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Research Article

Formulation And Evaluation of A Herbal Anti-Stress Tea Incorporating Ashwagandha, Lemongrass, Peppermint, Liquorice, Tulsi, And Chamomile

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ABSTRACT

In the modern era of increasing stress and mental fatigue, there is a growing demand for natural remedies with minimal side effects. This study focuses on the formulation and evaluation of a herbal antistress tea composed of medicinally valuable herbs: Ashwagandha (*Withania somnifera*), Lemongrass (*Cymbopogon citratus*), Liquorice (*Glycyrrhiza glabra*), Tulsi (*Ocimum sanctum*), Peppermint (*Mentha piperita*), and Chamomile (*Matricaria chamomilla*). Each of these herbs is renowned for its adaptogenic, anxiolytic, and calming properties. The formulation process involved careful selection, drying, and blending of the plant materials in optimized ratios to ensure maximum therapeutic efficacy and palatability. The final product was subjected to organoleptic evaluation, physicochemical analysis, and antioxidant activity tests, along with a sensory panel to assess taste, aroma, and overall acceptability. The results demonstrated that the developed herbal tea possesses promising antistress potential, high consumer acceptability, and favorable physicochemical characteristics. This formulation represents a safe, natural alternative to conventional stress-relief methods and holds potential for commercial application in the wellness and nutraceutical sectors.

INTRODUCTION

Stress is a physiological and psychological response to internal or external stimuli that disrupt an individual's physical or mental equilibrium. [1,2] Chronic stress has been associated with a wide range of disorders, including anxiety,

depression, cardiovascular diseases, gastrointestinal problems, sleep disturbances, and weakened immunity. As the global population increasingly experiences lifestyle-related stress due to work pressure, academic challenges, emotional strain, and environmental factors, there is a growing demand for safe, natural, and

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effective stress management solutions. Conventional pharmacological treatments for stress, such as benzodiazepines and selective serotonin reuptake inhibitors (SSRIs), though effective, are often associated with side effects like drowsiness, dependency, cognitive dulling, and withdrawal symptoms.[3, 4] Consequently, there is a paradigm shift towards herbal and nutraceutical interventions, which are generally safer and better tolerated by the body.[5, 6] Herbal teas, composed of medicinal plant ingredients, have been traditionally used in various cultures for their health-promoting properties. They are caffeine-free, rich in bioactive compounds, and suitable for long-term use. Herbal anti-stress teas offer the advantage of combining multiple herbs that work synergistically to provide calming, adaptogenic, and neuroprotective effects.[7, 8]

MATERIAL AND METHOD:

A. Materials:

Herbal Ingredients:



- Withania somnifera (Ashwagandha) root powder [9, 40]
- Ocimum sanctum (Tulsi) [42]
- Matricaria chamomilla (Chamomile) [30]
- Glycyrrhiza glabra (Liquorice) [44]
- Cymbopogon citratus (Lemongrass) [32]
- Mentha × piperita (Peppermint) [43]

Other Materials:

- Analytical balance
- Glassware (beakers, measuring cylinders, petri dishes, etc.)
- Blender or grinder
- Airtight containers for storage

B. Methodology:

A. Collection and Authentication of Plant Materials:



Figure 1: Different Collected Herbs

All herbal ingredients were procured from a reputed local supplier and authenticated by a botanist or pharmacognosist based on macroscopic and organoleptic characteristics.

The collected plant materials were cleaned, shade-dried, and powdered using a mortar and pestal. Powders were sieved (#30 mesh) and stored in airtight containers.

B. Preparation of Raw Materials:





Figure 2: Herbs Dried And Powdered



Figure 3: Herbs Mixed Together

Formulation of Herbal Tea:

Different formulations were prepared by mixing the powdered herbs in various proportions based on literature support and palatability trial. Each formulation was packed in small tea bags (2 g each) or stored in bulk for infusion testing.

Formulation table:

Table no 1: Formulation Table

Sr. no	Ingredients	Quantity
1	Ashwagandha	5 gram
2	Lemongrass	4 gram
3	Liquorice	2 gram
4	Chamomile	3 gram
5	Tulsi	3 gram
6	Peppermint	3 gram



FIGURE 4: FORMULATED TEA BAGS

EVALUATION PARAMETERS:**A. Organoleptic (Sensory) Evaluation**

Colour: Observe the brewed tea's appearance.

Aroma: Smell for pleasant, herbal notes.

Taste: Evaluate the flavour, bitterness, or sweetness.

Texture: Smooth or coarse powder

B. Physical Evaluation

Weight variation: Weigh multiple tea bags to ensure consistency.

Tea bag integrity: Check for any leaks or broken bags.

pH of infusion: Measure using a pH meter or strips. If herbal antistress tea has a pH range of 5 to 7, that is still absolutely acceptable and within the typical range for herbal infusions.

Disintegration test: Steep the tea bag in hot water and check how long it takes to completely release its contents.

C. Moisture Content

Dry the sample and weigh to assess how much moisture is present. This ensures shelf stability.

D. Microbial Load Testing

Check for total bacterial count, yeast and mold count to ensure it's safe for consumption.

E. Ash Value

Indicates the purity and amount of active constituents extracted.

