

Evaluation of Some Heavy Metals Concentrations in Chocolate, Candies and Tomato Puree

Revendra Parganiha^{1*}

¹FPS, SSTC, SSGI, Bhilai, Chhattisgarh, India

*Corresponding Author E-mail: parganiharevendra@gmail.com

ABSTRACT

The paper deals with the evaluation of heavy metals like lead and cadmium concentration in chocolate, candy and tomato puree which leads to fatal disease. In this paper the emphasis will be given to the process how the adding process is done, how chocolate industry took shape in the global market and how deadly it can be if the chocolate bars are being taken again and again.

Key Words:

Heavy metals, Process evaluation, Global Market, and harmful metals

Article History:

Received Jan 28, 2025

Accepted March 28, 2025

Published April 30, 2025

1. Introduction

The brands of chocolate, which are very popular these days proof to add worrisome levels of heavy metal like lead and other metals like cadmium. Our children and even we love to grab chocolate and so on products for instant energy, having mixed metals in these food supplements effects are lethal. Dark chocolate and milk bars contain *Ca*, *Cd*, *Ni*, *Cr*, *Cu*, *Pb*, *Mn*, *Zn* *Fe*¹.

2. Objective

- To find out the reason the trend of chocolate in daily life
- To evaluate the impact spreading awareness about the negatives of the chocolate industry
- To know get a clear view about the concentrations
- To analysis the effect of using heavy metals like lead in Chocó bars²

3. Methodology

HEAVY METALS IN CHOCOLATE

Heavy metals in the chocolate bars (that have been used)	Impacts and allowable dosages (if any)
----------------------------------------------------------	----------------------------------------

Lead	Disease like cardiovascular and allowable dosages in California is 0.5 mcg.
Cadmium	Fragile bones, damage kidney and nerve. Dosages that is allowed is 4.1 mcg.

The chocolate are actually made from the coco seeds, which is good for the body. But the heavy metals are using and deducting the goodness of coco seeds. Metals which are heavily injurious to our health, by using them in the food supplements is like Chocó bars, consuming frequently by the youths³.

Nowadays, in parties, social gatherings and festivals, chocolate and chocolate bars are used as a gifts, one should be aware of the concentration and its impact on our health. Dark chocolates are also associated with the good of brain function good blood pressure and to improve the heart condition⁴.

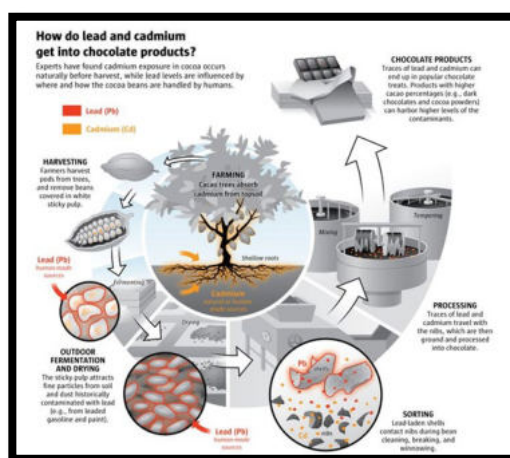


Figure 1: Chocolate products harming nature

The heavy metal like cadmium is a good reason for kidney damage, bone loss and heart problems to children and adults. Most importantly cadmium is considered as a

cancer agent in our body. Consuming the large amount of the metal lead also leads to damaged kidney, nerve, brain and bone. Harming and causing health issues in the

response to this, the NCA (THE NATIONAL CONFECTIONER ASSOCIATION) gave the statement that dark chocolates and cocoa are completely safe to consume as they acts as ant depression. However, not in the current scenario dark chocolate cannot be counted as a safe option, having more 0.2% of heavy

