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FORMULATION AND EVALUATION OF PHTHALATE FREE PERFUME FOR SAFETY CONCERN

Aditya Rai*[1], Subhranshu Panda[2]

[1]B.Pharma Scholar, School of Pharmaceutical Sciences, Jaipur National University, Jaipur, Rajasthan.

[2]Professor, School of Pharmaceutical Sciences, Jaipur National University, Jaipur, Rajasthan.

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***Corresponding Author: Aditya Rai**
B.Pharma Scholar, School of Pharmaceutical Sciences, Jaipur National University, Jaipur, Rajasthan.
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ABSTRACT

The present study aimed to formulate and evaluate a natural perfume using ambrette seed oil (*Abelmoschus moschatus*) as a plant-based fixative along with selected essential oils. The formulation was developed by blending citrus oil (top note), rose oil (middle note), and ambrette seed oil (base note), followed by dilution with perfumer's ethanol, addition of glycerine, and controlled maceration. The prepared formulation was subjected to evaluation parameters including organoleptic properties, stability studies, and pH determination. The organoleptic evaluation revealed that the perfume possessed a clear appearance, pale yellow color, and smooth, non-sticky texture. Stability testing under various conditions (room temperature, refrigerated, and elevated temperature) showed no significant changes in color, precipitation, or phase separation, indicating good stability of the formulation. The pH was found to be 6.25, which lies within the acceptable range for skin application. The inclusion of ambrette seed oil effectively enhanced fragrance longevity, demonstrating its potential as a natural alternative to synthetic fixatives. Overall, the study highlights the successful development of a stable, safe, and eco-friendly natural perfume formulation with promising applications in herbal cosmetic products.

KEYWORDS: Natural perfume, ambrette seed oil, herbal cosmetics, essential oils, fragrance formulation.

INTRODUCTION

Perfumes have been an integral part of human culture for centuries, used for personal grooming, religious rituals, and therapeutic purposes. Traditionally, fragrances were derived from natural sources such as flowers, herbs, spices, and animal secretions. However, with the advancement of the cosmetic industry, synthetic fragrance compounds have largely replaced natural ingredients due to their lower cost and higher stability. Despite these advantages, synthetic

perfumes are often associated with skin irritation, allergic reactions, and environmental concerns, leading to a renewed interest in natural and plant-based fragrance formulations.[1,2]

Natural perfumes are formulated using essential oils and plant-derived aromatic compounds, which offer not only pleasant fragrances but also therapeutic benefits. These essential oils contain bioactive constituents such as terpenes, alcohols, esters, and phenols, which contribute to their characteristic aroma as well as antimicrobial, antioxidant, and mood-enhancing properties. As a result, natural perfumes are increasingly preferred in aromatherapy and herbal cosmetic applications.[3,4]

A well-balanced perfume consists of three main components known as fragrance notes: top notes, middle notes, and base notes. Top notes, such as citrus oils (e.g., lemon and bergamot), are highly volatile and provide the initial impression of the fragrance. Middle notes, often derived from floral sources like rose and lavender, form the body of the perfume and last longer than top notes. Base notes, such as ambrette seed oil, are less volatile and provide depth and longevity to the fragrance.[5,6]

One of the major challenges in natural perfume formulation is maintaining fragrance longevity, as essential oils tend to evaporate quickly due to their volatile nature. To overcome this limitation, fixatives are incorporated into the formulation. Fixatives help to slow down the evaporation rate of volatile components, thereby enhancing the persistence of the fragrance. Natural fixatives such as ambrette seed oil (*Abelmoschus moschatus*) have gained attention as safer and eco-friendly alternatives to synthetic fixatives.[7,8]

Ambrette seed oil is a valuable plant-derived fixative known for its musky aroma and excellent fragrance-retaining properties. It is widely used in natural perfumery due to its ability to stabilize volatile fragrance compounds and improve the overall scent profile. Additionally, ambrette oil is biodegradable and less likely to cause skin irritation compared to synthetic musk compounds, making it suitable for herbal cosmetic formulations.[9,10]

Ethanol is commonly used as a solvent in perfume formulations due to its ability to dissolve both volatile and non-volatile aromatic compounds. It also aids in even dispersion of fragrance components and facilitates quick drying upon application. The addition of small amounts of glycerine and water can further improve the stability, texture, and skin compatibility of the final product.[5,11]

The process of perfume formulation involves careful blending of fragrance components followed by maceration, which allows the aromatic molecules to interact and stabilize. Maceration is typically carried out by storing the formulation in a cool, dark environment for a specific period, enhancing the overall harmony and depth of the fragrance. Filtration is then performed to obtain a clear and refined product free from impurities.[6,12]

Evaluation of perfume formulations is essential to ensure product quality, safety, and consumer acceptability. Parameters such as organoleptic properties (color, clarity, odor), stability under different conditions, pH, and fragrance longevity are commonly assessed. These evaluations help determine the suitability of the formulation for commercial and cosmetic applications.[11,13]

In recent years, there has been a growing demand for eco-friendly and sustainable cosmetic products. Natural perfumes align with this trend by utilizing renewable plant resources and minimizing the use of synthetic chemicals. Moreover,

the use of biodegradable ingredients reduces environmental impact, making natural perfumes an attractive alternative in the modern cosmetic industry.[14,15]

Therefore, the present study focuses on the formulation and evaluation of a natural perfume using ambrette seed oil as a fixative and selected essential oils as fragrance components. The study aims to develop a stable, safe, and effective herbal perfume formulation with enhanced fragrance longevity and consumer acceptability.

