



FORMULATION AND EVALUATION OF HERBAL TEA

¹A.Raja Reddy, ²Nelikanti Vaishnavi, ³Suman Yadav, ⁴Yaski Saitej

¹. Associate Professor, Department of Pharmaceutical Analysis, CMR College of Pharmacy, Hyderabad.

^{2,3,4}. B. Pharm Students, CMR College of Pharmacy, Hyderabad.

Corresponding Author: A.Raja Reddy

ABSTRACT

It has been demonstrated that herbal tea has several benefits. Tisanes are another name for herbal tea. A common and important element of social and cultural gatherings is tea. It is a preparation that strengthens immunity, maintains vitality, and regenerates cells. It eases worry, weariness, tension, and exhaustion. The beverage referred to as "herbal tea" is prepared with medicinal plants, herbs, and spices. Because of its medicinal and healing qualities, it is drunk all over the world without the need for caffeine. It can be purchased loose or in tea bag form. Herbal tea can be made by decoction or infusion with a total amount of water, or it can be diluted to an appropriate consistency and steeped for a predetermined amount of time. Natural bioactive substances like carotenoids, phenolic acids, flavonoids, coumarins, alkaloids, polyacetylenes, saponins, and terpenoids can be found in abundance in herbal teas and beverages. Herbal teas are concoctions prepared from the roots, leaves, fruits, and flowers of vibrant factory corridor plants. Herbal tea has antimicrobial and anti-inflammatory qualities, among other medicinal properties. Popular herbal teas include peppermint, ginger, ginseng, black, green, chamomile, and cinnamon teas. Most herbal teas can have one primary herbal component, or a combination of herbs used to achieve a certain goal. With herbal teas, connoisseurs can sample a wide range of flavors and possible health benefits. This study investigates the preparation and assessment of herbal teas, looking at the harmonious combining of therapeutic herbs to produce tasty and useful drinks.

Keywords: Tisanes, Camellia sinensis, Fermented, Phytochemicals, Antioxidant

INTRODUCTION

Herbal tea, also called tisane. It has increased in popularity due to its biological properties and certainly can be a complement to modern medicine. Dried leaves, seeds, grasses, flowers, nuts, or any other botanical components originating from plant species other than the commonly consumed tea species, Camellia sinensis, are consumed in this beverage.¹ Herbal tea is made using a combination of herbs in addition to those brewed in hot water.² Herbal remedies have been created by ancient cultures, such as Ayurveda and Traditional Chinese Medicine (TCM), to cure a variety of illnesses.³ The herbs were mixed based on the similarities of health benefits for individual species. The current market has shown that most herbal-based products have shifted from using a single herb to polyherbs, which are believed to exert more pharmacological effects compared to a single herb.⁴ Many studies have proved that herbs have the potential to prevent anemia. Sourashtra Herbal Tea (SHT) is composed of several herbs, each which helps in preventing anaemia and also

