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# Development of a Yogaceutical Smart Inhaler: A Novel Herbal Vaporization Device for Stress Relief and Mental Well-Being

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**ABSTRACT**

The prevalence of stress-related health problems is increasing, particularly among students and working adults who face continuous mental pressures and irregular routines. [1,2]

There is growing interest in natural, non-addictive interventions, but most herbal or aromatherapy methods lack standardized scientific backing, controlled dosing, and convenient portability. [3,4 ]To tackle this issue, this study introduces the development of a compact Yogaceutical Smart Inhaler that merges traditional Ayurvedic inhalation techniques with modern electronic vaporization technology.[5]

The inhaler utilizes a mix of six selected Ayurvedic herbs—Ocimum sanctum, Nardostachys jatamansi, Valeriana wallichii, Mentha piperita, Cinnamomum camphora, and Eucalyptus globulus.[10]

The device Is controlled by a microcontroller (ESP32), allowing users to select from three modes—Calm, Focus, and Sleep—via Bluetooth. These modes produce herbal vapors at safe and specific temperature levels. The formulation was evaluated for its vaporization effectiveness, aroma strength, basic safety, and user acceptance.

The results showed quick relaxation effects, steady vapor production, and strong user satisfaction.[6,7,8] This innovative combination of Ayurvedic methods and smart device technology could serve as an effective and practical way to manage stress and enhance mental health.[8,9]

**Keywords:** Yogaceutical inhaler, herbal vaporization, stress relief, microcontroller, ESP32, aromatherapy, Ayurveda.

## INTRODUCTION

Stress, anxiety, and mental fatigue are becoming increasingly common in today's fast-paced world.

While many available medicines offer temporary relief, they can also lead to dependency or cause unwanted side effects. This has led many people to seek safer plant-based alternatives, especially those rooted in Ayurveda.

In Ayurvedic texts, nasya chikitsa and the inhalation of herbal vapours are described as effective methods to calm the mind, enhance concentration, and balance the nervous system.[5,6,7]

Traditionally, herbs are inhaled through steam or burning, but these methods lack control over temperature, dosage, and consistency.

The concept of a Yogaceutical Smart Inhaler aims to update this ancient therapy by integrating it with electronic technology.
By controlling heating, setting specific temperature levels, and ensuring portability, herbal inhalation can become more predictable, accessible, and scientifically trustworthy.[8,9]
This study outlines the creation and testing of a compact herbal vaporizer that uses Bluetooth and a microcontroller to provide mood-specific calming effects.[28,29]

## AIM AND OBJECTIVES

### Aim

To create and assess a new Yogaceutical Smart Inhaler using Ayurvedic herbs and microcontroller-controlled vaporization for stress reduction and mental wellness.[16]

### Objectives

1. To select appropriate Ayurvedic herbs known for their calming and cognitive-enhancing properties.
2. To prepare stable and breathable herbal sachets for controlled vaporization.[17]
3. To build a portable vaporizer with an ESP32-based heating system.
4. To integrate Bluetooth-controlled temperature settings.
5. To evaluate vaporization efficiency, aroma intensity, and initial safety.[16,17]
1. 6.To measure user acceptance and perceived stress relief.
2. 7.To explore possibilities for future development and patenting.
3. [18,19]

