

of serotonin. Pase *et al.* (2013) reported similar findings in human subjects. Treatment of 72 healthy participants (age 40–65 years) with a cocoa-based beverage (500mg/day cocoa polyphenols) resulted in an increase in subjective calmness and contentedness compared to control. More studies are needed to better understand these mood modulating effects including larger human intervention studies to demonstrate efficacy and animal model studies to determine mechanism of action.

## Conclusions

Although chocolate is often viewed as an indulgence food by virtue of its high fat and sugar content, chocolate and cocoa contain a number of essential nutrients in significant quantities, as well as several classes of chemicals with putative non-nutritive bioactivity, including polyphenols, monounsaturated fatty acids and methylxanthines. The results of existing literature are promising with regard to the potential health beneficial effects of chocolate and other cocoa-containing foods, but additional studies are needed to more fully demonstrate efficacy, better understand the underlying mechanisms of action and inform producers in the development of novel cocoa and chocolate products with enhanced health beneficial effects.

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