

Research Article

Evaluating nutritional values for lemongrass (*Cymbopogon citratus*) herb tea formulation used in tea bags

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ABSTRACT

Tea is the second-most popular beverage engrossed after water. This study intends to formulate a herb tea using *Cymbopogon citratus* (lemongrass) in tea bags and evaluate its phytochemical and nutritional values. Lemongrass tea is abundant in energy, protein, carbohydrate fiber, and sodium. The method of making lemongrass tea is straightforward to prepare. It is prepared using lemongrass powder, mint leaf powder, dried ginger powder, and cardamom powder, then packed in the tea bag and dipped into hot water. Lemongrass tea boosts the immune system and detoxifies the body and it includes organic antioxidants and anti-inflammatory properties that can help prevent free radicals in the human body when consumed daily. Alkaloids, flavonoids, saponins, quinones, and tannins are among the active ingredients found in lemongrass plants. These chemicals provide antibacterial, antioxidant, pain relieving, cough and cold relief, stomach acid reduction, and aromatherapy effects due to their distinct and fresh aroma.

INTRODUCTION

Tea is a refreshing and fragrant beverage made by inoculating the leaves of *Camellia sinensis*. Different types of tea production are oolong, green, black, and ilex tea, determined by the post-harvest treatment and edibility of a specific zone. It is well established about the potential health benefits of lemongrass with natural antioxidants [9]. Tea, discovered to be anti-cariogenic, anti-microbial, and anti-inflammatory can be used as an effective precautionary agent. The main chemical compounds of green tea include polyphenols, caffeine, and amino acids. India is one of the biggest tea manufacturing, exporting, and consuming countries. The variations in tea flavor are floral, grassy, sugary, and slightly sour. *Cymbopogon* is also studied as lemon grass, barbed wire grass, silky heads, and Cochin grass [5].

Although lemongrass originated in South India and Sri Lanka, it is now produced in a variety of other countries. [4] Teas are classified according to their manufacturing process: fermented (black), unfermented (green), and semi-fermented (oolong or pouchong) [15]. The Chinese plant, which is grown in China, Japan, and to a lesser extent, Malaysia and Indonesia, is the usual source of green tea. Lemongrass includes organic antioxidants and anti-inflammatory properties that can help prevent free radicals in the human body when consumed daily. Alkaloids, flavonoids, saponins, quinones, and tannins are among the active ingredients found in lemongrass plants. These chemicals provide antibacterial, antioxidant, pain relieving, cough and cold relief, stomach acid reduction, and aromatherapy effects due to their distinct and fresh aroma (lemongrass) [21].

Researchers also investigated how different stocking densities of herbal tea trees and lemongrass essential oils affected grill chick growth, biochemical indicators, antioxidants, and immunological conditions [14]. Preservation of chilled Asian sea bass (*Lateolabrax niloticus*) steak by whey protein isolate coating containing polyphenol extract from ginger, lemongrass, or green tea was also studied [20]. "Herbal tea" refers to any beverage that does not contain *Camellia sinensis* tea leaves. Herbal teas are made from a variety of plant materials, including flowers, seeds, and roots. Herbal teas can contain a variety

of plants, such as ginger, lemongrass, and roselle. The optimal ratio of lemongrass, Roselle, and ginger is 1:2:1, with total phenol characteristics of 11.159 mg GAE/g, antioxidant activity of 79.7%, the acidity of 3.24, and a description of the colour Dark Moderate Orange with organoleptic test results that revealed a fairly similar outcome on overall acceptance [21].

On the other hand, a recent study has shown the effects of herbal teas sensory profiles and the optimal methods for brewing hot, iced, and hot+ice. Additionally, the approach of spectrum descriptive analysis was applied, and sensory vocabularies were developed by 12 trained panellists. In the meantime, 106 consumer respondents participated in the sensory optimisation process utilising the Just About Right (JAR) approach [7]. Additionally, a novel application of digestate tea to enhance the plant's growth rates was examined [22]. According to a number of studies on the leaves of *Cymbopogon citratus*, *Foeniculum vulgare* seeds, and *Murraya koenigii* could be useful sources of ingredients for the creation of consumer-friendly herbal tea with strong antimicrobial, antioxidant, and anti-obesity potential [18]. Lemongrass powder and essential oils are used to control the gut ecology by producing anti-microbial, anti-inflammatory, and antioxidant responses, boosting the gut system's optimal nutrition absorption. This is based on a variety of studies that are compatible with the current research [8].

