

THE COMPARATIVE DATA BETWEEN VARIOUS BRANDS OF TEA POWDERS AND GREEN TEA

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ABSTRACT:

Tea is composed of many compounds. These components have various Effects depending upon the amount of tea ingested and the quality of the tea .apart from that green tea having various useful properties which are helpful for human body .The present Communication Describes about the about the “THE COMPARATIVE DATA BETWEEN VARIOUS BRANDS OF TEA POWDERS AND GREEN TEA by using U.V Spectrophotometer and TLC Procedure for the estimation of caffeine content in commercial available tea samples and Comparative data of caffeine content along with analysis of different brands of tea samples by Comparing with the green tea powder. The present methods shows a detailed description about the Difference between commercial brands of tea powders and Green tea. A possible explanation to Account for the variability in Green Tea and analysis of different samples is offered.

Key words: Caffeine, Spectrophotometer, TLC,Green Tea.

Introduction :

Tea promotes health but at the same time it causes health problems due to its caffeine content Thus, to be reap the benefits of tea but at the same time minimizing the adverse effects of caffeine by consuming the lowest possible amount of caffeine.

There are many tea brands are present now a days but all are not similar,it differs based upon the availability, colour , texture, quality and cost .and the caffeine levels are also differ in individual tea powders

If drinking a relatively stronger tea containing 60mg / cup, 8 cups a day would be a safe amount, or 3 for pregnant women. For a weaker tea, with 30mg / cup, twice this amount would still be a safe amount of caffeine. Keep in mind that different people react differently to caffeine, so an amount that is safe or unpleasant for one person may not be healthy for everyone.

Caffeine has the ability to et heart rate ,blood pressure and basal metabolic rate (BMR)for several hours.it also acts as diuretic which increases urination. Despite all the goodness of the drinking tea, the negative effects of caffeine cannot be ignored. Caffeine can cause insomnia,headache,nervousness and dizziness when consume in high doses.it also cause addiction without it the addict will be able to concentrate well and suffers depression .thus caffeine should be taken in moderate dosage,drug to these reasons .i choose to research on tea ,tea is produced from leaves and buds of the *camellia sinenses* plant through a series of processes.

Caffeine ,a plant –based alkaloid can be found in tea ,coffee and cocoa .tea a popular drink among all ages is rich in polyphenolic flavonoids which have strong antioxidant properties despites containing caffeine .flavonoids play a role in preventing cancer by protecting cell from free radical damage .it also helps in keeping the heart healthy and research in Europe shows that drinking three or more cups of tea per day reduces the risk of heart diseases.

MATERIALS AND METHODS :

Materials : Different Brands Of Tea Powders and Green Tea Powder

Chemicals : Chloroform, Leadacetate,Watersamples of tea leaves

Apparatus : Bunsen burner, spectrophotometer, analytical balance, separating Funnel, beaker ,Glassrod.

Extraction Procedure of Caffeine:

Fifty grams of tea powder was taken from the tea bags and placed in a 1000-ml beaker to which 350 ml of water was then added. The whole was boiled for about 30 minutes and then filtered into another clean beaker.To the filtrate, 10% aqueous solution of lead acetate was added with constant stirring until no precipitate was seen. The resulting mixture was thoroughly stirred and then filtered by suction filtration. The filtrate was transferred to another clean beaker and concentrated by boiling to a volume of about 25 ml. This was cooled to room temperature. Twenty-five milliliters of chloroform was added to the cold filtrate which was stirred thoroughly with a glass rod. The resulting mixture was transferred into a clean separation funnel. When the mixture separated into two distinct layers, the lower chloroform layer was separated into a clean distillation flask.To the

aqueous layer, 20 ml of chloroform was added and the mixture was shaken well. After some time the two phases separated and the lower chloroform layer was once again collected into the China dish. The aqueous layer was once again extracted with another lot of 20 ml of chloroform. Collect the chloroform in pre weighed china dish and allow to evaporate the chloroform, The dry residue was scraped with a spatula and weighed using an analytical balance

Purification of Crude Caffeine :

The crude Caffeine is must Purified for removing of impurities for this, crude caffeine was purified by dissolving it in a small quantity of boiling water and then allowing it to cool undisturbed. The needle-shaped crystals of caffeine were filtered out and dried between folds of filter paper. Similar procedure was performed with different samples of tea leaves and quantify of caffeine observed in them. the percentage of Caffeine is calculated by using following formula

$$\text{Percentage of Caffeine} = \frac{\text{Weight of substance Obtained}}{\text{Weight of Tea powder Taken}} \times 100$$