helps to cure premenstrual problems in adolescent girls.⁵ Medicinal plants have been used to treat and prevent different types of infectious diseases since prehistoric times. Nearly 60 to 90% of the total population worldwide uses plant-based medication. Medicinal plants could be used as tea or infusion to prevent or treat urinary tract infections.⁶ Tea is the most commonly consumed beverage after water. It has a cooling, slightly bitter, and astringent flavor that many people enjoy. Tea is one of the most popular beverages, consumed daily in all domestic, social, and official meetings. It is a preparation that boosts immunity, keeps one active, rejuvenates cells, relieves stress, fatigue, tiredness, anxiety, and many more.⁷ British introduced teas into India in an attempt to break the Chinese monopoly on tea.⁸ In addition to serving as a beverage, many herbal teas are also consumed for their apparent medicinal benefits.⁹ Herbal tea is a non-caffeinated beverage made from the infusion or decoction of herbs, spices, or other plant material. Hence, in some countries like Europe, tisanes or herbal teas are also known as infusions. Depending on the plant used and the method of preparation of the beverage, there are many varieties of herbal tea. Many more herbal tea varieties can be found than tea varieties for one simple reason: tea is extracted from one plant, while tisane is made from many. The term "herbal tea" is actually a misnomer, as herbal teas do not contain any tea leaves.¹⁰ Herbal tisanes ("teas") are made up of various flowers, herbs, spices, and dried fruits, which are naturally caffeine-free. Tisanes are most of the time consumed for their physical or medicinal properties, particularly for their stimulant, relaxant, or sedative effects. While the antioxidant properties of tisanes from moderate regions have been well-studied, those originating in tropical regions are still an unknown territory, yet to be uncovered.¹¹ Tea in general, and herb tea in particular, are gaining increasing consumer attention due to growing awareness of the health benefits derived from their consumption. Herbal teas are made from herbs, fruits, seeds, and roots steeped in hot water.¹² Tea is the second most widely consumed beverage on the planet after water. It is typically prepared by boiling leaves of the tea plant (*Camellia sinensis*) in hot water. Currently, tea is a hot topic in nutritional and medicinal studies around the world. There are three basic types of tea, depending on the degree of fermentation and various methods of tea plant processing, but all are made from the same tea plant (*Camellia sinensis*). Fully fermented tea plant leaves are used to make black tea, semi-fermented tea is made from semi-fermented tea, and non-fermented tea plant leaves are used to make green tea. Phytochemicals present in the leaves of the tea plant, such as polyphenols and flavonoids, possess antioxidant and other biological activities.¹³ Tea use has long been encouraged due to its many health advantages, including a decrease in cardiovascular disorders and various types of cancer. It also increases the mineral density of bones and shows neuroprotective and antifibrotic properties. Tea is very good for oral health. It reduces blood pressure, helps control body weight, and possesses antibacterial activity.¹⁴ Herbal tea is different from other beverages like coffee and true tea. Due to their medicinal and healing qualities, herbal teas are drunk all over the world.¹⁵ There are more than 4,000 bioactive compounds present in herbal tea, of which polyphenols account for one-third ratio and the rest is covered by tannins and flavonoids. Herbal teas have therapeutic and immune-boosting effects, making them a viable alternative to conventional medicine.¹⁶ Tea is generally consumed for its attractive aroma and taste, as well as the unique place it holds in the culture of many societies. In recent times, there has been renewed interest in tea because of growing consumer awareness of the health benefits derived from tea consumption.¹⁷ Herbal teas are commonly consumed for their therapeutic and energizing properties since they can help to induce relaxation. Being able to aid with stomach or digestive problems, herbal teas can help provide cleansing properties to the body and strengthen the immune system as well.¹⁸ Herbal tea causes soothing to the stomach and lower blood pressure and cancer. An increase in the consumption of tea with negligible calorie cargo should be encouraged.¹⁹ Herbal tea can be prepared through infusion or decoction. Herbal teas have been extensively consumed due to their health-promoting and sensory characteristics. The main herbal tea are Asia - Bangladesh, China, India, Indonesia, Sri Lanka, and Vietnam; Africa- Burundi, Kenya, Malawi, Rwanda, Tanzania, Uganda, and Zimbabwe; and South America- Argentina, Brazil, and others.²⁰ No adverse effects have been reported for the drinking of herbal tea, and herbal tea combinations can be used for minor complaints affecting.²¹ Health Canada categorizes herbal beverages as natural health products (NHPs). However, according to Health Canada, moderate consumption (2-3 cups/day) of selected herbal teas, such as citrus peel, lemon balm, ginger, orange peel, and rosehip, is recommended during pregnancy and breastfeeding.²² In India, tea was cultivated in Assam, in the 19th century. Chinese variety (*C. s. Sinensis*) and the Assamese variety (*C. s. Assamica*) are the two basic varieties of tea from ancient times. are about 45 species of *Camellia*, out of which *Camellia sinensis* is considered native to India.²³

The peepal, or *Ficus religiosa*, is one of the earliest trees mentioned in Indian literature. It is a member of the *Ficus* genus and family *Moraceae*. Its botanical name came from two words, "*Ficus*," which is the Latin word for "fig," and "*Religiosa*," which means "religion," reflect the significance of religion in the Buddhist and Hindu faiths. It holds a significant position in medicine due to its historical significance. This tree is primarily found in close proximity to places of worship because of India's mythical and religious traditions. The tree reaches enormous proportions and spreads its branches widely. Its fruit is compressed and round, and its leaves are thin and glossy. When leaves are young, they are reddish-pink in hue, but as they mature, they become a rich green tint. Flowers bloom in February, fruits appear in the summer, and ripening is finished before the rainy season begins. This tree's components are utilized in many culinary and medicinal applications and are abundant in phytochemicals. The ripe fruits of *F. religiosa* are rich in minerals and proteins, and they are edible. Fruits are abundant in phytochemicals, such as glycosides, terpenoids, and flavonoids, which have been shown to treat digestive and asthmatic illnesses. The phytochemicals found in the leaves, such as terpenoids, flavonoids, and tannins, can effectively treat conditions like gonorrhoea, vomiting, and hiccups. Phytochemicals found in the bark, including as tannins, saponins, flavonoids, and others, have been shown to be effective in treating a variety of illnesses, including bleeding, paralysis, inflammation, diarrhoea, and dysentery. Because of all these phytochemical properties, it's a valuable medicinal plant, especially for those without access to prescription drugs. There are many value-added goods made from *F. religiosa* on the market.

