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FORMULATION AND EVOLUTION OF HARBAL FACE SCRUB FROM SAPODILLA FRUIT

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Abstract:

Cosmetics are defined as the products used for the purpose of beautifying, cleansing, promoting attractiveness or alternating the appearance. The aim of study is to formulate and evaluate a face scrub with incorporation of the sapodilla as an active ingredient. For the purpose of enhancing skin beauty, several skin conditions are developed, such as skin protection, sunscreen, anti-acne, and anti-wrinkle products. Despite the enormous health benefits of synthetic substances, which once more cause environmental destruction, demand for herbal items and cosmetics is rising daily. Due to their dual functionality as medications and cosmetics, herbal cosmetics are in high demand nowadays. The name itself indicates that herbal cosmetics are natural and they do not contain any chemicals. Natural ingredients have no side effects, making them the safest and greatest products to use on a daily basis. A facial scrub is a cosmetic or a beauty product used to exfoliate and clean the skin on the face and body. Blackheads, whiteheads, sebum, and skin cells can all be removed by using face scrubs. In this face scrub, sapodilla is used as an active ingredient. The other ingredients like carbopol, methyl paraben, triethanolamine, propylene glycol, sodium lauryl sulphate were added into this face scrub gel. The prepared face scrub were evaluated for various parameters such as organoleptic properties, pH, irritability, Washability, grittiness, Extrudability, formability, Spreadability and found to be satisfactory outcome. The prepared formulation works well as a scrub that encourages healthy and radiant skin.

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INTRODUCTION:

The body's largest organ is the skin. It acts as a key organ of protection for other body parts. The skin serves as a barrier to protect the inside from external dangers like the corrosive effects of the sun, wind, and pollution as well as dirt and germs that are present in daily air [1][2]. Cosmetics are defined as the products used for the purpose of beautifying, cleansing, promoting attractiveness or alternating the appearance [3] Cosmetics come in a variety of forms and are used worldwide to enhance beauty. For the purpose of enhancing skin beauty, several skin conditions are developed, such as skin protection, sunscreen, anti-acne, and anti-wrinkle products (4)

Face skin

Face skin thickness varies between areas and individuals, and undergoes a universal age-related thinning of the dermis. Subcutaneous fat exists throughout the face skin with connective tissue septa dividing the fat into lobules

The skin and subcutaneous tissue of the face can be divided into aesthetic units, eachunit characterized by the skin having a similar color, texture, thickness and mobility. Aesthetic unitshave an important clinical application to consider in skin resurfacing procedures as well as in sugery [5]

There are three different varieties of skin

A] Dry skin

B] Oily skin

C] Sensitive skin [6]

The skin's surface needs to be cleaned frequently in order to remove grime, sebum, and other secretions, dead cells, crusts, and makeup that has been applied in order to stay healthy and attractive [7].

Face Scrub [8]

A skincare item used to exfoliate your skin is a face scrub. It assists in removing dead skin cells from the skin's surface, lowering the likelihood of clogged pores and acne outbreaks.

History shows that individuals have scrubbed and exfoliated their skin since prehistoric times, perhaps using an abrasive substance.

Mechanism [8]

The coarse particles in facial scrubs help to exfoliate the skin. The particles in a face scrub scrape against your skin when you apply it,

clearing all the dirt from your skin pores. Additionally, it gets rid of dead skin cells, leaving your skin softer and smoother.

1] Ideal properties of face scrub

1] should be Non- sticky and mild abrasive.

2] It should be Non-toxic.

3] It must removes dirt and dead skin.

4] It should Non-irritant.

5] It must contain small gritty particles [9].

2] Merits of scrub

a) To maintain pristine skin: To expose clean skin, scrub away dirt, sweat to reveal clean skin. Unfortunately, the containers of cleaning milk, face wash, and facial cleansers can't get rid of all the dust that builds up in your skin's pores.

b) Eliminates skin flakes: Patches of dry skin result from flaky skin. It permits the accumulation of dead cells over time. One can easily treat flasky skin by exfoliating

c) Enhances skin shine: Skin may even appear more radiant after exfoliation.

d) Helps to remove dead cell: Skin looks drab and weary because of dead cells. With a soft scrub, remove them.

e) Get rid of acne scars: Exfoliation aids in the removal of acne scars.

F) For smooth skin: Being more attractive starts with having smooth skin. A skin will become soft and well-nourished in addition to appearing completely smooth after the scrub

g) Improving skin's texture: Skin will be cleaner, smoother, and have a better texture after a good scrub [10].

