MS.ID-IJPBS-4726
International Journal of Pharmacy and Biological Sciences-IJPBS™ (2023) 13 (2): 131-136
Online ISSN: 2230-7605, Print ISSN: 2321-3272
Research Article | Pharmaceutical Sciences | OA Journal | MCI Approved | Index Copernicus

A Novel Herbal Face Mist for Better Perspective in Routine Skin Care

Sanskruti V. Khedkar[1], Juveriya A. Momin[2], Mohini Upadhye[3] and Rutuja Aher[4]
PES Modern College of Pharmacy (For Ladies), Moshi.

Received: 24 Jan 2023 / Accepted: 22 March 2023/ Published online: 01 April 2023
*Corresponding Author Email: khedkarsanskruti0@gmail.com

Abstract

For the last 5 to 10 years people are concerned about their skin and health to cope with their dense schedule, preferably with natural ways, which include a lot of herbal formulations; one of them is a face mist. An herbal face mist including anti-inflammatory and free radical scavenging action of allantoin, and orange peel extract respectively is found to be a choice of interest. Face mist is the easiest way to maintain skin health, provides an instant boost of hydration in seconds, and maintains skin pH. Symphytum officinalis a small herb widely used in skin care formulations reason being the presence of a potent anti-inflammatory and antioxidant component allantoin which also helps to rejuvenate the skin. Herbs are available in lots of OTC preparations. It is in use in botanical preparation for more than 2000 years with promising actions. Allantoin is a purine metabolite that usually maintains oxidative stress in our bodies. Allantoin meets the CTFA requirement for cosmetic use. In this study ethanolic extract of orange peel shows dual action as a core action stated free radical scavenger and as a propellant, making it authentic and natural.

Keywords:
Face mist, Orange peel extract, Skin care, Rejuvenation, Hydration.

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1. INTRODUCTION:

Face mist is one type of pharmaceutical preparation. It is an easy way to apply on the skin and to carry. One might assume its role to be just plain old hydration, but it does a lot more than you expected. Turns out, the face mist pulls double duty. It plays the role of both a beauty product and the kind of self-care ritual which can be enjoyed anywhere. It is available to use midday in little spray bottle, they fit perfectly into your purse. Depending on the formula, a face mist can help perk up tired-looking skin, prepare and set the skin for makeup, or provide an additional boost of hydration which can be particularly helpful in dry skin.

A face mist always gets confused with toner and setting spray. Toner is meant to be used after washing the face, to remove all traces of cleanser and prepare skin for moisturizer, while face mist, on the other hand, can go on at any time of day and is usually more nourishing. Setting spray is makeup rather than skincare and contains film-formers (like synthetic polymers) that lock makeup in place. Mist is made with more skin-friendly ingredients that can help makeup look more natural.

2. MATERIAL AND METHOD:

Materials:

In this experiment allantoin was taken as API, Excipients, ethanolic extract of orange-peel powder, apple cider vinegar, tulsi green tea, glycerine, and rose water as vehicle.

As a propellant ethanolic extract is taken, ethanol is volatile in nature, it acts as a propellant and excipient.

2.1 Allantoin:

Allantoin is a natural chemical compound with the formula C4H6N4O3. It is also called 5-ureidohydantoin or glyoxyldiureide [1]. It is a diureide of very common glyoxylic acid. Allantoin is a major metabolic intermediate found in most organisms including animals, plants, and bacteria not in humans. It is produced from uric acid, which itself is a degradation product of nucleic acid (purine), by the action of the uricase enzyme [3]. It is a natural component used in skin care for a very long due to its promising actions. It has been published that allantoin is used in cosmetic and skin care formulations, with moisturizing and keratolytic effects, thus enhancing the desquamation of upper layers of dead skin cells, increasing the smoothness of the skin; it also promotes cell proliferation and imparts soothing, anti-irritant, and skin protectant effect due to formation of complexes with irritant and sensitizing agents [2]. It is also reported to possess wound healing activity.

2.2 Orange peel extract:

Orange is full of vitamin c and antioxidants too, while the peels are the most underrated part of an orange. Orange peel consists of the fresh and dried outer part of the pericarp of Citrus aurantium Linn. Peel is reported to be antioxidant, antibacterial, anti scalant properties. The most attractive action of peel is its anti-carcinogenic and anti-inflammatory activity (due to the presence of polymethoxy flavanoids PMFs), because of the presence of a wide range of flavonoids including hesperidin [6], rutin, Nari rutin, naringin, eriocitrin. The peel extract was reported to have good total radical antioxidative potential.

