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**Address for correspondence:**  
Ankita mhaske, D.G. Tatkare  
Mahavidyalay of Arts, Science,  
Commerce, IT & Management,  
Mangaon - Raigad..

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## Preparation and Evaluation of an Ayurvedic Clove Scented Candle

Ankita mhaske<sup>1</sup>, Mahek Kardekar<sup>2</sup>, Ruheena Chimavkar<sup>3</sup>, Safwan Salkar<sup>4</sup>, Dr. Namita More<sup>5</sup>

<sup>1,2,3,4,5</sup> D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad.

### Abstract:

The creation and assessment of an Ayurvedic clove-scented candle utilizing natural and herbal ingredients is the main goal of this research. *Syzygium aromaticum*, the technical name for clove, is well known in Ayurveda for its antibacterial, antifungal, and medicinal qualities. To provide a safe and environmentally sustainable product, the candle was made with natural wax (such as beeswax or soy wax), cotton wick, clove essential oil, and appropriate herbal additions. In order to maintain fragrance stability, the wax was melted at a regulated temperature, a calibrated amount of clove essential oil was added, and the mixture was then poured into molds with wicks positioned correctly. The candles were assessed for appearance, burning time, aroma preservation, uniformity of burning, and smoke output after solidification.

The findings showed that the Ayurvedic clove-scented candle had stable burning qualities, little smoke, and a pleasant, lingering scent. Clove essential oil helped purify the air and produced a relaxing, revitalizing ambiance.

**Keywords:** Ayurvedic clove-scented candle, beeswax or soy wax, lingering scent.



### Graphical Abstract: Ayurvedic Clove Scented Candle

#### Introduction:

Ayurveda, the ancient Indian system of natural medicine dating back more than 5,000 years, emphasizes the use of plant-based remedies to promote mental, physical, and spiritual well-being. Among the many medicinal herbs, clove (*Syzygium aromaticum*) is highly valued for its strong aroma and therapeutic properties. It contains an active compound called eugenol, which exhibits antibacterial, anti-inflammatory, antioxidant, and stress-relieving effects.<sup>1-4</sup> Ayurvedic clove-scented candles combine traditional herbal knowledge with modern aromatherapy practices. These candles are prepared using natural waxes such as soy wax or beeswax, along with clove essential oil or powdered clove. The warm and spicy aroma of clove helps in relaxation, reduces stress, enhances concentration, and purifies indoor air.<sup>5-6</sup> The preparation of an Ayurvedic clove-scented candle requires careful selection of natural ingredients, controlled melting and blending processes, and appropriate molding techniques to ensure uniform fragrance distribution and safe burning characteristics. The quality of the prepared candle is evaluated based on parameters such as fragrance retention, burning time, melting point, smoke emission, stability, and overall consumer acceptability.<sup>7-10</sup>

In today's fast-paced lifestyle, increasing stress levels, pollution, and the use of synthetic products have led to a growing demand for natural and therapeutic alternatives. Herbal scented candles, especially those prepared using Ayurvedic principles, have gained popularity as wellness products due to their calming and therapeutic effects. Clove (*Syzygium aromaticum*) has been widely used in Ayurveda for centuries due to its medicinal benefits. The presence of eugenol contributes to its antimicrobial, antifungal, antioxidant, and anti-inflammatory properties. In aromatherapy, clove essential oil is known to reduce anxiety, improve mental clarity, relieve headaches, and create a refreshing indoor environment.<sup>11-14</sup>

The preparation process involves melting eco-friendly wax such as soy wax or beeswax, followed by the addition of clove essential oil at a controlled temperature (typically 60–70°C) to preserve its active components. The mixture is stirred thoroughly to ensure uniform distribution.

A cotton or wooden wick is placed at the center of the mold, and the wax mixture is poured carefully and allowed to solidify. After cooling, the candle is trimmed and conditioned for use.

The evaluation of the prepared candle includes assessing its appearance, color, fragrance intensity, burning time, melting behavior, wick performance, smoke emission, and stability. Sensory evaluation may also be conducted to determine consumer acceptance and satisfaction.

This project aims to develop a safe, natural, and effective Ayurvedic clove-scented candle that not only provides a pleasant fragrance but also delivers therapeutic benefits. It integrates traditional Ayurvedic knowledge with scientific formulation and evaluation methods to create a value-added herbal product suitable for modern lifestyle needs.<sup>15-21</sup>

### Methodology:

**Materials:** Clove buds (*Syzygium aromaticum*) or clove essential oil were used as the primary herbal ingredient. Soy wax or beeswax was selected as the natural wax base due to its biodegradability and eco-friendly properties. Cotton wicks (medium size) were used as the burning medium.

