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Formulation And Evaluation Of Herbal Tea

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ABSTRACT

Herbal tea, commonly referred to as tisane, is a caffeine-free beverage derived from various medicinal plant parts such as leaves, flowers, and roots. This study aimed to formulate and evaluate a palatable and therapeutic herbal tea blend using Butterfly Pea (Clitoria ternatea), Tulsi (Ocimum tenuiflorum), and Lemongrass (Cymbopogon citratus). These herbs were selected due to their antioxidant, antimicrobial, immunostimulant, and digestive properties. The collected plant materials were dried, powdered, and sieved before formulation. Organoleptic evaluation confirmed desirable appearance, aroma, and taste. Moisture content was found to be 23%, loss on drying 29%, ash value 5.3%, and pH ranged from 5.6 to 6.4, indicating good physicochemical stability. Qualitative phytochemical screening revealed the presence of flavonoids, tannins, saponins, and alkaloids, which contribute to the herbal tea's therapeutic effects. Tests such as the Shinoda, Ferric Chloride, Foam, Benedict's, and Mayer's were employed to confirm the presence of these constituents. The herbal tea demonstrated beneficial effects like relaxation, immune boosting, digestive support, and potential for aiding in weight loss and blood sugar control. It provides a healthy, caffeine-free alternative to traditional teas and modern beverages. Literature supports the medicinal potential of herbal teas, highlighting their antioxidant, anti-inflammatory, and antimicrobial properties. This formulation shows promise as a natural health-promoting beverage with multiple physiological benefits. Further studies may explore more precise combinations and dosages for targeted health benefits.

KEYWORDS: Herbal Tea, Butterfly Pea, Phytochemical Screening, Antioxidant

INTRODUCTION:

Herbal tea, known as tisane, has gained popularity thanks to its health benefits and can certainly serve as a complement to contemporary medicine. This beverage is made from dried leaves, seeds, herbs, flowers, nuts, or various other plant-based materials that do not come from the commonly consumed tea plant, Camellia sinensis (1). The popularity of tea is reviving as more individuals are recognizing its health advantages. Infusions made from the leaves or other parts of the evergreen tea plant are used to create tea (2). Herbal teas derived from plants are gaining increasing popularity among consumers as a fresh trend. Many people describe its flavor as refreshing, mildly bitter, and astringent. This form of preparation aids in alleviating stress, fatigue, anxiety, and various other issues while enhancing immunity, maintaining vigor, and revitalizing cells (3). Herbal teas are essentially blends of multiple components and are more precisely referred to as 'tisanes.' Tisanes consist of mixtures of dried leaves, seeds, grasses, nuts, barks, fruits, flowers, or other botanical elements that contribute to their flavor and offer the health benefits associated with herbal teas (4). Unlike many other types of tea, herbal teas are caffeine-free. They also have pleasant flavors and are enjoyable to drink. Most herbal teas may feature a primary herbal component or a combination of several herbs, aimed at achieving specific effects like relaxation, revitalization, or alleviation of certain ailments, among other benefits (5). Tea, in general, and herbal tea specifically, are attracting more consumer interest due to the rising awareness of the health advantages associated with their consumption. Herbal teas are prepared by infusing herbs, fruits, seeds, and roots in hot water (6). The consumption of tea has been promoted for its numerous health benefits, which include a reduction in the risk of cardiovascular diseases and various cancers. It also enhances bone mineral density and exhibits neuroprotective and antifibrotic effects. Additionally, tea is beneficial for dental health. It lowers blood pressure, assists in weight management, and has antibacterial properties (7). Herbal tea distinguishes itself from beverages like coffee and traditional tea. Known for their healing and medicinal benefits, herbal teas are enjoyed globally (8). There are over 4,000 bioactive compounds found in herbal tea, with polyphenols making up approximately one-third and the remainder consisting of tannins and flavonoids. Herbal teas are known for their healing and immune-enhancing benefits, positioning them as a viable substitute for traditional medicine (9). People frequently enjoy herbal teas for their therapeutic and revitalizing effects, as they can promote relaxation. Additionally, herbal teas can assist in alleviating stomach or digestive issues, offering detoxifying benefits to the body and bolstering the immune system as well (10). Herbal tea can provide relief to the stomach, help reduce blood pressure, and may have anti-cancer properties. It is advisable to promote the intake of tea that has little to no calories (11).

