

Preparation and Evaluation of Herbal Body Scrub Cubes for Revitalizing Skin

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ABSTRACT

The present work, herbal body scrub cubes, was prepared with a suitable size and shape, weight, exfoliation, cleansing, and antioxidant properties. Herbal Body Scrub Cubes were prepared for removing dead skin cells, promoting cell turnover, and improving skin texture and appearance. Herbal body scrub cubes work through a combination of physical and chemical exfoliation where sugar is used as a physical exfoliant, removing dead skin cells and promoting turnover. These scrub cubes are versatile in nature because they provide both the chemical and physical exfoliation characteristics. The extract of the *Clitoria ternatea* flower contains the ingredient anthocyanin, which is responsible for providing chemical exfoliation. These formulations are the ones that contain the uniform content of the active ingredients, which help in providing better action on application. This formulation provides an effective moisturization due to the presence of shea butter. As these preparations are in the form of cubes, they are very handy and easy to use; the wastage of product is also eradicated due to the specific shape. Five different formulations, F1, F2, F3, F4, and F5, were prepared by the melt and pour base method, and the formulations were characterized for different evaluation parameters like washability, foam ability, pH, grittiness, scrubbing, Cleansing test on human volunteers, and antimicrobial tests. Based on the study, it can be concluded that herbal body scrub cubes show satisfactory results and are safe and cost-effective.

Keywords- *Clitoria ternatea*, Scrub cubes, Exfoliation, Cleansing, Antioxidant.

I. INTRODUCTION

Revitalizing Skin, One Cube at a Time

The largest organ in the body, the skin plays a crucial role in protecting us from external factors such as temperature, humidity, and pollution. However, the skin is also susceptible to damage from these factors, leading to issues such as dryness, dullness, and irritation. Exfoliation is an essential skincare product that removes dead skin cells, promotes cell turnover, and improves skin texture and appearance.

Mechanism of exfoliation:

1. Physical/Manual Exfoliation
2. Chemical/Herbal Exfoliation

Manual skin exfoliation refers to any type of topical skin exfoliation that is applied to the skin manually with fingers or an applicator. It is suitable for

normal skin. Mechanical exfoliation involves physically scrubbing the skin with a mild abrasive such as microfiber cloths, adhesive exfoliation sheets, microbead facial scrubs, crepe paper, crushed apricot kernels or almond shells, sugar or salt crystals, or pumice, or using abrasive sponges and brushes. Mechanical friction with abrasives exfoliates the outer corneocytes that comprise the stratum corneum layer, and results will vary depending on the amount of friction and the nature of the abrasive used (Chattopadhyay 1998). As a mechanical process, gentle exfoliation can be achieved with microbead face scrubs that will remove the top layer of skin. ^[1]

Chemical exfoliation may involve the use of products that contain alpha hydroxy acid (AHA) or beta hydroxy acids (BHAs) or enzymes that act to loosen the glue-like substance that holds the cells together,

allowing them to slough off. It is thought that AHAs primarily affect the skin by normalizing cell turnover in the epidermis. This stimulates the formation of normal, healthy skin, sloughing off of dead cells from the stratum corneum, a decreased formation of dry scales on the skin's surface, and stimulation of the cell cycle. It is often said that AHAs affect the skin from the inside out because of the suggestion that they influence coenocyte cohesion in the lower layers of the stratum corneum. The result is a thinner stratum corneum that is more flexible and compact, reflects more light, and overall gives the skin a more youthful appearance. ^[1] *Clitoria ternatea* flowers have been found to possess remarkable antioxidant properties; its aqueous extract does contain Alpha-Hydroxy Acids (AHAs), specifically:

1. Malic acid: A naturally occurring AHA, malic acid has been identified in *Clitoria ternatea* flower extract ^[2].
2. Citric acid: Another AHA, citric acid has also been detected in *Clitoria ternatea* flower extract ^[3].

These AHAs, particularly malic acid and citric acid, are known for their:-

- Exfoliating properties, helping to remove dead skin cells and promote cell turnover
 - Humectant properties, helping to retain moisture in the skin
 - Antioxidant properties, helping to protect the skin from environmental stressors

The presence of AHAs in *Clitoria ternatea* flower aqueous extract contributes to its potential benefits for skin exfoliation, brightening, and hydration.

