



FORMULATION AND EVALUATION OF HERBAL MEDICATED TEA

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Abstract:-

Herbal tea, composed of various herbs derived from leaves, seeds, and roots of different plants, is often misunderstood as being sourced from traditional tea plants. In reality, these concoctions are better described as "tisanes." There exists a diverse array of tisanes, each renowned for its therapeutic attributes. Some are prized for their invigorating qualities, aiding in relaxation, alleviating digestive issues, and bolstering the immune system. Among the well-known herbal teas are black herbal tea, herbal green tea, herbal chamomile, herbal ginger, herbal ginseng, peppermint, and cinnamon. Certain herbal teas possess potent healing properties; for instance, astragalus, a Chinese herb, boasts antimicrobial and anti-inflammatory effects, offering support to individuals with conditions like HIV and AIDS. While scientists continue to explore and confirm the health advantages of consuming herbal teas, they have found little evidence of harm associated with their consumption.

Key words:

Camellia Sinensis, tisanes, Historic herbal remedy, Modern day discoveries, medical benefits, ailments, benefits, drawbacks.

1. INTRODUCTION:

Many assert that herbal tea, though resembling traditional tea in appearance and preparation method, is distinct from true tea because it doesn't come from the Camellia Sinensis bush, the origin of all teas. Herbal teas, more accurately called "tisanes," consist of blends of various herbs, such as dried leaves, seeds, grasses, nuts, barks, fruits, and flowers, rather than tea leaves. Tisanes, while possessing flavors akin to herbal teas, lack caffeine, which is prevalent in most other tea varieties. They are easily consumed and often favored for their pleasant taste. Typically, herbal teas contain a single primary herbal ingredient or a blend of herbs, each serving a specific purpose, such as relaxation or relief from certain conditions.

The misconception arises because herbal teas, or tisanes, don't contain any leaves from the tea plant, Camellia sinensis. True teas from this plant naturally contain caffeine, while herbal blends are devoid of it. Herbal blends, or tisanes, consist of a variety of flowers, herbs, spices, and dried fruits, offering a caffeine-free alternative. In some cases, additional herbs, spices, or fruits may be combined with true tea for flavoring, such as in Chai tea. The presence of caffeine in herbal blends depends on whether tea is among the ingredients. Research by Bhat R.B. explores the medicinal uses of herbal teas in South Africa, where various

blends are sold under different names, each containing a mix of herbs known for their therapeutic properties.

Herbal teas, crafted from different herbs' leaves, roots, fruits, and flowers, are rich in nutrients and can serve as alternatives to conventional medicine for certain ailments. These teas contain high levels of polyphenols, offering antioxidant, anti-inflammatory, anticancer, antihyperglycemic, and other health benefits. Despite their potential benefits, herbal teas may be produced in areas with environmental issues, leading to contamination with metallic and metalloid elements. This contamination poses health risks, as high concentrations of toxic elements in herbal teas can accumulate in the body over time, potentially causing adverse effects. Analytical methods have been developed to assess the levels of these elements in herbal teas and evaluate potential health risks for consumers. While some herbal teas may exceed permissible limits for certain elements, the overall risk to human health from metal and mineral contamination in commercial herbal teas appears to be low, considering factors like solubility and bioavailability.

1.1 Historic Herbal Remedy

Combining a variety of herbs and spices in herbal tea blends can offer therapeutic benefits for numerous ailments. Take, for instance, Southern Mint herbal tea, whose mint leaves offer a multitude of advantages. As noted by Dr. Mercola, peppermint has been associated with alleviating symptoms of conditions such as irritable bowel syndrome, infantile colic, tuberculosis, hay fever, memory issues, chemotherapy-induced nausea, prostate cancer, headaches, stress, and more. Additionally, according to GreenMedInfo, dried mint leaves have even been discovered in certain Egyptian pyramids, dating back to 1000 BC, indicating its historical significance and enduring utility.