3] Demerits of scrub

Skin irritation, including redness and inflammation, can be brought on by harsh rubbing movements and chemicals. A person with sensitive skin may potentially experience allergic responses to the chemicals found in synthetic scrubs.[11]

4] Difference between face wash and face scrub

1) Face wash: The face wash is creamy and usually smooth. Most doctors advise using merely a face wash and not a scrub if you have sensitive skin. A face wash uses chemicals, like soap, to remove the oil and grime from your face.

2) Face scrub: Face scrub typically contain some kind of grit that is used to remove dead skin cells. Scrubs for the face might aggravate skin irritation and make it simpler to itch. Face scrub uses exfoliants like walnut shells or microbeads to remove the oil and grime from your face.

5] Selection of scrub based on skin type

1) For dry skin: Any face cleanser with components designed to remove dead skin cells can be used by those with dry skin. One such chemical that eliminates flaky skin and dead skin cells quickly is glycolic acid. It is a well-known excellent exfoliants.

2) For sensitive skin: While choosing skincare products, people with sensitive skin should be more cautious. A face scrub that is both antibacterial and anti-inflammatory is best if one have sensitive skin.

3) For combination skin: Choosing a face scrub might be challenging because combination skin is a mix of dry and oily skin. [12]

Benefits of face scrub [13]

1. **Detoxifies Your Skins**

The removal of dead skin cells from your face is the main benefit of utilizing a facial scrub. Your skin's dead cells give you a dry, dismal expression on your face.

2. Unclogs Skin Pores
Sebum is a natural oil that the body produces to keep the skin moisturised. But occasionally, production can become excessive, and the extra sebum oil is stored in your skin pores.
3. Gives Smoother Skin
Apart from the over, face scrubs moreover make your skin surface smooth and shining. When you confront shows up smo5other, softer, and shining, your self-esteemis actually bound to extend.
4 Improve skin texture for better absorption of skin.
Facial skin is delicate, thinner, and more inclined to harm as compared to the skin another parts of the body. Inappropriate skincare, contamination, etc.
5. Evacuates Flakes
Drops are the name for these areas of dry skin. These are not only unpleasant, but they also make the skin look extremely dismal.
ADVANTAGES OF FACE SCRUB [14]
Healthy, glowing skin, minimize spore,
reduces breakout and acne, Hides wrinkle
Allows absorption of the products,
improve your tan, Maintain body pH.
Scrubbing is the removal of dry/ dead skin cells on the surface of the skin and is one of the most important of skincare routine for face.
Scrubbing not only helps many skin problems,
it also increases blood circulation,
DISADVANTAGES OF FACE SCRUB
Hard scrubbing motions and hard scrubbing chemicals may cause skin irritation including redness.
If you have a sensitive skin one can also have allergic reactions to the chemicals present in the synthetic scrubs as well.
Over scrubbing can result in open pores which are exposed to pollution and UV rays at the same time.
It also leaves your skin more prone to infections and tanning.

HERBAL INGREDIENT USED IN FACE SCRUB

Fig.1- Sapodilla.

Fig.2- Sapodilla plant

[A] SAPODILLA[15]
Common Name- sapodilla
Scientific Name- Manilkara zapota
Description- Chikoo has brown fuzzy skin and is more oval-shaped than its Central American cousins, though some develop pointed ends. The skin is inedible, but serves a purpose as a kind of bowl for the sweet flesh.
Plant Care -The soils varieties suitable for Sapota cultivation are deep alluvium, sandy loam and medium black soil. Sapota is a tropical fruit and needs warm, humid climate for growth and development
Uses - Chikoo is an excellent source of antioxidants and helps with skin texture. Chikoo can make for excellent exfoliants when used with honey and sugar

. **[B] VERNACULAR NAMES [16]**
Sapodila is known by a number of vernacular /common names in different Countries

Countries	Common/Vernacular Name
Brazil	Sapoti, sapotilha
Thailand	Lamoot, Lamut, Lamut - farang
Indonesia	Sawu
Cuba	Sapota,sapote
India	Chikoo,chiku,chicku
Mexico	Chicopote ,Chicozapote
West Indies	Nasebery
Singapore	Ciku
English	Sapodila
Malaysia	Chikoo

Table 1. Vernacular Name of sapodilla

The fruit is round or egg-shaped and weighs 75-200 g. Its diameter ranges from 5 to 9 cm. The pulp, which is the inside, fleshy portion of the fruit, is delicate and simple to consume. It has a gritty texture, a light brown colour, and usually has 12 flat, black seeds.

Superior kinds have seedless flesh with a smoother texture [17].