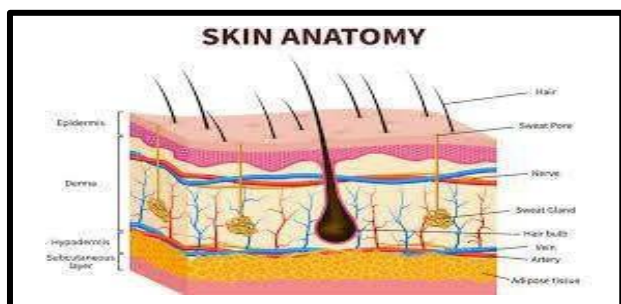


Fig.no 1 Skin structure

Scrub cubes: Scrub cubes are solid, cube-shaped products that combine the benefits of exfoliation with the nourishment of moisturizing ingredients.

The Rise of Scrub Cubes Exfoliating is an essential step in any skincare routine, helping to remove dead skin cells, unclog pores, and reveal brighter, smoother skin. Traditional exfoliating methods, such as sugar or salt scrubs, can be messy and inconvenient. That's where scrub cubes come in – a innovative, easy-to-use, and effective way to exfoliate and nourish your skin.

Herbal body scrub cubes: These are a type of skincare product that combines the benefits of exfoliation and herbal therapy to promote healthy, glowing skin, says goodbye to cellulite, stretch marks, dark spots, and acne

scars, while also helping to combat blocked pores, blackheads, ingrown hair, and blemishes.

How to use: In the shower, add water to one or two cubes and gently massage onto wet, focusing on rough patches Rinse off to reveal soft, smooth and hydrated skin.

Benefits of Herbal Body Scrub Cubes

- Convenient and easy to use
- Gentle yet effective exfoliation
- Antioxidant protection
- Customizable for different skin types and concerns

Ideal Properties of Herbal Body Scrub Cubes

- It should be non toxic and non irritant.
- It should be non greasy and easily washable.
- It must possess small gritty particle or mild abrasive.
- It contain antioxidant qualities that encourage healthy looking skin^[4].
- It must have properties like remove dead skin cell^[4].



Fig.no 2 Herbal Body Scrub Cubes

II. PLANT PROFILE^[5]

Clitoria ternatea

➤ **Scientific Name:-** *Clitoria ternatea*

➤ **Synonyms:**

- Aprajita
- Butterfly Pea
- Asian Pigeonwings
- Gokarni
- Garnee

➤ **Biological Source:** It is obtained from the plant of *Clitoria Ternatea L.*

➤ **Colour:** Blue

➤ **Odour:** Sweet

➤ **Taste:** Slightly bitter taste

➤ **Taxonomical classification:**

- Kingdom: Plantae
- Order: Fabales
- Family: Fabaceae
- Genus: Clitoria
- Species: Ternatea



Fig.no 3 *Clitoria ternatea*

➤ **Chemical constituents:** It consist variety of chemical constituents, including flavonoids, alkaloids, anthocyanins, and phytosterols. It contain Taraxerol, Aparajitin, Kaempferol.

➤ **Part of the plant used:** Flowers

➤ **Uses:**

1. Natural exfoliant to remove dead skin cells
2. High in antioxidants beneficial for skin health
3. Delay skin aging
4. Prevent premature aging
5. Enhances the overall tone and texture of the skin

III. MATERIAL AND METHODS

Ingredients:

Ingredients for formulation of Herbal Body Scrub cubes are given in table no. 1.

Table no. 1 Ingredients

Sr. No	Chemicals	Source
1	Glycerine base	Bodhichitta organic
2	Shea butter	Oriana traders
3	Bees wax	College Laboratory
4	Sugar	Marketed
5	<i>Clitoria ternatea</i> extract	Prepared in college Laboratory
6	Methyl paraben	Research Lab-fine Chem Industries, Mumbai
7	Sandalwood Perfume	College Laboratory



Fig.no 4 Ingredients

Method of Preparation:

➤ **Method of *Clitoria ternatea* extract:**

By Double Boiling Method

- Weigh the flowers (5gms), keep in beaker.

