

Available online on 15.03.2023 at <http://jddtonline.info>

Journal of Drug Delivery and Therapeutics

Open Access to Pharmaceutical and Medical Research

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Research Article

Formulation and Evaluation of Herbal Face Pack

Swarali Yuvraj Sandanshiv^{1*}, Sonali Ravindra Patil^{2*}, Vijay Dhondiran Wagh³, Pooja Arjun Shinde⁴, Rohit Pradip Mali⁵

¹ Student, NGSPMs College of Pharmacy, Brahma Valley Educational Campus, Anjaneri, Nashik-422213, Maharashtra

²⁻⁴ Assistant Professor, Department of Pharmaceutics, NGSPMs College of Pharmacy, Brahma Valley Educational Campus, Anjaneri, Nashik-422213, Maharashtra

³ Principal, NGSPMs College of Pharmacy, Brahma Valley Educational Campus, Anjaneri, Nashik-422213, Maharashtra

⁵ Assistant Professor, Department of Pharmacognosy, NGSPMs College of Pharmacy, Brahma Valley Educational Campus, Anjaneri, Nashik-422213, Maharashtra

Article Info:



Article History:

Received 04 Jan 2023
Reviewed 13 Feb 2023
Accepted 27 Feb 2023
Published 15 March 2023

Cite this article as:

Sandanshiv SY, Patil SR, Wagh VD, Shinde PA, Mali RP, Formulation and Evaluation of Herbal Face Pack, Journal of Drug Delivery and Therapeutics. 2023; 13(3):120-124

DOI: <http://dx.doi.org/10.22270/jddt.v13i3.5773>

*Address for Correspondence:

Ms. Sonali R. Patil, Assistant Professor, Department of Pharmaceutics, NGSPM'S College of Pharmacy, Brahma Valley Educational Campus, Anjaneri, Nashik-422213, Maharashtra

Abstract

Majority of the cosmetic products available in market are of synthetic origin and causes numerous side effects when used for longer period of time. One of the solutions for this problem is use of herbal cosmetics. Herbal cosmetics are considered safe for routine use with minimal side effects. Acne, redness, wrinkles, dark circles, pimples, dry and dead skin is some of the major skin issues. All these problems can be minimized by using herbal cosmetics such as face pack, scrub, cream, etc. Present work focused on preparation of powder based herbal face pack using natural ingredient like orange peel, neem, tulsi, sandalwood, rose oil, etc. Orange peel was used as core ingredient for its ability to reduce acne, wrinkle and also to control excessive secretion of oil is known as natural or herbal cosmetics. Formulation was evaluated for its appearance, spreadability, smoothness, irritability, pH etc. from the results obtained from evaluation parameters, it can be concluded that the prepared face pack can be safely used.

Keywords: herbal cosmetics, scrub, softening, cleansing, moisturizing and fairness

INTRODUCTION

Cosmetics are intended to be applied over human body for cleansing, beautifying, decorating, promoting attractiveness, and/or altering the appearance of skin. Skin cosmetics act on the epidermis or outermost layers of skin without affecting the normal physiological properties of skin. These agents are incorporated on routine basis in various forms or types to intensify the beauty of skin. Generally cosmetics are used to prevent and reduce fine lines, wrinkles, aging, fight acne and to control excessive oil secretion by skin.^{1,2}

Recently consumers focus towards their appearance has been increasing and so the use of cosmetic products has superiorly boosted. However, excessive use of synthetic cosmetic agents is adversely affecting human skin then it's said benefits thus, the demand for plant based herbal cosmetics is increasing due to its ability to cause less or even no harm and enriches the body with nutrients and other useful minerals. The term herbal cosmetics are based on incorporation of natural extracts from plants and animal origin as active ingredient in cosmetic products. These agents emphasize more on use of plant based green components which also encourages sustainable living. Since ancient era, phytochemicals or phytoconstituents obtained from natural source are commonly used as active constituents in topical preparations. The advantageous properties of these bioactive

phytoconstituents used for manufacturing of topical preparations are likely to poses antioxidant, antiinflammatory, antimicrobial, antiaging, anticarcinogenic, UV protecting activity.³⁻⁷ Dry and damaged skin is one of the most common conditions marked by scaling, itching, and cracking of skin, faced due to excessive water-loss from skin (dehydration), UV rays damage by sun and excessive screen time, hectic and unhealthy lifestyle, climate change, aging, use of medications or other factors. Such type of skin problem can be effectively overcome by using variety of skin care preparation like: moisturizers, creams, lotions, face pack, face scrub, oils, serums etc.⁸⁻¹⁰