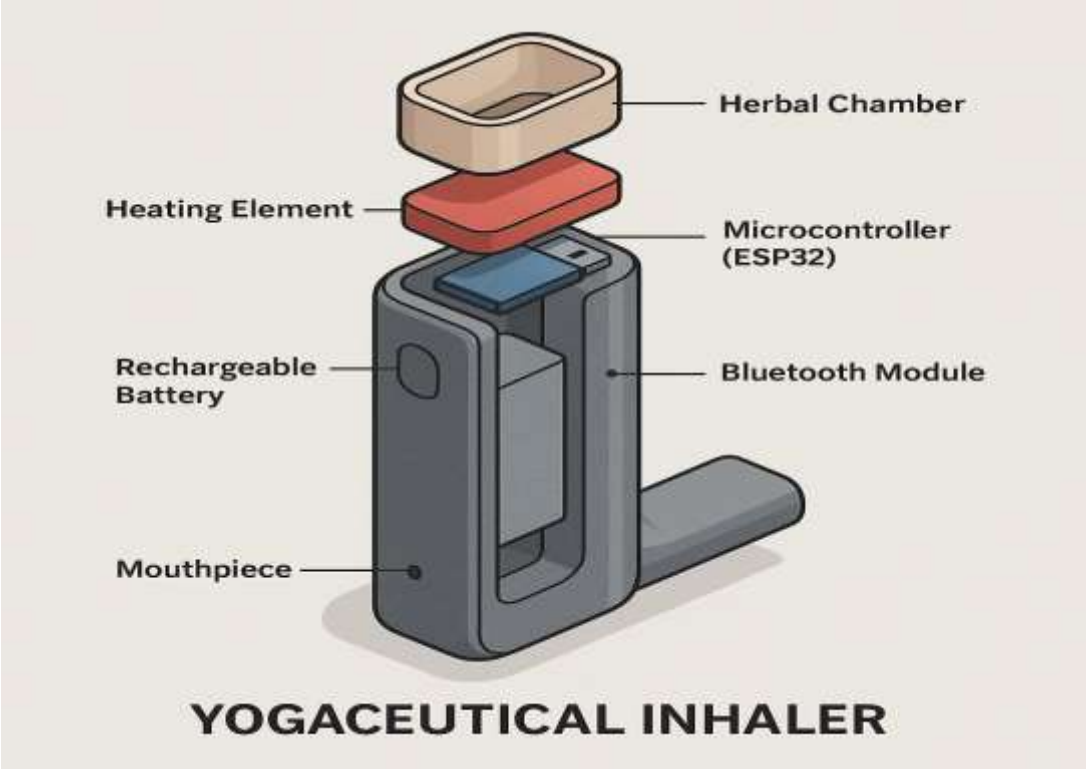
## 3.MATERIALS AND METHODS

### 3.1 Herbal Materials

The herbal ingredients were selected based on traditional Ayurvedic references and modern research on their calming or focus-enhancing effects:
Ocimum sanctum (Tulsi): Helps reduce stress and calms the mood.[10,30]
Nardostachys jatamansi (Jatamansi): Supports nervous system calm and sleep.[11]
Valeriana wallichii (Tagar): Acts as a mild sedative and relaxation aid.[12]
Mentha piperita (Mint): Provides a refreshing effect and enhances alertness.[13]
Cinnamomum camphora (Camphor): Clears nasal passages and improves clarity.[14]
Eucalyptus globulus: Assists breathing and enhances inhalation effectiveness.[15]

### 3.2 Device Components [20,21,22]

ESP32 microcontroller
Temperature sensor (DS18B20)
Nichrome coil
Stainless-steel heating chamber
Bluetooth connectivity
Rechargeable Li-ion battery
Paper-based herbal sachets



