

**FORMULATION AND EVALUATION OF POLYHERBAL SCRUB GEL  
USING HYLOCEREUS POLYRHIZUS AND CITRUS MAXIMA****Anju Achankunju<sup>\*1</sup>, Arsha Nishad<sup>2</sup>, Arya S.<sup>3</sup> and Midhuna S. Minos<sup>4</sup>**B. Pharm Students<sup>1,2,3,4</sup>, Neema K. Ramesh<sup>5</sup>, Associate Professor,<sup>5</sup>

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**ABSTRACT**

Herbal cosmeceuticals are more popular at the moment because they don't have any side effects. Scrubbing is very important because acne, whiteheads and blackheads affect a lot of people. Dragon fruit seed has scrubbing property and pomelo peel has antioxidant property neem has antiacne property. Dragon fruit seed, Pomelo peel and neem powder are utilized as active ingredients preparation are mixed in the form gel by using Carbopol. Other ingredients like Propylene glycol, Triethanolamine, Methyl paraben and rose water was added along with sodium lauryl sulphate into the gel. The prepared gel was evaluated for various parameters such as appearance,  $P^H$ , viscosity, spreadability, irritability. The formulation shows no redness edema, inflammation and irritation during irritancy test. These formulations are safe to use for skin and found to be satisfied with all required characterizations.

**KEYWORD:** Polyherbal scrub gel, Hylocereus polyrhizus (Dragon fruit seed), Citrus maxima (Pomelo Peel), Neem (Azardirachta indica)

**INTRODUCTION**

Cosmetics were first connected to superstition, religion, fighting, and hunting before being connected to medicine. Herbal Cosmetics, sometimes referred to as Products, are made with a variety of legal cosmetic substances as the base, and then one or more herbal elements are added us from microbes and the elements helps regulates body temperature and permits the sensation of touch, heat and cold. Skin function as protective wrapper keeping everything beneath it and keep safe from to provide specific cosmetic benefits. Herbal cosmetics are

made from natural herbs and materials that are utilized for their aromatic qualities in the creation of cosmetics. Skin cosmetics are the products that are used to support skin integrity, improve its appearance and for reducing skin conditions. These includes the nourishment, avoidance of uncontrolled sun exposure and use of emollients appropriately.<sup>[1]</sup>

Face Scrub is a one of the most common face care cosmetic product. Skin protects daily threats such as harsh effect of sun, wind and pollution.<sup>[2]</sup> Herbal cosmetics or cleansing herbs have been used for ages to help with oily skin, acne, discoloration, pimples, and dark circles. Scrubbing your face can effectively remove oil, debris, and grime from your pores, and encourage the skin's natural renewal process. In addition to stimulating blood circulation and exfoliating the skin, it also gets rid of dead skin cells. Mildly abrasive and non-aggressive are the best qualities for face scrubs. An exfoliating scrub made of herbs can lessen the signs of aging.<sup>[3]</sup> Skin care cosmetics have cleansed the skin, maintaining the skin's moisture balance, promoting skin metabolism, and shielding the skin from damaging UV rays are the goals of skin care products. Cosmetics for skin care include ingredients that help the skin operate correctly. They help it retain or, in the event that it is not, regain its homeostatic function, which keeps it in a lovely and healthy state. Basic properties include cleansing, anti-drying, protection against UV rays, antioxidation, and energizing; however, they can also resolve skin issues, have a whitening effect to counteract issues related to skin aging (such as freckles and liver spots from the sun), and prevent wrinkles, sagging skin, and acne.<sup>[4]</sup>

Skin exfoliation is the process of exfoliation involves removing the dead, old skin cells that adhere to the skin's outermost layer. Exfoliation comes in two flavors: chemical and mechanical. In recent years, more people have had the opportunity to seek dermatological care for a wide range of disorders, such as rosacea, acne, striae, photo damage, and skin malignancies. The process of the skin aging naturally or intrinsically is known as chronological aging. The main cause of extrinsic aging, or skin alterations brought on by environmental exposure, is photo damage of the skin, which is brought on by prolonged exposure to ultraviolet (UV) light. Alpha-hydroxy acids, antioxidants, anti-androgens, moisturizers, and exfoliants are among the management choices for photo damaged skin.<sup>[5]</sup> A three-dimensional network of solvated macromolecules from the dispersed phase restricts. The term "gel" is the movement of the dispersing medium in gels, which are classified as semi-rigid systems. derived from "gelatin," while the words "gel" and "jelly" have their roots in the Latin words gelu, which means "frost," and gel an, which means "freeze" or "congeal."