Face pack is fine powder or paste with smooth texture, supposed to be applied on facial skin as a thin layer and allowed to dry for few minutes, leaving behind a film which can be easily washed off with water. Routine application of face pack exfoliates skin, removes dry and dead skin, provides soothing, cooling, moisturizing and nourishing effects, and provides skin tightening, strengthening effects, based on type of formulation, also helps to remove dirt and grease from skin without actually altering the normal physiological functioning of skin.^{5,11} All of these effects help to rejuvenate skin which is an ultimate goal for use of cosmetic preparations. Based on requirement, use and type of different skin type's herbal face packs are used. Herbal face pack containing natural active ingredients helps to reduce acne, redness, pimples, wrinkles,

and dark circles. Such preparations may also help to increase fairness while promoting skin nourishing and soothing effects.^{5,12,13}

Generally an herbal face pack should provide necessary nutrients and vitamins to skin while penetrating into subcutaneous tissues and outermost layers of skin without actually altering the normal physiology of skin. Based on different skin type, face pack can be formulated with variety of ingredients depending on desired property for example in order to prepare nourishing and moisturizing face pack different oils like and butters like coconut oil, jojoba oil, almond oil, shea butter, cocoa butter etc. can be used.¹⁴ Vitamins like vitamin C, D and E can be used for enriching skin with required vitamins. Additionally substances prove to be beneficial for skin is also used.¹⁵

Present research work aimed to formulate and evaluate poly herbal face pack to promote nourishment and glow of skin by using natural materials like multani mitti (Fullers Earth), sandalwood, orange peel, rose petal, hibiscus leaves and neem leaves. The face pack can also be used as scrub to remove dried, dead and flecky skin.

MATERIAL AND METHOD

The materials used for preparation of poly herbal face pack were sourced from local market and face pack was formulated followed by cleaning, drying and pulverization of required material. The details of materials used are elaborated below.

Fuller's Earth (*Calcium Bentonite*)

Commonly known as multani mitti, it contains bentonite, magnesium, sodium, and calcium which are highly absorbent and offer various skin benefits. Helps to improve appearance of skin in different ways by removing blackheads, whiteheads, fading freckles, minimizes pore size, reduces acne and blemishes and gives a glowing effect to a skin. Fuller's earth powder is also beneficial for soothing sunburns, cleansing skin, improving blood circulation. Additionally it acts as an anti-inflammatory agent^{12,16,17}

Sandal Wood (*Santalum Alba*)

Majorly contains α -santalol and β -santalol. Sandalwood oil as well as powder is enriched antioxidants, antimicrobial activity that helps to maintain the structure of the skin cells intact.¹⁸ It also **reduces dryness and replenishes the moisture, while increasing elasticity of skin.** Due to the rich antioxidant component, sandalwood can help prevent wrinkles by fighting free radical formation. Also shows skin protective action and protect skin against environmental damage, helps to maintain skin healthy and cool.^{5,11,16}

Orange Peel Powder (*Citrus Aurantium Dulcis*)

It is obtained from orange peel extract, which is further fried to powder form. It is rich source of vitamin C and other antioxidants. Vitamin C protects skin from free radical damage and oxidative stress due to harmful UV rays. Also poses instant glow property, acts as skin lightening agent, prevent acne, blemishes, wrinkles, and reduces the signs of aging and sun tan. Other components of orange peel powder are calcium, potassium, and magnesium, orange. It also contains pectin, cellulose, and hemicelluloses which contribute towards skin cells strengthening and helps in skin hydration.^{12,16} other benefits of orange peel extract include unclogging pores, removing blackheads and treating acne. It contains citric acid, which exfoliates.^{17,18}