Thin Layer Chromatography Technique : (TLC)

sample of pure caffeine, crude caffeine and purified caffeine were dissolved in Dichloro Methane Prepare TLC plates by using silica gel G .pure caffeine was spotted on the TLC plates by using a new capillary spotted each time .Place the TLC plates into the mobile phase i.e 9:1 ratio of chloroform and acetone. Placing the spotted end into the mixture. Allow to run the Mobile phase with out any disturbance. Remove the plates from the mobile phase allow to dry then viewed under UV light and note the readings .Calculate the the Rf value then viewed under UV light and note the readings Calculate the the Rf values by using following formula.

$$\text{Rf Value} = \frac{\text{Distance travelled by the solute from from origin line}}{\text{Solvent Front}}$$

Procedure for analysis of bulk density :

Bulk density of powder is defined as the ratio of the mass of the powder to its bulk volume. For determination of the bulk density, a weighed quantity of tea powder was introduced into a graduated measuring cylinder. The measuring cylinder was tapped manually till a constant volume was obtained. This volume is known as the bulk volume of the tea powder. The same procedure was followed for each brand of tea powder.

$$\text{Bulk Density} = \frac{\text{Mass of the Powder}}{\text{Bulk Volume}}$$

RESULT AND DISCUSSION

Figure 1: Caffeine content of the seven different brands of tea powder

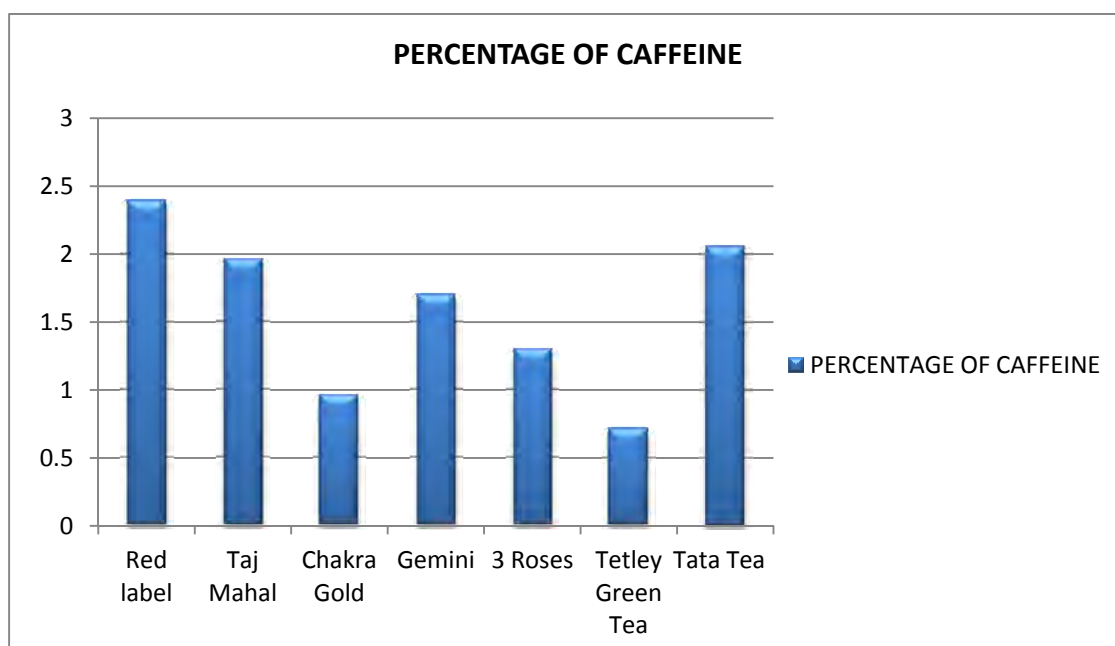


Figure 2 :Rf and Absorbance Values of the seven different brands of tea powder

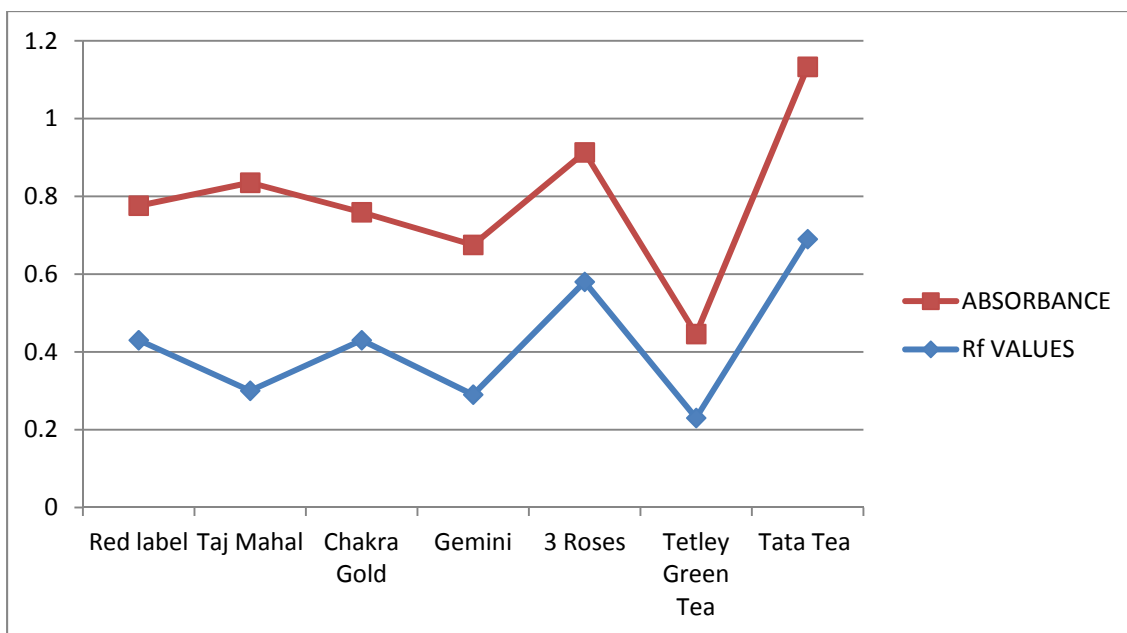


Figure 3 :Bulk Density of the seven different brands of tea powder

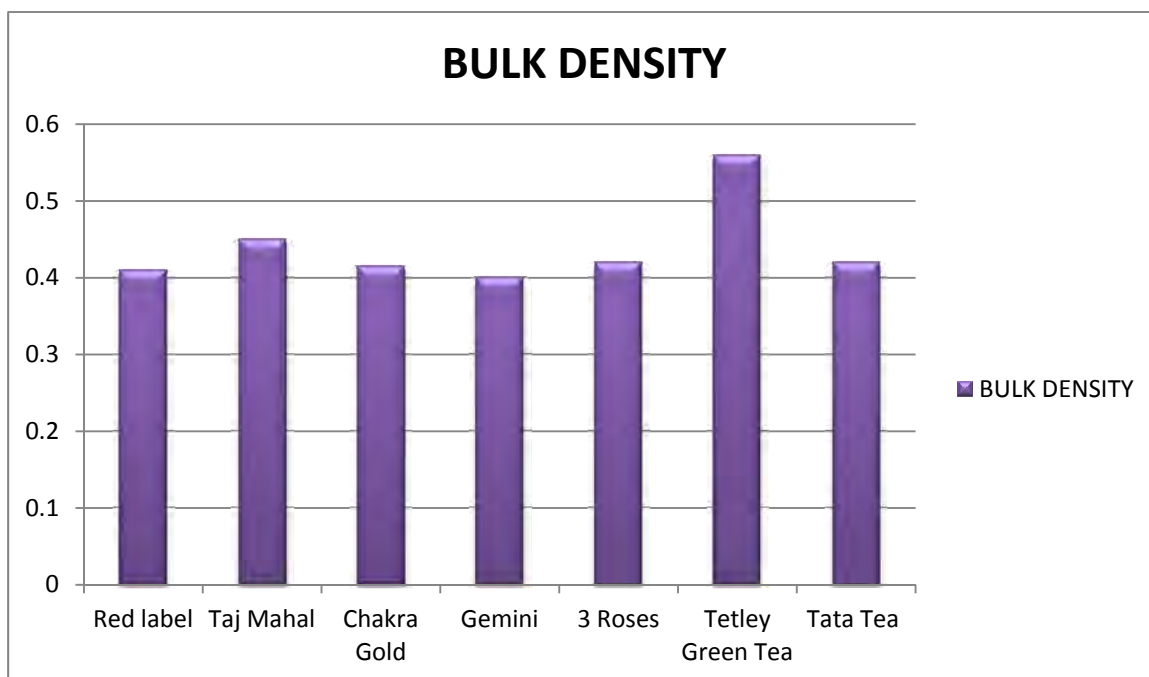
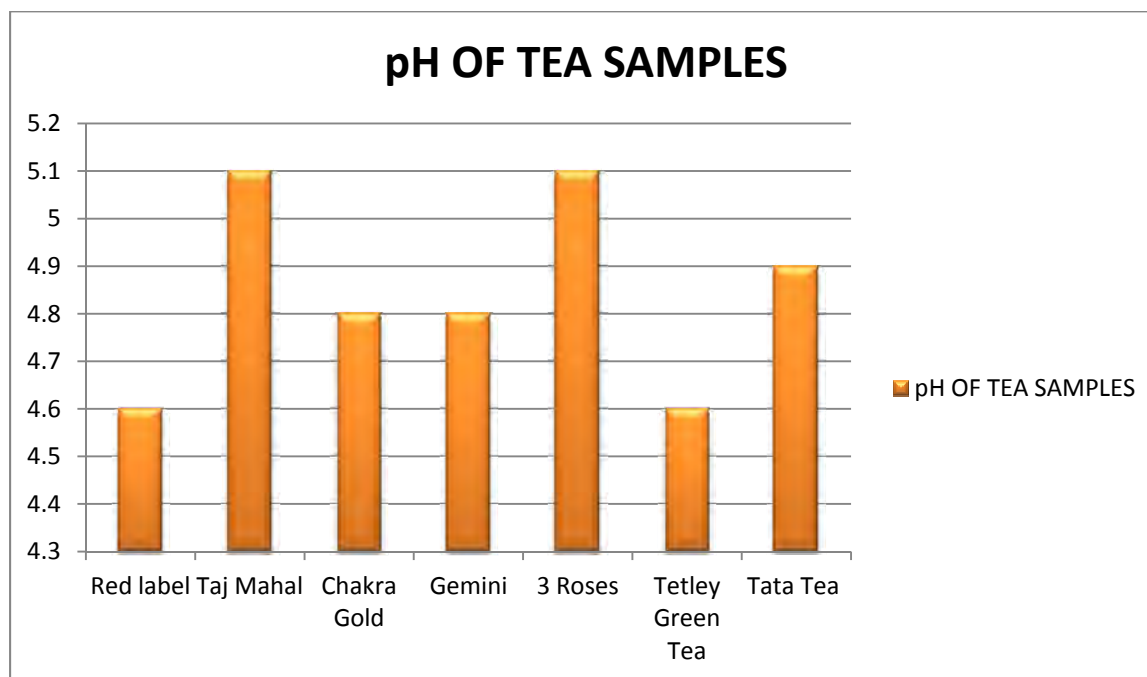


Figure 4 : PH of the seven different brands of tea powder



DISCUSSION :-

Caffeine content :

The results [Table 1 and Figure 7] show that Red Label Tea has the highest caffeine content of 2.4g/50 grams of tea. The lowest caffeine content was seen in Tetley Green Tea, which had only 0.72g. The other products fall in between, with Tata Tea having 2.06 g, Taj Mahal Tea 1.96 g, Gemini 1.70 g, and 3 Roses Tea 1.30 g and Chakra gold 0.96g.