OBJECTIVES

1. The main objective during the formulation phase is to create a flavorful, stable, and potentially beneficial herbal tea blend using the selected ingredients.

2. Herbal teas are crafted to enhance overall health, strengthen the immune system, and promote bodily balance using natural components.

3. Herbal tea acts as a traditional or alternative treatment for common issues such as colds, digestive troubles, stress, and sleeplessness.

4. Herbal tea assists in detoxifying the body by eliminating toxins and enhancing metabolism.

5. It provides a wholesome, caffeine-free substitute for conventional black or green tea.

6. It contributes to digestive wellness by calming the stomach and facilitating digestion (e.g., peppermint or ginger tea).

7. Herbal teas include soothing herbs like chamomile or lavender that help alleviate anxiety and encourage relaxation.

8. Herbal tea provides a tasty method to remain hydrated while enjoying the advantages of herbs.

9. Certain herbal teas might assist with reducing appetite or enhancing fat metabolism.

MATERIALS AND METHODOLOGY

1)Butterfly Pea Flower:

Botanical Name: Clitoria Ternatea

Family: Fabaceae.

Chemical Constituents: It contains Anthocyanin (antioxidant), Flavonoids, Alkaloids, Glycosides, Saponins and Tannins.

Parts typically used: Flowers

Medicinal uses: It helps in promoting Weight loss, Stabilizing Blood Sugar levels, Supports Skin and Hair Health. It also has strong Antimicrobial and Immune Boosting effects.

2)Tulsi:

Botanical Name: Ocimum Ternuiflorum

Family: Lamiaceae

Chemical constituents: It contains Monoterpenes, Sesquiterpene, Alcohols, Esters, Oxides, Phenols (ursolic acid, apigenin, luteolin), Eugenol (35-70%), Carvacol (4-6%).

Parts typically used: Leaves

Medicinal uses: Used as Antiallergic to inhibit Mast cell degranulation and histamine release, Carminative depressant, Antiseptic, Antifungal, Antibacterial, Anti-diabetics.

3)Lemongrass:

Botanical Name: Cymbopogon citratus

Family: Poaceae.

Chemical constituents: It contains Hydrocarbon terpens, Alcohols, Ketones, Esters, Aldehydes.

Parts typically used: Leaves

Medicinal uses: It shows potential effect on blood Sugar and cholesterol, used as diuretics, digestive aid, antioxidant, anti viral, analgesic and anti-inflammatory.

Procedure:

Collection and processing of plant materials

Fresh Butterfly Pea Flower, Lemongrass and tulsi leaves were collected from a local area near home. They were washed and dried at room temperature for 3-4 days. Clitoria Ternatea flowers and Ocimum Tenuiflorum leaves, Cymbopogon Citratus leaves were taken. These plant materials were then powdered by using mortar and pestle. They were then passed through sieve 60 individually to obtain uniform size of the powder. All ingredients were mixed in the ratio 3:1:1 to obtain the final formulation.

Fig 1: Dried butterfly pea flowers

Fig 2: Dried tulsi leaves

Fig 3: Dried lemongrass

Table 1: Formulation table for herbal tea

Sr. No.	Ingredients	Quantity
1	Butterfly Pea	3gm
2	Tulsi	1gm
3	Lemongrass	1gm

RESULTS AND DISCUSSION

1. Organoleptic test:

Organoleptic tests were performed by visual inspection for appearance, colour, odour and taste.

Table 2: Organoleptic evaluation test

Ingredients	Colour	Odour	Taste
Butterfly Pea	Blue	Sweet	Characteristics
Tulsi	Green	Fresh Aromatic	Astringent
Lemongrass	Yellowish Green	Strong, fresh lemony	Citrusy

2. Moisture content:

A quantity of 3 g of the herbal material was measured out into an evaporating dish crucible that had been preheated to 105 ± 2°C for 5 minutes and then placed in a desiccator until ready for use. The evaporating dish was placed in an oven set at 105 ± 2°C, and the crucible was taken out every 30 minutes and weighed until two consecutive measurements showed no change in weight. This process was repeated 3 to 4 times. The percentage of moisture content was calculated using the formula:

% moisture content = C2-C3/C2-C1×100

where: C1 =weight of the empty evaporating dish

C2 = weight of crucible + sample before heating

C3 = weight of crucible = sample after heating.