Rose Petals Powder and Rose Oil (*Rosa Indica*)

Rose petals are rich in vitamin A, C, K which are beneficial for boosting collagen production in human body. Collagen helps

keep your skin supple and firmer. Vitamin C present rose also lightens and brightens skin tone, fades scars, minimizes pores, and reduces hyperpigmentation.¹⁹ Rose petals powder shows antibacterial properties. Also provide a pleasant aroma and aesthetic feel upon application which is preferred in cosmetics preparation.^{5,15,20}

Neem Leaves (*Azadirachta indica*)

The principal constituents of neem leave include protein, carbohydrates, triterpenoids, flavonoids, alkaloids, minerals, calcium, phosphorus, vitamin C, and carotene. Neem has antibacterial, anti-inflammatory, antifungal etc. properties.⁽⁹⁾ Powder of neem leaves helps to reduce the skin problems such as eczema, psoriasis. Also helps to cures the boils, prickly acne marks, scars and other skin problems.^{12,17}

Hibiscus leaves powder (*Hibiscus rosa-sinensis*)

Active principles present in the Hibiscus are anthocyanins and polyphenols (protocatechuic acid and quercetin). The phenolic compounds present in hibiscus flower helps to protect skin from harmful effect of free radicals and helps to reduce oxidative stress caused by UV rays and other factors like pollution, stress and unhealthy life style. Hibiscus is one of the natural sources of alpha hydroxy acids (AHAs).²¹ This helps to exfoliate your and reduce hyperpigmentation blackheads while improve the skin texture. while antioxidants present in hibiscus powder also help reduce inflammation on skin caused by acne or other skin problems.¹⁷

METHOD OF PREPARATION

All the powdered ingredients were passed through sieve, with 40 mesh size separately in order to get uniformed sized particles, followed by weighing them accurately. Further all powder ingredients were mixed geometrically to insure uniform and even mixing. Quantity of each ingredient is represented in table 1. The prepared face pack was stored in an airtight container and evaluated by various evaluation parameters.^{5,12,22}

METHOD FOR APPLICATION

Take 5 grams of the powder mixture containing multani mitti, sandalwood, orange peel powder, rose petal powder, and neem leaves. Add 3-4 ml of rose water or normal water to get a smooth paste. Apply this paste all over face and allow it to dry for 10-15 minutes. Once the powder dries gently scrub and remove the pack from skin and wash it off using water. The face pack also serves as scrub when rubbed on skin in gentle motion for few minutes.^{12,16,22}

Table 1: Face pack formula

(All ingredients were used in powdered form)

Sr. no.	Material		Quantity (for 100 gm)
	Common name	Scientific name	
1.	Orange peel	<i>Citrus Aurantium</i>	35
2.	Sandalwood	<i>Santalum Alba</i>	20
3.	Hibiscus petals	<i>Hibiscus rosa-sinensis</i>	20
4.	Rose petals	<i>Rosa indica</i>	15
5.	Multani mitti	<i>Calcium Bentonite</i>	05
6.	Neem leaves	<i>Azadirachta indica</i>	05

EVALUATION ^{5,12,15-17}

Prepared face pack was evaluated using following parameters to ensure supremacy of prepared face pack:

Organoleptic Evaluation

The prepared face pack was evaluated for various organoleptic parameters such as; color, odor, appearance, texture and consistency. Color, odor and texture were evaluated visually by touch and sensation respectively.

