RESEARCH PAPER

Harnessing The Power Of Muskmelon Seeds: A Review On Exfoliating Scrub Formulation

Sumit Kumar[1], Anjali Kannojiya[2*], Nishant Kumar[3], Peeyush Srivastava[4], Akhil Saroha[5]

[1,3,5] Scholar, School Of Pharmacy And Research, Dbuu.

[2,4] Assistant Professor, School Of Pharmacy And Research, Dbuu.

Corresponding Author: Anjali Kannojiya, Assistant Professor, Dev Bhoomi Uttarakhand University, Dehradun. Email: anjalikannojiya99@gmail.com

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Abstract

In recent years, herbal cosmetic formulations have gained wide acceptance due to their safety, effectiveness, and reduced risk of adverse effects when compared with synthetic products. Herbal exfoliating scrubs are commonly used to remove dead skin cells, improve skin texture, unclog pores, and promote healthy skin renewal. The present review emphasizes the formulation and evaluation of a polyherbal exfoliating scrub, highlighting cucumis melo (musk melon) seed powder as a key active ingredient. Muskmelon seeds are rich in bioactive compounds such as flavonoids, phenolic constituents, essential fatty acids, proteins, and antioxidants, which contribute to their moisturizing, exfoliating, anti-aging, and skin-brightening activities. The review also discusses the functional role of other natural ingredients including masoor dal powder, sandalwood powder, rose petals powder, multani mitti, coffee powder, oatmeal powder, rice powder, orange peel powder, tea tree oil, glycerine, and distilled water, each selected for specific cosmetic benefits such as cleansing, exfoliation, antioxidative protection, antibacterial action, soothing effect, and hydration.

Keywords: Cucumis Melo, Exfoliating, Hydration, Polyherbal, Cosmetic.

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INTRODUCTION

MUSK MELON

Cucumis melo, the general name is muskmelon The melon fruit belongs to the family of Cucurbitaceae and is cultivated in all the tropical regions of the world. *Cucumis melo* Linn, is a species in the family of Cucurbitaceae with so many genera. It is commonly called muskmelon, cantaloupe or sweet melon and originates from Persia, India and Africa [1,2]. Musk melon was first documented by Linné in Species Plantarum in 1753[3]. The fruit is a great source of potassium and vitamins A, B6, and C, which support good skin and give it a youthful appearance [2]

Muskmelon seeds contained high percentage of crude fibres (33.94%), carbohydrates (3.14%), flavonoids and some amount of antioxidant substance as phenolic compound. In melon seed oil main fatty acid is linoleic acid and oleic acid [4].

High proportions of lipids, proteins, and fibres can be found in melon seeds. In addition to their potential as prebiotics, they have antiproliferative activity and antioxidant qualities [5,6]. Furthermore, the presence of flavonoids and phenolic components confirms the excellent antioxidant properties of *Cucumis melo* L. melon seed flour [7].

Botanical Classification [2]

Kingdom	: Plantae
Subkingdom	: Trophobionta
Super division	: Spermatophyta
Division	: Magnoliophyta
Class	: Magnoliopsida
Subclass	: Dilleniidae

Order : Violales
Family : Cucurbitaceae
Genus : *Cucumis*
Species : *melo*

Geographical distribution

- Native range: Iran, South Africa, India, Philippines, China and Australia.
- Exotic range: Pakistan, Japan, India, Sri Lanka, Saudi Arabia, Indonesia and Yemen [8,9].

Fig. no. 1*: Cucumis melo*

SCRUB

The skin one of the body's major organs, serves as a barrier to protect everything beneath it from everyday dangers like the sun, wind, pollution, and germ-filled dirt. Regular skin surface cleaning is necessary to remove dirt, filth, dead cells, crusts, makeup, sebum, and other secretions for healthy skin and a beautiful appearance.[10] A facial scrub is a cosmetic, beauty product, or process that cleans and exfoliates the skin on the face and body. Face scrubs can help remove dead skin cells, sebum, blackheads, and whiteheads. It helps maintain the appearance of healthy skin The primary goal of utilizing face scrub is to get rid of moles and dead skin that accumulate on the face and obstruct pore [11,12]. Face scrubs and body scrubs are the two types of scrubs that are used on the skin. The quantity of oil and sugar added to each is the only distinction between the two. Face scrub is less abrasive because it contains a lot of oil. [13,14] Herbal face scrubs are skincare products made with natural and organic ingredients to revitalize and exfoliate the skin on the face. Herbal face scrubs are composed of soft, nurturing plant-based substances, in contrast to synthetic scrubs that may contain harsh chemicals that can harm the skin.[15,16]

Difference between Herbal and Synthetic face scrub

Herbal scrub	Synthetic scrub
Herbal products are non-harmful due to their natural origin.	Synthetic products are hazardous ingredients because these are synthetically derived.
These are the products made using plants and their parts for their wellness benefits are mentioned as Herbal.	These are the product which is made using synthetic chemical referred as synthetic product.
Risk free contrast formulations.	
Less side effects or no side effects.	More side effects than herbal products.