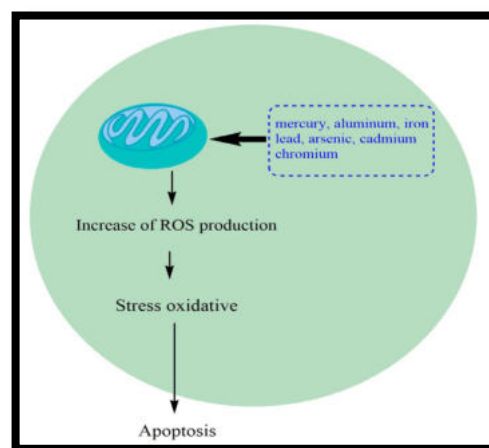
metals lead to severe health issues. The state of California affirmed that having more than 0.5 micrograms of lead and 4.1 micrograms of cadmium is can't be good to go.

TRENDS OF CHOCOLATES IN CURRENT SCENARIO⁶

Current trends	Impact
Consumer behavior	Massive addiction can easily found and attraction towards its alluring package .An abnormal eating habit grows through in the consumer.
Market size	USD 116.11 billion worldwide, alike the consumer refers Chocó bars and milky bars over and over again.
Growth rate	As a result of an large of consumer and the corona pandemic, the chocolate industry meets a gigantic growth. 3.7% of annual growth in the global market with a huge success.
Online chocolate shopping	With the trends of online (garments, beauty products, grocer etc), chocolate bars have been sold online and counted as one of most ordered staff online lately.

Countries with developing industry and a large number of youth, with this type of population have a key consumer of chocolate and milky bars . As research proved, dark chocolate helps to calm restless mind with release of serotonin, and gain a lot of good

name as a Anti-depression. So, it has its own goodness of consuming and recuperates the exhausted mind. The global chocolate market, with impressive growth rate, size was estimated at USD 113.16 billion in 2021.



The harmful elements make the chocolates absorption more harmful and need proper awareness related to it. With so any good reasons and with factor that it helps to

improve our health, consumption meets global success. Moreover, it's the covid-19 pandemic, in that time period people grew more interest in dark chocolate products⁷.

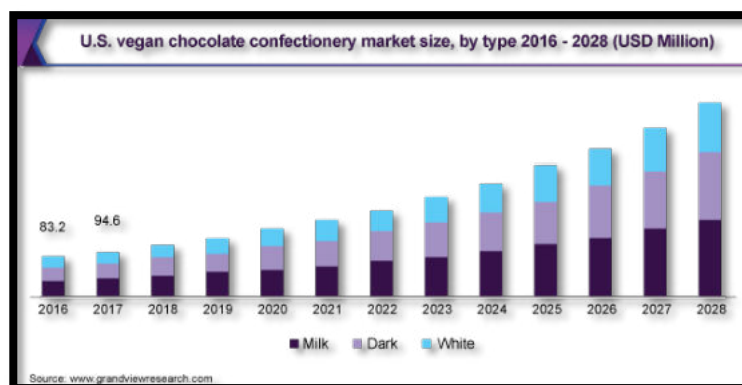


Figure 3: The increase in consumption of chocolate

THE EFFECT OF HEAVY METALS AND REACTION IN OUR BODY

No amount of heavy metals is ever considered safe, most importantly for children. Children with their growing body

and brain, bones is in grave danger with having these foods with heavy metal like lead and cadmium. Scientists stated that dark chocolate contains concentration of lead and cadmium, and it increases the chances of damaged kidney and brain functions. and its essential goodness of act as an anti-depression is no longer there.