3. Loss on drying:

Loss on drying refers to the weight reduction, expressed as a percentage w/w, due to the evaporation of water and volatile substances under specific conditions. Weigh approximately 2 grams of the air-dried crude substance in a pre-dried and tared flat weighing dish. Heat in an oven at a temperature of 100-105°C. Allow it to cool in a desiccator containing phosphorus pentoxide for a predetermined duration. The weight loss is noted as moisture content. Repeat the procedure until a constant weight is achieved.

4. Total ash value:

The ash consists of inorganic components such as phosphates, carbonates, and silicates that include sodium, potassium, magnesium, calcium, and others. Factors like the levels of calcium oxalate, silica, and carbonate in the raw material influence the 'Total Ash Value.' Accurately weigh 2 grams of the air-dried substance in a pre-weighed silica crucible and incinerate it at a temperature not higher than 450ºC until it is free from carbon, then allow it to cool and weigh again. If the ash contains carbon, rinse the charred material with hot water, gather the remaining particles on an ashless filter paper, and burn the residue along with the filter paper until the ash is white or nearly white. Combine the filtrate back into the dish, let it evaporate until dry, and ignite at a temperature not exceeding 450ºC. Calculate the percentage of total ash based on the weight of the dried drug.

5. Qualitative estimation:

The herbal tea decoction underwent phytochemical analysis to identify various phytoconstituents such as carbohydrates, tannins, alkaloids, saponins, and flavonoids.

1)Test for Flavonoids (Shinoda Test):

10 drops of dilute hydrochloric acid was added in 1-2ml of extract. A piece of magnesium tungsten was then added, on shaking deep pink colour indicates the presence of flavonoids.

2)Test for Tannins (Ferric chloride Test):

In 1-2ml of extract 2ml of ferric chloride was added. Greenish black color indicates the presence of phenolic compounds.

3)Test for Saponins (Foam Test):

Drop of Sodium carbonate was added in 5ml of extract. On shaking formation of foam indicates the presence of saponins.

4)Test for Carbohydrates (Benedict's Test):

5ml of benedict's reagent was added in 2ml of extract. It was then heated for 5mins. Dark red precipitate indicates the presence of carbohydrates.

5)Test for Alkaloids (Mayer's Test):

In 1-2ml of extract, few drops of Mayer's reagent was added. Creamy white precipitate indicates the presence of alkaloids.

6)Test for Alkaloids (Wagner's Test):

In 2-3 ml of extract, few drops of Wagner's reagent was added. Reddish brown precipitate indicated the presence of alkaloids

Fig 4: evaluation tests for the qualitative estimation

Phytochemical Screening Results:

Table 3: results of phytochemical tests

Phytochemicals	Result	Observation
Flavonoids (Shinoda Test)	+	Pink colour
Tannins (Ferric Chloride Test)	+	Greenish black
Saponins (Foam Test)	+	Presence of foam
Carbohydrates (Benedict's Test)	-	No dark red ppt
Alkaloids (Mayer's Test)	+	Reddish brown ppt
Alkaloids (Wagner's Test)	-	No creamy white ppt

Evaluation:

Table 4: evaluation parameters of herbal tea

Sr. No.	Evaluation parameter	Observation
1	Colour	Bluish green
2	Odour	Characteristic
3	Appearance	Pleasant
4	Ash value	5.3%
5	Moisture content	23%
6	Loss on drying	29%
7	pH	5.6-6.4

CONCLUSION:

The creation and assessment of a herbal tea using Butterfly Pea Flower, Tulsi, and Lemongrass successfully highlight the potential of natural ingredients as a health-enhancing, caffeine-free substitute for conventional tea. The chosen herbs, recognized for their healing properties, were skillfully blended in a 3:1:1 ratio to create a stable and enjoyable mixture. The formulation exhibited acceptable sensory and physicochemical properties, along with the presence of important phytochemicals such as flavonoids, tannins, alkaloids, and saponins, suggesting notable therapeutic potential. This herbal tea blend may bolster immunity, alleviate stress, assist digestion, and enhance overall wellness. Hence, it can be regarded as a beneficial functional drink with minimal adverse effects, appropriate for regular consumption. Additional research and development could improve its therapeutic targeting and attractiveness to consumers.

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