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Comparison of biochemical, mineral and nutritive analysis of Camellia Sinensis, L. (Green Tea) with normal tea dust

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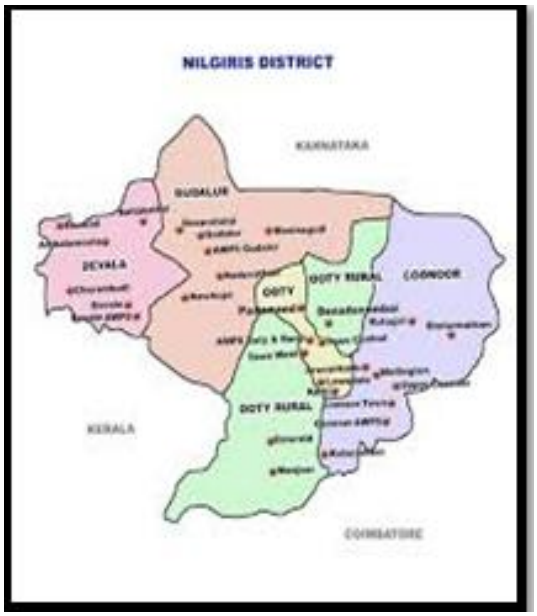
Abstract
Many locally available plants are not usually consumed by mankind due to the lack of knowledge about them. Green tea is the healthiest beverage on the planet. It is loaded with antioxidants and nutrients that have powerful effects on the body. The present study aimed to compare the biochemical, mineral and nutritive analysis of *Camellia sinensis* (green tea) with normal tea dust. The result showed the presence of carbohydrate, starch, protein and aminoacid in very less concentration when compare to RDA value. The green leaf was found to be rich in Vitamin A and B. In comparison with RDA minerals like iron, magnesium and calcium were found to be in the required amount for one day. Hence green tea can be taken in our day today life. The study revealed that the nutritive value of green tea in higher concentration than the tea dust and also found to be in required RDA value. Hence green tea can be recommended and suggested for our day to day life which enriches the energy.

Keywords: *Camellia sinensis*, L, green tea leaf and tea dust, biochemical, mineral and nutritive value.

1. Introduction
Many countries in the developing world have experienced extremely rapid population growth since the early 20th century, due to economic development and improvements in public health. The impact of the food crisis is likely to be much more severe among women and children. Malnutrition or malnourishment is a condition that results from eating a diet in which nutrients are either not enough or much such that the diet causes health problems. The composition of our diet is essential to meet these needs and therefore it is important to understand the two different types of nutrients can be split into macronutrients (carbohydrates, starch, proteins, aminoacids, vitamins and minerals). Micronutrients are not needed in the same quantities as macros, however are still equally as important. Micronutrients work in random with macronutrients to keep the body functioning and are crucial in order to maintain energy levels, metabolism, cellular function and physical and mental wellbeing. In addition to building bones and keeping them healthy, calcium helps our blood clot, nerves send to messages and muscles contract. About 99 percent of the calcium in our bodies is in our bones and teeth. Vitamin A deficiency can occur as either a primary or a secondary deficiency. A primary vitamin A deficiency occurs among children and adults who do not consume an adequate intake of vitamin A. Tea (*Camellia sinensis*, L.) is consumed worldwide and is second to water in its popularity as a beverage and has many health benefits such as reduction in cholesterol and protection against cardiovascular disease. Medicinal plants are important for the treatment and management of human diseases due to the presence of plant biochemical constituents. The present study aimed to compare biochemical, mineral and nutritive value of *Camellia sinensis*, L. (green tea) with normal tea dust.

2. Materials and Methods
2.1 Plant Collection
The *Camellia sinensis*, L. leaves were collected from Nilgiris district in Ooty (Plate -1) during the month of December (2016). The collected leaves were then washed in running tap water and distilled water. The leaves were spread on newspaper to remove the excess water. The leaves were shade dried, powdered and stored in air tight container for further analysis. Carbohydrates, Starch, Protein, Aminoacid, Vitamins and Minerals were analysed using the standard method.



Study Area (Plate -1)

Fresh Leaves **Dry Leaves**

Plant Description (Plate- 2)

2.2 Taxonomic Position

Kingdom: Plantae
Order : Ericales
Family : Theaceae
Genus : *Camellia*
Species : *Camellia sinensis, L.*

Camellia sinensis, L. is native to East Asia, the Indian Subcontinent and Southeast Asia, but it is today cultivated across the world in tropical and subtropical regions. Camellia sinensis, L. is a species of evergreen shrub or small tree whose leaves and leaf buds are used to produce tea. It is of the genus Camellia "tea flower" of flowering plants in the family Theaceae. Green tea has also been used for cancer prevention, to lower cholesterol and to prevent Parkinson disease.