Earlier studies have demonstrated that the tip of lemongrass leaves possesses higher levels of antioxidant and antibacterial activity than the mid and base sections. This implies that the tip helps to improve the physicochemical, antibacterial, and antioxidant properties of food products. Lemongrass methanolic extracts of up to 10% enhanced the nutritional value and flavour of the drinks considerably [13]. Prospects for using *Cymbopogon citratus* as a medicinal plant to treat diabetes have been demonstrated, and it has been discovered that the flavonoid glycosides in this have a hypoglycemic impact and may be investigated as potential medications to function as glucosidase inhibitors [17]. Other factors aside, the primary emphasis of the



research is on the impacts of sugar, pulp, and maltodextrin addition when producing kiwi jellies with lemon grass tea [19]. Essential oils are produced from tea trees (*Melaleuca alternifolia*) and lemon grass using a deep eutectic solvent based on betaine [15]. Prior research investigated students' social knowledge and awareness of the consequences of lemon grass tea on oral health [2,3]. The medicinal benefits of lemongrass and tea trees have also been well established in recent studies, as have the characteristics and properties of lemongrass and its extensive application, as demonstrated by several research investigations [23].

The main objective of the study was to assess the effectiveness of lemon grass and its nutritional values. *Cymbopogon citratus* tea stimulates the immune system and detoxifies the body, and it contains organic antioxidants and anti-inflammatory characteristics that can help avoid free radicals in the human body when ingested daily.

MATERIALS AND METHODS

Materials

Materials used in the research include for beverage preparation. The ingredients used for making the drink are water, fresh lemongrass, mint leaves, dried ginger and cardamom.

Methods

The process of making herbal tea from lemongrass is done by drying the ingredients at a temperature of 50°C to a constant weight. The dried material was then crushed and sieved using an 18mesh sieve. Lemongrass, mint leaves, dried ginger and cardamom that have been

shifted are then mixed using a predetermined method, the preliminary phytochemical analysis of lemon grass tea was carried out as per the methods given here under.

Sample collection

The collection of ingredients from Villupuram town (Tamil Nadu, India). The sample was collected by hand picking. The collected samples were washed with fresh water to separate contaminants such as adhering impurities, sand particles and dust. Then prepare the ingredient and separated. The ingredient was stored at room temperature until further analysis.

Formation of *Cymbopogon citratus* (lemon grass) tea

Wash the lemon grass and mint leaves and cut them into small pieces. Allow the lemon grass and mint leaves to dry, then grind the dried lemon grass, dried mint leaves, dried ginger, and cardamom. Take 30 grams of lemon grass powder, 7 grams of mint leaf powder, 5 grams of dried ginger powder, and a pinch of cardamom powder. The powder was mixed well and packed into the bags. Each bag is filled with 1.6 grams of powder, and the tea bag is dipped in 100 ml of hot water (Table 1,2; Fig. 1,2).

Table 1. Amount of the ingredients.

Sl.No.	Ingredients	Quantity to be taken (42 gram)
1.	<i>Cymbopogon citratus</i> (lemon grass) powder	30 gram
2.	Mint leaves powder	7 gram
3.	Dried ginger powder	5 gram
4.	Cardamom powder	pinch

Table 2. Ingredients used in formulation.