1.2 Modern Day Discoveries

The South African rooibos herb, rich in antioxidants, minerals and vitamin C, is part of the Honey bush Caramel herbal tea. These antioxidants are organic compounds that are thought to destroy free radicals, dangerous byproducts of natural biological processes that can damage cells and promote cancer, andquot; According to WebMD.

When our ancestors started adding tea, herbs and spices to their diet in ancient times, they wanted something. It tastes good, but it can also make you feel fantastic.

In recent years, scientists and researchers have been exploring the health benefits of various herbs used in traditional teas. Some notable trends and discoveries include:

- **Adaptogenic Herbs:** Certain herbs like ashwagandha and holy basil are gaining attention for their adaptogenic properties, helping the body adapt to stress and promote overall well-being.
- **Anti-inflammatory Effects:** Turmeric, often found in herbal teas, has been recognized for its anti-inflammatory properties, potentially aiding in conditions associated with inflammation.
- **Gut Health:** Herbal teas containing ingredients like peppermint and ginger are being studied for their potential benefits in supporting digestive health and alleviating gastrointestinal issues.
- **Sleep and Relaxation:** Chamomile and valerian root are traditionally known for their calming effects, and recent research continues to explore their role in promoting better sleep and relaxation.
- **Antioxidant Rich:** Green tea, although not new, remains a focus of research due to its high antioxidant content, which may contribute to various health benefits, including cardiovascular health.
- **Cognitive Function:** Certain herbs, such as ginkgo biloba, are being studied for their potential cognitive-enhancing effects, leading to increased interest in herbal teas for brain health.
- **Blood Sugar Regulation:** Some herbal teas, including cinnamon tea, are being investigated for their role in helping regulate blood sugar levels, offering potential benefits for individuals with diabetes.

1.3 Herbal Tea Types & their Benefits

1. Mentha piperita Herbal Tea

In addition to its cooling taste and aroma, peppermint tea and its calming effect and other chemical ingredients can have a positive effect on a person's health and appearance. You can drink it as much as you want because it contains no calories or caffeine. It can also help with menstrual cramps, relax muscles and promote relaxing sleep, treat gastric problems such as gas, swelling and dyspepsia, act as oral freshener and dismiss stress, headaches and migraines.



Fig 1: Mentha piperita herbal tea

2. Ginseng Tea

Tea made from ginseng root is recognized to have several health aids. It used to be general only in the Korea, but gradually people are becoming conscious of it. The strong taste and aroma of this drink can help your body relax. This is one of the best varieties of herbal tea for a strong life.

- Contains anti-inflammatory and antioxidant effects.
- Combat fatigue and exhaustion.
- Beneficial for regulating blood sugar.
- Enhance mood, behaviour, and memory.
- Control high blood pressure
- Establishes a hormonal balance.



Fig 2: Ginseng tea

3. Herbal Hibiscus Tea

Hibiscus tea is something you will definitely enjoy if you enjoy the sweet and sour taste of cranberries. There exist numerous varieties of hibiscus, yet Hibiscus sabdariffa stands out as the predominant choice for brewing hibiscus tea, enjoyable whether served hot or cold.

- Blood pressure reduction
- Aids in health of liver.
- Boosts cholesterol HDL while lowering cholesterol LDL.
- Aid in combating bacterial illness.
- Strive to overcome depression.

- A plentiful supply of vitamin C



Fig 3: Herbal Hibiscus Tea

4. Herbal Moringa Tea

Moringa herbal tea contains nutrients important for human health and is full of antioxidants, vitamins and minerals. Leaves of moringa, which are now even offered as powder and bags of tea, are used to make moringa herbal tea, which tastes similar to green tea.

- Malnutrition can be fought with moringa tea.
- Can shield against arsenic toxicity.
- Improve your sex life by increasing your testosterone levels.
- Balances blood sugar levels and reduces insulin resistance.
- High levels of insoluble fibre.