Rheological Evaluation

It involved evaluation of powder characteristics. The sample was subjected for evaluation by various physical parameters like angle of repose, bulk density, tapped density and hausner's ratio. ^{5,12}

- A. Angle of Repose:** The required amount of sample was allowed to drop down from the funnel mounted at the height of 6 cm, the height and radius of the heap was recorded for further calculations. Angle of repose (θ) can be calculated by using following formula:

$$\text{Angle of repose } (\theta) = \tan\left(\frac{h}{r}\right)$$

Where,

θ - Angle of repose

h - Height of the heap

r - Radius of the base

- B. Bulk Density:** It is calculated by the ratio of given mass of powder and its bulk volume. Determined by transferring 25 gm of accurately weighed amount of powder sample to the graduated cylinder.

$$\text{Bulk density} = \frac{\text{Mass of sample}}{\text{Volume of sample}}$$

- C. Tapped density:** It is measured by transferring a known quantity (10 gm) of powder sample into a graduated cylinder. The initial volume of sample in measuring cylinder was recorded and it was placed on tapped density determining apparatus to give subsequent tapping to the measuring cylinder containing sample continuously for a period of 10-15 min. Tapped density was determined as ratio of mass of powder and tapped volume which is calculated by following formula:

$$\text{Tapped density} = \frac{\text{Mass of sample}}{\text{Tapped volume of sample}}$$

- D. Housner's ratio:** The flowability of powders can be determined by housners ratio. It basically the ratio of tapped density to the bulk density of the powder.

$$\text{Housner's ratio} = \frac{\text{Tapped density}}{\text{Bulk density}}$$

- E. Percent Compressibility:** Also known as Carr's index is also used for measuring the powder flow property. It is directly related to the relative flow rate of cohesiveness and particle size. Following equation is used to determine percentage compressibility index:

$$\% \text{ compressibility} = \frac{\text{Tapped density} - \text{Bulk density}}{\text{Tapped density}} \times 100$$

- F. Particle size:** Particle size was performed by microscopic method as per standard procedure. Particle size analysis is an important parameter, which directly affect various properties of powder namely; spreadability, grittiness, etc. ¹²

Physicochemical Evaluation

Physicochemical evaluation included parameters like moisture content, pH and ash values.

- A. pH:** The pH of the preparation was determined by using digital pH meter. The pH meter was initially calibrated at different pH using suitable buffer solution. A 10 % (w/v) dispersion of the preparation was prepared in distill water and pH was determined directly without any further dilutions. ⁵

- B. Moisture content:** For plant based products moisture content and loss on drying (LOD) are important important parameters. Insufficient drying of these agents may lead to enzymatic degradation of active principles. Moisture content of the preparation was determined by LOD method. 3 gm of sample was weighed accurately and placed in previously weighed petri plate (W_1). Weight of petri dish containing sample was recorded (W_2). Petri dish was placed in hot air oven at 100-108^o C until contestant weight of sample was obtained. ¹²

- C. Ash value:** Ash value is generally the residues remaining after complete incineration of the powdered sample. It is used identity or purity of the drug. Principally a very high ash value is representative of adulteration, contamination, substitution during preparation of the product. Ash values can be determined as follows: ^{5,12,23}

- i. Total Ash value:** Total ash value is used for determining low grade, exhausted products and also important for identifying excess of sandy, earthy matter with drug. About 2-4 gm the powdered sample was placed in a previously ignited and tarred crucible. The material was evenly spread on the crucible and ignited by gradually increasing the heat until it a white powder i.e. free from carbon was obtained. Followed by cooling the sample in desiccator and weight of sample was recorded. Percentage total ash was calculated with reference to the air-dried sample.
- ii. Acid insoluble Ash value:** It is used to determine the earthy matter. Add 25 ml of hydrochloric acid to the crucible containing total ash and covered it with watch glass. The mixture was boiled gently for 5 minutes. Further watch glass was rinsed with 5 ml of hot water and added into the crucible. The insoluble matter was collected on an ash-less filter paper and washed with hot water until it became neutral. The filter paper containing the insoluble matter was transferred to the original crucible, dried on a hot plate and ignited to constant weight and subjected for cooling in desiccator for 30 minutes followed by weighing the sample. Percentage of acid insoluble ash was calculated in reference to air-dried sample.
- iii. Water soluble ash value:** It is the difference in weight between total ash and residue after treatment of total ash with water. It is used to determine whether the material is exhausted by water or not. To the crucible containing total ash, 25 ml water was added and boiled for 5 minutes. The insoluble matter was collected on an ash-less filter paper. Followed by washing with hot water and subjected for ignition for 15 minutes at temperature not exceeding 450^o C. the sample was cooled, weighed and percentage of water soluble ash was calculated in reference to air dried sample.