EXFOLIATING SCRUB

Exfoliation is the process of removing dead skin cells from the skin so that new ones can proliferate. A face scrub uses chemicals, beads, or microscopic particles to achieve this. The term "exfoliant" describes the substances used in exfoliation. By increasing blood flow to the skin and eliminating dead skin cells, exfoliating agents leave the skin feeling renewed and glowing. By keeping the face free of oils, debris, and dust, it aids in maintaining clean skin pores [16]. Herbal exfoliants lessen aging-related changes and environmental damage by removing skin cells from the surface and encouraging cell growth in the sub-epidermal layer. Exfoliating the skin can be done in two ways [17].

- Physical Exfoliation: The hands or a rough sponge are used to apply abrasive materials to the skin and gently rub them in circular motions.
- Chemical Exfoliation: chemically dissolves the first layer of adhesion that holds dead (keratinized) skin cells together before reaching the epidermis to eliminate dead cells entirely.[17]

IDEAL PROPERTIES OF SCRUB

- It must be Innocuous.
- It should be Safe for sensitive skin.
- Not adhesive and able to eliminating dead skin cells.
- Slightly abrasive.
- Have tiny, gritty granules. [18]

BENEFITS OF USING SCRUB

- Helping the skin get rid of dead cells.
- Reveals fresh, radiant skin by clearing flakes.
- Improves epidermal moisture retention.
- Supports stress relief naturally.
- Gets rid of acne scars.[19]

PRECAUTION WHILE APPLYING AN EXFOLIANT

- Selection of exfoliating agent is skin-type specific.
- Repeated abrasive exfoliation disrupts skin integrity.

- Exfoliation should not be performed on skin when skin is injured, abraded, or sun-damaged area.
- Rub gently in circles on face for 30Secs. Then wash off with water. [20,21]

MATERIAL

Skin-loving ingredients with wellness perks

1. **Cucumis melo seed powder:**

Fig. no. 02: *Cucumis melo* powder

Synonym – Musk melon

Biological Source – *Cucumis melo linn.*

Family – Cucurbitaceae

Description – **Colour: -** Light yellow, **Odour: -** Characteristic, **Taste: -** sweet.

Chemical constituents – flavonoids, linolenic acids, Amino acids, phenylalanine, tyrosine, methionine and isoleucine

Uses- Moisturizing agent, anti-aging, brightening effect, exfoliation, sun care, antioxidant, anti-inflammatory, and ayurvedic hair care, skin care etc.

2. **Masoor dal powder**

Masoor dal, commonly known as red lentil, is frequently incorporated the herbal face scrubs for its mild exfoliating action, natural cleanser and skin brightening effect. It also provides proteins, vitamins, and minerals that nourish the skin, help reduce pigmentation, and support an even complexion.

Fig. no. 03: Masoor dal powder

Synonyms - Masoor flour

Biological Source - Obtained from the seeds of *Lens culinaris* Medik.

Family – Fabaceae (Leguminosae)

Description – **Colour: -** Pinkish/reddish-brown, **Odour: -** mild earthy, **Taste: -** nutty

Chemical constituents – Vitamin C, Proteins, Carbohydrate, Minerals Flavonoids etc.

Uses – Natural cleanser, Reduce tan and pigmentation, Anti-oxidant etc. [22]

3. **Sandalwood powder**

Santalum album bark belonging to the family of Santalaceous contain major constituent's esters, cedrol, and santalol. It widely applied in cosmetics for its soothing brightening and cooling properties.

Fig. no. 04: Sandalwood powder

Synonym – Sandalwood tree

Biological source – Dried bark of *Santalum album*

Family – Santalaceous

Description – **colour: -** Brown, **Odour: -** Aromatic, **Taste: -** Unpleasant

Chemical constituents – Cedrol, Santalol, and esters

Uses – Skin cooling, Treatment for sunburn, Remove hyperpigmentation etc. [23,24,25]

4. Rose petals powder

Rose petals powder is a valued ingredients in herbal face scrubs because of its mild exfoliating and its ability to calm, hydrate, and refresh the skin. Rose petals powder rich in antioxidants and vitamin C, it helps defend the skin against environmental damage, supports collagen synthesis, and enhances elasticity.