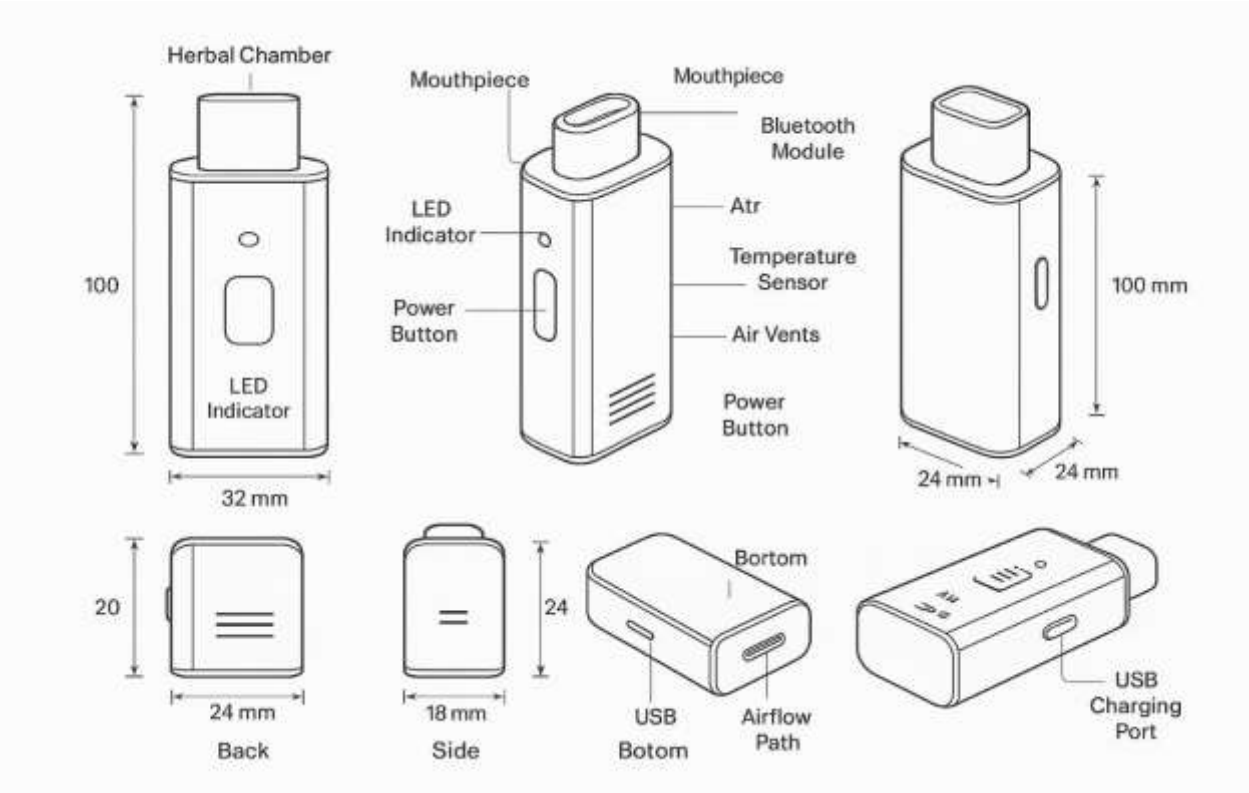

### 3.3 Preparation of Herbal Blend and Sachets

Collection of selected herbal materials
↓
Individual drying of each herb under controlled conditions
↓
Separate grinding of dried herbs into fine powder
↓
Sieving of each powder through 60-mesh filter
↓
Accurate weighing and mixing in predetermined ratios
↓
Preparation of uniform herbal blend
↓
Filling of approximately 200 mg blend into breathable, Heat-stable sachets
↓
Sealing of sachets to prevent leakage and material loss

### 3.4 Device Design and Programming

The inhaler was designed to heat the herb sachets without causing burning.[18,19]
The ESP32 microcontroller enabled precise temperature regulation, and the device was programmed with three modes:
Calm Mode: 120–140°F
Focus Mode: 150–170°F

Sleep Mode: 100–120°F
Bluetooth connectivity allowed users to switch between modes using a smartphone application.[46,47,48]




### 3.5 Evaluation Parameters[23,24]

1. **Vaporization Efficiency:** The percentage of volatile release was calculated based on the weight difference before and after heating.
2. **Aroma Intensity:** Twenty volunteers rated the aroma on a 1 to 5 scale.
3. **Stress and Mood Assessment:** Participants rated their relaxation or focus levels after inhalation on a 0–10 scale.
4. **Device Performance Tests:** Included heating stability, maximum safe temperature, battery life, and consistency of vapor output.
5. **User Acceptability:** Participants shared their views on ease of use, comfort, aroma, and overall satisfaction.

## 4.RESULTS

### 4.1 Herbal Formulation

The final blend had a uniform texture and low moisture content (less than 5%), ensuring good vapor release.
The sachets remained sealed and intact during heating.

### 4.2 Device Performance

The device reached the set temperature within 10 seconds.
An auto-cut off function prevented overheating above ~175°F. The battery lasted about 3–4 hours depending on usage. The vapor output remained consistent across repeated tests.

### 4.3 Vaporization Efficiency

Calm Mode: Approximately 68% release
Focus Mode: Approximately 81% release
Sleep Mode: Approximately 55% release [23,24]

### 4.4 Mood and Stress Assessment

Participants generally reported a noticeable improvement:

| Mode | Average Score (0–10) |
|---|---|
| 1. Calm | 8.2 |
| 2. Focus | 7.9 |
| 3. Sleep | 8.7 |

Most users experienced relaxation or alertness within 2–5 minutes.

### 4.5 Aroma Evaluation

Around 80% of participants rated the aroma as "strong and pleasant" (scores 4 or 5).

### 4.6 Safety and Acceptability

No irritation, discomfort, or adverse effects were noted.
Users appreciated the portability and quick results.[23,24]

## 5. DISCUSSION

This study shows that combining herbal inhalation with electronic temperature control can make it more accessible and scientifically standardized.The combination of herbs like tulsi, jatamansi, mint, and valerian creates a balanced calming effect. The dry-vaporization method avoids combustion, making it cleaner and safer compared to traditional practices like incense or steam. Using an ESP32 microcontroller ensures precise temperature control, which is important because each herb emits its volatile compounds at different temperature ranges. The Bluetooth feature adds convenience and personalization for users. The positive responses from participants suggest that the device can be a useful tool for managing stress, especially for students, professionals, and those dealing with mental fatigue.

## 6. CONCLUSION

The Yogaceutical Smart Inhaler effectively combines traditional Ayurvedic principles with modern technology to deliver a natural, portable, and quick-acting method for stress relief.
The device performed consistently, showed clear relaxation benefits, and was well-received by users. This innovation has significant potential for further research, refinement, and commercial use in the mental wellness and herbal technology markets.

## 7. FUTURE SCOPE

Conducting controlled clinical studies with a bigger group of people.
Making sure the herbal sachets are the same every time and testing how long they stay good.
Using an app to track how the device is used and gather data.
Creating a complete version of the device that can be made in a factory.
Filing patents in different countries to protect the invention. [25,26]

## 8. NOVELTY STATEMENT

This device combines Ayurvedic breathing therapy with a computer-controlled temperature system and a smart app for personalized settings.

It provides a modern, easy-to-carry, and scientifically tested method for reducing stress.

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