- Add 50 ml distilled water.
- Heat in water bath for 1 hour at 90-95 °C.
- Strain the herbal extract.

➤ **Method of Herbal scrub cube preparation:**

1. Melt the glycerine base in beaker at 95°C
2. Add beeswax
3. Add Shea butter, Cool at room temperature.
4. Add herbal extract
5. Add granulated Sugar
6. Add Perfume
7. Pour into mould and let it settle down at room temperature

Formulations:

The following formulation table outlines the carefully selected blend of natural ingredients and herbs used in our herbal body scrub cubes. Each ingredient has been chosen for its unique properties. The quantity given below represents the proportion of each ingredient in the final product.

Table no 2 Formulations

Sr. No	Ingredients	Uses	F1	F2	F3	F4	F5
1	Glycerine base (gm)	Hardness, exfoliation, Cleansing property	30	30	30	30	30
2	Shea butter (gm)	Moisturizer	3.0	3.2	3.4	3.6	3.8
3	Beeswax (gm)	Emulsifying agent, stabilizer and gives thickness to the cube	6	5	4	3	2
4	Sugar (gm)	Exfoliant	12	13	14	15	16
5	<i>Clitoria ternatea</i> extract (ml)	Antioxidant	6.5	7	7.5	8	8.5
6	Methyl paraben (gm)	Preservative	0.02	0.02	0.02	0.02	0.02
7	Sandalwood Perfume (ml)	Fragrance	2.5	2	1.5	1	0.5

Phytochemical screening^[7]: It comprised of tests for the presence of Alkaloids, Tannins, Glycosides, Resins, Steroids, Saponins, Flavonoids and Phenols,

Test for Alkaloids:- About 0.5 gm of methanol extract was taken in a test tube and was diluted and homogenized with 10 ml distilled water. dissolved in 20 ml dilute hydrochloric acid solution and clarified by filtration. The filtrate was tested with Dragendroff's and Mayer's reagent. The treated solution was observed for precipitation of white or creamy colour.

Test for Tannins:- About 2 ml of extract was boiled with 1 ml of 1% aqueous hydrochloric acid was taken and observed for the red precipitation which showed that presence of tannins,

Test for Glycosides:- About 0.5 gm of methanol extract was taken in a test tube and 1 ml glacial acetic acid containing traces of ferric chloride was added to it. To this solution, 1 ml concentrated sulphuric acid was added and observed for the formation of reddish brown colour at the junction of the two layers and the upper layer turned bluish green in the presence of glycosides.

Test for Resins:- For the tests concerning the presence of Resins, 0.5 gm of methanol extract was taken in a test tube and 5 ml of distilled water was added to it and observed for turbidity which indicates the presence of Resins.

Test for Anthocyanin:-

Sulfuric acid test: 1mL of concentrated sulphuric acid was added to 2mL extract. The presence of anthocyanin would be indicated by orange coloration of the interface.

Sodium hydroxide test: 2 drops of 1 N sodium hydroxide were added to 2mL of extract. The presence of anthocyanin would be Indicated by blue to bluish-green coloration.

Test for Saponins:- About 0.5 gm of methanol extract was taken in a test tube and 5 ml distilled water was added to it. The solution was shaken vigorously and observed for persistent froth. The frothing was mixed with 3 drops of olive oil and shaken vigorously after which it was observed for the formation of an emulsion.

Test for Flavonoids:- About 0.5 gm of extract was introduced into 10 ml of ethyl acetate in a test tube and heated in boiling water for 1 min. The mixture was then filtered. About 4 ml of the filtrate was shaken with 1 ml 1% aluminium chloride solution and incubated for 10 min. Formation of yellow colour in the presence of 1 ml dilute ammonia solution indicated the presence of flavonoids.

Test for Phenols:- About 0.5 gm of extract was taken in a test tube, mixed with 100ml distilled water and heated gently. To this, 2 ml of ferric chloride solution was added and observed for the formation of green or blue colour.