METHODOLOGY

Materials required

- Ambrette seed oil (*Abelmoschus moschatus*) as a natural fixative and base note (Bauer *et al.,* 2008)
- Essential oils for top notes such as citrus oils (e.g., bergamot, lemon) (Sell *et al.,* 2006)
- Essential oils for middle notes such as floral oils (e.g., lavender, rose) (Burdock *et al.,* 2010)
- Perfumers' ethanol as solvent (Sell *et al.,* 2006)
- Standard laboratory glassware and airtight containers

Table No. 1: List of Ingredients.

S. No.	Ingredient	Quantity
1	Citrus oil	6% (3 ml)
2	Rose oil	10% (5 ml)
3	Ambrette seed oil	4% (2 ml)
4	Perfume ethanol	75% (37.50 ml)
5	Glycerine	2% (1 ml)
6	Distilled water	3% (1.5 ml)

Formulation Procedure

1. Individual fragrance components are accurately measured according to standard perfumery formulation practices (Sell *et al.,* 2006).
2. Top, middle, and base notes are blended sequentially to achieve olfactory balance (Bauer *et al.,* 2008).
3. Ambrette seed oil is incorporated as the base note and natural fixative to enhance fragrance longevity (Surburg *et al.,* 2016).
4. The fragrance concentrate is diluted with ethanol and mixed thoroughly to obtain a clear solution (Sell *et al.,* 2006).
5. The formulation is allowed to mature for 2–4 weeks in a cool, dark place to allow proper blending of aromatic components (Bauer *et al.,* 2008).

Figure No. 1: Phthalate free perfume.

Evaluation Parameters

1. Organoleptic evaluation including odor profile and clarity, performed according to standard sensory assessment methods (Sell *et al.*, 2006)
2. Assessment of fragrance longevity on blotter strips as an indicator of fixative efficiency (Surburg *et al.*, 2016)
3. Physical stability observation during storage

Step 1: Preparation of fragrance blend

In a clean, dry beaker, add citrus oil, rose oil and ambrette seed oil. Mix gently to obtain a uniform blend. The selection of oils is based on their volatility and role in fragrance layering ***(Jellinek, 1997; Baser & Buchbaure, 2015).***

Step 2: Addition of Fixative

Ambrette seed oil present in the formulation acts as a natural fixative. Additionally, glycerine may be incorporated to improve stability and longevity of the fragrance ***(Arctander, 1960).***

Step 3: Alcohol Incorporation

Add ethanol slowly into the oil mixture with continuous gentle stirring to ensure complete solubilization of oils ***(Sell et al., 2006)***

Step 4: Dilution

Add 0.5 ml of distilled water and mix thoroughly to adjust the concentration and improve spray characteristics ***(Singh et al., 2022).***

Step 5: Maceration

Transfer the mixture into an amber-coloured glass bottle, seal tightly and store in cool, dark place for 1 week ***(Rahman et al., 2023).***

Figure No. 2: Maceration of crude drugs.

Step 6: Filtration

After maceration, filter the solution using Whatman filter paper to remove any suspended particles or impurities.

Step 7: Packing

Transfer the clear filtrate into clean, dry perfume spray bottles and label appropriately with batch details.

RESULT

1. Organoleptic Evaluation

Table No. 1: Organoleptic Evaluation.

Parameter	Finding
Colour	Pale yellow
Clarity	Clear
Texture	Smooth and non sticky

2. Stability Test

Table No. 2: Stability Test.

Condition	Finding
Room temperature	No change in color
Refrigerated	No precipitation form
Elevated	No phase seperation

3. pH - 6.25 (Ideally from 4.5-7)

CONCLUSION

The present study successfully demonstrated the formulation and evaluation of a natural perfume using ambrette seed oil as a plant-based fixative along with selected essential oils for top and middle notes. The systematic blending of citrus oil, rose oil, and ambrette seed oil, followed by dilution with ethanol and maceration, resulted in a stable and aesthetically acceptable fragrance formulation. The evaluation parameters indicated that the prepared perfume exhibited desirable organoleptic properties, including a clear appearance, pale yellow color, and smooth, non-sticky texture. The fragrance profile was well-balanced, reflecting effective integration of top, middle, and base notes. Stability studies under different storage conditions revealed no significant changes in color, phase separation, or precipitation, indicating good physical stability of the formulation. The pH of the formulation (6.25) was found to be within the acceptable range, suggesting its suitability for safe topical application. Additionally, the use of ambrette seed oil as a natural fixative contributed to improved fragrance longevity, supporting its potential as an alternative to synthetic fixatives.

Overall, the study highlights the feasibility of developing eco-friendly and skin-compatible natural perfumes using plant-derived ingredients. The formulation shows promising characteristics in terms of stability, safety, and performance, and can be further explored for commercial applications in the field of herbal cosmetics and natural perfumery.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this research work.

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