Sapodilla consists of sugars (12-18%), proteins (0.7 g/100 g), ascorbic acid (6.0 mg/100 g), phenols (15.35 mg gallic acid equivalent/100 g), carotenoids (1.69 mg b-carotene/100 g), and minerals like; phosphorous (27 mg/100 g), calcium (28 mg/100 g), iron (2.0 mg/100 g), potassium (193 mg/100 g), copper (0.086 mg/100 g), etc [18].

[C] BOTANICAL DESCRIPTION

Sapodilla is a medium to large sized tree with dense and almost round canopy formed by profuse branching system (sympodial type). Initially the growth of these trees is slow but after man years, may reach upto 20-30 metres in height. [19].

Roots: Sapodilla roots show shallow-root system with a major portion of roots present within the top 75 cm of soil and about 66% of the moisture extracted from the soil is in the first 75 cm [20]'

Leaves: The leaves are evergreen and spirally arranged (7-12×2-4cm in size), pinkish brown when young and turns light-dark green at maturity.

Flowers: Flowers are small, bisexual, bell-shaped (10 mm in diameter), borne singly or in clusters in the axils of leaves near the branch tips.

Fruit: The fruit of sapodilla is a brown coloured berry, nearly round and varies from 5-10 cm in width. The unripe fruit is hard and coarse where it becomes soft and juicy on maturity [21]

Seeds: Some Sapodilla fruits are seedless but normally they produce 3-12 seeds per fruit. They are hard and brown or black in colour with one white margin.

Reproductive biology: Sapodilla is an out-breeding species and shows self-incompatibility Flowers are bisexual and the stigma grows beyond the corolla so that cross pollination can occur easily [22-23].

Phytoconstituents

These workers observed the presence of steroids, glycosides and saponins in low polar chloroform extract; glycosides and saponins in the high polar methanol extract and maximum number of phytoconstituents such as tannins, flavonoids, alkaloids, phenols, steroids, glycosides and saponins were present in the medium polar acetone extract. [24].

[D]PHARMACOLOGICAL STUDIES

1] Antioxidant Activities

Antioxidants are the chemical compounds that act on oxidation chain reactions by inhibiting or delaying the oxidation of other molecules. Antioxidants protect the human body from harmful effects of free radicals and ROS (Reactive Oxygen Species) [25]

2] Anti-diabetic Activities

studied hypoglycemic activity using aqueous and ethanol extracts of sapodilla seeds, however it was found that the ethanolic extract produce better hypoglycaemic effect than the aqueous extract. [26].

3] Anti-microbial Activity

tested antimicrobial activities of M. zapota using ethyl acetate extracts of both stem-bark and leaves against some pathogenic bacteria and fungi and found that ethyl acetate extract of stem bark showed antimicrobial activity against all the pathogenic bacteria used with zone of inhibition in the range of 08-16 mm whereas extracts of had mild activity against these bacterial strains with inhibition zones in the range of 06-09 mm. [27]

[E] ETHNOMEDICINAL USES

Fruit also have got antispasmodic value that helps in treatment of muscle spasms and pains and also inhibit growth of breast and colon cancers. Seeds contain saponins and quercitin, used as tonic, antibacterial, antipyretic, febrifuge and laxative. [28].

[F] EXCIPIENTS

[1] Carbopol.

Chemical Name- Carbomer

IUPAC name- Poly(acrylic acid), poly(1-carboxyethylene)

Molecular formula- $(C_3H_4O_2)_n$

Molecular weight-713.1 g/mol

Functional category- Bioadhesive material, controlled-release agent, emulsifying agent, emulsion stabilizer.

Description- Carbopol is white-coloured, fluffy, acidic, hygroscopic powders with a characteristic slight odour.

Synonym- Acrypol, Acritamer, acrylic acid polymer, carbomera, Carbopol, carboxy .

Uses- Carbopol is used as a thickener in lotions, creams and gels. It is also used to stabilize, suspend.

[2] Methyl paraben

IUPAC name- Methyl-4-hydroxybenzoate

Molecular formula- $C_8H_8O_3$

Molecular weight-152.15 g/mol

Functional category- Antimicrobial preservative

Description- Methyl paraben occurs as colourless crystals or a white crystalline powder. It is odourless or almost odourless and has a slight burning taste

Synonyms- Methyl paraben, Methyl p-hydroxybenzoate, Methyl Para hydroxybenzoate,

Uses- Inhalation solutions, Nasal solutions, ophthalmic preparations, Oral solutions and suspensions.

