IJBPAS, September, 2024, 13(9): 4504-4511

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

FORMULATION AND EVALUATION OF EXFOLIATOR FROM ANNONA RETICULATA

TIRTH THAKER*, PARIMAL PATEL AND DHAVAL PATEL

Department of Chemistry, Parul Institute of Applied Sciences, Parul University, Waghodia, Vadodara-391760, Gujarat, India

***Corresponding Author: Dr. Tirth Thaker: E Mail: tirth6582@gmail.com**

Received 18th July 2023; Revised 20th Sept. 2023; Accepted 2nd Dec. 2023; Available online 1st Sept. 2024

https://doi.org/10.31032/IJBPAS/2024/13.9.8317

ABSTRACT

The demand for cosmetics is now clearly bigger than that of any other products on the market. The majority of beauty products are comprised of chemicals, which affect the skin, but people have already started turning their attention away from chemicals and toward natural goods. On the other hand, beauty is delivered naturally via natural products. Natural products are consequently in greater demand. This study focuses on the skin which is a sensitive organ of the body. Any inadequate product applied to it can produce results in a matter of minutes and cause swelling, irritation, discoloration, and other problems. It is vital to treat this sort of skin which can be done effectively using natural products. Moisturizers are used to prepare the normal skin and exfoliator is used to moisturize, smooth, and clean the skin. The skin on the face is thinner than other parts of the body's skin. So, a chapped and dry face can be cured using an exfoliator. It hydrates and heals skin faster. In the current era, numerous studies have been conducted to enhance a person's beauty through nature and the results include products that include Annona Reticulata (Custard apple) used to make the skin more radiant and smoother, coconut oil as a moisturizer, smooth and spreadable mixture, beeswax for proven stability.

Keywords: Annona Reticulata, Beeswax, Coconut oil, exfoliator

INTRODUCTION

Cosmetics are used to enhance or change the appearance, scent or feel of the face, body or fragrance. The word "cosmetics" derives from the Greek word "kosmos," which refers to substances that are intended to be rubbed, poured, sprinkled, sprayed or otherwise applied to any part of the human body for cleansing, beautifying, enhancing attractiveness or modifying appearances **[1]**. Facial cleansers must be a part of the

skincare regimen. A face exfoliator commonly known as the scrub is usually a cream-based treatment that contains microscopic exfoliating particles that, when rubbed over the skin, help to physically remove dry, dead skin cells, hence assisting in skin smoothing. Unquestionably, skin will feel smoother, purer and more energized **[2]**. A cosmetic is a substance applied to the human body for cleansing, beautifying, enhancing beauty or modifying the look without affecting the body's structure or functions, according to the United States Food and Drug Administration (USFDA). Consumers today utilise the majority of cosmetics to improve their appearance without considering the impact on the skin. One of the adverse effects of paraben usage is skin allergy **[3]**. There are many various types of cosmetics and each one has a unique impact on the skin. Exfoliators effectively address a variety of skin problems, including dullness and lifelessness. Body scrubs and face scrubs are the two types of scrubs used on the skin. The only distinction between these two is the amounts of sugar and oil that are used. Depending on the kind of skin, just the essential oil used as a component of the scrub will alter. The three varieties of skin are dry skin, oily skin and sensitive skin **[4]**. Herbal ingredients are currently highly appreciated because of their historical importance and present relevance in the cosmetics industry. New safety issues arise when natural plant chemicals are used more often in personal care products, necessitating the development of novel methodologies for assessing their safety, similar to those used for plant-derived food additives **[5]**. Looking towards exfoliating properties of Annona Reticulata peel, exfoliator formulated utilizing its peel. Ideal properties of an exfoliator (scrub) should be non-toxic, possess small gritty particles, Mild abrasive, non-irritating, non-sticky, and able to remove dead skin cells **[6]**.

MATERIALS AND METHODS

Materials:

1. Annona Reticulata (Custard apple): One of the important contemporary fruit crops in India is the custard apple. Despite the fact that custard apples are often eaten as a fruit for dessert, both the pulp and the seeds contain medicinal properties. It belongs to the Annonaceae family, which is in the order Magnoliales. Other names for it include sweet apple, Sharifa, and sitaphal **[7]**. Additionally, it has vitamin A, which skin healthy **[8]**. The benefits of custard apple for the skin are Good for skin rejuvenation, naturally healing skin infections, keeping skin cancer away, Lowering pigmentation problems, good for pimple-prone skin, and Natural detoxifying agent **[9-11]**. In addition, it provides Vitamins C, B, and antioxidants are among

the elements and are all essential for skin renewal.

2. Coconut oil: It is clear that it is liquid in the summer and freezes into white fat in the winter since it is 99% unsaturated fat. Coconut oil is said to be beneficial for the skin because of its natural properties. It acts as a barrier, protecting the skin from injury and diseases while hydrating it **[12]**.