Sl.No.	Components	General term	Biological source	Family	Uses	Images
1	Lemon grass	USA-Citronell	Dried leaves of <i>Cymbopogon citratus</i>	Poaceae	Eliminate the bad microorganism and increases blood circulation	
2	Mint leaves	Peppermint leaves	Dried leaves of <i>Mentha piperita</i> L. (Peppermint)	Lamiaceae	Prevent for allergies, improves sterility and treat indigestion	
3	Dried ginger	Cochin ginger	Dried plant of <i>Zingiber officinale</i>	Zingiberaceae	Lower cholesterol and regulates blood sugar level	
4	Cardamom	Capalaga	Dried seed of <i>Elettaria cardamomum</i>	Zingiberaceae	Cures bad breath and improves heart health	



Fig. 1. Ingredients of *Cymbopogon citratus* (lemongrass) tea.



Fig. 2. Preparation of *Cymbopogon citratus* (lemon grass) tea.

Phytochemical screening of extracts

The preliminary phytochemical analysis of *Cymbopogon citratus* (lemon grass) tea was carried out as per the methods and tests given by Day and Raman (1957).

Estimation of reducing sugar – DNSA method

Take eight tubes and name them blank and 1-7. Make standard dilutions of glucose. Distribute the DNSA reagent (3 ml) evenly among the eight test tubes. Stir completely, then immerse in boiling water for 15 minutes. Mark the absorbance with a spectrophotometer set to 540 nm after the mixture has cooled to room temperature in a cold water bath. First, determine the absorbance (OD) of the blank and set it to zero. Determine the OD of each test tube (Nos. 1–7). After each OD, wash the cuvettes.

Table 3. Quantitative analysis.

Phytochemical constituents	Testing methods
Flavonoids	Shinod's test
Saponins	Froth test
Alkaloids	Wagne's test
Carbohydrates	Molisch's test
Proteins	Biuret test
Terpenoids	Salkowski test
Phenol	Ferric chloride test
Tanins	Modified prussian blue test
Steroids	Liebermann burchard test
Reducing Sugar	Fehlinhstesttest
Anthraquinones	Detection of coumarins

Total estimation of protein by Lowry's method

0.2, 0.4, 0.6, 0.8, and 1 milliliter of the working standard were pipetted into a sequence of test tubes. Next, transfer 0.1 and 0.2 milliliters of the sample extract into two more test tubes using a pipette. In each test tube, we added 1 ml to the volume. A blank tube is filled with one milliliter of water. We added 2 ml of reagent C to each tube, including the blank. After thoroughly mixing, let stand for half an hour. The hue blue is created. The method was carried out on the same sample from the same test. The assessment was made at 660nm. Using a standard graph, the amount of protein in the sample was determined.

Estimation of vitamin C (ascorbic acid)

0.5 to 2 ml of the standard dehydroascorbic acid solution was pipetted out into a different tube. 1 and 2 ml of tea were taken in the test tube. The volume was made up to 4 ml with distilled water. 0.5 ml of urea and 1 ml of 2, 4-dinitrophenyl hydrazine were added to all the tubes and incubated at 37° C for 3 hours. 5 ml of 85% sulfuric acid was added to all the tubes. The yellow colour was read calorimetrically at 540nm using a green filter. From the standard graph, the amount of ascorbic acid present in the given unknown solution and the amount of vitamin C was expressed as mg/dl.

Estimation of ferrous ion

Indicates the presence of ferric ion reducing to adding the kmno4 drop by drop in the conical flask; the white colour is converted to pink colour.

Fourier Transform Infrared (FTIR) spectroscopy

Fourier transform infrared (FTIR) spectroscopy is a systematic methodology used in construction and academic laboratories to determine the composition of molecular mixtures. It is used to find functional and uncompound groups.

RESULT AND DISCUSSION

The phytochemical analysis of *Cymbopogon citratus* (lemon grass) tea shows the presence of alkaloids, tannins, terpenoids, flavonoids, reducing sugar, glycosides, phenols, proteins, and carbohydrates, as well as the absence of steroids. The quantitative analysis of lemon grass tea contains the presence of reducing sugar, protein, and vitamin c. The sample was subjected to FTIR analysis it indicates the presence of functional and uncompound groups of the lemon grass tea samples. The primary and secondary metabolites of herbal tea blends are shown in Table 4. In that, the lemon grass tea indicates the presence of alkaloids, tannins, terpenoids, flavonoids, reducing sugar, phenols, and proteins, except steroids.

