



FORMULATION AND EVALUATION OF SOLID PERFUME

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1. ABSTRACT: : Solid perfumes, formulated using a combination of natural waxes, oils, and essential oils, have gained popularity as a sustainable alternative to traditional liquid perfumes. This study explores the formulation and evaluation of solid perfumes, focusing on their physical characteristics, fragrance intensity, and longevity. The solid perfume was prepared by melting natural waxes and oils, incorporating essential oils, and allowing the mixture to solidify. Various tests, including organoleptic, specific gravity, fragrance resistance, spreadability, sensitivity, physical stability, pH, and hedonic tests, were conducted to assess the quality and performance of the solid perfume. The results indicated that the solid perfume had a smooth texture, attractive appearance, and a suitable melting point for various climates. The fragrance intensity and longevity were comparable to other market-available solid perfumes. Additionally, the essential oils used exhibited potential antimicrobial and antioxidant properties, offering added benefits to users. This study demonstrates the potential of solid perfumes as a natural and sustainable alternative to traditional perfumes, with further research recommended to explore different essential oils and their impacts on sensory and functional properties.

KEYWORDS: perfume, solid perfume, Fragrance, Essential oil

2. INTRODUCTION:

Perfumes that have essential oils are becoming more popular. The term “perfume” comes from the Latin phrase per fumum, which translates to "through smoke. You can find them foods, drinks, and sweets. They are also present in personal care items like soaps, toothpastes, mouthwashes, deodorants, bath lotions, and shampoos. These fragrances not only enhance the appeal of such products but also help to cover up less pleasant tastes or odors. Products with added fragrance tend to attract more attention. In addition, scents are a significant part of cosmetics and even medicines. They play an important role in making everyday products more enjoyable for consumers.^[1]

Solid perfumes, sometimes referred to as cream perfumes or solid colognes, present a distinctive substitute for conventional liquid perfumes because they have a solid composition as opposed to the usual combination of alcohol, water, or scent and carrier oil.^[2] High-end perfume brands are now offering their signature scents in a

solid form.^[3] These are compact, leak-proof, & easy to carry because of their waxy. This is great news! Unlike liquid perfumes, solid fragrances can be reapplied quietly in public without the chance of making a mess.^[4] There's also a rise in demand for natural & sustainable options. Solid was worth around USD 1.65 billion in 2023. It's projected to grow to USD 4.7 billion by 2032! This growth is largely due to a growing consumer interest in personal care & fragrance products.^[5]

2.1 HISTORY:

The Latin expression "per fumus," which meaning "through smoke," is where the word "perfume" originates. Perfume has a long history that traces back to ancient civilizations such as the Chinese, Greeks, Romans, Egyptians, and Hindus.. Many people think of fragrance as just perfume, but scientists say true perfumes are actually extracts or essences made with oils in alcohol. Egyptians were ahead of their time in using glass bottles for storing perfume. This practice dates back over 5,000 years. They even connected its creation to their sun god, Ra. Initially, these fragrances were made from plants or animal products mixed with oils. From Egypt, the art of perfume spread to other regions like Rome, Greece, China, & Iran. Archaeologists have found perfume containers that show how long people have been using scents in their lives. These discoveries help us understand the rich history of fragrance and its importance to different cultures.^[6]

With the development of novel synthetic chemicals and enhanced purification of plant odorants in the late 1800s, organic chemistry broadened the spectrum of fragrances. From 30% in 1970 to nearly all synthetic components now, perfumes contain more synthetic materials than ever before. Incense was the main usage of aromatic compounds in the past. A perfume needs to include at least 22% essential oils in order to be classified as pure. To produce new scents, perfumers mix dozens of oils together, hoping for a combination that is better than the sum of its parts. Businesses like IFF, which generates over 31,000 compounds (about 60% flavors and 40% scents) and employs 5,300 people, are important players in the market.^[7]

2.2 NEED OF PERFUME:

- Taking care of ourselves and maintaining hygiene.
- A lovely aroma increases confidence and good feelings.
- Certain smells can aid in the memory of particular occasions and pursuits.
- Aromas improve the way someone feels.
- Essential oils found in perfumes are applied to medical conditions like naturopathy and aromatherapy. - Scents have the power to draw or repel people.
- Perfumes often enhance well-being, reduce stress, and encourage a pleasant way of life.

2.3 Benefits Of Solid Perfume:

I. Without Alcohol

Alcohol is frequently added to liquid perfumes to help them evaporate more quickly after application. Although this lets the scent sink in, perfumes with alcohol content can be abrasive and drying. Choosing solid perfume is a more skin-friendly option because it doesn't include alcohol and is less likely to include irritating ingredients, which makes it kinder to delicate skin.