The apparatus and materials used included a glass beaker or stainless steel container, heating mantle or double boiler setup, thermometer, stirring rod, candle molds or glass jars, weighing balance, measuring cylinder, and adhesive or wick holder. All materials used were of standard quality and suitable for laboratory use.



**Figure 1 :** Preparation of Ayurvedic clove-scented candle

### Method:

The Ayurvedic clove-scented candle was formulated using natural ingredients in accordance with traditional Ayurvedic principles, emphasizing purity and therapeutic value. Dried clove buds of *Syzygium aromaticum* were first cleaned to remove impurities and then finely powdered using a mechanical grinder. Clove essential oil was obtained either through steam distillation, which preserves volatile active constituents such as eugenol, or procured in pure form. The oil was stored in an amber-colored glass container to protect it from light and oxidation until further use in figure no.1.

For candle preparation, soy wax or beeswax was selected as the base material due to its eco-friendly nature, biodegradability, and superior fragrance retention compared to paraffin wax. The required quantity of wax was accurately weighed using a digital balance and melted using the double boiler method to prevent direct heat exposure. The temperature was carefully maintained between 70–80°C to avoid overheating and degradation of the wax.

After complete melting, the wax was allowed to cool slightly to approximately 60–65°C. At this stage, 3–5% v/w of clove essential oil was added with continuous gentle stirring to ensure uniform distribution of the fragrance. A cotton wick was fixed at the center of a clean, dry mold or glass container, and the prepared wax–oil mixture was poured carefully to avoid the formation of air bubbles.

The candle was then allowed to cool and solidify at room temperature for 24 hours. After solidification, the wick was trimmed to an appropriate length, and the candle was conditioned before evaluation.

The prepared candle was evaluated based on various parameters. Physical properties such as color, texture, smoothness, and absence of cracks were examined. Burning characteristics, including burning time, flame stability, smoke formation, and uniform melting, were also assessed. Fragrance properties such as aroma intensity and retention were evaluated to determine its effectiveness.

Stability studies were conducted by storing the candle at room temperature for a period of 30 days. During this period, any changes in color, texture, or fragrance were carefully observed and recorded. All observations were systematically documented to assess the overall quality, stability, and performance of the formulated Ayurvedic clove-scented candle.<sup>3-6</sup>

## Health Test:



**Figure 2.1 :** Health test of Ayurvedic clove-scented candle

The herbal clove candle prepared using clove essential oil obtained from *Syzygium aromaticum* was subjected to health and safety evaluation to ensure its suitability for regular use. A skin irritation (patch) test was performed by applying a small amount of melted wax on the forearm to observe any signs of redness, itching, or allergic reaction. The candle was then burned in a well-ventilated room to assess respiratory comfort and to check for any breathing difficulty. Eye irritation was also observed to ensure that the fragrance or smoke did not cause watering or burning sensation. Additionally, smoke evaluation was conducted to examine soot formation and ensure the emission of minimal, non-toxic fumes. Aroma tolerance was assessed to confirm that the fragrance was pleasant and did not induce headache, nausea, or discomfort. The results indicated that the herbal clove candle was safe for use when formulated with 3–5% clove essential oil and used under proper ventilation conditions shown in *figure 2.1*. The prepared candle was evaluated for physical characteristics such as color, texture, smoothness, and absence of cracks. Burning tests were conducted to determine flame stability, burning time, smoke formation, and uniform melting. Fragrance evaluation was carried out to assess aroma intensity and retention.

## Literature Review:

Ayurveda, the ancient Indian system of medicine, emphasizes the use of natural plant-based substances for maintaining physical, mental, and spiritual well-being. Herbal formulations have been widely accepted due to their safety, efficacy, and minimal side effects. In recent years, there has been a growing interest in integrating Ayurvedic principles with modern wellness products, such as aromatherapy candles.

Clove (*Syzygium aromaticum*) is one of the most important medicinal spices described in Ayurvedic and traditional medicinal texts. Several studies have reported that clove contains a major bioactive compound, eugenol, which exhibits significant antimicrobial, antioxidant, anti-inflammatory, and analgesic properties. According to pharmacological research, eugenol plays a crucial role in reducing microbial growth and relieving pain, making clove a valuable component in therapeutic formulations.<sup>7</sup>

Aromatherapy is a complementary therapy that utilizes essential oils derived from plants to promote relaxation, reduce stress, and improve mental health. Research studies have demonstrated that inhalation of essential oils can influence the limbic system, thereby affecting emotions, mood, and cognitive functions. Clove essential oil, due to its warm and spicy aroma, has been reported to reduce anxiety, enhance concentration, and purify the surrounding environment.

