

Blending Essential Oils: Formulation of Natural Perfumes

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ABSTRACT

The present study focuses on the formulation and organoleptic evaluation of perfumes prepared using natural plant-derived essential oils, highlighting their safety, effectiveness, and sensory characteristics. A range of aromatic plant sources, including citrus, floral, and medicinal species such as orange, lemongrass, citronella, peppermint, tea tree, bergamot, rose, lavender, white jasmine, and fresh lime, were selected for their distinctive fragrance profiles and therapeutic properties. Eight perfume formulations - Orange Blossom, Summer Breeze, Dewy Luxe, Fresh Escape, Zesty Bliss, Royal Jazz, Tropical Elixir, and Calm Oasis - were developed by blending essential oils in suitable proportions using ethanol as a solvent and fixatives to enhance stability and longevity. The formulations were matured, filtered, and stored under controlled conditions to ensure quality. The prepared perfumes were evaluated through physicochemical and sensory analyses, including pH determination, fragrance assessment, skin compatibility, and longevity testing. The pH of all formulations was within the range of 5–6, indicating good compatibility with human skin. Sensory evaluation by a panel of five participants showed high acceptability in terms of fragrance quality, intensity, and overall appeal, while skin testing confirmed the absence of irritation or adverse reactions. User feedback over seven days demonstrated consistently high satisfaction levels across parameters such as longevity, intensity, substantivity, and stimulative effect, supported by positive qualitative responses. Overall, the study concludes that natural essential oil-based perfumes are eco-friendly, skin-compatible, and capable of providing long-lasting fragrance along with additional benefits such as antimicrobial, mood-enhancing, and refreshing effects, making them suitable for cosmetic and therapeutic applications.

Keywords: Natural perfumes, essential oils, fragrance evaluation, pH analysis, skin compatibility, longevity, aromatherapy, eco-friendly

formulation

I. INTRODUCTION

Since ancient times, humans have used natural plant materials to produce pleasant fragrances for personal and cultural purposes. Perfume is a fragrant liquid prepared by extracting aromatic compounds from plant sources and dissolving them in suitable solvents such as alcohol and water. These fragrances vary from person to person due to differences in body chemistry, temperature, and environmental conditions. Modern perfumery, however, has evolved significantly with the use of synthetic aromatic compounds, allowing for a wider range of stable and long-lasting fragrances (Matoshri Miratai, 2023; Ozturk, 2020).

Plant-derived essential oils are the main components responsible for fragrance in perfumes. These oils are extracted using techniques such as steam distillation, solvent extraction, and maceration. The choice of extraction method influences the yield, quality, and chemical composition of the essential oil. In perfume formulation, alcohol acts as a solvent to dissolve these oils, while fixatives are added to slow down evaporation and enhance the longevity of the scent.

Perfume is a fragrant product prepared by blending essential oils obtained from natural sources such as fruits, flowers, and aromatic plants. Essential oils like orange, lemongrass, citronella, peppermint, tea tree, bergamot, rose, lavender, white jasmine, and fresh lime are widely used in perfumery due to their pleasant and refreshing aromas (Muhammad, 2017; Gavahian *et al.*, 2019). These oils are extracted using scientific techniques such as steam distillation, solvent extraction, or cold pressing, and are then mixed with alcohol to create stable and long-lasting fragrances (Cholke *et al.*, 2017; Gavahian *et al.*, 2019). Each essential oil has its own unique chemical composition, which contributes to the overall scent profile and therapeutic properties of the perfume.

(Chanthaphonet *et al.*, 2008). The formulation of perfume involves careful selection and blending of different fragrance notes to achieve a balanced and appealing aroma. Citrus oils like orange, bergamot, and fresh lime provide a fresh and uplifting top note, while floral oils such as rose, lavender, and white jasmine add a soft and soothing middle note. Aromatic oils like lemongrass, citronella, peppermint, and tea tree contribute to the base and provide antimicrobial and refreshing properties (Chanthaphonet *et al.*, 2008; Joy *et al.*, 2001). A “fruit basket” combination of multiple fruity and floral scents enhances the complexity and attractiveness of the perfume. The use of fixatives helps in reducing the evaporation rate of volatile compounds, thereby increasing the longevity of the fragrance (MatoshriMiratai,2023).