The fundamental concept of a liquid settling to a solid-like substance that is elastic and retains some liquid properties despite not flowing is indicated by this source. The rigidity of a gel arises from the presence of a network formed by the interlinking of particles gelling agent. The nature of the particles and the type of force that is responsible for the linkages, which determines the structure of the network and the properties of the gel. The individual particles of the hydrophilic colloid may consist of either spherical or an isometric aggregate of small molecules, or single macromolecules.<sup>[6]</sup>

### **BENEFITS OF HERBAL SCRUB GEL<sup>[7]</sup>**

- keep flawless skin
- Removes skin flakes
- Removes dead cells from the skin
- Remove acne scars

### **MATERIALS AND METHODS**

#### **Material**

**Materials:** Red dragon fruit seed, Pomelo peel, Neem, Triethanolamine, Sodium lauryl sulfate, Carbopol 940, Methylparaben, Propylene glycol, Rose water.

**Equipment's:** Beaker, Measuring Cylinder, Mortar pestle.

**Instruments:** Digital balance, Sieves, Mechanical Stirrer.

### **METHODOLOGY**

#### **HERBAL INGREDIENTS USED IN FORMULATION**

##### **1. Dragon fruit seed: *Seleniferous undatus***

Dragon fruit seeds were collected from the fruit of dragon fruit, which was purchased from the market. It is thoroughly washed, cleaned, dried in oven and powdered. Further kept in an air tight container.

**Kingdom:** Plantae

**Phylum:** Tracheophyta

**Clade:** Rosids

**Class:** Magnoliopsida

**Order:** Sapindales

**Family:** Rutaceae

**Genus:** Citrus

**Species:** Maxima



**FIG. 1: Dragon fruit seed.**

## **2. Pomelo peel: Citrus maxima**

Pomelo peel were collected from the fruit of pomelo found in local areas, it is collected, cut to small pieces, dried and powdered, stored in an air tight container.

**Kingdom:** Plantae

**Clade:** Rosids

**Class:** Magnoliopsida

**Order:** Sapindales

**Family:** Rutaceae

**Genus:** Citrus

**Species:** Maxima



**Fig. 2: Pomelo Powder.**

## **3. Neem leaves: Azadirachta indica**

The leaves of neem were collected from local area as it is found abundantly in almost all areas. The leaves obtained was washed and cleaned. The leaves were further shade dried, grounded in a mixer and finally sieved to obtain fine powder. Stored in an air tight container.

**Kingdom:** Plantae

**Phylum:** Spermatophyta

**Clade:** Angiospermae

**Class:** Magnoliopsida (Dicotyledons)

**Order:** Sapindales

**Family:** Meliaceae

**Genus:** Azadirachta

**Species:** Indica



**FIG. 3: Neem Powder.**

#### **Preparation of polyherbal face scrubgel**

**Weighing:** The powders of herbal ingredients prepared are weighed for formulating the polyherbal face scrubgel. All the herbal powders are gathered and placed conveniently near the digital balance. Each powder ingredients were weighed individually in the digital balance.

**Sieving:** The fine homogenous powder mixture obtained is sieved by hand sieving to get uniform sized particles. The herbal powder mixture of Neem and Pomelo is placed on the mesh of the smallest aperture sieve number 44-80 and tapped at sides. Paper sheet is kept at the bottom to collect the fine powder after sieving. Fine powder is obtained as result.

**Mixing:** The accurately weighed seeds of Dragon fruit are mixed by trituration method involving direct rubbing in a mortar and pestle. All herbal ingredients were mixed together by adding in an ascending order of their quantity.

**Storage:** All the powdered herbal ingredients were properly stored in an air tight container.

#### **Formulations of polyherbal face scrub gel**

The polyherbal face scrubgel was formulated accordingly. Three batches of poly herbal face scrubgel (SG1 SG2 and SG3) were prepared by slightly changing the concentration of

ingredients. Both formulations were prepared, further evaluated to choose the best formulation.

Table depicts the composition of formulation of polyherbal face scrubgel.