MATERIALS AND METHODS

Sample Collection

The required ingredients were collected and the leaves of *Ficus religiosa* were authenticated from Kendriya Sadan, Koti.

1. *Ficus religiosa*

Biological Source- The leaves belonging to *Ficus religiosa* or Peepal tree is a species of fig that belongs to the *Moraceae* family.

Chemical constituents- Phenols such as Gallic acid, rutin and gallo catechin are present. It also contains Terpenoids such as Friedlein, lupeol, Beta amyrin. Additionally, the presence of Rhein, anthraquinone and taraxasterol are also observed.

Medicinal Uses- It is an antioxidant and antidiabetic. It also shows anticancer and anti-inflammatory effects.



2. Tulasi

Biological Source- The leaves of *Ocimum tenuiflorum* or Holy Basil are considered sacred in many cultures and belongs to the family Lamiaceae.

Chemical Constituents- It contains approximately 70% eugenol, carvacol (3%), eugenol-methyl-ether (20%) and caryophyllin.

Medicinal Uses- It acts as an immunomodulant. It also shows antidiabetic, analgesic effects and reduces cold, cough and other respiratory disorders.



3. Clove

Biological Source- Cloves are the aromatic flower buds of a tree (Myrtaceae) *Syzygium aromaticum* (*Eugenia caryophyllus*).

Chemical Constituents- Its main constituent is eugenol which is an essential oil comprising total 23 identified constituents, among them eugenol (76.8%), followed by Beta caryophyllene (17.4%), alpha humulene (2.1%) and eugenyl acetate (1.2%) as the main components.

Medicinal Uses- It is used as an analgesic and antiviral due to presence of Eugenol. Cloves are good expectorant that clears respiratory passage. The aromatic clove oil, when inhaled soothes the respiratory conditions like asthma, cold, cough.



4. Cinnamon

Biological Source- Cinnamon are dried inner bark of shoots of trees of *Cinnamomum zeylanicum* belongs to family Lauraceae.

Chemical Constituents- Cinnamon oil contains cinnamaldehyde, eugenol, benzaldehyde, cumin aldehyde and other terpenes like pinene, cymene and caryophyllene.

Medicinal Uses- Cinnamon is fragrant and delicious spices with high antioxidant content. It also provides antibacterial activity. Cinnamon may help fight throat pain and infection due to cold and cough.



5. Ginger

Biological Source- It consists of rhizomes of *Zingiber officinale* belonging to family Zingiberaceae.

Chemical Constituents- The pungent taste of ginger is due to presence of zingerol. It consists of 0.25-3% volatile oils, 5-8% resinous matter, 56% starch and proteins.

Medicinal Uses- Ginger has antimicrobial property that can fight bacterial and viral infections. It has anti-inflammatory property that can manage and reduce the risk of sore throat.



Preparation of Herbal Tea Powder

The materials were shade dried and reduced to coarse powder. The powder was passed through appropriate sieve and was weighed accurately. The F1, F2 and F3 were formulated as per the table.

Formulation 1

Ingredient	Quantity
Ficus religiosa	5g
Ginger	0.01g
Tulasi	0.1g

Formulation 2

Ingredient	Quantity
Ficus religiosa	5g
Clove	2g
Cinnamon	2g

Formulation 3

Ingredient	Quantity
Ficus religiosa	5g
Cinnamon	2g
Tulasi	1g

Preparation of Herbal Tea

The decoction of different formulations was prepared and evaluated. Decoction is a method of extraction by boiling the herbal tea powder to dissolve the chemicals present.

**EVALUATIONS****Organoleptic test:**

Organoleptic test was performed by visual inspection for appearance, colour, odor and taste.

Ingredients	Colour	Odor	Taste
Ficus religiosa	Green	Pungent	Sour
Ginger	Light brown	Aromatic, penetrating	Spicy
Tulasi	Green	Fresh aromatic	Astringent
Clove	Dark brown	Strong aromatic	Spicy
Cinnamon	Dark brown	Aromatic	Sweet

Physical test:

• **Determination of Total Ash Value:** Ash contains inorganic radicals like phosphates, carbonates and silicates of sodium, potassium, magnesium, calcium etc. Inorganic variables like calcium oxalate, silica, carbonate content of the crude drug affects 'Total Ash Value'. Weigh accurately 2g of the air-dried drug in a tarred silica crucible and incinerate at a temperature not exceeding 450°C until free from carbon, cool and weigh. If a carbon-free ash is not obtained, wash the charred mass with hot water, collect the residue on an ashless filter paper, incinerate the residue and filter paper until the ash is white or nearly white, add the filtrate to the dish, evaporate to dryness and ignite at a temperature not exceeding 450°. Calculate the percentage of total ash on the dried drug basis.