IV. EVALUATION TEST^[8]

The prepared herbal body scrub cubes was evaluated for appearance, pH, consistency, washability, grittiness, foamability, stability study, Acid value, Cleansing test on human volunteers.

Appearance: The prepared scrub cube was evaluated for its colour, odour, texture, weight and shape.

pH: Ph of the scrub was evaluated by using Digital pH meter. As pH of the scrub cube cannot be directly measured, 10% dilution were made with distilled water and the pH was determined.

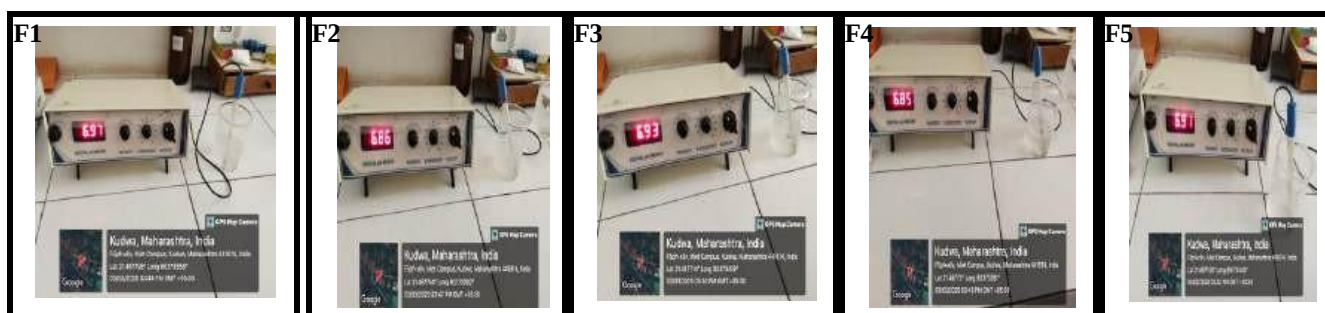


Fig.no 5 pH Test

Consistency: It was found to be solid by visual observation

Washability: Little quantity of scrub cube was applied over the skin and was washed with water. Formulation on applied on skin was easily removed by washing with water tested manually.

Grittiness: This test is checked for the presence of any gritty particle by applying it on the skin.



Fig. no 6 Grittiness test



Fig.no 7 Foamability test

Foamability: Small amount of formulation was taken in a measuring cylinder and water in it and shake for 10 times and note the final volume.

Antibacterial Activity: The antibacterial screening of herbal scrub cube was done by disc diffusion method. The herbal scrub cube were tested against bacterial agents namely S. aureus and E. coli. Nutrient agar media was sterilized and poured into petri plates. After

solidification, 0.1ml of the inoculum was spread over the agar evenly using a rod. 6mm diameter cavity was prepared and formulated gel is placed in the cavity. A standard antibiotic was used as the control. The inoculated plates are incubated for 24 hours. Later, the zone of inhibition around the disc was measured and recorded.



Fig. no 8 Antimicrobial test

Scrubbing Action: Apply a standardized amount of scrub product to the skin sample for a standardized time, Rinse with warm water and evaluate visually to assess the level of exfoliation and repeat on multiple skin samples to ensure reproducibility.

Accelerated stability studies: As per ICH Guidelines, the stability testing of herbal body scrub cubes formulation was done for 45 days at a temperature of $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ / RH 60% and $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ /75% RH. The cubes formulation was evaluated for the change in appearance, pH and other such parameters after stability studies.

Acid Value: Weigh 5g of scrub cube sample into 100 ml volumetric flask. Add 50 ml of ethanol to the flask. Heat the mixture gently (around 40°C) to dissolve sample completely. Cool the solution to room temperature. Transfer 10 ml of sample solution into 100 ml conical flask. Add 2-3 drops of phenolphthalein indicator. Titrate with 0.1 N potassium hydroxide using a burette, continue titrating until solution turns pink, indicating the endpoint. Repeat the titration for blank sample without the fat.