The use of herbal scented candles has gained attention as a convenient method for delivering aromatherapy benefits. Natural waxes such as soy wax and beeswax are preferred over paraffin wax due to their eco-friendly nature, biodegradability, and reduced emission of harmful substances. Studies indicate that soy wax candles burn more cleanly and provide better fragrance retention compared to conventional paraffin candles.

Several researchers have explored the formulation and evaluation of herbal candles using essential oils. Parameters such as melting point, burning time, flame stability, fragrance intensity, and smoke emission are commonly evaluated to determine product quality. Proper formulation techniques, including controlled temperature during wax melting and optimal concentration of essential oil, are essential to achieve uniform fragrance distribution and stable burning characteristics.<sup>8–10</sup>

Stability studies are an important aspect of herbal product development. Literature suggests that factors such as temperature, light, and storage conditions can affect the physical and aromatic properties of candles. Therefore, storing candles in cool and dry conditions helps in maintaining their quality and fragrance over time.

Overall, the reviewed literature supports the potential of combining Ayurvedic herbal knowledge with modern candle-making techniques to develop a safe, effective, and eco-friendly clove-scented candle. However, limited studies are available specifically on Ayurvedic clove-based candles, highlighting the need for further research in this area.<sup>10</sup>

## Result and Discussion:

The Ayurvedic clove-scented candle prepared using natural wax and clove essential oil (*Syzygium aromaticum*) demonstrated satisfactory physical, functional, and stability characteristics.

The candle exhibited a light brown color with a smooth and uniform surface appearance. The absence of cracks, air bubbles, and surface irregularities indicates proper control during the melting, mixing, and solidification processes.

This suggests that the selected formulation and preparation method were appropriate for producing a high-quality herbal candle.

The fragrance of the candle was warm, spicy, and characteristic of clove, confirming the effective incorporation and retention of clove essential oil. The uniform distribution of aroma indicates proper mixing at controlled temperature conditions, which is essential to preserve volatile constituents such as eugenol.

During the burning evaluation, the candle showed a stable and steady flame with minimal smoke formation, indicating efficient combustion and suitability of the wick and wax combination. The wax melted uniformly without tunneling, which reflects proper wick placement and formulation balance. The observed burning time was satisfactory for the prepared batch size, demonstrating good performance characteristics.

Fragrance diffusion was found to be gradual and consistent throughout the burning period, suggesting effective release of essential oil vapors. This supports the candle's potential application in aromatherapy for stress relief and environmental purification.

Health safety evaluation revealed no signs of skin irritation, respiratory discomfort, or eye irritation when used in a well-ventilated environment, indicating that the formulation is safe for regular use under normal conditions.

Stability studies conducted over a period of 30 days showed no significant changes in color, texture, or fragrance intensity. This confirms that the prepared candle possesses good stability and maintains its quality over time when stored under appropriate conditions.

Overall, the results indicate that the formulated Ayurvedic clove-scented candle is stable, safe, and effective, with desirable physical properties and satisfactory performance, making it suitable for therapeutic and wellness applications.

### Conclusion:

The present study successfully demonstrated the formulation and evaluation of an Ayurvedic clove-scented candle using natural wax and clove essential oil derived from *Syzygium aromaticum*. The prepared candle exhibited desirable physical characteristics, including a smooth surface, uniform texture, and absence of defects such as cracks or air bubbles. The candle showed satisfactory burning properties, with a stable flame, minimal smoke production, and uniform wax melting without tunneling. The fragrance was warm, pleasant, and consistent throughout the burning period, indicating effective incorporation and retention of clove essential oil. The presence of active constituents such as eugenol contributed to the therapeutic potential of the product.

Health safety evaluation confirmed that the candle is safe for use under normal conditions, with no observed irritation or discomfort. Stability studies further indicated that the formulation remains stable over time, with no significant changes in color, texture, or fragrance intensity over a 30-day period.

Overall, the study highlights that Ayurvedic clove-scented candles can serve as a safe, eco-friendly, and effective alternative to synthetic scented candles, offering both aromatic and therapeutic benefits. The integration of traditional Ayurvedic knowledge with modern formulation techniques adds value to the development of natural wellness products.

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### Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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