamide is famously responsible for "runners high"
- While THC is also a ligand for the CB receptors, you would have to eat a ton of chocolate to experience the same psychoactive effects of THC

Phenylethylamine (PEA)

Key Points:

- Another compound that acts directly on the central nervous system, also associated with the pleasure center
- Low levels of PEA is often associated with depression [read more here](#)
- Chocolate contains the highest concentration of PEA, but much of it will be metabolized before it reaches your brain

So go ahead and eat that second piece of chocolate, it's for your brain!



HMT Leaders in Metabolomics Grant Winners

We thank all of the applicants and look forward to your submissions again this summer

[Check here to see the winners](#)

HMT is a leading company providing metabolomic profiling based on unique and high performance CE-MS technology. We complete over 400 projects a year and our technology has contributed to the advancement of research in a variety of scientific areas.

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