Comparative Quantitative estimation of total tannin content of leaves of *Ocimum sanctum* (tulsi), *Mentha* (pudina) and *Camellia sinensis* (tea leaves)

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Abstract- Ocimum sanctum or Tulasi is a perennial plant belonging to the family of Lamiaceae, native to the Indian subcontinent and widespread as a cultivated plant all over the Southeast Asian tropics. *Mentha* or mint, is a genus of plants in the family Lamiaceae, distribution across Europe, Africa (Southern Africa), Asia, Australia Oceania, North America and South America. *Camellia sinensis* (tea) belonging to the Theaceae family is a plant that generally cultivates in tropical and subtropical climates. Present study was to estimate total tannin content of leaves of Tulsi, mint and tea. Tannic acid was used as a standard and the total tannin content were expressed as tannic acid equivalents (TAE). Absorbance was measured using a spectrophotometer at 720nm. The study shows that the tannin contents of pudina and tulsi leaves is comparable whereas the tannin content of tea leaves is much more as compare to above pudina and tulsi leaves. The research will be continue to determine the other phytochemical constituent like flavonoid, Bitter, Alkaloids and Saponin etc.

Key words: *Ocimum sanctum* or Tulasi, Mint, *Camellia sinensis* (tea), Tannin

Introduction

The plant kingdom is an excellent and natural source of medicine. Nowadays there has been an increasing awareness about the importance of medicinal plants. Plants are rich source of therapeutic medicines and produce various bioactive molecules. Herbal plant extracts are very useful in controlling various types of pathogens and as growth promoters[1]. These are the economical source for therapeutics and viable solution for number of pathogens. The medicinal plants are rich in a wide variety of secondary metabolites such as tannins, phenolics, alkaloids and flavonoids etc. which enhances growth, innate immune response and disease resistance against pathogenic bacteria in human[2]. A large numbers of people uses various medicinal plants as anticancer drugs antimicrobial drugs, antifungal etc[3]. A large number of phytochemicals are widely uses in human therapy, agriculture, veterinary, various scientific researches along with inhibitory effects on most of microorganisms[4-5]. Ocimum sanctum also known as Tulsi or Holy basil is an aromatic plant and it belongs to the family Lamiaceae. Tea, also

known as *Camellia sinensis* (Theaceae family), is a lesser-known variety of the world-famous Camellia sinensis plant and beverage, it possess health advantages, cheap cost, and energizing effects. *Mentha Arvensis* L. belongs to the family Lamiaceae and is typically known as Pudina, menthol mint, corn mint. In this study we are evaluate and compare the tannin contents of these three herbs.[6-8]

Material and Methods

The plant specimens (leaves) for the proposed study were collected from the store of Himalaya wellness company Faridabad Haryana. The Collected plants were carefully examined and authenticated by Dr. Mayaram Uniyal, Ex. Advisor Medicinal plant UP govt.

Estimation of Total Tannin Content[9]

The tannins were determined by A.M. Diaz, Analytical method. Absorbance for test and standard solutions were measured against the blank at 720 nm with an UV/ Visible spectrophotometer. The tannin content was expressed in terms of mg of tannic acid equivalents/ g of dried sample.

Sample preparation

The collected leaves were washed with running tap water to remove adhering materials and cut into small pieces. Then, the leaves were dried at a temperature not exceeding 50 °C. These dried materials were cut into small pieces and then pulverized mechanically into coarse powder. The fine powder was separated by passing through sieve No: 60.weight accurately about 0.1 g finely powered sample in 100 ml of purified water at 100^0C using water bath for 1 hr, cool and decant the dissolved extract in to 500 ml volumetric flask. Washed the residue with purified water and make the volume up mark with same solvent. Filter the extract through whatman filter paper no.1. Discard first 50 ml of filtrate use next filtrate for analysis.

Standard preparation

Weight accurately about 100 mg of standard tannic acid in 100 ml standard flask and make up to volume with water (standard stock solution). Pipette out 1 ml from the above solution and makeup to 100 ml with water (standard solution).

Reagent preparation

1. Prepare 1 % potassium ferri cyanide in water
2. Prepare 1 % ferric chloride in water

Procedure

Take 1 ml of standard solution in 10 ml volumetric flask. Add 1 ml potassium ferri cynide and 1 ml of ferric chloride. Mix well and make the volume up to 10 ml with purified water. Exactly 30 min after addition of the reagent read the optical density at 720 nm against reagent blank. Reagent blank is prepared by a diluting 1 ml potassium ferri cynide and 1 ml of ferric chloride to 10ml with purified water.

Test solution: Take 0.2 ml of test solution and follow the same procedure as thatas standardand measure the test absorbance (T) against reagent blank.

Test blank: Take 0.2 ml of test solution and make up to 10 ml with purified water and measure the absorbance (TB) against water.

Note-All the optical density readings should be taken exactly 30 min after additions of the reagents.

Calculation

Subtract the reading of test solution from test blank and calculate the content of tannic acid from the standard curve express as % w/w of tannins.

$$\frac{\text{Absorbance of sample (T- TB)}}{\text{Absorbance of standard}} \times \frac{\text{weight of standard mg}}{100} \times \frac{1}{100} \times \frac{\text{Volume of stand. taken for reaction(ml)}}{\text{Volume of sample}} \times \frac{\text{Total volume of Sample ml}}{\text{Weight of sample}} \quad \text{\% Purity of Standard} = \text{Total tannins \% w/w}$$

Results and Discussion

We observe at the tannin content of all three leaves and found that the tea leaf contained more tannin than the other two leaves, Tannic acid was used as a standard and the total tannin contents of pudina, tea leaf and tulsi leaves is shown in(**Table-1**)

Table-1

Sample name	Sample absorbance	Sample blank absorbance	Standard absorbance	Standard weight	Sample weight	Purity of standard	Results Percent%
Pudina	0.3674	0.0026	0.4822	101.4	104.0	95.6	3.53
Tea	1.9505	0.0063	0.4677	100.1	101.4	95.6	19.62
Tulsi	0.3591	0.0018	0.4622	100	106.8	95.6	3.46

Medicinal plants since ancient time are lauded for their diverse pharmacological actions which could be attributed to the presence of secondary plant metabolites such as alkaloids, flavanoids, glycosides, tannins, steroids etc. some of these plants are important source of natural antioxidants that have been shown to reduce the risk and progression of certain acute and chronic diseases such as cancer, heart diseases and srtoke by scavenging free radicals which are implicated in the pathogenesis of many diseases. The present study indicated that the aqueous extract of these plant leaves show good amount of total tannins. The study shows that the tannin contents of pudina and tulsi leaves is comparable whereas the tannin content of tea leaves is much more as compare to above pudina and tulsi leaves. The research will be continue to determine the other phytochemical constituent like flavonoid, Bitter, Alkaloids and Saponin etc.

Disclaimer Statement

Authors declare that no competing interest exists. The products used for this research are commonly used products in research. There is no conflict of interest between authors and producers of the products.

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