Fig. no. 05: Rose petals powder

Synonyms – Rose powder, Gulab powder

Biological source – Derived from petals of *Rosa damascena* and *Rosa centifolia*

Family – Rosaceae

Description – colour: - Pink to reddish brown depending on dry method, **Odour:** - pleasant, sweet, **Taste:** - slightly sweet and astringent.

Chemical constituents – volatile oil, Tannis, flavonoids, vitamin C etc.

Uses – natural toner and cleanser, used in fragnance, soothes irritation and sunburn etc. [22]

5. Multani mitti

Multani mitti composed chiefly of aluminium silicate, kaolinite, and attapulgite, is traditionally used in Asia for cleansing skin and hair. It removes blackheads, control oil, and nourishes the skin.

Fig. no. 06: Multani mitti

Synonyms - Multan clay

Biological source – *Hydrous aluminium silicates*

Family – clay minerals

Description – colour: - white scent, **Taste: -** Delightful

Chemical constituents – kaolinite, montmorillonite and attapulgite

Uses – Oil absorber, skin nourishing, skin exfoliation, detoxifying the skin etc. [23,26]

6. Coffee powder

The alkaloid caffeine, sourced from coffee, tea and various soft drinks, demonstrate potent bioactivity and transdermal absorption, leading to its growing application in cosmetic science. Caffeine with potent antioxidative properties, it protects from UV radiation, slows photoaging, and contribute to exfoliation and minimizes dark circles.

Fig. no. 07: Coffee powder

Synonyms – Java, caffeine

Biological Source – Derived from the berries of *Coffea arabica*

Family – Rubiaceae

Description – Colour: - Brown, **Odour: -** Aroma, **Taste: -** Bitterness, sweetness etc.

Chemical constituents – Chlorogenic acid, volatile compounds, alkaloid etc.

Uses – Antioxidant (protect from radical damage, reducing oxidative stress), Helps in fade suntan and pigmentation. [27,28,29]

7. Oatmeal powder

Oatmeal powder not only provides a calming and soothing effect, but also reduces skin inflammation and relieves itching- symptoms linked to dry skin condition such as eczema. It is readily available at local pharmacies and it is highly affecting in restoring the body's pH balance while simultaneously regulating excess oil production on the skin. By maintaining hydration and balancing skin chemistry, it supports healthier, clear, and more comfortable skin.

Fig. no. 08: Oatmeal powder

Synonyms – Oat flour, Avena powder

Biological Source – Derived from the Seeds of *Avena sativa*

Family - Poaceae (Gramineae)

Description - Colour: - cream, **Odour: -** mild cereal, **Taste: -** bland sweet

Chemical constituents – Phenolic compounds, Saponins, Vitamin E, Polysaccharides.

Uses – used as moisturizing agent, provide soothing effect, gentle sensitive skin exfoliant.[30]

8. Rice powder

Rice powder is a natural exfoliants which removes dead cells and impurities while supplying antioxidants, vitamins, and minerals. It nourishes, brightens, improves texture, supports collagen, and protects the skin for a healthy glow

Fig. no. 09: Rice powder

Synonyms – Rice flour, Chawal ka atta, Orzya sativa

Biological Source – It seed of the grass species *Orzya sativa* or *Orzya glaberrima*

Family - poaceae (Gramineae)

Description - Colour: -white, **Odour: -** characteristics, mild, **Taste: -** sweet, bland

Chemical constituents – Amylose and Amylopectin

Uses – used as polishing agent, gentle scrub for sensitive skin, reduce UV damage, sooth irritation and redness, antioxidant protect against oxidative stress. [22,31]

9. Orange peel powder

Orange peel carried into skin-brightening remedies, it is rich in vitamin C, flavonoids, terpenes and bioactive, boosts collagen, protect against oxidative stress, prevent aging signs wrinkles, acne, and gives skin a radiant glow.

Fig. no. 10: Orange peel powder

Synonym – Orange Zest

Biological Source – Fresh or Dried outer parts of the pericarp of *Citrus sinesis*

Family - Rutaceae

Description - colour: - Dark orange, **Odour: -** Fresh, citrusy, and sweet fragrance, **Taste: -** Bitter

Chemical constituents – Carotenoids, Flavonoids, Alcohols, Ketones, Aldehydes, Esters, and Terpenes.