II. MATERIALANDMETHOD

Collection and Preparation of Materials



CollectionofSourcesandPreparationof Perfumes

Measurement and Blending of Essential Oils

The formulation process involved precise measurement of essential oils using a calibrated measuring cylinder to ensure accuracy and reproducibility. The selected oils were incorporated in varying proportions according to their fragrance intensity and functional role within the perfume composition. Citrus-derived oils such as orange, bergamot, and fresh lime were utilised in relatively higher proportionstoserveas top notes, imparting an immediatefresh andinvigoratingaroma. Floraloils,includingrose,lavender,andwhite jasmine,wereadded inmoderateconcentrationsasmiddlenotestoenhance thebodyandcomplexityofthe fragrance. More potent

A diverse range of aromatic plant sources, including citrus fruits, floral species, and medicinal plants such as orange, lemongrass, citronella, peppermint, tea tree, bergamot, rose, lavender, whitejasmine,andfreshlime,werechosenbasedontheir characteristicfragranceprofiles and suitability for perfume formulation. Essential oils representing these sources were obtained and stored in airtight containers under appropriate conditions to preserve their chemicalstability and prevent oxidation or loss of volatile constituents.All laboratory glassware, including measuring cylinders, beakers, and storage bottles, was thoroughly cleaned, rinsedwith distilled water, and dried before use to ensure the elimination of contaminants that could interfere with the formulation process. Ethanol was employed as the primary solvent due to its excellent solubilising capacity for essential oils and its suitability for topical applications (MatoshriMiratai, 2023).

aromatic oils such as lemongrass, citronella, peppermint, and tea tree were included in lower proportions as base notes due to their strong and long-lasting characteristics. The measured essential oils were combined in a clean container and mixed systematically. Ethanol was then added gradually to facilitate the complete dissolution of the oil blend. The resulting mixture was stirred gently to achieve a uniform and homogeneous solution, ensuring proper integration of all components (Karneet *et al.*, 2023; Cholkeet *et al.*, 2017).

OBSERVATIONTABLE

Sr No.	Name of Perfume	Essential Oil				Ethanol
1	Orange Blossom	Orange 10%	Bergamot 10%	--	--	90%
2	Summer Breeze	Fruit Basket 10%	Bergamot 5%	Orange 3%	--	90%
3	Dewy Luxe	Lemongrass 10%	Roses 5%	Bergamot 5%	Fruit Basket 5%	80%
4	Fresh Escape	Citronella 20%	--	--	--	90%
5	Zesty Bliss	Bergamot 20%	--	--	--	90%
6	Royal Jazz	Lavender 10%	Rose 5%	White Jasmine 10%	--	80%
7	Tropical Elixir	WhiteJasmine 5%	Limefresh 10%	FruitBasket 5%	--	80%
8	Clam Oasis	Lavender 15%	--	--	--	90%



FormulatedEssentialOil-BasedPerfumes

Descriptive Analysis of Perfumes

Sr No.	Name of Perfume	Significance
1	Orange Blossom	Enriched with orange and bergamot oils, it is known for its uplifting and stress-relieving properties, helping to improve mood and reduce anxiety.
2	Summer Breeze	Containing fruit basket, bergamot, and orange oils, promotes freshness and mental relaxation, making it suitable for enhancing focus and reducing fatigue.
3	DewyLuxe	Lemongrass, rose, bergamot, and fruity notes exhibit antimicrobial and calming effects, supporting emotional balance and skin freshness.
4	FreshEscape	Dominated by citronella oil, acts as a natural insect repellent while also providing a refreshing and purifying effect
5	ZestyBliss	Rich in bergamot, it is beneficial for relieving stress and improving mental clarity.
6	RoyalJazz	Composed of lavender, rose, and white jasmine, has strong calming and soothing properties, aiding in better sleep and relaxation

7	TropicalElixir	White jasmine, lime, and fruity notes enhance mood, boost energy, and provide a rejuvenating effect
8	CalmOasis	Containing lavender oil, it is highly effective in reducing stress, promoting relaxation, and supporting overall mental well-being

Addition of Fixative and Homogenization

A small amount of fixative was incorporated into the mixture to slow the evaporation of volatile compounds and enhance the fragrance's longevity. The solution was mixed thoroughly to achieve a homogeneous composition, ensuring that all ingredients were evenly distributed.

Maturation, Filtration, and Storage

The prepared perfume solution was transferred into clean, airtight glass bottles and allowed to mature for a few days under controlled conditions. This maturation process helps in stabilising the chemical interactions between different fragrance components, resulting in a more balanced and refined scent. After maturation, the solution was filtered, if necessary, to remove any undissolved particles, ensuring clarity of the final product. The finished perfume was then stored in a cool and dry place, away from direct sunlight, to maintain its stability and quality for further evaluation.