Lemongrass includes various antioxidants that can help your body destroy free radicals that might cause disease. Chlorogenic acid, isoorientin, and swertiajaponin are notable antioxidants. These antioxidants may aid in the prevention of cell dysfunction in your coronary arteries [16]. Lemongrass tea's antibacterial qualities may aid

in the treatment of mouth infections and cavities. It has been found that lemongrass essential oil possesses antibacterial properties against the tooth decay-causing *Streptococcus mutans* bacteria [1]. Many diseases, including heart disease and stroke, are thought to be impacted by inflammation. Lemongrass' anti-inflammatory qualities are thought to be related to two of its primary components, geranial and citral. It has been suggested that these compounds may help stop your body from releasing particular markers that lead to inflammation [2]. Lemongrass's citral is also believed to possess strong anticancer properties against certain cancer cell types. Lemongrass has several ingredients that combat cancer. This happens through either immediately inducing cell death or strengthening your immune system by rendering your body more capable of fending against cancer on its own. Lemongrass tea is occasionally used as an adjuvant therapy during chemotherapy and radiation treatments. It is only appropriate to use under an oncologist's supervision [11]. When experiencing stomach discomfort, cramps, or other digestive issues, a cup of lemongrass tea is a go-to alternative cure. Additionally, lemongrass may be useful in preventing stomach ulcers. Lemongrass leaf essential oil can help shield the stomach lining from alcoholic and aspirin-induced damage [18]. Lemongrass tea has been used for its natural ability to relieve bloating, hot flashes, and melting. While specific studies on lemongrass and PMS is lacking, its anti-inflammatory and stomach-soothing properties may be beneficial [12].

Lemongrass has anti-inflammatory and analgesic qualities that make it useful in treating rheumatism, osteoarthritis, gout, and other joint pain conditions. Because of its purifying and cleansing qualities, lemongrass tea helps improve and detoxify the pancreas, which decreases blood sugar levels in diabetics. Still, further research and analysis are required in this area. Lemongrass is a renowned skin tonic and a highly effective cleanser for oily or acne-prone skin because of its astringent and antibacterial qualities. Viral infections such as the common cold, influenza, fever, pox, and others can cause discomfort in the muscles, joints, teeth, and headaches, among other things. Lemongrass oil can aid with these symptoms.

Table 4. Results of photochemical analysis.

Phytochemical constituents	Lemongrass tea powder	Testing methods
Flavonoids	+	
Saponins	+	Froth test
Alkaloids	+	Wagne's test
Carbohydrates	+	Molisch's test
Proteins	+	Biuret test
Terpenoids	+	Salkowski test
Phenol	+	Ferric chloride test
Tanins	+	Modified prussian blue test
Steroids	-	Liebermann burchard test
Glycosides	+	
Reducing Sugar	+	Fehlinhstesttest
Antraquinones	+	Detection of coumarins



Fig. 3. Phytochemical analysis of *Cymbopogon citratus* (lemon grass) tea.

CONCLUSION

Tea is an energizing and odorous drink. People all over the world have been consuming tea for good causes, overall. Tea may boost mental health and fight inflammation. We prepared the herb tea formulation using *Cymbopogon citratus* (lemongrass) in tea bags. This tea is prepared by a quick method. The ingredients used for the *Cymbopogon citratus* tea are commercially available ingredients. The main source of our tea is lemongrass. Lemongrass contains quercetin, a flavonoid known for its anti-inflammatory benefits. Lemon grass tea is very healthy and boosts the immune system; it controls lower cholesterol levels, detoxifies the body, helps to prevent cancer, treats respiratory disorders, effectively aids the nervous system, treats stomach disorders, and treats infection. Compared to other teas, this *Cymbopogon citratus* tea is caffeine-free. Drinking our tea makes people enjoy it. Hence, we conclude that people must drink lemongrass tea for health benefits and stress relief.

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