Table 1: Caffeine content of the seven different brands of Tea Powder

| Commercial Tea Brands | Weight Of empty China Dish (W1) (gm) | Weight Of empty China Dish With Precipitate (W2) (gm) | Weight Of Caffeine Content (gm) | Percentage Of Caffeine (%) |
|-----------------------|--------------------------------------|---|---------------------------------|----------------------------|
| Red label | 88.74 | 89.94 | 1.2 | 2.4 |
| Taj Mahal | 104.67 | 105.65 | 0.98 | 1.96 |
| Chakra Gold | 93.85 | 94.33 | 0.48 | 0.96 |
| Gemini | 84.65 | 85.5 | 0.85 | 1.7 |
| 3 Roses | 95.66 | 96.31 | 0.65 | 1.3 |
| Tetley Green Tea | 98.59 | 98.93 | 0.34 | 0.72 |
| Tata Tea | 102.75 | 103.78 | 1.03 | 2.06 |

Intensity of color :

In this experiment the absorbency of each product was tested to determine the concentration of color. Figure 2 shows that Chakra Gold and Tetley Green Tea had the lowest absorbency level at a wavelength of 450 nm of 0.329 and 0.216, respectively. Taj Mahal Tea had the highest absorbency level at the same wavelength (0.535). From these results we concluded that Taj Mahal Tea has the highest concentration of caffeine.