## FORMULATION TABLE

**Table no. 1: Formulation of Polyherbal scrub gel.**

SI No:	INGREDIENTS	SG1	SG2	SG3
1	Dragon fruit	2%	2%	2%
2	Pomelo	1%	1.5%	2%
3	Neem	1%	1%	1%
4	Carbapol940	1.5%	2%	3%
5	Methyl paraben	0.2%	0.15%	0.05%
6	Triethanolamine	1%	2%	2%
7	Propylene glycol	2%	1.5 %	2%
8	Sodium lauryl sulphate	3%	2.5%	2%
9	Rose water	2drops	2-3drops	2drops
10	Distilled water	Qs	Qs	Qs

### Procedure of polyherbal scrub gel

Preparation of gel base: The gel was prepared first by taking required quantity of water in a beaker. A weighed quantity of Carbopol 940 was added little by little in a homogenizer and kept overnight. Using mechanical stirrer, it was stirred until uniform gel was obtained. A weighed quantity of methyl paraben dissolved in water was added and stirred. Propylene glycol and Sodium lauryl sulphate was added in measured quantities. Triethanolamine was added to adjust the pH and finally few drops of rose water can be added as a perfume. Thus, Scrub gel was prepared.

### Evaluation of polyherbal scrubgel

The prepared polyherbal face scrubgel was evaluated for various parameters. It includes.

#### 1. Organoleptic Evaluation

##### Colour

The colour of formulation of scrubgel was observed as green, and was checked manually.

##### Odour

The smell of formulation of scrubgel was checked by applying preparation on hands and feels the fragrance of the perfume.

**Consistency**

The consistency of the formulation and particles were used for checking the texture and homogeneity of the preparation on the skin like stiffness, greasiness, softness.

**Texture**

It was tested by pressing a small quantity of the formulated scrubgel between the thumb and index finger.

**pH**

pH of the prepared polyherbal face scrubgel formulation was determined by using a digital pH meter.

**Spreadability**

Spreadability of polyherbal face scrub gel, when it comes to the behavior of the gel emerges spreadability is crucial. It determines the extent to which the gel can be spread across the skin surface.

**Washability**

It was conducted directly on the skin, which was prepared and cleaned by using water.

**Viscosity**

The Brookfield viscometer was used to measure the viscosity of the polyherbal face scrubgel.

**Irritancy test**

The prepared polyherbal face scrubgel was applied to the 1 square cm area on the left dorsal surface of the skin that had been previously marked, and the application time was noted accordingly. The skin was then periodically checked for the irritation.

**RESULT AND DISCUSSION**

**FIG. 4: Polyherbal scrubgel.**

## EVALUATION OF POLYHERBAL SCRUB GEL

The main objective of the present study was to prepare a poly-herbal scrub incorporated into the gel. The use of natural ingredients to fight against acne, wrinkle and ageing. The scrub gel provides exfoliating effect there for the dead cells can be removed. The natural ingredients present in the poly-herbal scrub gel promotes skin brightening, antibacterial property and antioxidant property.

## ORGANOLEPTIC EVALUATION

The prepared scrub gel formulations are evaluated for the parameters like its colour, odour and texture, consistency. The organoleptic evaluations are done to improve the appearance, odour and their texture. All the formulations have same observations.

## P<sup>H</sup> DETERMINATION

The evaluation of PH of the scrub gel is very significant. Using products with a high pH (alkaline) level like soap can strip the skin of its natural oils, leading to dryness, irritation, and inflammation. On the other hand, products with a low pH level (acidic), like some exfoliating acids, can lead to over-exfoliation and cause skin damage and increased sensitivity. So, it is very much important for scrub gel formulations to maintain the correct P<sup>H</sup> which is suitable for the skin. And the PH of all the formulations of the scrub gel was determined using the P<sup>H</sup> meter and the results are shown in the table no: 2.



**Fig: 5 Estimation of P<sup>H</sup>.**

## SPREADABILITY

Spreadability denotes the extent of area to which the gel readily spreads on application to skin. The spreading was expressed in terms of time in seconds taken by two slides to slip off from the gel, placed in between the slides, under certain load. Lesser the time taken for



separation of the two slides, better the spreadability. Two sets of glass slides of standard dimensions were taken. The gel formulation was placed over one of the slides. Spreadability of different scrub formulation were studied and the results are shown in the table no: 2.