2.3 Biochemical Analysis

The biochemical analysis was analyzed by following standard methods. Carbohydrates - Anthrone Method, Starch - Anthrone Method, Protein -Lowry's Method, Amino Acids - Ninhydrin Method, Vitamins – AACC Method, Minerals- AOAC method

2.4 Review of Literature

Kottawa Anachchi (2011) [5] studied biochemical constituents in Black Tea (*Camellia sinensis*, L. for predicting the quality of tea germplasm in Srilanka. Polyphenol content, total liquor colour, brightness and infused leaf color could be used as reliable quality parameters, whereas total amino acid and crude fiber contents cannot be considered as useful quality parameters. Magoma and Wachira (2013) studied biochemical differentiation in *Camellia sinesis, L.* and its wild relatives as reveated by isozyme and catechio patterns. The quality and pharmacological importance of tea is mainly derived from catechins and catechin precursors like the aromatic aminoacids, these results have important implications in breeding stratergies especially in connection with tea germplasm enrichment and quality. Hanafy (2006) studied on evalution of the ant itumor effect of (*Camellia sinensis*), L. extract. Biochemical analysis represents decrease in total protein and albumin and increase in the other investicated parameters.

3. Results

The result of biochemical analysis (Table 1, Chart 1) showed the presence of Carbohydrate, Starch, Protein, Aminoacids in least amount. The plant (Table 1 and Chart 2, 3) showed the presence of high concentration of Vitamin A as 3.32 mg/100gm and minerals such as Calcium (480mg/100gm), Iron (18mg/100gm), Magnesium (220mg/100gm), Potassium (2160mg/100gm) and Phosphorus (630mg/100gm) that are typically hard to obtain from plant food. When compared with Recommended Dietary Allowance (Table 2, Chart 4**)** the plant showed high amount of Vitamin A (3.32mg/100gm), Iron (18mg/100gm), Calcium (480mg/100gm) and Magnesium (220mg/100gm). When Vitamins and Minerals of Green tea leaf compared with normal tea dust (Table 3, Chart 5) the green tea showed high amount of nutrient. Hence green tea can be recommended for our day today life which enriches the energy. The result clearly showed that the green tea is rich in nutrients when compared with RDA and normal tea dust.

Table 1: Concentration of Nutrients Present In (*Camellia Sinensi*, L.)

S. No	Nutrients	Concentration mg/100gm
1	Carbohydrate	10
2	Starch	9
3	Protein	14.8
4	Aminoacid	8.4
5	Vitamin –A	3.32
6	Vitamin –B	1.05
7	Calcium	480.0
8	Iron	18.0
9	Magnesium	220.0
10	Potassium	2160.0
11	Phosphorus	630.0

Table 2: Comparison of nutrients present in *Camellia Sinensis, L.* with recommended dietary allowance (RDA) Value

S.No	Nutrients	Composition mg/100gm	Recommended Daily Allowances (per day)			
			(1-3years) Infants and children	Older children	Adult man and women	Pregnant women and lactating mother
1	Carbohydrates	10mg	95g	130g	130g	210g
2	Protein	14.8mg	11.0g	19g	46-56g	71g
3	Aminoacid	8.4mg	714mg	214	84mg	_
4	Vitamin –A	3.32mg	0.3mg	0.6mg	0.9mg	0.77mg
5	Vitamin - B	1.05mg	0.5mg	0.9mg	1.3mg	1.4mg
6	Calcium	480.0mg	500mg	1300mg	1000mg	1000mg
7	Iron	18.0mg	7mg	8mg	8mg	27mg
8	Magnesium	220.0mg	80mg	240mg	400mg	360mg
9	Potassium	2160.0mg	3000mg	4500mg	4700mg	4700mg
10	Phosphorus	630.0mg	460mg	1250mg	700mg	700mg

Table 3: Comparison of Vitamins and Minerals of Green Tea Leaf with Normal Tea Dust.

