

ORIGINAL RESEARCH ARTICLE

Caffeine in Chocolates a Hazardous Sign to Children's Health

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ABSTRACT

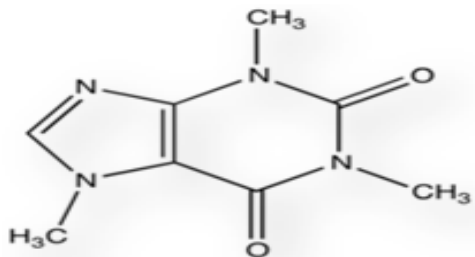
Caffeine is an alkaloid isolated from plant species. Caffeine is most commonly used to improve mental alertness. It is also used with painkillers for simple headaches and preventing and treating headaches after epidural anesthesia. 250 milligrams of caffeine per day chocolates is considered an average. For children's the dosage will be very low. It is used as an ingredient in the manufacture of many numbers of chocolates. Children's are very much found off chocolates. But chocolates contain high amount of caffeine content relative to their daily intake of tolerable caffeine dosage. The dosage of the caffeine increase causes hazardous health effects to the children's. The present study deals with the amount of caffeine present in different chocolates available in local market.

Key words: Caffeine, Chocolates, Children's Health

INTRODUCTION

Caffeine is a bitter, white crystalline xanthine alkaloid acts as a stimulant drug. Caffeine is found in varying quantities in the seeds, leaves, and fruit of some plants, where it acts as a natural pesticide that paralyzes and kills certain insects feeding on the plants. It is most commonly consumed by humans in infusions extracted from the bean of the coffee plant and the leaves of the tea bush, as well as from various foods and drinks containing products derived from the kola nut. Other sources include yerba maté, guarana berries, guayusa, and the yaupon holly.

Fig 1: Structure of Caffeine



In humans, caffeine acts as a central nervous system stimulant, temporarily warding off drowsiness and restoring alertness. It is the world's most widely consumed psychoactive drug, but, unlike many other psychoactive substances, it is both legal and unregulated in nearly all parts of the world. Beverages containing caffeine, such

as coffee, tea, soft drinks, and energy drinks, enjoy great popularity; in North America, 90% of adults consume caffeine daily.

Caffeine is toxic at sufficiently high doses, but ordinary consumption poses few known risks to health, even when carried on for years — there may actually be a modest protective effect against some diseases, including certain types of cancer. Some people experience sleep disruption if they consume caffeine, especially during the evening hours, but other people show little disturbance: the effect of caffeine on sleep is highly variable across individuals. Evidence for a risk to pregnancy is equivocal, but some authorities have concluded that prudent advice is for pregnant women to limit consumption to the equivalent of two cups of coffee per day or less. Caffeine has diuretic properties when administered to people, who are not used to it, but regular users develop a strong tolerance to this effect, and studies have generally failed to support the common notion that ordinary consumption of caffeinated beverages contributes significantly to dehydration. With heavy use, strong tolerance develops rapidly and caffeine can produce clinically significant physical and mental dependence.

Coffee has been heavily criticized for the fact that its caffeine content is addictive and unhealthy. But

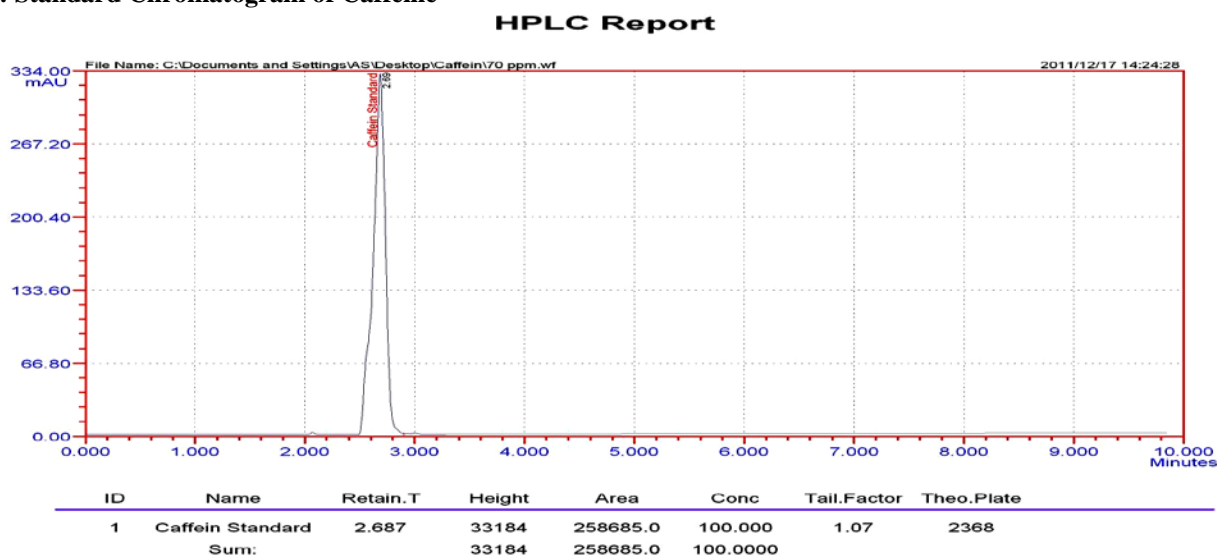
I think that if we would stop consuming everything scientists discover to be cancer prone or unhealthy, we would be left to surviving on bread and water. It's like many things in life: if you drink coffee with moderation, can be beneficial.

