



Herbal Solid Perfume: A Turkish Concept-Based Synthesis and Quality Valuation

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ABSTRACT

Perfume has been in the life of humans since ancient times. Today's era has led to the formation of different fragrant liquids as per the people's perception. Solid perfume is generally constituted of all herbal ingredients, except in some cases, it has usually three main ingredients: beeswax, carrier oil, and essential oils. It is applied topically on pulse points with the help of a finger or a cotton swab. Various evaluation tests were performed individually on ingredients to identify them and assess their quality. These evaluation techniques were of organoleptic, physical, and chemical nature. The prepared formulation of herbal solid perfume consisted of many merits as ease of application, patient convenience, portable formulation, less risk in storage, higher efficiency in low quantity. Demerits observed were larger particle size of any constituents, which may lead to a decrease in uniformity of formulation, chances of allergic reactions in patients, poor absorption & permeability due to other factors.

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INTRODUCTION

Medicinal plants have seen their universal role in many of the medicine systems irrespective of the methodologies and concepts. This system of medicines, ranging from western systems to the Unani system of medicine and from Ayurveda in the Indian subcontinent to oriental system of medicine in China & Japan, has seen the perspectives of medicinal plants (Brandt *et al.*, 2018). Apart from being used specifically as drugs, these also play important role in the various other industries, like the food and cosmetic industry, for exhibiting therapeutic effects. Various plant sources are used as nutraceuticals to provide a nutritionally enriched supplement to consumers. In the cosmetic industry, the usage of natural sources is done to make creams, gels, oils, and masks, make-up cosmetics, moisturizers, balms, and much more. Production of volatile oils or essential oils from plant sources has led to the expansion of aroma industries and perfumery to new horizons (Chisvert & López-Nogueroles, 2019; Ammoo *et al.*, 2021).

Perfumes

The word perfume has originated from the Latin word 'per fumum', meaning 'through smoke'. The evidence of its existence was traced 4000 years back in Mesopotamia in the

custom of incense. The science of perfume is chemistry and the perfumed result is creativity. The philological of perfumery bears spectator to its inherent aesthetic qualities. Classification of fragrance is based on their concentration levels, the scent family they belong to, and the notes in the scent (Barwich, 2016). Concentration level defines the intensity and predicted duration of its existence on the skin. Higher the concentration of fragrance, durable will be its scent and longer the extent on the skin surface.

- Parfum- 15% to 30% aromatic compounds
- Eau de Parfum- 8% to 15% aromatic compounds
- Eau de toilette - 4% to 8% aromatic compounds
- Eau de cologne - 2% to 5% aromatic compounds (Fratini *et al.*, 2016; Tortora & Derrickson, 2020)

The perfumes are distinguished by the characteristic smell possessed by the particular scent family and scent family subtypes. These names of the scent are from traditional classification terms.

Scent families

Oriental, Chypre, Marine/Ozonic, Floral, Fougère, Green, Citrus and Gourmand.

Scent family subtypes

fresh, aldehyde, fruity, amber, spicy, woody, and animalistic.

The fragrance wheel, as in the **Figure 1**, is new cataloging shaped in 1983 by Michael Edwards. Each category contains three subtypes except fougère, as it large family of scents derived from each of the above four classes.

- Floral: - Floral, Floral Oriental, Soft Floral
- Oriental: - Oriental, Soft Oriental, Woody Oriental
- Woody: - Wood, Mossy Woods, Dry Woods
- Fresh: - Citrus, Green, Water
- Fougère (Sowndhararajan & Kim, 2016; Mohebitabar *et al.*, 2017; Lin *et al.*, 2018)



Figure 1. Fragrance Wheel

Need of perfumes

- It gives the idea of hygiene and personal care.
- Smelling good gives the idea of personal care and also represents positive vibes.
- Wearing particular scents during different work may help in remembering certain events and activities.
- An odor also helps in the amplification of mood.
- Smelling good also elevates confidence.
- Many fragrant essential oils are used in treatments through aromatherapy or naturopathy.
- Perfumes also play an important role in attracting or deviating.
- Overall, it just not only helps in improving health but also removing stress and creating a positive lifestyle. (Boukhatem & Setzer, 2020)

Solid perfume

Solid perfumes, in general terms, are the perfume in a solid base instead of a liquid one like water or alcohol. The substances used for the solid base are waxes that can be easily melted to mix perfumes and, at room temperature, can easily be solidified. Examples of bases used are beeswax, Vaseline, petroleum jelly, etc. It is applied to the skin with the help of fingers or a cotton swab. The strength of scent of a solid perfume solely depends on the strength of essential oils used. Solid perfumes are a compact way of perfume that can be easily carried from one place to another (Sarkic & Stappen, 2018).