II. No Leaks

Solid scents have the benefit of not leaking. You won't have to worry about spills or messes whether you're

taking them on a trip or keeping them in a cabinet at home.

III. Durable

Solid fragrances are renowned for their durability. Their high skin adhesion ensures that the smell lingers for a long time. They're also a handy option for all-day wear because they're simple to reapply as needed.

IV. Nourishing and Moisturing

Solid fragrances are made of oils and moisturizers that assist keep the skin hydrated while also giving off a strong scent. They are simple to apply to the wrists because to their balm-like texture, which guarantees freshness and hydration. This makes them especially advantageous for people with dry skin, as they combine the benefits of skincare with fragrance in a single product.

V. Small sizes

Because solid perfumes come in little, sturdy, and carry-friendly containers, they are quite practical. They readily fit into a purse or pocket, allowing portability without the worry of breakage that comes with glass bottles of liquid perfumes. Choosing a solid perfume guarantees hassle-free usage and transportation wherever you go.

VI. Skin response risk is lower

Because solid fragrances are made of natural oils, they are less prone to trigger skin sensitivities. With less synthetic components or alcohol, they are a gentler alternative for those with sensitive skin, minimizing the chance of irritation or allergic reactions. ^[8,9]

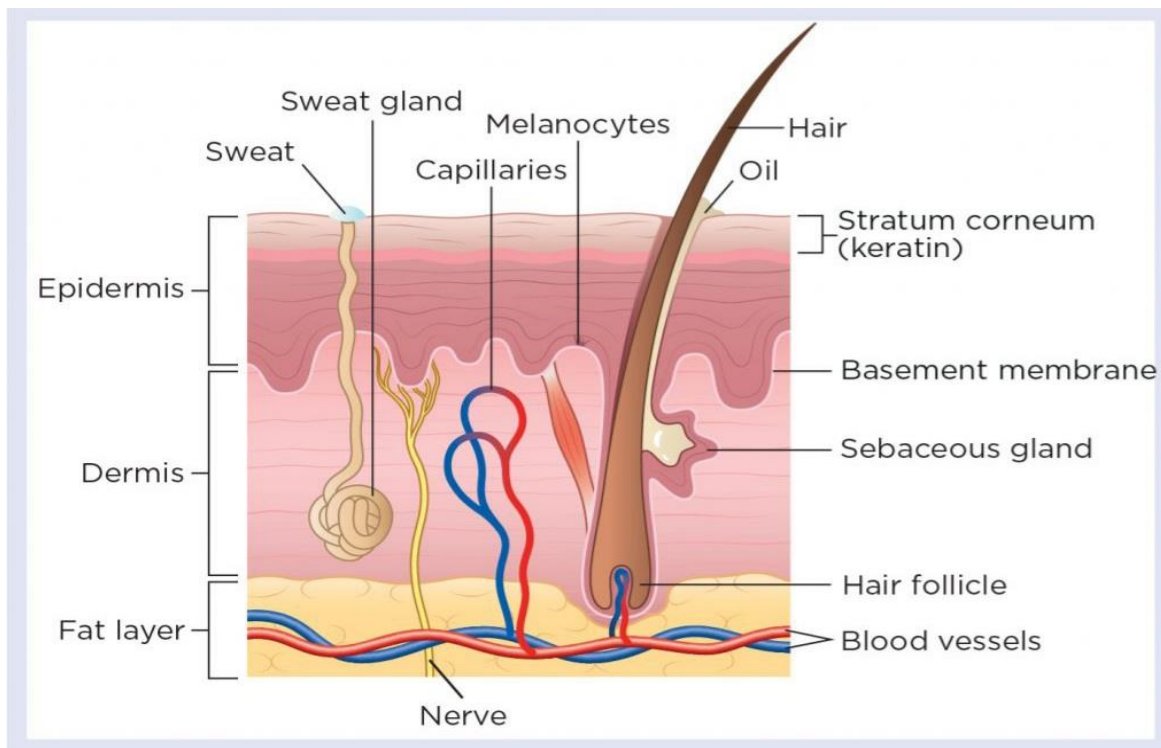
2.4 ADVANTAGES:

Solid perfume	Liquid perfume
Solid perfume is good for the skin.	Liquid perfume contains alcohol, which irritates the skin and causes it to dry.
Solid perfume does not leak, therefore it is easy to transport from one location to another.	When transporting liquid perfume, there is a risk of spillage.
Solid perfume uses waxes as its base, making it long-lasting.	Liquid perfume has alcohol as a base, which evaporates after some time of spraying ^[10]

Skin:

The skin is the body's exterior surface and the largest organ in terms of weight. It covers about 2 square meters. The skin is made up of two parts: epidermis and dermis. Water-soluble compounds are poorly absorbed by the skin, however certain lipid-soluble molecules enter the skin layers. Such compounds include some medications, fat-soluble vitamins, and gasses such as carbon dioxide and oxygen. Topical steroids, which are lipid-soluble, can easily penetrate the dermal papillary layer. Absorption through the skin has also resulted in the transdermal mode of medication delivery.[]

Disadvantage: Drug and/or excipients may cause skin irritation and contact dermatitis.[]



3. Literature Review:

(i) Hatwar(2024) : The Formulation And Evaluation Of Solid Perfume Is done in this article. The study focuses on the formulation and evaluation of solid perfume using natural ingredients like beeswax, jojoba oil, almond oil, lavender oil and lemongrass oil.

(ii) Abhishek S. Gawande (2023): The Formulation, Evaluation And Comparative Study of Herbal Solid Perfume Stick has been done in this article. The paper explores making stick perfumes from Jeumpa flowers, specifically Magnolia champaca. It likely discusses formulation methods, the scent profile, and potential applications. This research contributes to utilizing natural ingredients in perfumery and may have implications for eco-friendly fragrance production.

(iii) Shinde(2024) : Formulation Of Essential Oil Based On Solid Perfume is discussed in this article. The paper explores making solid perfume from essential oils like almond oil, coconut oil, jasmine oil. It discusses about extraction of essential oil, formulation method and evaluation parameters.

(iv) Rashmi Saxena Pal (2021): Herbal Solid Perfume: A Turkish Concept-Based Synthesis and Quality Valuation. This Article contains the effect and uses of solid perfume, the major tests for evaluation of solid perfume and tests related to ingredients used in solid perfume which are necessary.

4. OBJECTIVES

- Prevents undesirable odors on skin
- Improves self-confidence.
- Provides moisture and nourishment.
- Prevent dry, oily, and sensitive skin.
- To create a sense of optimism.

– To give anti-inflammatory and anti-depressive activity

5. MATERIALS AND METHODS

The materials for this work are entirely natural. The formulation of solid perfume requires three major ingredients:

- Beeswax
- Carrier oils
- Essential oils

i. Beeswax:

Beeswax, a naturally occurring fluid produced by the wax-producing glands in the abdomens of worker bees of the *Apis mellifera* and *Apis cerana* genera, is used in this composition. Beeswax transforms the carrier oil from a liquid to a solid state, which helps to prolong the wear of perfumes containing essential oils. Beeswax is used in lip gloss, skin care, soap production, and baby items. ^[11]

ii. Jojoba oil:

Jojoba oil is the carrier oil in this composition. Essential oils are applied to your skin and diluted with carrier oils. Jojoba oil penetrates quickly into the skin and does not block pores. This makes it an appropriate carrier oil for perfumes, bath oils, and massage oils. ^[12]

iii. Almond oil :

The seeds of the *Prunus dulcis* plant, a member of the Rosaceae family, produce a golden-yellow oil that contains 40-50% fixed oil, 20% proteins, mucilage, emulsion, and 2.5-4% amygdalin. These oils act as a carrier for this composition and are also referred to as nourishing or moisturizing oils. Almond oil contains numerous skin-beneficial substances, including vitamins, minerals, fatty acids, and antioxidants. Its nice underlying undertone of light nutty aroma enhances the overall smell experience. ^[12]

iv. Lemongrass oil :

Lemongrass is *Cymbopogon citratus*, a member of the Gramineae family with a lemon-like aroma due to the presence of citral, a cyclic monoterpene. Lemongrass essential oil has a depressing effect on the central nervous system ^[13,14]

V. Lavender oil:

Lavender (*Lavandula officinalis* Chaix.), a lovely herb for the garden, is a member of the Lamiaceae family (Figure 4). Its constituents include camphor, terpinen-4-ol, linalool, linalyl acetate, betaocimene, and 1,8-cineole. When it comes to its application in aromatherapy, it has a long history of success in treating a variety of conditions, including burns, abrasions, stress, headaches, skin issues, sore muscles, and immune system stimulation. ^[15]

5.1 Method of Preparation:

1. using a weighing balance, weigh five grams of beeswax.
2. In a measuring cylinder, combine 3 ml of jojoba oil, 2 ml of almond oil, 5 ml of lavender oil, and 5 ml of lemongrass oil.
3. A 50 ml beaker containing beeswax, jojoba oil, and almond oil was heated over a water bath until the components melted.

4. In a separate 50-ml beaker, mix 5 ml lavender oil and 5 ml lemongrass oil together.
5. Fill the storage container with beeswax, jojoba oil, and almond oil mixture.
6. Once the liquid has cooled for a minute, gently whisk in the essential oil combination.
7. After closing the lid, the perfume was allowed to cool before use. ^[16,17]

5.2 Instruments:

Equipment needed: beaker, water bath, and tripod stand.