Uses – Used as Brightening properties, Reduces scarring, Fades dark spots for brighter skin, Treats pimple, Acne. [27,32,33,34]

10. Tea tree oil

Tea tree oil is known for its potent antibacterial and anti-inflammatory properties. It reduces acne by targeting bacteria, prevents pore blockage, regulates sebum and calms inflammation to improve skin clarity.

fig. no. 11: Tea tree oil

Synonyms - Tea tree essential oil, Melaleuca oil

Biological Source – Derived from Leaves of *Melaleuca alternifolia*
Family – Myrtaceae
Description – Colour: - Pale yellow/clear, **Odour: -** camphoraceous **Taste: -** pungent
Chemical constituents – Terpinen-4-ol, α-Terpineol, p-Cymene, Limonene
Uses – Used as anti-bacterial, soothes minor cuts, rashes, reduce fungal infection etc. [35]

11. Glycerine

Glycerine, a viscous liquid, is commonly used in cosmetics and herbal formulations as a humectant and emollient, maintaining hydration and softness of the skin.

Glycerine, widely applied in cosmetic science, glycerine functions to retain moisture, protect against dryness, and improve skin texture.

Fig. no. 12: Glycerine

Synonym – Glycerol
IUPAC Name - Propane-1,2,3-triol.
Molecular formula – C3H803.
Molecular weight – 92.09382 g/ mol.
Description – Colour: - colourless, **Odour:** - odourless, **Taste**: - sweet and non-toxic.
Uses – Act as a humectant, moisturizer. [31,36]

12. Distilled water

Distilled water used as vehicle.

Fig. no. 13: Distilled water

FORMULATION OF EXFOLIATING SCRUB

Sr. No.	Common name	Natural Ingredients	Botanical name	Category
1	Cucumis melo seed Powder & Granules		*Cucumis melo linn*	Active Ingredient
2	Masoor Dal Powder		*Lens culinaris* Medik	Natural cleanser
3	Sandal wood Powder		*Santalum album*	Cooling Agent
4	Rose Petals Powder		*Rosa damascena* and *Rosa centifolia*	Fragnance
5	Multani Mitti		*Hydrous aluminium silicates*	Oil absorber
6	Coffee Powder		*Coffea arabica*	Antioxidant
7	Oatmeal Powder		*Avena sativa*	Moisturizing agent
8	Rice Powder		*Orzya sativa*	Polishing agent

9	Orange Peel Powde		*Citrus sinesis*	Brightening properties
10	Tea Tree Oi		*Melaleuca alternifolia*	Anti-bacterial
11	Glycerine		IUPAC NAME-Propane-1,2,3-triol	Humectant
12	Distilled Water			Vehicle

PARAMETER FOR EVALUATION

The evaluation of the exfoliating scrub was carried out across multiple parameters, including organoleptic evaluation, texture, homogeneity, consistency, irritability, pH, washability, spreadability, grittiness, viscosity, etc. all of which met the required standards.

1. Organoleptic evaluation

Colour – colour should be attractive and uniform.

The color of formulation was checked manually

Odour – pleasant and free from rancidity.

The fragrance of the formulation was evaluated by topical application on the hand.

Taste – Typically not required, but if consumed unintentionally, it must be non-bitter.

2. Textures & homogeneity

The scrub's texture is evaluated by touch and sight; it should feel smooth and appear evenly mixed, with no lumps present.

3. Consistency

The scrub consistency should be balanced- neither over runny nor excessively thick, so it spreads easily during application.

4. Irritability

Assesses whether the scrub triggers irritation, redness, itching, inflammation or any other side effect after application.

This test is done by applying formulation on hand and observed the results.

5. pH

Determination of the pH of exfoliating scrub using calibrated digital pH meter.

The ideal pH of the exfoliating scrub is 5.0 to 6.5.

6. Washability

Assesses the rinseability of the scrub how easily it washes off with water without leaving residue.

Determined by a little quantity of exfoliating scrub applying on skin and wash with water.

7. Spreadability

Assesses the spreadability of the scrub, ensuring even distribution and optimal coverage.

Sample placed between glass slides with weight; time and area of spreading measured.

The extent of scrub coverage on the glass slide indicates the spreadability efficiency i.e. spreadability= M ×L/T.

8. Grittiness

Evaluate the granulometry and abrasiveness of particles, ensuring they are sufficiently fine to prevent dermal injury while maintaining exfoliating efficacy.

The exfoliant requires abrasive characteristics; therefore, lentil pulses were finely ground sieved through mesh no.60 to ensure minimal coarse particles. The formulation successfully met the grittiness criteria.

9. Viscosity

For Viscosity measurement, Brookfield viscometer "Helepath Spindle A-91 used, and result observed**.**

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