3. Aloe vera: Injured skin, especially skin damaged by free radicals, receives hydration, smoothness, and suppleness from the polysaccharides, enzymes, vitamins (B2, B6, C, and E), minerals (selenium and manganese) and amino acids like proline and salicylic acid found in aloe vera **[13]**. Aloe vera is a plant with anti-inflammatory, skin-moisturizing, anti-acne, and anti-allergic qualities that are frequently employed raw in traditional herbal remedies **[14]**.

4. Beeswax: The use of biologically active natural compounds obtained from bee products in alternative medicine is growing in acceptance in today's culture. Bee products have been used as ingredients in skin care products, therapies, and cosmetics. Numerous studies have shown how bee products influence the skin and their therapeutic value is highlighted by the use of honey, propolis, bee pollen, and bee venom in the treatment of wounds **[15-18]**.

Collection of custard apple peel and pulp powder: Fresh custard apple was collected from the market. pulp and peel were separated to cut them into small pieces then it was dried in shade for 3-4 days. The dried sample was grinded properly to convert into powder form.

Formulation: The cream base was prepared by diluting 1.1gm of bees into 11ml of coconut oil in a water bath. The mixture was heated in a water bath at 60-65 ˚C until it converts into thick form and the mixture was cooled down at room temperature for further process. 0.3gm of Sodium Lauryl Sulphate, 2.8gm of custard apple peel powder, 1.9gm of custard apple peel powder, and 2.9gm of aloe vera gel were added into the cream base on a water bath with continues stirring to prepare a paste. Allow it to reach 25-30 ˚C and store it. Wt. of formulated scrub 18 gm. Use it as an exfoliator.

Exfoliant: Exfoliation is the process of removing old skin cells to make room for new ones and a facial scrub uses tiny particles, beads, or chemicals to accomplish this. Exfoliants are substances applied to the skin to remove dead skin cells. Exfoliating substances are used to get rid of dead skin cells on the skin and increase blood flow, giving the skin a fresh glow. It prevents oil, dirt, and dust from settling on the face, which is good for keeping pores on the skin clean **[19]**.

RESULTS & DISCUSSION:

pH: In an effort to rule out any potential detrimental effects, the pH of scrub was

evaluated. The pH of the touchscreen was set to be as close to neutral as possible because an acidic or alkaline pH can irritate the skin. The pH test involved dissolving 1 gm of material in 100 ml of water. The pH was assessed using a pH meter. The formulated that was tested has a pH 6.97.

Melting point: A melting point equipment was used to ascertain the melting point of scrub. To determine the melting point, a sample of scrub was put in a glass capillary with one end sealed by flame. The capillary holding the scrub was submerged in liquid paraffin inside the melting point device, which was equipped with magnetic stirring. The melting point was determined visually and it was reported.

Custard apple scrub melting point = 69 - 71ºC

Washability: The formulation sample can be applied on the skin and easily removed by washing with water is checked manually grittiness. The product can be checked for the presence of any gritty particles by applying it to the skin.

Viscosity: Using a Brook field viscometer, the viscosity of the scrub formulas was assessed. After allowing the scrub sample to settle in the viscometer's sample holder for five minutes, the viscosity was measured. The viscosity of scrub- 1.4210 poise

Formability: In a graduated measuring cylinder, a little amount of gel and water were agitated to create foam, which was then measured. After recording the initial volume, the beaker was shaken ten times before the final volume was recorded. The formability of the scrub is good.

Organoleptic properties: The scrub organoleptic characteristics, such as colour, odour, and appearance were examined **(Table 1)**.

Moisture content: For accelerated stability testing, prepared scrub was stored for 30 days at both ambient temperature (25.0 ± 3.0 ºC) and refrigeration (4± 2.0 ºC). It was evaluated for organoleptic characteristics, melting point and pH after 30 days and found consistent result with no decay **(Table 2)**.

Table 1: Organoleptic characteristics of formulated exfoliator (scrub)

Parameter	Observation
Colour	Light Brown
Appearance	Soft and non sticky
Odour	Pleasant

Table 2: Moisture content (%) study of Custard apple scrub.

Storage Temp. (˚C)	Moisture content after interval of successive month (% w/w)			
	1 Month	2 Month	3 Month	4 Month
4 ± 2.0	1.14	1.15	1.14	1.16
25.0 ± 3.0	1.19	1.18	1.17	1.18

Table 3: Weight degradation study of scrub at room temperature.

Content	Initial	1 Month	2 Month	3 Month	4 Month
Wt. of Custard apple scrub (in gm)	20	20	20	19.9	19.9

Antibacterial activity: A bacterial assay is a specific type of biological test that uses microorganisms. The amount of bacterial growth inhibition caused by a compound's or test extract's concentration is compared to the amount caused by the absence of a typical antibiotic formulation with non-steroidal antimicrobial agent activity in a biological assay for bacteria. The bacterial experiment may be carried out in a variety of ways utilising a disc plate.