Fig 4: Moringa Herbal Tea

5. Herbal Lemon Balm Tea

Lemon balm is a lemon-flavored mint family member. This beneficial plant can help those with anxiety or insomnia. The antioxidants it contains have been shown to help treat a number of medical conditions, including the herpes virus. However, be careful not to consume too much of it for a long time.

- Enhances mental performance and mood.
- Arteries' suppleness should be increased.
- Boost mental capacity.
- Alleviates motion sickness.
- Can relieve chest pain.
- Reduce the thyroid's excessive activity.



Fig 5: Lemon Balm Tea

- **Chamomile Tea**

Chamomile tea is a type of herbal tea. The famous health drink made from the plant family Asteraceae is known by the spelling of chamomile. Chamomile tea is high in flavonoids but no caffeine, which makes it good for skin and well-being. This soothing drink has analgesic, antispasmodic and anti-inflammatory effects.



Fig 6: Chamomile Tea

6. Ginger Tea

Stress can be eased with just one sip of ginger tea. Herbal Ginger tea is used as an herbal remedy for many diseases because it is a high source of magnesium, vitamin C and any other minerals. Lemon, honey or mint taste great in this soothing drink.

- Alleviate the signs of motion sickness.
- Alleviates nausea brought by surgery, morning sickness.
- Relieve cold-related congestion.
- Improve heart health and blood circulation.
- Beneficial for joint and muscular issues.
- Reduces the risk of stomach ulcers.



Fig 7: Ginger Tea

7. Lemongrass Herbal Tea

Few things rival the revitalizing and pleasurable experience of sipping on a piping hot mug of lemongrass tea, renowned as one of the most popular herbal infusions. Known for its refreshing flavor and abundant nutrients, lemongrass herbal tea is often savored post-dinner to aid in digestion.

- Contain abilities to calm anxiousness.
- Increase metabolism to burn more calories.
- Provide vital nutrients for healthy skin and hair.
- Boost dental health and avoid cavities.
- Boost the body's red blood cell count.
- Increase urine output to relieve bloating.



Fig 8: Lemongrass Herbal Tea

1.4 The benefits and drawbacks of drinking herbal teas are discussed in the sections below:-

BENEFITS:

Because herbal teas can help you relax, people often drink them for their therapeutic and invigorating properties. Herbal teas offer relief for stomach or digestive issues, promote detoxification, and boost the immune system. It's essential to recognize that various herbs possess unique healing properties, allowing for personalized herbal blends to suit individual needs. Here are several herbal teas types and their respective aids:

- The healthiest herbal teas is green tea. The several benefits such as prevention of certain malignancies, fighting tooth decay and gum disease, weight loss and more. Green tea is sometimes served as "matcha" in a form that is simply finely ground green tea. Green and white tea is actually a whole tea leaf ground into a fine powder, so consuming it has many positive side effects.
- Nettle and dandelion are added to mint raspberry leaf to increase milk production during breastfeeding.
- Black tea is known for its high antioxidant content despite being very low in salt, fat and calories. It also aids with Parkinson's disease and cardiac disease.
- Oolong tea, a well-known Asian drink, can successfully treat type 2 diabetes when drunk regularly.
- Another useful tea to drink is yerba mate tea. It also helps in weight loss when used regularly. Some of the great side effects of Yerba Mate tea include a reduced risk of heart disease and various malignancies. It is full of nutrients that many adults lack in their regular diets, including vitamins A, B1, B2 and C, as well as the minerals magnesium, potassium, calcium, iron and riboflavin.
- The most popular herbal of teas that public enjoy is chamomile. It has a mild effect of sedation, making an ideal sleep aid. In addition, it relieves stomach problems and has a mild laxative effect. It relieves menstrual cramps because research shows that chamomile increases levels of glycine, a compound that reduces muscle spasms.
- Women who are expecting or trying to conceive should drink red raspberry leaf tea. It is said to reduce labor discomfort. It strengthens the pelvic and uterine muscles without causing contractions, so it does not cause

labor or miscarriage.