2.3 Tulsi green tea:

Tulsi (Ocimum sanctum Linn) is a preeminent, ancient herb with lots of actions. Tulsi is an aromatic shrub in the basil family Lamiaceae (tribe) Green Tea Contains the Polyphenols, known to be effective free radical scavengers, and other ingredients that could also provide benefits to the skin. Green Tea containing cosmetic formulations have pronounced moisturizing effects and improve skin microrelief. Green Tea containing cosmetic formulation has shown the moisturizing benefits to the skin.[23]

2.4 Apple cider vinegar (ACV):

It is one of the three most common types of vinegar, produced by fermenting apples. This acidic solution is consumed throughout the world as a flavoring and preservative agent in foods. ACV contains a variety of flavonoids, such as gallic acid, catechin, caffeic acid, and ferulic acid. Animal experiments have reported that ACV has a variety of pharmacological functions, including anti-oxidant, anti-inflammatory, anti-diabetic, antihypertensive, and anti-hyperlipidemic properties [5].

2.5 Propellant:

The propellant is responsible for maintaining proper pressure within the container to expel the product on opening the valve. [20] The propellant is the most important component in the formulation. As stated earlier, it is a pure herbal formulation, all excipients being pure including propellant too, due to the lack of availability of any form of natural or herbal propellant, in this study ethanol is used. Ethanol is volatile, it will act as a propellant that is safe and most importantly free of the hazardous effects of synthetic propellant; which makes this formulation an authentic herbal face mist. In ethanolic extract of orange peel powder, ethanol shows dual-action natural and authentic propellant and, is a perfect solvent for orange peel powder for preparing extract.

2.6 Glycerine:

It is a simple polyol compound. It is a colorless, odorless, thick liquid that is sweet-tasting and non-toxic [19]. The glycerol backbone is set up in lipids known as glycerides. Due to its antimicrobial and antiviral properties, is widely used in FDA-approved wound treatment. Typical plant sources include soybean or palm. Animal-derived tallow is another source.

Sr. no.	Ingredient	Functions	Quantity	Pictures
1	Allantoin	Anti-inflammatory [2]	1ml/0.7gm	
2	Tulsi green tea	Anti-acne, detoxifier, Anti-aging [4]	1ml	
3	Orange peel extract	Propellant and free radical scavenging	1ml (4%)	
4	Vinegar	Preservative antibacterial	1ml	
5	Glycerine	Humectant	3ml	
6	Rose water	Vehicle	Q.S.	

Table No. 01: Plant extract

3. MECHANISM OF ACTION:

The spraying bottle has a trigger lever, which activates the pump. This pumping action forces the air from the nozzle to the dip tube due to which there is a drop in the pressure of the top of the tube due to pressing the top lever. After this difference pressure falls in the tube and the liquid is forced up from the tube. The liquid now leaves the nozzle through the actuator in the form of mist droplets due to pressure and is applied on the skin through force penetrating inside the skin [18]

4. METHOD:

4.1 Preparation of standard allantoin solution

0.7gm of allantoin was dissolved in 100 ml of water. Allantoin was found to be sparingly soluble in water. It can be stored at room temperature. [22]

4.2 Preparation of tulsi green tea extract:

Green tea was dissolved in water at 100^{o}C for 2 minutes.[21]

4.3 Orange peel extract

Orange peel powder is soluble in polar solvents, it is sparingly soluble in ethanol and slightly soluble in water. Its extraction is done by the Soxhlet extraction method [7][8]

Figure No.01: Soxhlet extraction

4.4 Preparation of Extract:

Orange fruits were washed with distilled water and then peeled and their edible portions were carefully separated [16]. The peels were air-dried in a ventilated oven at 40°C for 48 h and ground to a fine powder and passed through a 24-mesh sieve. 20g powdered sample was extracted with 200 ml ethanol at room temperature by Soxhlet extraction method

for 6 h. The extracts were placed in dark bottles and stored in the refrigerator at 4°C until use.

4.5 Preparation of face mist:

The prepared allantoin is mixed with green tea and diluted orange peel extract. Glycerine was added and stirred using a magnetic stirrer until a uniform mixture is obtained, and serially vinegar and rose water were added, and the entire formulation was stirred once again to get the final uniform formulation [18].

5. EXPERIMENTAL WORK:

The face mist was formulated following their standard concentration values. A total of four batches were made. For allantoin, the standard concentration in skin care formulation is 0.2 to 2%. In the following batches as allantoin is API 0.7% was taken in all formulations. The propellant which is an ethanolic extract of orange peel was prepared using a Soxhlet extraction process. The standard concentration of orange peel in skin care formulations is 2 to 6%. The concentration in the batches is 2%, 3%, 4%, and5% in B1, B2, B3, and B4 respectively.