**FIG: 6 Estimation of Spreadability.**

### WASHABILITY

The washability of a scrub gel depends mainly on the surfactant action in its concentration and this test is performed to test the efficacy of the formulation to get easily washed off from the skin without leaving any residues on the skin. So, this test is performed and their results are shown in table no: 2.



**FIG. 7: Estimation of washability.**

### VISCOSITY

Viscosity is a measure of the thickness of a fluid or gel. Brookfield viscometer is used to measure the viscosity of gel. Gel preparation refers to fluids that have high a viscosity of 2000–4000 cps. The viscosity test results for the gel preparations ranged from 3405.97–4604.96 cps.



**FIG: 8 Estimation of viscosity.**

### SKIN IRRITATION

The irritancy test is done to predict the acute skin irritation potential of the ingredients used in the scrub gel formulation. So, the irritancy test is performed for the scrub gel formulations and the results are shown in table no: 2.



**FIG: 9 Estimation of skin irritation.**

### Evaluation Table

**Table no. 2: Evaluation of Polyherbal scrub gel.**

SL NO:	PROPERTIES	SG1	SG2	SG3
1	Colour	Jungle green	Pale green	Pale green
2	Odour	characteristic	characteristic	characteristic
3	Consistency	Semi solid	Semi solid	Semi solid
4	Texture	Gel like	Gel like	Gel like
5	pH	5.19	5.28	5.12
6	Washability	Easily washable	Easily washable	Easily washable
7	Irritability	No irritation	No irritation	No irritation
8	Spreadability	5.70 g.cm/sec	5.10 g.cm/sec	4.89 g.cm/sec
9	Viscosity	505cp	655cp	705cp

In this study the polyherbal preparation consisting of multiple herbal ingredients includes dragon fruit seed, pomelo peel and neem powder. Dragon frit seed have scrubbing effect

which helps to remove dead cells, pomelo peel has antioxidant and antiaging property which helps to rejuvenate the skin and neem powder has antibacterial action helps to fight against acne.

The scrub gel was prepared in 3 different concentrations, and were subjected to evaluation of various parameters. The formulated scrub was found in greenish colour. There are only slight variations in the colour of formulations (SG1, SG2, SG3) at the time of stability study. Odour of three formulated scrub were characteristics the consistency of three prepared scrub was semisolid. Upon application of the three formulations on the skin, scrub appeared greasy. All the formulated scrub were easily washable.

The preparations (SG1, SG2, SG3) showed PH ranges from the scrub SG2 shows the PH which is near to skin PH and was compactable on topical application. Viscosity of the preparation changes with the change in temperature. It ranges from decreases in the viscosity. So, it shows high spreadability. After analysis of all batches of formulation for their evaluation parameters like PH, Viscosity, Spreadability, Washability, the formulation of SG2 shows satisfactory results. Hence further analysis was carried out primary irritation test was carried out successfully and showed no irritant results in all formulations. Based on the evaluation study carried out SG2 shows better results. There for SG2 is significant.

## CONCLUSION

Natural components are safe as well as providing better quality of product. The world market is also moving towards herbal medicine for skin care, hair care and for cosmetic purposes. Scrubbing is very important because acne, whiteheads and blackheads affect a lot of people. Natural remedies are better as well as having less side effect. A survey of global skin care market trends indicates that consumer's use of herbal products has significantly increased over past years.

The main aim of the study was to formulate poly herbal scrub gel as herbal preparation with minimum side effects and maximum quality. The ingredients used to formulate herbal scrub are safer than the synthetic ingredients. The current study was to formulate a face scrub gel using different herbs. Dragon fruit seed has scrubbing property and pomelo peel has antioxidant property neem has antiacne property.

Dragon fruit, pomelo, and neem are utilized as active ingredients preparation are mixed in the

form gel by using carbapol. Other ingredients like propylene glycol, triethanolamine methyl paraben and rose water was added along with sodium lauryl sulphate into the gel.

To evaluate for good product performance of the prepared herbal scrub gel various evaluation tests were performed. Based on evaluation results, formulation II (SG2) showed better results than formulation I (SG1) and formulation III (SG3). The formulated herbal scrub gel is further evaluated for various parameters such as appearance, pH, viscosity, spreadability, irritability.

Based on these tests, SG2 herbal scrub gel formulation code was selected as the best formulation among the others. The herbal scrub gel has economic and social benefit as it packed in transparent glass bottle and doesn't contain chemical ingredients.

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