- Ginger tea offers a versatile remedy for various conditions, spanning from alleviating morning sickness to combating motion sickness and a range of other ailments.
- Astragalus tea is known to treat HIV and AIDS.
- Cardamom tea reduces flatulence, soothes the stomach and treats indigestion. Drinking a cup of cardamom tea can also help with nausea. Cardamom tea treats lung diseases with a lot of mucus. In addition, helps calm the cough. Women who experience mood swings during their menstrual cycle may find it helpful to drink a cup of cardamom tea.
- Ginger stimulates and gives energy. Ginger tea stimulates and soothes the digestive system at the same time. Ginger has a reputation for helping people with motion sickness.
- Due to its anti-inflammatory properties, ginger tea has been shown to be beneficial for arthritis patients.
- An upset stomach can be treated with peppermint tea, especially when chamomile is added.
- Typically, herbal teas are recognized for their ability to soothe the stomach, decrease blood pressure, and mitigate the likelihood of cancer.

DRAWBACKS:-

Some of the drawbacks of taking certain herbal teas include:

- During the growing environment or preparation, some of these teas may contain potentially harmful compounds such as dyes, glues and flavor enhancers. Here are some of the effects of drinking green tea
- Although it is extremely unusual and rare, allergic reactions can occur after drinking green tea. Some of these are breathing problems and other throat or breathing problems and swelling around the lips, tongue or face. In such cases, you should stop drinking green tea and consult a doctor immediately.
- The consumption of green tea for a very long time (in large quantities) has also been associated with esophageal cancer.
- Other less serious side effects of green tea have been reported (although rare), including:
 1. Indigestion
 2. Abdominal pain
 3. Appetite Loss
 4. Diarrhea or constipation
 5. Tenseness, irritability or nervousness
 6. Sleep disorders
 7. Abnormal heart beats
 8. Headache or pain
 9. To control the patient and ongoing suffering, such cases must be immediately reported to the doctor.

1.6 USES:-

Black tea often contains caffeine, which leads to the following effects:

Caffeine, a central nervous system stimulant, can sometimes cause insomnia in adults, children and newborns. It can worsen urinary incontinence and has a diuretic effect on the kidneys, increasing urine output and sodium/potassium levels in the urine and possibly lowering blood sugar sodium/potassium levels. Consuming black tea can (very rarely) result in these circumstances, even though the amount of caffeine it contains is small.

- It has been shown to corrode tooth enamel with continuous use. Blood sugar may increase after drinking black tea containing 200 mg of caffeine (4-5 cups, depending on the strength of the tea and the size of the cup). Caffeinated brews such as black tea should be used with caution in patients

(or person) with diabetes.

- Although it is unclear whether the tannin in black tea significantly increases the risk of cancer in humans, animal studies suggest that the tannin components of tea plants may do so.

1.7 SIDE EFFECTS OF CHAMOMILE TEA:

- A person who experiences an allergic reaction to plants in the Composite family, which includes a broad group of flowers that include chrysanthemums, asters and ragweed, should use chamomile tea with caution.
- Pregnant women are not advised to drink chamomile tea because it can cause uterine contractions, although symptoms of sensitivity to this herb, such as rashes and bronchoconstriction, have occasionally been reported. Also, since chamomile thins the blood, it is not recommended to drink this tea if you are currently taking blood thinners.

1.8 Others type of tea

- Safrole, a poisonous substance contained in sassafras tea, is almost 80% of it. According to studies, high consumption of safrole can increase the risk of liver damage. Do not drink sassafras tea if you are expecting or breastfeeding. Healthy, non-pregnant people should drink sassafras tea only occasionally.
- Recent research indicates that peppermint tea may lower testosterone levels, particularly in males, potentially impacting fertility. It is important to highlight that not all herbal teas are necessarily safe for consumption.

1.9 Herbal Tea Preparation Process

Newly harvested shoots from *Camellia sinensis* cultivars were gathered at the tea experimental farm. These samples, consisting of 93% *Camellia sinensis* shoots and 7% herbal plant material, underwent processing. Through different manufacturing methods, two types of herbal tea were created: green (unfermented) and black (fully fermented).