Skin

The skin covers the external surface of the body and is the largest organ in weight. It approximately covers 2 square meters. The skin mainly contains two parts: Epidermis and Dermis. The absorption of water-soluble substances through the skin is negligible but certain lipid-soluble materials penetrate the skin layers. Such substances are certain, drugs fat-soluble vitamins, and gases as carbon dioxide and oxygen. In the case of topical steroids, which are lipid-soluble, they reach easily to the papillary region of the dermis. Absorption through the skin has also given rise to the transdermal route of drug administration (Sowndhararajan & Kim, 2016).

MATERIALS AND METHODS

Materials chosen in this work were complete of natural origin. Herbal solid perfume requires three main ingredients that are:

- Beeswax
- Carrier oils
- Essential oils (Baqueiro-Peña & Guerrero-Beltrán, 2017)

Necessity of ingredients in this formulation

Beeswax

It takes the carrier oil from a liquid state to a solid-state. Beeswax, as in **Figure 2**, also works as a barrier to retain the essential oil-based perfume for a longer duration of time. It is usually the wax part of honeycomb, with yellow or light brown color, a characteristic odor of honey is solid, non-crystalline in appearance, insoluble in water, is chemical, composed of 80% myricyl palmitate, myricyl stearate, 15% free cerotic acid, cerolein, hydrocarbons, lactones, cholesterol esters, and pollen pigments (Mishra, 2017; Sung & Lin, 2017).



Figure 2. Beeswax

Almond oil

Seeds of *Prunus dulcis*, Rosaceae, give oil, as in **Figure 3**, which is golden yellow, odorless, chemically contains 40-55% fixed oils, 20% proteins, mucilage, emulsion, 2.5-4% amygdalins. These oils are also referred to as nourishing or moisturizing oils, also working as a vehicle for this formulation. Many carrier oils like grape seed oil, almond oil, jojoba oil, avocado oil, and coconut oil can also be used (Bernal *et al.*, 2005; Das *et al.*, 2021).



Figure 3. Almond Oil

Essential oils

Single essential oil can be used to create one-and-done perfume. Custom scents can be created by blending the oils and experimenting with the scents by comparing the strength of the smell. Apart from having a single purpose of perfume, essential oils also exhibit many other effects like hydration, moisturizer, soothing effect (Franklin & Mitchell, 2019).

Rose essential oil

obtained from flower petals of *Rosa damascene* Mill., *R. canina*, *R. centifolia*, *R. galica*, *R. moschata* & *R. rugosa*, belonging to family Rosaceae, is rich in terpenes as citronellol, geraniol, nerol, famesol, and rose oxide.

Vanilla essential oil

from vanilla pods, *Vanilla fragrans*, *V. plantifolia*, belonging to family Orchidaceae, is chemically composed of vanillin, anisyl alcohol, p-hydroxybenzoic acid, piperonal, vitispirane (Chavan et al., 2020).

Preparation of herbal solid perfume

- 10 grams of beeswax and 30 ml of almond oil were taken in a beaker of 100 ml and heated over a water bath till they melt.
- 50 drops of vanilla essential oil and 40 drops of rose essential oil were mixed simultaneously in another beaker of 50 ml.
- Poured the mixture of beeswax and almond oil into the storage container.
- After a minute, when the liquid starts cooling, added the mixture of essential oils in it with gentle stirring.
- The lid was closed and the perfume was then allowed to cool before use, as in **Figure 4**.



Figure 4. Herbal Solid Perfume

Method to use

A clean finger/Q-tip across the top of the solid perfume is rubbed to apply the perfume to wrists and various pulse points. Repeated as needed (Ugandar & Deivi, 2013; Ashi 2021).

Assessment of prepared perfume

Organoleptic assessment

Done for color, odor, appearance, pearlescence, roughness, texture grade, etc.

Chemical assessment

Saponification value

It is defined as the number of milligrams of KOH required to hydrolyze 1gram of wax. It is expressed as mg KOH/g.

$$\text{SAPONIFICATION VALUE} = 56.1 \times (B - S) \times N \times W \quad (1)$$

Where; B = volume in ml of the standard hydrochloric acid required for the blank, S = volume in ml of standard hydrochloric acid required for the wax, N = normality of standard hydrochloric acid, and M = mass in gms of the wax taken for the test.

Acid value

it is defined as the number of milligrams of KOH required to neutralize 1gram of the wax. It is expressed as mg KOH/g.

$$\text{ACID VALUE} = 56.1 \times V \times N \times W \quad (2)$$

Where; V = volume in ml of standard potassium hydroxide solution used N = normality of standard potassium hydroxide solution, M = mass in grams of the wax taken for the test.

Ester value

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

$$\text{Ester Value} = \text{Saponification Value} - \text{Acid Value} \quad (3)$$

Ester to acid ratio

It is defined as the number obtained by dividing the ester value by the acid value (Sahu et al., 2016).