• **Loss on drying:** Loss on drying is the loss of weight expressed as % w/w resulting from water and volatile matter can be driven off under specified conditions. Weigh about 2 gm of the air-dried crude drug in a dried and tarred flat weighing dish. Dry in oven at 100-105°C. Cool in desiccators over phosphorus pentoxide for specific period of time. The loss in weight is recorded as moisture. Repeat the process till constant weight is obtained.

Qualitative estimation: The decoction of herbal tea was subjected to phytochemical screening for identification of different phytoconstituents like carbohydrates, proteins, alkaloids, tannins, glycosides, and flavonoids.

RESULTS AND DISCUSSION

The present work of herbal tea was subjected to organoleptic test, physical test, and qualitative estimation.

Organoleptic test: It includes

Evaluations	F1	F2	F3
Colour	Green	Green	Green
Odor	Pungent	Pungent	Pungent
Taste	Sour	Sweet	Sour
Overall acceptability	Low acceptability	High acceptability	Medium acceptability

Physical test: It includes

Test	F1	F2	F3
Total ash	3.7	3.5	3.6
Loss on drying	5	4	4.5

Qualitative estimation: It includes

Chemical test	F1	F2	F3
Carbohydrates	+	+	+
Proteins	+	+	+
Alkaloids	-	-	-
Tannins	+	+	+
Glycosides	+	+	+
Flavonoids	+	+	+

DISCUSSION: Based on the above results, it can be said that the formulation-2(F2) is highly acceptable due to its better taste than the other two formulations.

CONCLUSION

The consumption of tea as a beverage, health drink or medicated tea needs to be promoted for research and its publication. The detailed literature survey was done, and it was found that the tea can be an interesting topic of research. Here a new combination of herbal tea has been prepared using ficus religiosa, tulasi, ginger, clove, and cinnamon in three different formulations and evaluated. In conclusion, the formulation and evaluation of herbal tea utilizing Ficus religiosa leaves present a promising avenue for exploration within the field of pharmaceutical research. The findings suggest that Ficus religiosa leaves possess significant medicinal properties, including antioxidant, antimicrobial, and anti-inflammatory properties, making them a valuable ingredient in herbal preparations. Furthermore, the sensory evaluation indicates that the herbal tea offers a palatable and enjoyable sensory experience, further enhancing its appeal to consumers. So, we can conclude that the F2 formulation has showed better taste than other two formulations and preferable for consumption. Overall, this study contributes to the growing body of knowledge surrounding herbal medicine and underscores the potential of Ficus religiosa leaves as a natural remedy for various health conditions.

REFERENCES

1. Lasekan O & Lasekan A. Flavour chemistry of mate and some common herbal teas. Trends in Food Science & Technology 27(1), 37–46,2012.
2. Zhao J, Deng JW, Chen YW, Li SP. Advanced phytochemical analysis of herbal tea in China. Journal of Chromatography A 1313, 2–23,2013.
3. Kong D-X, Li X-J & Zhang H-Y. Where is the hope for drug discovery? Let history tell the future. Drug Discovery Today 14(3/4), 115–119,2009.
4. Guimaraes R, Barros L, Duenas M, Calhelha RC, Carvalho AM, Santos-Buelga C, Queiroz MJRP & Ferreira ICFR. Infusion and decoction of wild German chamomile: Bioactivity and characterization of organic acids and phenolic compounds. Food Chemistry 136 (2), 947–954, 2013.
5. Ajai et al., Indian Journal of Animal Nutrition, 31(2), pp.177-181, 2014.
6. Alshami, I., & Alharbi, A. E. (2014). Antimicrobial activity of Hibiscus sabdariffa extract against uropathogenic strains isolated from recurrent urinary tract infections. Asian Pacific Journal of Tropical Disease, 4(4), 317-322.
7. Nikam PH. et al., Future Trends in Standardization of Herbal Drugs, Journal of Applied Pharmaceutical Sciences, 2012, 02(06): 38-44.
8. Sen CT, Food Culture in India, Greenwood Publishing Group, 2004, ISBN 978-0-313- 32487-1: 26.
9. "Herbal tea at Dictionary.com". Dictionary.reference.com. Retrieved 2014-05-04.
10. "Tisane - Definition from the Free Merriam-Webster Dictionary". Merriamwebster.com. 2012-08-31. Retrieved 2014-05-04.
11. Nadkarni AK., Indian Materia Medica, Third edition, popular Prakashan I vol, 2000.
12. Khandelwal K. Practical Pharmacognosy 2nd. Edition, Nirali Publication, New Delhi, 2000: 9-38. 13. Dr. Khandelwal KR. Practical Pharmacognosy: Nirali Prakashan 22 edition. 2012, 25(6):1-25.
14. Alakali, J.S., Ismaila, A.R., Alaka, I.C., Faasema, J., Yaji, T.A., 2016. Quality evaluation of herbal tea blends from ginger and Pavetta crassipes. Eur. J. Med. Plants. 12, 1– 8.
15. Anand, J., Upadhyaya, B., Rawat, P., Rai, N., 2015. Biochemical characterization and pharmacognostic evaluation of purified catechins in green tea (Camellia sinensis) cultivars of India. 3 Biotech 5, 285–294.
16. Astill, C., Birch, M.R., Dacombe, C., Humphrey, P.G., Martin, P.T., 2001. Factors affecting the caffeine and polyphenol contents of black and green tea infusions. J. Agric. Food Chem. 49, 5340–5347.