The caffeine contained in coffee will give you a significant boost of energy. It usually provides you with an increase in performance for more monotonous tasks like filing or simple bookkeeping, and it can also help you stay awake during drawn out tasks such as long distance driving or working as a security guard.

Usual tolerable dosage of caffeine will be 100 to 200 mg orally not more often than every 3 to 4 hours. Caffeine overdose occurs when someone accidentally or intentionally takes more than the normal or recommended amount of this medication. Symptoms in adults may include, Breathing trouble Changes in alertness Confusion, Convulsions, Diarrhea, Dizziness, Fever, Hallucinations, Increased thirst, Irregular heartbeat, Muscle twitching, Rapid heartbeat, Sleeping trouble, Urination increased, Vomiting.

For pregnant women's Caffeine, like alcohol, travels through bloodstream to the placenta and can have a negative effect on baby. Because caffeine is a stimulant, it increases heart rate and metabolism -- both of which directly affect the

Fig 2: Standard Chromatogram of Caffeine



Isolation of Caffeine from Chocolates

Weigh the chocolate accurately 200 mg of chocolate is taken in a beaker containing 200ml of distill water heated in a water bath to 30min. It is cooled to room temperature and is filtered in a Whatman filter paper until a clear solution is obtained. Then the filtrate is taken in a separating funnel and the caffeine in the filtrate is extracted with 10 ml Dichloro methane twice. The two

baby. It is okay to have one or two cups of coffee, tea, or cola a week, but try to give them up completely if you can. Many drugs will interact with caffeine.

The present studies deals with the isolation of caffeine from different chocolates available for children's and the estimation of the amount of the caffeine present in those samples.

MATERIALS AND METHODS

The analysis of the caffeine was carried out on Shimadzu HPLC model (VP series) containing LC-10AT (VP series) pump, variable wave length programmable UV/visible detector SPD-10AVP and Rheodyne injector (7725i) with 20 μ l fixed loop. Chromatographic analysis was performed using zodiac C-18 column with 250 x 4.6mm internal diameter and 5 μ m particle size. Shimadzu electronic balance (AX-200) was used for weighing. Isocratic elution with, Methanol: Acetonitrile 3:1 (v/v) was selected with a flow rate of 1 ml min⁻¹. The detection wavelength was set at 283nm with a runtime of 10 min. The mobile phase was prepared freshly and it was degassed by sonicating for 5 min before use. The column was equilibrated for at least 30min with the mobile phase flowing through the system. The column and the HPLC system were kept at ambient temperature.

extracted organic layer solution is mixed in a beaker and the organic layer is evaporated and small amount of the caffeine is present at the bottom of the beaker. The remained caffeine was injected in to hplc system to determine the total amount of caffeine present in the sample.

Preparation of calibration curve:

The standard caffeine was purchased from fine chem. Pvt ltd, Mumbai. The standard caffeine 10

mg was weighed and dissolved in 100ml of methanol to get a final concentration of 100ppm. and Isocratic elution with, Methanol: Acetonitrile 3:1 (v/v) was selected with a flow rate of 1 ml min⁻¹. The detection wavelength was set at 283nm with a runtime of 10 min. the calibration curve was prepared by injection 6 dilutions starting from 100ppm. The linearity range was identified as 50 – 100 ppm. Regression equation for the calibration curve will be $Y = 3486.5X - 2258.12$

Fig 3: Calibration curve.