Physical assessment

- *Determination of homogeneity* - The formulations were tested for homogeneity by touch and visual appearance.
- *Determination of spreadability* - Spreadability may be expressed by area extent to which the topical application spreads when applied to the parts of the skin that is affected. Sample of known weight was applied on a known area and spreadability factor was determined.
- *Determination of solubility* - The solubility of the formulation was checked in different mediums.
- *Determination of absorption* - The amount of formulation absorbed in a given area was observed.

- *Determination of the type of smear* - It was determined by applying the solid perfume on the skin surface of a human volunteer. After applying solid perfume, the type of smear or film formed on the skin was checked.
- *Determination of emolliency* - Slipperiness, emolliency and amount of residue left after the applying fixed amounts of cream was checked.
- *Determination of physical appearance* - The physical appearance of solid perfume was inspected visually against a dark background.
- *After feel* - The nature of the skin texture on the applied area was assessed after the application of the formulation.
- *Ease of removal* - The ease of removal of the cream applied was determined by washing the applied part with tap water.
- *Irritancy test* - An area was marked on one dorsal part of the hand. The prepared solid perfume was applied and the time was noted down. It was continuously monitored for any kind of irritancy or allergic reactions at regular time intervals for 24 hours (Morilla & Demayo, 2019).

RESULTS AND DISCUSSION

Organoleptic evaluation performed, revealed the details regarding the colour, odour, appearance, texture etc of the prepared formulation, which as depicted in **Table 1**, was found to be pleasant, smooth and acceptable (Septyanti *et al.*, 2021).

Table 1. Organoleptic Assessment

Properties	Observation	Inference
Color	Dull white	Off-white
Odor	Rose scent	Rose smell
Appearance	Uniform appearance	Formulation has uniformity
Pearlescence	Present	Formulation is lustrous
Roughness	Absent	Formulation is smooth
Texture Grade	Uniform	Formulation is uniform and smooth in texture

Chemical evaluation for the lipid based formulation, confirmed the values as depicted in **Table 2**, which are confirmatory standards for quality of wax incorporated.

Table 2. Chemical Assessment

Chemical Tests	Results
Saponification Value	99.5 mg KOH/g
Acid Value	21.35 mg KOH/g
Ester Value	78.15 mg KOH/g
Ester To Acid Ratio	3.66

Physical evaluation, disclosed the details as mentioned in **Table 3**, regarding the physical properties of the formulation, which are essential for its applicability and stability aspect. The formulation was found to be homogenous, with even

spreadability, absorbability, non-irritant, uniform and consistent in nature.

Table 3. Physical Assessment

Properties	Observation	Inference
Homogeneity	Smooth and consistent mixture	Formulation is homogenous
Spreadability	Consistent	Formulation has good spreading ability
Solubility	Insoluble in water Partially soluble in alcohol Soluble in lipid medium	The formulation is hydrophobic & lipophilic
Absorption	Most of the formulation was observed	The formulation is easy to get absorbed on the skin
Wetness	Moisturizes the skin area	Formulation moisturizes the skin
Type of Smear	Greasy	The formulation is oil in nature
Emolliency	No residue observed	The formulation is uniform and consistent
Physical Appearance	Uniform and no passing of light	Formulation is opaque
After Feel	The skin was smooth and soft	Formulation is smooth
Ease of Removal	Cannot be removed by tap water requires soap/detergent	The formulation has an oily base
Irritancy Test	No irritancy was observed	Formulation is non-irritant

CONCLUSION

There had been vast advances made when it comes to developing new fragrances and scents. But these advances lack when it comes to changing the formulation of perfumes. Solid perfumes have been in the market for a while and are still not known much due to the concept of their rigidity. Fragrant substances in the cosmetics in solid form aren't something new, but still, solid perfumes lack the ground of fame as compared to them. Solid perfumes have been very much used around the region of Turkey & Bulgaria and generally known as perfumed cream. Solid perfume is made of all-natural ingredients whether it is an in-house preparation or a laboratory experiment. On its comparison to a cream, the grounds for assessment can be united. The assessments for herbal solid perfume are similar to the assessments for any emulsion or cosmetic cream. The ingredients used in it impart therapeutic as well as additive action when used in the

formulation. Beeswax is a moisturizer and is also used for the solidification of the solid perfume. Almond oil has its therapeutic value and is used as a vehicle here. Essential oils are always used in dilute form due to the chances of high toxicity and allergic reactions. Each derived essential oil has its different therapeutic value and most of them contain fragrances. Due to the fragrant nature of their volatile substances, they are also used in aromatherapies. The likeness of solid perfume is still quite good due to its easy portability and storage. It is also suited for those people who are not comfortable with highly fragrant perfumes in the market. The fragrance of the perfume can be adjusted to one's comfort and, hence, the strength of the scent may vary among the population. Solid perfume is one of those less researched topics on which much rigid information has yet to be established.

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