Glycerine acts as a humectant and viscosity enhancer, the standard concentration of glycerine is 20 to 45%. The concentration in batches is 1ml, 2ml, 3ml, and 4ml respectively. All the ingredients were mixed using a magnetic stirrer and the batches were stored at room temperature for further tests and evaluations [18].

5.1 Evaluation of batches:

Four batches were evaluated for pH, viscosity, and physicochemical tests. Out of all the batches, batch 3 was found to have optimum pH viscosity within the standard limits.

BATCHES	ALLANTOIN	GREEN TEA	ORANGE PEEL EXTRACT	GLYCERINE	VINEGAR	ROSE WATER
B1	2ml	1ml	2%(1ml)	1ml	1ml	q.s.
B2	2ml	1ml	3%(1.4ml)	2ml	1ml	q.s.
B3	2ml	1ml	4%(1ml)	3ml	1ml	q.s.
B4	2ml	1ml	5%(1ml)	4ml	1ml	q.s.

Table No. 02: Data of all four batches concerning concentration.

6. Optimized batch evaluation:

6.1 pH:

The formulation of 30 ml was taken in a beaker with graduations and now the calibrated pH meter was made stand in the formulation for some time and pH was recorded.

Figure No. 02: pH meter

BATCHES	pH
B1	4
B2	6.18
B3	6.29
B4	6.34

Table No. 03: Results for pH

BATCHES	VISCOSITY (cp)
B1	0.7
B2	0.9
B3	1.8
B4	2.2

Table No. 04: Results for Viscosity

6.2 Viscosity: Brookfield viscometer was used to measure the viscosity of the formulation. The viscosity of water and the formulation were recorded in centipoise.

6.3 Skin irritation:

A small amount of the mist toner was sprayed on the left-hand dorsal skin and kept for some time; the result was found non-irritant on the skin.

6.4 **Stickiness:**

The mist particles were not found to be much sticky.

6.5 Skin conditioning:

The appearance of the skin after application of the mist was seen to be Smooth, hydrated, and supple.

6.6 Flame extension test:
The aerosol was sprayed through a candle flame from a fixed distance of six inches.

6.7 Light Exposure:
The product was exposed to direct sunlight in its original packaging to see if any discoloration of formulation occurred. No discoloration was seen. Evaluation of facial mist

6.8 Stability studies:
The face was stored and monitored for 3 weeks at room temperature, at 45 degrees Celsius, with Relative humidity of 60%. It was found to be stable with no change in color, odor, and viscosity.

7. RESULT:
The final formulation was subjected to various physicochemical tests. All the tests were performed according to every test standard procedure. All the results were recorded and found within the standard ranges. The pH, viscosity, stickiness, and stability were studied thoroughly and were within the range. No discoloration was found after light exposure to the formulation. The formulation was also effective and non-irritant, and the mist was found to be easily removable.

Sr. no.	Physical character	Description	Result
1	pH	pH was recorded by using a pH meter	6.29
2	Viscosity	Viscosity was measured by using the Brook field viscometer	1.8cp
3	Skin irritation	When applied on the skin it causes irritation or not	No irritation
4	Stickiness	Does particles of mist stick or not.	Not much sticky
5	Skin conditioning	The appearance of skin after the application of mist	The skin was moisturized, soft, and supple
6	Light exposure test	The product is placed in direct sunlight in its packaging to check if any discoloration occurs	No discoloration/ physical/chemical changes seen
7	Flammability	The aerosol was sprayed through a candle flame from a fixed distance of six inches	2cm
8	Removable	The product is washable from the skin or not.	Easily removable

Table No. 05: Evaluation of the Face Mist

Figure No. 03: Image of Final face mist

8. DISCUSSION:
The face mist was prepared and evaluated for the following test. All the batches were prepared and pH was found to be 4, 6.18, 6.29, and 6.34 for B1, B2, B3, and B4 respectively. Batch 3 was found to be optimized, the pH of batch 3 was 6.29 which aligns with the skin pH range.

9. CONCLUSION:
In the current scenario, people need healthy skin and better results with minimal side effects. Herbal ingredients are the way to formulate cosmetic products with minimal side effects. Herbal face mist advances the appearance of the skin, soothing effect, hydration, and maintains skin pH.
In this study, the herbal face mist was successfully formulated using allantoin, orange peel extract, apple cider vinegar, etc. This formulation is physically and chemically found to be stable and it fulfils the characteristics of standard cosmetic formulation for skin care.

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