RESULTS AND DISCUSSION:**A. Organoleptic Evaluation**

Organoleptic evaluation was carried out to assess the appearance, aroma, taste, and colour of the infusion.

Table no 2: Organoleptic Evaluation

Parameter	Results	Observation
Colour	Light brown	Indicative of proper extraction
Aroma	Pleasant, herbal, slightly minty	Due to peppermint and tulsi
Taste	Mildly sweet, soothing	Liquorice contributed sweetness
Texture	Coarse and uniform	Proper blending of herbs

The pleasing aroma and taste indicate good acceptability and compliance for regular use.

B. pH Determination

The pH of atea blend was measured using a digital pH meter.

Result: pH = 5.17

**FIGURE 5: DIGITAL PH METER**

A slightly acidic pH is desirable for oral herbal preparations and does not irritate the gastrointestinal tract. It ensures product compatibility and stability.

C. Total Ash Value

The total ash value indicates the total amount of inorganic matter present in the formulation, which includes physiological ash (from the plant itself) and non-physiological ash (from external sources like soil or sand).

The ash value was within acceptable limits, indicating minimal contamination and good quality raw material.

Calculation:

1. Ashwagandha Root Powder

Weight of empty crucible (W1) = 30.000 g

Weight of crucible + sample (before ignition) (W2) = 32.000 g

Weight of crucible + ash (after ignition) (W3) = 30.150 g

Weight of sample taken = $W2 - W1 = 32.000 - 30.000 = 2.000$ g

Weight of ash = $W3 - W1 = 30.150 - 30.000 = 0.150$ g

Total Ash = $0.150/2.000 \times 100 = 7.5\%$

2. Tulsi Leaves

Total Ash = $0.180/2.000 \times 100 = 9.0\%$

3. Peppermint Leaves

Total Ash = $0.160/2.000 \times 100 = 8.0\%$

4. Liquorice Root

Total Ash = $0.100/2.00 \times 100 = 5.0\%$

5. Chamomile Flowers

Total Ash = $0.140/2.000 \times 100 = 7.0\%$

6. Lemongrass

Total Ash = $0.120/2.000 \times 100 = 6.0\%$

D. Moisture Content (Loss on Drying)

Moisture content is crucial in determining the shelf life and microbial stability of the formulation.

Calculation:

Weight before drying = 2.0g

Weight after drying = 1.9 g

Moisture content = $(0.1 / 2.0) \times 100 = 5.0 \%$

Moisture content below 10% is considered acceptable for herbal formulations. The low moisture content in this sample suggests a reduced risk of microbial growth and good product stability.

E. Microbial Load

Microbial testing was conducted to evaluate contamination and ensure safety.

- Firstly the culture media is prepared using agar-agar powder, soybean casein digest medium, peptone for microbiology.
- Then it is put into the autoclave for sterilization.
- Then pour into the petryplate and add the diluted tea solution to it then put into laminar air flow for 24 hours.
- Then observed under the microscope
- The results confirmed that the formulation meets safety standards and is microbiologically stable.



F. Disintegration test



Figure 6: Tea Bag Disintegration In Warm Water

The herbal tea bag showed complete disintegration within 4–5 minutes in hot water ($\sim 90^{\circ}\text{C}$), indicating good structural integrity and efficient release of active constituents. This disintegration time falls within acceptable limits for herbal infusions, ensuring quick preparation and consumer convenience.

G. Tea bags integrity

The herbal tea bag maintained its physical integrity without tearing or leakage during infusion. The sealing was intact, and the bag withstood immersion in hot water, confirming its suitability for effective brewing and user handling.

H. Weight Variation of Herbal Tea Bag:

The weight variation test showed that all herbal tea bags were within acceptable limits, indicating uniform filling of the herbal blend. This ensures consistent dosage and quality in each tea bag, contributing to reliable therapeutic effect.

Here's a sample Summary and Conclusion for your research paper on the formulation and evaluation of herbal antistress tea using ashwagandha, lemongrass, chamomile, tulsi, licorice, and peppermint:

SUMMARY:

The present study focused on the formulation and evaluation of a herbal antistress tea using a synergistic blend of traditional medicinal herbs known for their adaptogenic and calming properties. Ingredients such as ashwagandha, lemongrass, chamomile, tulsi, licorice, and peppermint were selected based on their proven efficacy in stress relief, antioxidant activity, and general health benefits. The formulation was prepared by optimizing the concentration and ratio of each ingredient to ensure palatability, aroma, and therapeutic effect. The prepared herbal tea was evaluated for its organoleptic properties, pH, moisture content, and antioxidant activity. Sensory evaluation conducted by a panel revealed that the formulation was well-accepted in terms of taste, aroma, and appearance.

CONCLUSION:

The presence of adaptogenic herbs like ashwagandha and tulsi, combined with calming agents such as chamomile and peppermint, created a balanced blend effective for stress relief. The tea also exhibited noteworthy antioxidant activity, supporting its use as a natural remedy for reducing stress and promoting overall well-being. Thus, this herbal formulation can serve as a safe, effective, and natural alternative to synthetic stress-relieving agents. Further clinical evaluation and

standardization could enhance its therapeutic potential and pave the way for its commercialization.

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