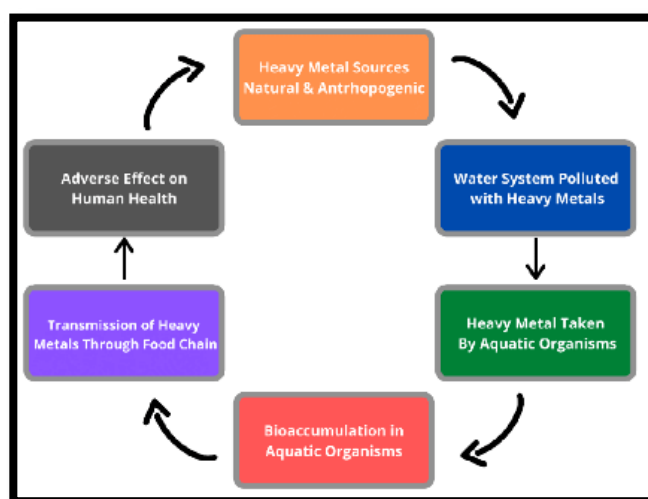


Figure 4: Lead and cadmium exhaling problem

Lead and cadmium can severe damage our heath for instance, vomiting , inhale and exhale problem , very fragile bones and in worse cases even cancer. As a result of this fatal diseases the government and the authority has banned the usages of these heavy metal for good. To know more, in gasoline the authority banned the usage of cadmium in the soils.

4. PROBLEM STATEMENT

One of the problems, one might have is the lack of well-information giving sources, very problematic find out an authentic resource with accurate information's. As the research goes through progress many things sticks, such as reliability, authenticity, moreover, the right way represents the whole thing at once. However, it is as simple as its seem to be, write with truthfulness and prioritize the public interest first. From the beginning to end, the fear that dominated is that made the points clear and understandable to all, with easy language.

5. CONCLUSION

In the conclusion to this paper, the dark chocolate bars, candy and sweets are being had by mostly all, may not just guilty as it have been taken as food product gaining weight delicious supplement. Moreover, it is food that increases chance of stroke, fragile bone, cholesterol, heart disease and cognitive function etc.

Reference

1. Amjad, M., Hussain, S., Baloch, Z. U. R., & Raza, A. (2021). Determination of heavy metals in locally available chocolates in Lahore region. Turkish Journal of Agriculture-Food Science and Technology, 9(6), 1144-1153. Retrieved on 3rd April 3, 2023. Retrieved from <http://www.agrifoodscience.com/index.php/TURJAF/article/view/4262>
2. Ferial-Cáceres, P. F., Penagos-Velez, L., & Moreno-Herrera, C. X. (2022). Tolerance and Cadmium (Cd) Immobilization by Native Bacteria Isolated in Cocoa Soils with Increased Metal Content. Microbiology Research, 13(3), 556-573. Retrieved on 3rd april 2023 .Retrieved from <https://www.mdpi.com/1776046>
3. Nnuro, W. A., Amankwaah, D., Awudza, J. A., & Afful, S. (2020). Assessment of heavy metals and proximate analysis of cocoa beans from selected cocoa growing areas in Ghana. Retrieved on 3rd April 3, 2023. Retrieved from <http://dspace.knust.edu.gh/handle/123456789/14590>
4. Özer, T., Caner, C., Altıntığ, E., & Altundağ, H. (2022). Determination of some heavy metal deposits in gluten-free foods in Turkish market with ICP-OES. Journal of Chemical Metrology, 16(2). Retrieved on 3rd April 3, 2023. Retrieved from <https://www.tandfonline.com/doi/abs/10.1080/19440049.2020.1833088>
5. Romero-Estévez, D., Yáñez-Jácome, G. S., Simbaña-Farinango, K., & Navarrete, H. (2019). Content and the relationship between cadmium, nickel, and lead concentrations in Ecuadorian cocoa beans from nine provinces. Food control, 106, 106750. Retrieved on 3rd April 3, 2023. Retieved from <https://www.sciencedirect.com/science/article/pii/S0956713519303391>
6. Salama, A. K. (2019). Health risk assessment of heavy metals content in cocoa and chocolate products sold in Saudi Arabia. Toxin Reviews, 38(4), 318-327. Retrieved on

3rd April 3, 2023. Retrieved from
<https://www.tandfonline.com/doi/abs/10.1080/15569543.2018.1471090>