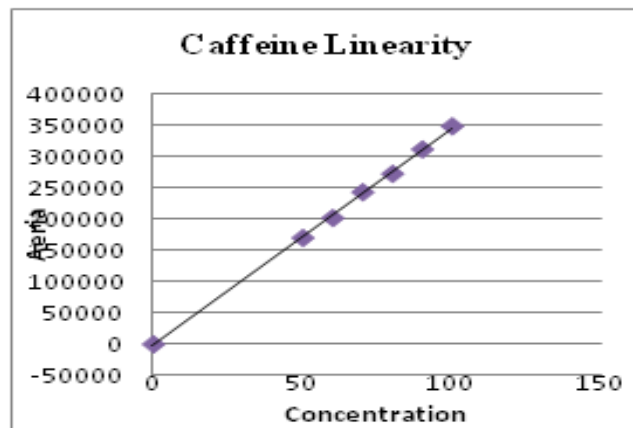


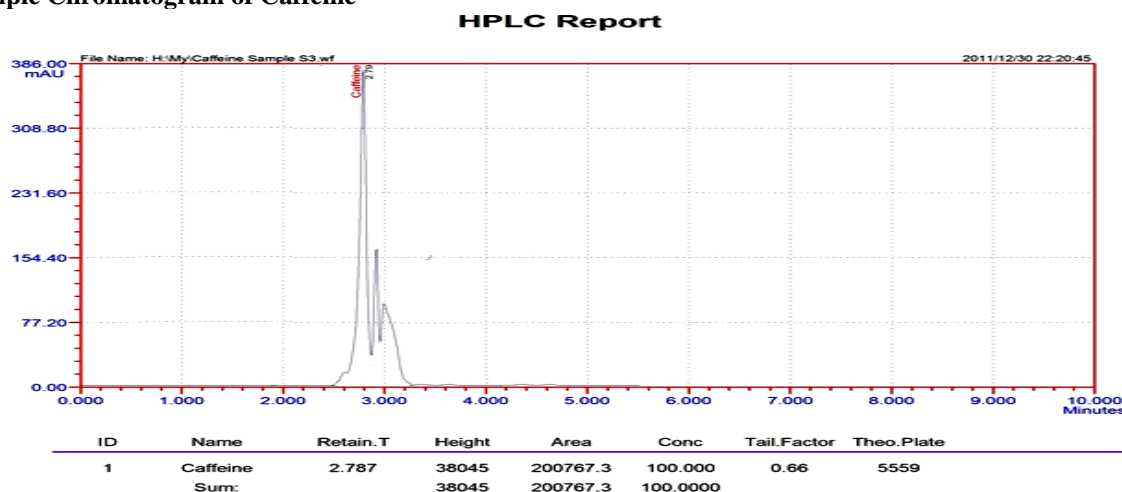
Table 1 : Linearity Results

S.No	Concentration	Aeria
1	50	170768
2	60	202593
3	70	258685
4	80	273437
5	90	312613
6	100	349703
	Slope	3486.5
	Intercept	- 2258.12
	Correlation coefficient	0.999

Analysis of the extracted samples

Different samples extracted from chocolates were injected into the hplc system having the same chromatographic conditions selected for the analysis of the standard for preparing calibration curve and the retention time of the samples were compared with the standard and the amount of the caffeine present in the samples were analyzed by substituting in the aria values in the equation $Y = 3486.5X - 2258.12$ and the amount of caffeine found in the sample can be determined.

Fig 4: Sample Chromatogram of Caffeine



RESULTS AND DISCUSSIONS

The amount of caffeine found in different chocolates can be shown in table.

Table 2: Amount of caffeine present in different chocolates

S.No	Name of the chocolate*	Amount of Caffeine present (in mg / 200mg weight of chocolate)
1	Dark Fantasy	24.6
2	Coffee bite	19.37
3	Ferrero rocher	52.97
4	Bournvalle	35.39
5	Dairy milk	48.64
6	Crème egg	68.63
7	Five star	20.71
8	Fantasy den	48.63
9	Bounty bar	67.52
10	Masti bar	58.19

*only brand names are given and manufacturer names can't mentioned because of legal problems

High amount of caffeine is found to be in crème egg Chocolates and low amount is found in Coffee bites.

CONCLUSION

The American Medical Association Council on Scientific Affairs states that low amount of caffeine likely has no negative effect on health, as long as you live an otherwise healthy lifestyle. For adults 250 milligrams of caffeine per day chocolates is considered an average or moderate amount of caffeine. For children's general dosage is 45 milli grams per day. But the marketed chocolates that are very much eaten by children's contain high amount of caffeine. More than 68.63mg of caffeine present per 200mg wet weight of a single chocolate bar. Caffeine in those Chocolates present in high amount and children's

are very much found off those and are eat more number of chocolates per day. Then the caffeine levels in the blood of children's increases and May results cause irritable, sleepless and may even trigger anxiety and cause diarrhea. Caffeine can aggravate heart problems or nervous disorders. Parents should be aware of the effects of caffeine and control their kids to avoid those chocolates contain high content of caffeine for healthy life of their children otherwise their kid's health at risk.

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