IRRITANCY TEST:

The prepared face pack was applied to the previously marked area of a 1 square cm was marked on the left-hand dorsal surface and time was recorded. Skin was then observed for irritancy, erythema and edema (if any), for regular intervals up to 24 hrs. ⁵

WASHABILITY:

Formulation was evaluated for its ability to get washed off. Face pack was applied on the skin and then ease and extent of washing with normal tap water were checked manually.⁵

RESULT

Following are the results of all evaluation parameters performed to ensure supremacy of prepared face pack

Organoleptic evaluation: The herbal face pack prepared in current study was evaluated for various organoleptic parameters and its observations are shown in the Table 2.

Table 2: Organoleptic Evaluation

Sr. no.	Evaluation parameters	Observations
1.	Appearance	Fine powder (free flowing)
2.	Color	Pale yellow
3.	Odor	Pleasant
4.	Texture	Fine
5.	Smoothness	Smooth

Rheological Evaluation: The observations of rheological findings are given in table 3. This justifies the flow properties of the face pack as it was found to be free flowing and non-sticky powder in nature.

Table 3: Rheological Evaluation

Sr. no.	Rheological parameters	Observations	Inference
1.	Bulk density	0.43 g/ml	Good flowability
2.	Tapped density	0.39 g/ml	Good flowability
3.	Angle of repose	32°	Angle of repose between 31-35° is considered as good
4.	Housners ratio	1.10	Housners ratio between 1-1.11 is considered as good
5.	Compressibility index	12 %	% Carr's index between 11-15 is considered as good

Physicochemical Parameters: Results of formulation are shown in table 4. Moisture content of face pack was found to be 6.3 which near to pH of skin and so the formulation can be considered as safe to be used on skin.

Table 4: Rheological Evaluation

Sr. no.	Physicochemical parameters	Observations
1.	pH	6
2.	Moisture content	11.53 %
3.	Ash value	
	– Acid insoluble ash	0.815 %
	– Water soluble ash	1.98 %
	– Total ash	2.795 %

Irritancy test: Formulation did not showed any signs of rashes, redness, irritation and swelling when it was subjected to irritancy test throughout the test.

Table 5: Irritancy test

Sr. no.	Parameters	Observations
1.	Irritancy	No signs of irritation was observed
2.	Erythema	No signs of redness and irritation
3.	Edema	No signs of swelling or puffiness observed

Washability: The face pack can be easily washed off from skin with normal water.

Table 6: Washability test

Sr. no.	Parameters	Observations
1.	Washability	Easily washable

DISCUSSION

The results obtained from various evaluations properties indicated that the prepared face pack was smooth and fine in texture with pale yellow color and had pleasant smell. Flow properties indicated good flowability of the powders. Irritancy test did not showed any signs of redness, rashes, and swelling. While the pH of the formulation was 6. Which is close to skin pH, indicating that the face pack is suitable for application on skin. Formulation can be easily washed off from skin with no signs of stains on skin.

CONCLUSION

The face pack was prepared with the aim to promote nourishment, to enhance the appearance and aesthetic feel of skin. It was prepared by combining powders of various natural plants and herbs. Presence of natural agents in formulation does not directly alter the normal physiological properties of skin and yet tends to be effective. These agents also tend to cause minimal side effects unlike synthetic face pack containing chemical agents which may be harmful upon application. The prepared face pack can also be used as face scrub to remove dead and fleecy skin. From the observation of all evaluation parameters it can be concluded that the prepared face pack based on home remedies is safe to use on skin.

ACKNOWLEDGMENT

We would like to thank Dr Vijay D. Wagh sir, Principal, Department of Pharmaceutics, Brahma Valley college of pharmacy, Anjaneri, Nashik for encouraging us throughout the work and for his support by providing all necessary requirements. We are also grateful to all teaching staff for their kind support thorough various means.

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