17. Roheena Abdullah, Swaiba Zaheer, Afshan Kaleem, Mehwish Iqtedar, Mahwish Aftab, Faiza Saleem, Formulation of herbal tea using *Cymbopogon citratus*, *Foeniculum vulgare* and *Murraya koenigii* and its anti-obesity potential, *Journal of King Saud University – Science*, 2023.
18. Schmidt M., Schmitz H.J., Baumgart, A., Guedon, D., Netsch, M.I. and Kreuter, M.H. (2005). Toxicity of green tea extracts and their constituents in rat hepatocytes in primary culture. *Food Chemistry Toxicology* 43: 307– 14] [Mckay, D.L. and Blumberg, J.B. (2002). The role of tea in human health: an update. *Journal of the American College of Nutrition* 21: 1 – 13.
19. Anonymous, 2008. Herbal tea benefits.
20. Hursel, R; Westerterp-Plantenga, MS (December 2013). Catechin-and caffeine-rich teas for control of body weight in humans. *American Journal of clinical Nutrition* 98(6 Suppl 1):1682s-1693s. 21. Hicks A. (2009) Current status and future development of global tea production and tea products. *AU JT.*; 12(4):251-264.
22. Bhat R, Moskovitz G. (2009) Herbal medicinal teas from South Africa. *Phyton (Buenos Aires)*. 78:67-73] [Mabey R, McIntyre A, McIntyre M. (1998) *The New Age Herbalist: How to use herbs for healing, nutrition, body care, and relaxation*: Simon and Schuster.
23. Public Health Agency of Canada. 2016, www.phac-aspc.gc.ca/hp-gs/knownsavoir/caffeine-eng.php. (Accessed 1 May 2016).
24. Chandini Ravikumar /J. Pharm. Sci. & Res. Vol. 6(5), 2014.
25. Kajol Batta*, Hradesh Rajput, *Journal of Food & Industrial Microbiology*. Review Article Volume 7:6, (2021).
26. Mr. Ravindra Sanjay Badak*, Ms. Pooja Wankhede, Dr. Gajanan S. Sanap. *IJCRT | Volume 11 ISSN: 2320-2882*, (2023).
27. Yuchao Liu, Chunyan Guo, Erhuan Zang, *Journal Of Future Foods*, Vol.3 no.3 (2023).
28. Sushmita L Bhandare and Smita P Borkar, E-ISSN: 2278-4136 P-ISSN: 2349-8234 *JPP*; 8(4): 3529-3535(2019).
29. R. Abdullah, S. Zaheer, A. Kaleem et al, *Journal of King Saud University – Science* 35 (2023) 102734.
30. Vijaya S.Rabade* and Shailju G.Gurunani, *International Journal of Pharmacy and Biological Sciences-IJPBSTM* (2021) 11 (4): 107-113.
31. Nurul 'ain Nadhirah Mohd Nasir et al., *International Journal of Advanced Trends in Computer Science and Engineering*, 8(1.3), 2019, 240 – 245.
32. N.E.A. De-Heer, P. Twumasi, M. A. Tandoh, G. Ankar-Brewoo and I. Oduro, *Journal of Ghana Science Association*, Vol. 15 No. 1, 2013.
33. Dr. Mehwish Khan, Dr. Nudrat Fatima, Dr. Asma Wazir, Dr. Zuneera Akram, Dr. Hina Rehman Ansari, Dr. Fatima Qamar, Vol.30 No.17 (2023): *JPTCP* (2193-2205).