III. OBSERVATION

The formulated perfumes were systematically evaluated through pH analysis, fragrance assessment, and longevity testing to ensure their overall quality and performance. The pH of each formulation was measured using standard procedures to confirm compatibility with the natural skin environment, thereby minimising the risk of irritation and enhancing product stability. Fragrance testing was conducted through sensory evaluation, focusing on parameters such as initial impression, note development, balance, and overall acceptability of the scent profile. Long-lasting performance was assessed by applying the perfumes under controlled conditions and monitoring fragrance persistence over time at regular intervals. Additionally, consistency in aroma retention and

user comfort was observed throughout the evaluation period. The results indicated that the formulations maintained skin-friendly pH levels, exhibited pleasant and well-balanced aromatic characteristics, and demonstrated satisfactory longevity, making them suitable for practical and consumer applications.

Performance Analysis

Ph TEST:

The formulated perfumes - Orange Blossom, Summer Breeze, Dewy Luxe, Fresh Escape, Zesty Bliss, Royal Jazz, Tropical Elixir, and Calm Oasis - showed pH values between 5 and 6, indicating good skin compatibility. Formulations with pH 6 were slightly acidic to near-neutral, while those with pH 5 were moderately acidic, supporting stability and safety. Overall, this pH range is ideal as it matches the natural skin pH, ensuring minimal irritation and effective performance.

FRAGRANCE TEST:

A fragrance evaluation study was conducted using a panel of five participants to assess the overall acceptability and sensory appeal of the formulated perfumes. Each participant provided feedback based on parameters such as scent quality, intensity, and pleasantness under controlled conditions.

SKIN TEST:

A skin compatibility study was conducted by applying the perfume samples to five participants under controlled conditions. Each individual was observed for any signs of irritation, redness, or adverse reactions over a specified period. The participants reported positive feedback, indicating that the formulations were gentle and well-tolerated on the skin. Overall, the results confirmed good skin compatibility and the perfume's suitability for regular use.

Participant no.	No. of days used	Response marked with percentage out of 100%				
		Longevity	Intensity	Substantiality	Stimulative	Review
01	7	89	75	80	95	Productive

02	7	90	89	90	79	Good
03	7	85	86	78	90	Useful
04	7	90	90	80	89	Soothing & Peaceful
05	7	95	70	93	88	Refreshing

IV. CONCLUSION:

The present study successfully demonstrates the formulation of perfumes using natural plant-derived essential oils as a sustainable and scientifically effective alternative to synthetic fragrances. A diverse range of aromatic sources, including citrus, floral, and medicinal plants, was carefully selected and blended to create eight distinct perfume formulations with unique fragrance profiles and functional properties. The use of ethanol as a solvent and the incorporation of fixatives contributed to the stability, uniformity, and enhanced longevity of the formulations. The systematic methodology, including precise measurement, controlled blending, maturation, and proper storage, ensured the development of high-quality and reproducible perfume products.

The evaluation of the formulated perfumes through physicochemical and sensory analyses confirmed their suitability for practical use. The pH values ranging between 5 and 6 indicated good compatibility with the natural skin environment, minimising the risk of irritation. Fragrance testing through sensory evaluation revealed that the perfumes possessed pleasant, balanced, and acceptable scent profiles. Additionally, skin compatibility studies conducted on participants showed no adverse reactions, confirming that the formulations are safe and well-tolerated. Longevity testing further demonstrated satisfactory persistence of fragrance, supported by consistent aroma retention and user comfort over time.

Moreover, the performance assessment based on participant feedback over seven days indicated high levels of user satisfaction across parameters such as longevity, intensity, substantivity, and stimulative effect. The positive qualitative responses, including productive, good, useful, soothing and peaceful, and refreshing, further validate the effectiveness and appeal of the formulations. In addition to their aromatic qualities, the perfumes exhibited added benefits such as antimicrobial activity, stress relief, mood enhancement, and insect-repellent properties due to the presence of bioactive compounds in essential oils. Overall, the study concludes that natural

essential oil-based perfumes are eco-friendly, safe, and effective, with significant potential for application in cosmetic and therapeutic fields (Karneet *al.*, 2023; Gavahianet *al.*, 2019; Chanthaphonet *al.*, 2008).

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