Nutrient	Green tea leaf mg /100 gram	Tea dust mg /100 gram
Vitamin – B	0.9	0.2
Iron	8	18
Magnesium	80	79
Calcium	500	276

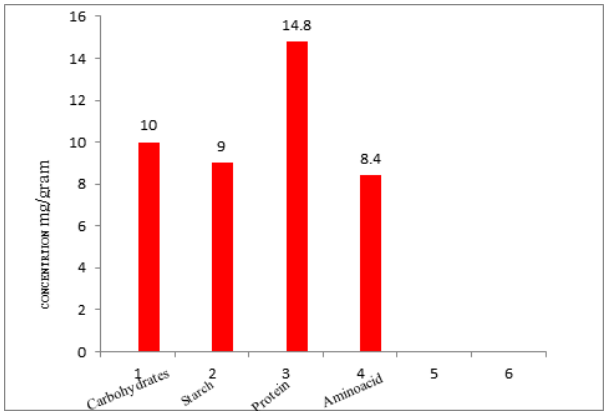


Fig 1: Composition of Macronutrient Present In *Camellia Sinensis*, L.

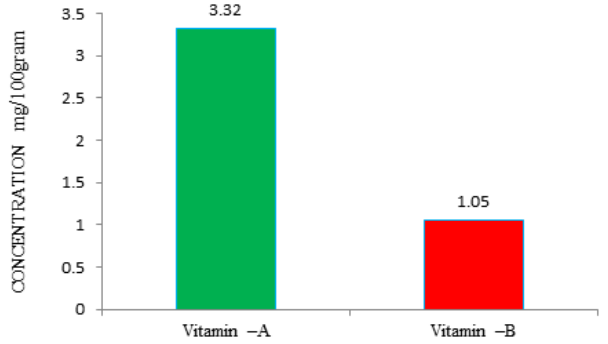


Fig 2: Composition of vitamins present in T He *Camellia Sinensis*, L.

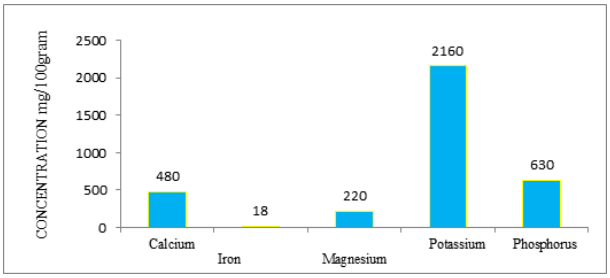


Fig 3: Composition of Minerals present in *Camellia Sinensis*, L.

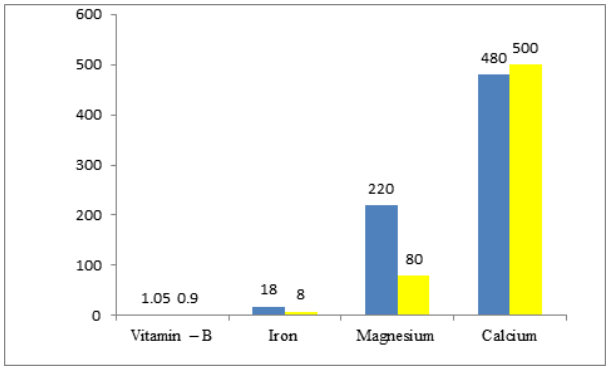


Fig 4: Suggested Nutrient of *Camellia Sinensis*, L. In Comparison to RDA Value

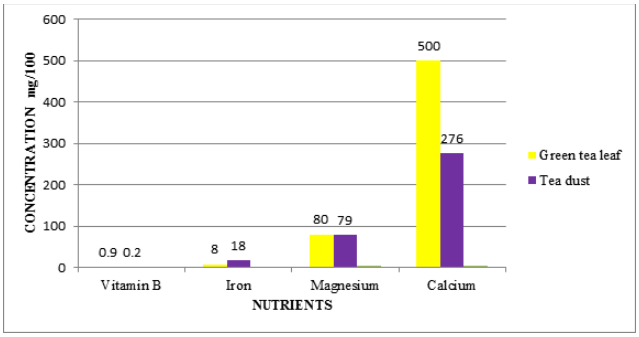


Fig 5: Comparison of Vitamins and Minerals of Green Tea Leaf with Normal Tea Dust.

4. Conclusion

The aim of this study was to analysis the biochemical and nutritive value of the *Camellia sinensis*, *L.* and to compare with RDA and normal tea dust. The biochemical studies, showed the concentration of carbohydrates, protein, starch, aminoacid in very less amount than the RDA value. It is also estimated that tea leaves are the good source of Vitamins such as Vitamin B and Vitamin A, Minerals such as calcium, magnesium, phosphorus and iron. Vitamin B, Iron, Magnesium and Calcium is present in the higher amount in the green tea. When compared with RDA and normal tea test. Green tea can be suggested for women above 40 years because of the risk of calcium deficiency and also diabetic patients. Hence green tea can be recommened and suggested for our day to day life which enriches the energy.

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