Formula:

$$\text{Acid Value} = \frac{\text{Titer value} \times \text{Normality of standardized KOH} \times \text{Molecular weight of KOH}}{\text{Weight of fat}}$$



Fig.no 9 Acid value

Cleansing test on Humans volunteers : This evaluation test was carried out on human volunteers. Herbal Body Scrub Cubes were applied on the hands as guided. Before and after application of the product, the readings were taken on the basis of photographs.

Sr. no	F1	F2	F3	F4	F5	Marketed preparation
Before Application						
During Application						
After Application						

Fig.no 10 Cleansing test on human volunteers

V. RESULT AND DISCUSSION

Phytochemical Screening

Table no. 3 Phytochemical Screening

Sr no.	Test	Observation	Inference
1.	Test for Alkaloids		

	Dragendorff's test	A Reddish brown precipitate	Alkaloids were absent
	Mayer's test	Cream colored precipitate formed	Alkaloids were absent
2.	Test for Tannins	Red precipitate formed	Present of tannin
3.	Test for Glycosides	Reddish brown colour at the junction of two layer turned bluish green	Glycosides are present
4.	Test for Saponins	Formation of emulsion	Saponins are present
5.	Test for Resins	Turbidity observed	Resins are present
6.	Test for Anthocyanin		
	Sulfuric acid test	Orange coloration at the interface	Presence of anthocyanin
	Sodium hydroxide test	Blue to bluish-green colour	Presence of anthocyanin
7.	Test for Flavonoids		
	Shinoda test	Red colour	Presence of flavonoid
8.	Test for Phenols	Green or blue colour formed	Presence of phenols

Physical Parameters:

Table no. 4 Physical parameters

Sr.no	Physical parameters	F1	F2	F3	F4	F5
1	Colour	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue
2	Odour	Pleasant	Pleasant	Pleasant	Pleasant	Pleasant
3	Shape	Cubic	Cubic	Cubic	Cubic	Cubic
4	Weight (Average)	15.17gm	14.27gm	14.87gm	15.07gm	14.61gm
5	Texture	Rough	Rough	Rough	Rough	Rough

Evaluation test:

Table no. 5 Evaluation test

Sr.no	Test	F1	F2	F3	F4	F5
1	Washability	Easily washable	Easily washable	Easily washable	Easily washable	Easily washable
2	Foamability	4.5cm	4.9cm	4cm	3cm	3.2cm
3	pH	6.97	6.86	6.93	6.85	6.91
4	Grittiness	Gritty particle present	Gritty particle present	Gritty particle present	Gritty particle present	Gritty particle present
5	Scrubbing action	High	Moderate	Low	High	Low
6	Acid Value	4.48	3.36	3.92	5.61	3.81
7	Cleansing test on human volunteer	Considerable	Optimum	Considerable	Considerable	Considerable

Antimicrobial Activity test:

Table no. 6 Antimicrobial Activity Test

Sr.no	Formulation code	Zone of inhibition(mm)	
		<i>Staphylococcus aureus</i>	<i>Escherichia coli</i>
1	F1	16.4mm	13.2 mm
2	F2	16.2mm	13mm
3	F3	16.7mm	13.5mm
4	Marketed preparation	18mm	14mm

Accelerated stability studies:**Table no. 7 Accelerated stability studies**

PARAMETERS	F1	F2	F3	F4	F5
Change in colour	Week 2- no change	Week 2- no change	Week 2- no change	Week 2- no change	Week 2- no change
	Week 4- slight change	Week 4- No change	Week 4- slight change	Week 4- No change	Week 4- slight change
Change in pH	Week 2- slight change	Week 2- no change	Week 2- slight change	Week 2- no change	Week 2- slight change
	Week 2- slight change	Week 2- no change	Week 2- slight change	Week 2- no change	Week 2- slight change

Comparision between herbal formulation and marketed formulation:**Table no. 8 Comparision between herbal formulation and marketed formulation**