1.10 Infusion Preparation

For each 2g of tea, 100 mL of hot distilled water was used. The infusion was agitated for 3 minutes, steeped for 4-6 minutes, and then cooled for 20 seconds [28]. After filtering through Whatman paper, the tea infusions were stored at 4 °C and used within 24 hours. This process was repeated three times.

1.11 Volatile Organic Compounds Extraction through Simultaneous Distillation Extraction (SDE)

Using 100g of dried herbal tea samples, volatile organic components were extracted following the Rawat et al. [32] technique. The Likens-Nickerson apparatus, connected to an extended condenser, was utilized. The air vent pressure, attached to a vacuum pump, was maintained at 0.267 bar. VOC extraction occurred over 20 minutes. For each herbal tea sample, volatile chemicals from five SDE batches were combined, concentrated to 5 mL at 35 °C in the Vigreux column. To eliminate moisture and contaminants, the resulting volatile extracts were concentrated to 5 mL in an inert environment and passed through anhydrous Na₂SO₄.

1.12 Aroma Extract Dilution Analysis (AEDA)

The volatile components extracted from herbal teas were sequentially diluted with dichloromethane, following ratios such as 1:2, 1:4, and so forth, prior to analysis.

1.13 Gas Chromatography Analysis

A gas chromatograph from the Agilent 7890 Series equipped with a fused silica column (30 m in length, 0.25 mm inner diameter, coated with a 0.25 μm film of HP-5) was employed for the analysis of volatile compounds. Injection was performed without splitting. The temperature of the column was programmed to increase from 40 to 210 °C at a rate of 5 °C/min. The injector and detector temperatures were set at 250 °C and 230 °C, respectively. Hydrogen was utilized as the carrier gas at a flow rate of 1 mL/min, and a flame ionization detector (FID) was utilized.

1.14 Identifying Favor Components:

Compounds were identified by correlating retention indices (RI) with a mix of C₈-C₂₃ n-alkanes. The identification involved comparing compound mass spectra to NIST 02 and Wiley 7 libraries and validating

them by matching with an in-house library. Finally, compounds were associated with known chemicals based on RI.

1.15 Sensory Evaluation:

Green and black herbal teas were steeped with 100 mL of hot distilled water for every 2 grams of tea, allowed to steep for 4 to 6 minutes, and then cooled for 20 seconds. The tea infusions underwent taste testing, and a trained panel assessed total quality score (TQS) based on leaf color, flavor, aroma, and form of soaked leaves. TQS was calculated by summing flavor qualities using Spearman linear correlation analysis.

1.16 Statistical Analysis:

Samples were analyzed in triplicate using STATISTICA 7 variance, and ClustVis variance software created a heatmap for catechins profiling. Principal component analysis (PCA) was conducted to analyze the amino acid content using PAST variance 3 software.

2. CONCLUSION:

This article delves into the multifaceted realm of herbal tea consumption, highlighting its scientifically substantiated benefits such as aiding digestion, promoting a sense of calmness, and potentially contributing to cancer prevention. Despite the wealth of research supporting these positive attributes, the complete spectrum of herbal tea's effects remains somewhat elusive, with conclusive evidence still lacking in certain areas. There persists a lingering concern among some circles regarding the possibility of minor and sporadic medical complications arising from excessive herbal tea consumption, although such occurrences are relatively rare. Therefore, it is strongly recommended to seek counsel from experts well-versed in the nuances of herbal teas, their ingredients, and any potential adverse reactions they may elicit before integrating them into one's daily routine. Moreover, for individuals harboring uncertainties about the safety or efficacy of herbal teas, embarking on personal research endeavors is encouraged to better inform their decisions. Meanwhile, it's worth noting the broader health benefits associated with increasing tea consumption, as it represents a beverage choice that typically contains minimal calories, further emphasizing its potential as a healthy addition to one's dietary habits.

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