Tea is the most commonly and widely used soft beverage in the household. It acts as a stimulant for central nervous system and skeletal muscles. That is what tea removes fatigue, tiredness, and headache. It also increases the capacity of thinking. It is also used for lowering body temperature. The principle constituent of tea, which is responsible for all these properties, is the alkaloid-caffeine. The amount of caffeine in tea leaves varies from sample to sample.

Originally it was thought that caffeine is responsible for the taste and flavor of tea. But pure caffeine has been found to be tasteless while substance. Therefore, the taste and flavor of tea is due to some other substances present in it.

There is a little doubt in the popularity of the Xanthine’s beverages depends on their stimulant action, although most people are unaware of any stimulation. The degree to which an individual is stimulated by given amount of caffeine varies from individual to individual. For example , some people boast their ability to drink several cups of coffee in evening and yet sleep like a log, on the other hand there are people who are so sensitive to caffeine that even a single cup of coffee will cause a response boarding on the toxic.

The xanthine’s beverages also create a medical problem. They are dietary of a stimulant of the CNS. Often the physicians face the question whether to deny caffeine containing beverages to patients or not. In the fact children are more susceptible than adults to excitation by xanthene. for this reason, tea and coffee should be excluded from their diet. After all our main stress is on the presence of caffeine in xanthene’s beverages and so in this project we will study and observe the quantity of caffeine varying in different samples of tea leaves.

To determine the percentage quantity of caffeine present in tea samples



1. Tea of different sample
2. Bunsen burner

A close up of a device

Description automatically generated

1. Beakers

A picture containing cup, sitting, next, table

Description automatically generated

1. Conical flask

A picture containing sky, bottle, vessel

Description automatically generated

1. Filter papers

A close up of a piece of paper

Description automatically generated

1. Funnels

A close up of a glass

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1. Separating funnel

A picture containing object

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1. Lead acetate
2. Chloroform

The most important methylated alkaloid that occurs naturally is caffeine. Its molecular formula is **C8H10N4O2**.

Its IUPAC name is **1,3,7-Trimethylxanthene** and common name is **1-Methylated theobromine.**

Purine it is white, crystalline solid in the form of needles. Its melting point is **1230C**. it’s the main active principle component of tea leaves. Its present in tea leaves up to 3% and can be extracted by first boiling the tea leaves with water which dissolves many glycoside compounds in addition to caffeine. The clear solution is then treated with **lead acetate** to precipitate the glycoside compounds in the form of lead complex. The clear filter is then extracted with extracts caffeine because its more soluble in it than water.

1. First, 40g of tea leaves were taken as sample and 250 ml of water was added to it in beaker and was heated.
2. The brown color extracted is separated decantation followed by filtration.
3. Lead acetate was added dropwise to the filtrate, leading to the formation of curd brown precipitate.
4. The solution is filtered again.
5. The filtered solution is then extracted with some chloroform and transferred to a separating funnel.
6. The lower layer is separated.
7. The lower layer is dissolved in minimum amount of hot water and then exposed to atmosphere in order to allow chloroform to get evaporated.
8. The residue that is left is weighed and recorded.

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| --- | --- |
| **Weight of china dish** | **117.395g** |
| **Weight of china dish with precipitate** | **117.455g** |
| **Amount of caffeine** | **0.060g** |

|  |  |
| --- | --- |
| **Weight of china dish** | **117.395g** |
| **Weight of china dish with precipitate** | **177.450g** |
| **Amount of caffeine** | **0.055g** |

|  |  |
| --- | --- |
| **Weight of china dish** | **117.395g** |
| **Weight of china dish with precipitate** | **117.440g** |
| **Amount of caffeine** | **0.045g** |

* 1. Quantity of caffeine in Red Label Tea 60 mg/sample of 25g.
  2. Quantity of caffeine in Yellow Label Tea 55 mg/sample of 25g.
  3. Quantity of caffeine in Green Label Tea 45 mg/sample of 25g.
* Order of quantities of caffeine in different tea sample is,

**Green Label < Yellow Label < Red Label**

* **Migraine headache.** Taking caffeine by mouth together with pain relievers such aspirin and acetaminophen is effective for treating migraines. Caffeine is an FDA approved product for use with pain relievers for treating migraine headaches.
* **Breathing problems in premature infants (neonatal apnea).** "Neonatal apnea" describes a condition in which infants have pauses in breathing that last for at least 15 seconds or that cause a serious drop in heart rate. This condition is common in very premature infants. Caffeine given by mouth or intravenously (by IV) can improve breathing in very premature infants with this condition. It also seems to reduce the number of episodes of apnea by at least half over 7-10 days. Caffeine citrate is approved as a prescription drug for treating neonatal apnea in premature infants. But caffeine does not seem to prevent this condition from developing in premature infants.
* **Headache following surgery.** Using caffeine by mouth or intravenously is effective for preventing headaches following surgery. Caffeine is an FDA-approved product for this use in people who regularly consume products that contain caffeine.
* **Tension headache.** Taking caffeine by mouth in combination with pain relievers is effective for treating tension headaches.

Caffeine is **LIKELY SAFE** for most healthy adults when used in doses up to 400 mg per day. This amount of caffeine is similar to what is found in about 4 cups of coffee.

Caffeine is **POSSIBLY UNSAFE** when taken by mouth for a long time or in high doses (>400 mg per day). Caffeine can cause insomnia, nervousness and restlessness, stomach irritation, nausea and vomiting, increased heart rate and respiration, and other side effects. Caffeine can make sleep disorders in patients with acquired immunodeficiency syndrome (AIDS) worse. Larger doses might cause headache, anxiety, agitation, chest pain, and ringing in the ears.

Caffeine is **LIKELY UNSAFE** when taken by mouth in very high doses as it can cause irregular heartbeats and even death. Products with very concentrated or pure caffeine have a high risk of being used in doses that are too high. Avoid using these products.

* https://www.thespruceeats.com/caffeine-in-coffee-tea- cola-765276
* https://www.webmd.com/vitamins/ai/ingredientmono-
  + 979/caffeine
* https://en.wikipedia.org/wiki/Caffeineinduced\_anxiety\_disorder