Sr. no	Evaluation test	F1	F2	F3	F4	F5	Marketed Preparation
1	Colour	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Green
2	Odour	Pleasant	Pleasant	Pleasant	Pleasant	Pleasant	Pleasant
3	Shape	Cubic	Cubic	Cubic	Cubic	Cubic	Cubic
4	Weight (Average)	15.17gm	14.27gm	14.87gm	15.07gm	14.61gm	28gm
5	Texture	Rough	Rough	Rough	Rough	Rough	Rough
6	Cleansing Test on human volunteers	considerable	optimum	considerable	considerable	considerable	considerable
7	Washability	Easily washable	Easily washable	Easily washable	Easily washable	Easily washable	Easily washable
8	Foamability	4.5cm	4.9cm	4cm	3cm	3.2cm	7cm
9	pH	6.97	6.86	6.93	6.85	6.91	6.54
10	Grittiness	Gritty particle present	Gritty particle present	Gritty particle present	Gritty particle present	Gritty particle present	Gritty particle present
11	Scrubbing action	High	Moderate	Low	High	Low	Moderate
12	Acid value	4.48	3.36	3.92	5.61	3.81	-

**Fig no. 11 Prepared Formulation****VI. DISCUSSION**

Evaluation of prepared herbal body scrub cubes was done for physical appearance, pH, cleansing, washability, skin irritation, foam ability, grittiness, scrubbing, rancidity tests, and antimicrobial tests. The color of herbal body scrub cubes is light blue; its odor is pleasant, its shape is cubic, its average weight is 15 gm, and its texture is rough due to the presence of granulated sugar as an exfoliant. The physical appearance of all

batches is almost similar. Washability of all the batches is even. Foamability of each batch differs in the foam height: F1 is 4.5 cm, F2 is 4.9 cm, F3 is 4 cm, F4 is 3 cm, and F5 is 3.2 cm due to the variation in presence of additives. pH of F1 is 6.97, F2 is 6.86, F3 is 6.93, F4 is 6.85, and F5 is 6.54. The grittiness of all the batches resembles each other. The scrubbing action of F1 and F4 is high, F2 is moderate, and F3 and F5 are low. The rancidity test, i.e., the acid value for F1 is 4.48, F2 is 3.36, F3 is 3.92, F4 is 5.61, and F5 is 3.81. Cleansing

test on human volunteers has been done, and the result for F1 and F4 is good; F3 and F5 are moderate, and F2 is excellent due to its ability to easily remove dead skin. The antimicrobial activities of herbal soaps were studied. The results obtained from the studies were shown photographically as well as in Table No. 7. The zones of inhibition for F1, F2, and F3 formulations were calculated. The F2 formulation showed a maximum zone of inhibition compared to the F1 and F3 formulations. A significant result was obtained for the F2 formulation against *Staphylococcus aureus* and *Escherichia coli*, which were found to be 16.4 mm, 16.2 mm, and 16.7 mm, respectively, and 13.2 mm, 13 mm, and 13.5 mm, which showed a significant zone of inhibition and acted effectively against bacteria. As we discussed in the previous discussion about the different quality, activity, and evaluation tests of us.

VII. CONCLUSION

From the study, it can be concluded that prepared Herbal Body Scrub Cubes formulation F2 using Glycerine Base, Beeswax, Shea Butter, Granulated Sugar, Herbal extract is suitable for exfoliation, cleansing, and better anti-microbial activities. From the comparative study, it is concluded that the formulated preparation shows better activities as compare to that of marketed product. Hence, the formulated product reduces the side effect of Herbal body scrub cubes preparation and it does not show any harmful effect on our body.

Prepared formulation. As such, the same for the marketed formulation is to obtain the proper comparative studies on both of them to check the activity of the formulated and marketed ones. The evaluation study that was done on the formulated preparation was the same as the one performed on the marketed formulation as well to check the effectiveness of both products. From the above-cited study, it was found that the formulations F3 & F4 were superior, and F2 was found to be the optimum batch among the other formulations.

This formulation shows various kind of future prospect regarding the preparation of cosmeceuticals and skincare product. Due to the increase demand for herbal natural product it can have an contribution in market expansion and global research.

This formulation shows contribution in the pharmaceutical and therapeutic application and natural, organic product development.

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