[3] Triethanolamine

IUPAC name- N, N-diethylethanamine

Molecular formula- C6H5NO
Molecular weight- 149.19 g/mol
Functional category- Alkalizing agent, emulsifying agent.
Description- Triethanolamine is a clear, colourless to pale yellow-coloured viscous liquid having a slight ammonical odour
Synonyms-Tealan, triethylolamine, trihydroxy triethylamine.
Uses- Triethanolamine is used as an intermediate in the manufacturing of surfactants, textile specialties, waxes, polishes, herbicides,

[4] Propylene Glycol
IUPAC name- Propane-1, 2-diol
Molecular formula- C3H8O2
Molecular weight- 76.09 g/mol
Functional Category- Antimicrobial preservative, disinfectant, humectant, plasticizer, solvent, stabilizing agent.
Description- Propylene glycol is a clear, colourless, viscous, practically odourless liquid, with a sweet.
Synonyms 1, 2-Dihydroxypropane, E1520; 2-hydroxypropanol, methyl ethylene glycol,
Uses- Propylene glycol is used in cosmetics and in the food industry as a carrier for emulsifiers and as a vehicle for flavours in preference to ethanol,

[5] Sodium Lauryl Sulphate
IUPAC name- Sodium dodecyl sulphat
Molecular formula- C12H25NaO4S
Molecular weight-288.38 g/mol
Functional category- Anionic surfactant, detergent, emulsifying agent, skin penetrant.
Description- Sodium lauryl sulphate consists of white or cream to pale yellow-coloured crystals, flakes, or powder having a smooth feel, a soapy.
Synonyms- lauryl sodium sulphate, lauryl sulphate, sodium salt
Uses- Anionic emulsifier, forms self-emulsifying bases with fatty alcohols, as detergent in medicated shampoos. [29]

MATERIALS AND METHOD

Sr.No.	Materials	Supplier	Category
1	Sapodilla	Local market	Scrubbing agent, Antioxidant
2	Carbopol	SIOP College of pharmacy Washim	Gelling agent
3	Methyl paraben	SIOP College of pharmacy Washim	Preservative
4	Triethanolamine	SIOP College of pharmacy Washim	Neutralizer
5	Propylene glycol	SIOP College of pharmacy Washim	Moisturizer
6	Sodium lauryl sulphate	SIOP College of pharmacy Washim	Foaming agent
7	Rose water	SIOP College of pharmacy Washim	Vehicle

Table-2. Formulation Table for face scrub

Sr.No.	Ingredients	Formulation -1 Qty. (10g)	Formulation -2 Qty. (10g)	Formulation -3 Qty. (10g)
1	Sapodilla	2 g	2.5 g	3 g
2	Carbopol	2 g	2 g	2 g
3	Methyl paraben	0.1 g	0.1 g	0.1 g
4	Triethanolamine	0.9 g	0.9 g	0.4 g
5	Propylene glycol	1 ml	0.5 g	0.5 ml
6	Sodium lauryl sulphate	4 g	4. g	4 g
7	Rose water	q.s.	q.s.	q.s.

Table -3. Formula for face scrub

METHOD OF FACE SCRUB
Preparation of sapodilla powder:
Selection of ingredients
Sapodilla was first bought from the local market.
Then sapodilla was grated and let to dry in the sunlight for the following seven days.
Sapodilla was ground into a powder once the water has completely evaporated from it.

Preparation of gel:
Methyl paraben was weighed and dissolved in beaker containing rose water.
To this, carbopol was added and stirred continuously for few minutes until it forms a gel.
Sodium lauryl sulphate was weighed dissolved separately with rose water and added into above gel Followed by this propylene glycol was added.
Dropwise triethanolamine added into gel to neutralise pH.Active ingredients then added into prepared gel and stirred [30].

Fig -3 Sapodila powder.

Fig -4 Face scrub

CONCLUSION :

From above study, of Formulation and evaluation of sapodilla it is clear that Sapodilla is an important minor fruit crop and can be considered as one of the healthy fruits because of the presence of various nutritious components in it.

Apart from this, large numbers of phytochemicals have been reported from the plant by various researchers from time to time that are responsible for many biological effects such as anti-inflammatory, anti-arthritis, anti-bacterial, anti-fungal, anti-oxidant, anti-tumor and anti-diabetic activities. Despite being economically and medicinally important, it has not gained popularity because of high degree of perish ability

The creating the scrub gel is tested using a number of factors, and it was determination of use on the skin to promote health and radiance without causing any side effects.

By incorporation of sapodilla as scrubbing agent into the formulation, efficiency of product is increases. The use of a scrub gel, which promotes better blood flow and enhances oxygenation of the skin's surface. Skin feels softer, cleaner, and more invigorated after applying scrub.

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