– Burner

– Stirrer

- Weighing balance.

– A measuring cylinder

– Used to store finished product.^[18]

5.3 Solid perfume Ingredients:

Sr. No	Ingredients	Quantity	Role
1	Beeswax	5 gram	Base
2.	Jojoba oil	3 ml	Mixing
3.	Almond oil	2ml	mixing
4.	Lavender oil	5ml	Fragrance
5.	Lemongrass oil	5ml	Fragrance

5.4 Method to use: To use, brush a clean finger across the top of the solid perfume and apply it to wrists and pulse points. Repeated as needed. ^[16]



Fig. Solid perfume

6. Evaluation Parameters:

6.1 Organoleptic evaluation

The following elements should be considered while assessing the organoleptic properties of solid perfume.

1. Color.
2. Odor
3. Appearance
4. Ruggedness
5. Texture grade

6.2 Chemical Evaluation:

(i) Saponification value: The number of milligrams of KOH required to hydrolyze one gram of wax. It is expressed as mg KOH/g. $SAPONIFICATION\ VALUE = 56.1 \times (B - S) \times N \times W$ (1). Where: B = volume in ml of the standard hydrochloric acid necessary for the blank, S = volume in ml of the standard hydrochloric acid required for the wax, N = normality of standard hydrochloric acid, and M = mass in grams of the wax collected for the test.

(ii) Acid value:

It is defined as the amount of milligrams of KOH necessary to neutralize one gram of wax. It is expressed as mg KOH/g. $ACID\ VALUE: 56.1 \times V \times N \times W$ (2) Where V is the volume in ml of the standard potassium hydroxide

solution used. N = normality of standard potassium hydroxide solution, M = mass in grams of the wax used in the test.

(iii) Ester value:

It is defined as the difference between the acid and saponification values.

(iv) Ester to acid ratio :

It is defined as the result of dividing the ester value by the acid value.

6.3 Physical assessment:

(i) Testing for homogeneity:

The formulations were assessed for homogeneity using touch and visual appearance.

(ii) Determine spreadability:

Spreadability can be defined as the amount to which a topical application spreads when applied to affected areas of the skin. A sample of known weight was applied to a known region, and the spreadability factor was calculated.

(iii) Determining solubility:

The formulation's solubility was tested in several mediums.

(iv) Determine absorption:

The amount of formulation absorbed in a specific area was monitored.

(v) Identifying the sort of smear:

It was determined by rubbing the solid perfume onto the skin surface of a human palm. After applying solid perfume, the type of smear or film that formed on the skin was checked.

(vi) Determined emolliency by assessing slipperiness, emolliency, and residue after applying fixed amounts of cream.

(vii) Assessment of physical appearance:

The physical look of solid perfume was examined visually against a black backdrop.

(viii) After Feeling:

The skin texture of the treated region was evaluated following the application of the product.

(ix)Ease of Removal

The ease of removal of the cream was assessed by rinsing the applied area with tap water.

(x) Irritation test: Mark a spot on the dorsal region of the hand. The manufactured solid perfume was applied, and the time was recorded. It was regularly examined for any irritancy or allergic reactions at regular intervals for 24 hours.

(xi) Melting Point:

Take the melting point of solid perfume. A solid perfume sample of 2 grams was placed in a glass tube. This tube was dipped into a plate of water heated on a water bath. The melting point of a material was defined as the temperature at which it forms a liquid drop.

(xii) pH Test for Solid Perfume:

Formulation The pH standard for topical preparations in contact with the skin was around 4-8. The pH value was predicted to be neither excessively acidic nor too alkaline, as both might cause discomfort and flaky skin. The resulting solid scent was tested on universal pH paper and had a pH of 5. This pH level was deemed safe for topical preparation for human skin use. ^[19]

Conclusion:

In conclusion, the development and formulation of solid perfumes present a promising alternative to traditional liquid fragrances. This thesis has explored the various aspects of solid perfume, including its historical context, formulation techniques, and the benefits it offers over conventional perfumes. Solid perfumes are not only more environmentally friendly due to reduced packaging and the absence of alcohol but also offer a unique sensory experience with their longer-lasting scent and ease of application.

The research conducted highlights the potential for innovation within the fragrance industry, emphasizing the importance of natural and sustainable ingredients. Future studies could further investigate the long-term stability of solid perfumes and explore consumer preferences in different markets. Overall, solid perfumes represent a significant step towards more sustainable and user-friendly fragrance products, aligning with the growing consumer demand for eco-conscious and health-conscious beauty solutions.

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