Table 2: Color intensity of the seven different brands of Tea powder By Spectrophotometry.

| Brand of Tea Powder | Absorbance |
|---------------------|------------|
| Red label | 0.346 |
| Taj Mahal | 0.535 |
| Chakra Gold | 0.329 |
| Gemini | 0.385 |
| 3 Roses | 0.333 |
| Tetley Green Tea | 0.216 |
| Tata Tea | 0.443 |

Bulk density :

The results showed that Tetley Green Tea Contains Very High density and Gemini Tea Contains low bulk density [Table 3]. That could be seen since the other 5 products were having Bulk Density Between 0.41 to 0.45 i.e the space occupied for air is more that the particles.

Table 3 : Bulk Density of the seven different brands of Tea powder

| Brand of Tea Powder | Bulk Density |
|---------------------|--------------|
| Red label | 0.41+0.022 |
| Taj Mahal | 0.45+0.014 |
| Chakra Gold | 0.41+0.023 |
| Gemini | 0.40+0.002 |
| 3 Roses | 0.42+0.025 |
| Tetley Green Tea | 0.56+0.001 |
| Tata Tea | 0.42+0.002 |

Tea acidity and taste

The results [Figure 10 and Table 4] showed that Tetley Green Tea had the lowest pH among the products tested, Taj Mahal and 3 Roses Tea showed a pH of 5.1, which ranks both products as having the highest pH. The rest of the products fall in between, with pH of 5.0. With regard to the taste of the products, the results show correlation between the pH and the taste. Red Label Tea and Tetley Green Tea with a pH of 4.6, had a very bitter taste that lingered on the tongue. On the other hand 3 Roses and Taj Mahal Tea and tasted only mildly bitter, which could be explained by their higher pH of 5.1.

Table 4: Acidity and taste of the seven different brands of Tea powder by pH meter

| Tea Sample | Taste | pH |
|------------------|-------------|-------------|
| Red label | Very bitter | 4.6 + 0.003 |
| Taj Mahal | Mild bitter | 5.1+ 0.001 |
| Chakra Gold | Bitter | 4.8+ 0.001 |
| Gemini | Bitter | 4.8+ 0.001 |
| 3 Roses | Mild bitter | 5.1+ 0.001 |
| Tetley Green Tea | Very bitter | 4.6+ 0.001 |
| Tata Tea | Bitter | 4.9+ 0.001 |

Rf values :

The results results [Figure 8 and Table 5] showed that Tetley Green Tea and Gemini Tea had lowest Rf values i.e 0.23 & 0.29 Red label and Chakra Gold Tea powder Contains similar Rf Values (0.43).Tata Tea Powder contains highest Rf value of 0.69

Table 5 : Rf Values of seven different brands of Tea powder

| Commercial Tea Brands | Rf Values |
|-------------------------|-------------|
| Red label | 0.43 |
| Taj Mahal | 0.30 |
| Chakra Gold | 0.43 |
| Gemini | 0.29 |
| 3 Roses | 0.58 |
| Tetley Green Tea | 0.23 |
| Tata Tea | 0.69 |

CONCLUSION:

- 1.Taj Mahal Tea and 3 Roses Tea have the highest pH and they possess a mildly bitter taste. Red Label Tea and Green Tea has the lowest pH, with a very bitter taste.
- 2.Taj Mahal Tea has the highest color concentration due to the high concentration of caffeine. Green Tea has the lowest color concentration due to the low concentration of caffeine.
- 3.Green Tea Tea have the high bulk density. That means more void volume, which indicates slightly difference particle size distribution
- 4.when compared to other brands Red Label Tea has the highest caffeine content. Green Tea has the lowest caffeine content Finally the results are conclude that, The Green Tea contains less caffeine percentage and also less Caffeine concentration so it is very good for health. and Taj Mahal Tea contains high percentage of caffeine so this may be leads to quick relief and at the same time it also Causes addiction.

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