Disc plate method: This technique enables you to identify the antibiotic resistance of a specific bacteria. A disc containing antibiotics is put on an agar plate after bacteria are added to it. The effectiveness of this method depends on the antibiotics spreading from one area to another antibiotic disc to the point when any further bacterial growth in a cyclical pattern is entirely prevented in a "Zone" surrounding the antibiotic solution disc or test material.

The study included results over *Staphylococcus aureus, Escherichia coli, Bacillus* subtilis, *and Enterobacter* bacterial strains. The bacterial culture was given by the microbiology division of the Parul Institute of Applied Science. Using cultures of the organisms that were 24 hours old, the antibacterial activity of the organisms was evaluated. The nutrient agar medium plates were created using 15 to 20 ml of nutrient agar media and 90 cm sterile Petri dishes. The plates were contaminated with 0.1 percent inoculums after they had hardened for five to ten minutes. For the agar disc diffusion process, agar discs with a diameter of 5 mm were created using No. 1 Whatman filter paper or newspaper and sterilized in an autoclave. The discs were then filled with varied sample concentrations. The plates were then kept at 37°C for an additional 24 hours of incubation. The plates were left to stand for 30 minutes before being incubated at 37°C for 24 hours.

The inhibitory zone's mm-diameter was used to measure the antibacterial activity. The zone of inhibition against the test pathogens was measured in order to assess antimicrobial activity **[20-21]**.

Table 4: Antimicrobial and zone of inhibition of custard apple scrub

Zone of inhibition (in mm)				
Sample	*Gram +ve*		*Gram -ve*	
	Bacillus subtilis	*Staphylococcus aureus*	*Escherichia coli*	*Enterobacter*
Formulated Scrub	20	24	16	17
Ampicillin	7	8	6	6

RESULTS

Sr. No.	Parameters	Observation
1	pH	6.97
2	Melting point	69-71^{0}C
3	Washability	Easily washable
4	viscosity	1.4210 poise
5	Formability	Good
6	Colour	Light brown
7	Appearance	Soft and non-sticky
8	odor	pleasant

CONCLUSION: This research innovates herbal scrub with consistent weight, moisture content, and skin-friendly pH. Various characteristics were used to assess the produced scrub gel and it was determined to be satisfactory for the application without causing any adverse effects, on the skin to make it healthy and radiant. Formulated exfoliator possess promising antibacterial activity which enhances medicinal importance. The formulated scrub is having great commercial scope as it shows medicinal properties with promising and consistent results and ends with radiant skin.

Acknowledgment: The authors are thankful to Dr. Devanshu Patel, President, Parul University, for providing the necessary infrastructure facilities.

REFERENCES

[1] Esposito E, Carotta V, Scabbita A, Yalkowsky, Slunick, Stoughton. Cutaneous and transdermal delivery: Processes and systems of delivery. In: Baker GS, Rhodes C, editors. *Modern Pharmaceutics. USA: Marcel Dekker, Inc*. 1996. 239-98.

[2] Banchhor M, Ashawat MS, Saraf S, Saraf S. Herbal cosmetics: Trends in skin care formulation. *Phcog* . 2009, *3*, 82-9.

[3] J E Nagel, J T Fuscaldo, P Fireman. Paraben allergy. *JAMA*. 1977, 1594–1598

[4] Garg A, Agarwal D and Garg S. Spreading of semisolid formulation. *Pharm Tech*. 2002, *9*, 89-105.

[5] Nohynek GJ, Antignac E, Re T, Toutain H. Safety assessment of personal care products/cosmetics and their ingredients. *Toxicol Appl Pharmacol*. 2010, *243(2)*, 239–259.

[6] Chein Y W. Transdermal Drug Delivery. *in: Swarbick J. editor, Novel Drug Delivery Systems, second edition, New York: Marcel Dekker* 2005, *1*, 301-380.

[7] De LC and Bhattacharjee SK. Handbook of Vegetable Crops. *Pointer Publisher Jaipur*. 2011, 76-81.

[8] Hundal J S and Khurana D S, CH-1 A new hybrid of chilli. *Prog. Fmg*. 1993, *29*, 11-13.

[9] Gupta R K, Kesari A N, Watal G, Murthy P S, Chandra R and Tandon V. Nutritional and hypoglycemic effect of fruit pulp of Annona squamosa in normal healthy and alloxan-induced diabetic rabbits. *Annals of Nutrition and Metabolism*. 2005, 49(6), 407- 413.

[10] Hansche P E and Gabelman W H. Digenic Control of Male Sterility in Carrots, Daucus carota L. *Crop Science*. 1963, *3(5)*, 383- 386.

[11] Hole R, Wakade A, Juvekar A, Nachankar R and Kulkarni M. Protective effect of Annona reticulata L. fruits on isoproterenol induced myocardial infarction in rats. *In International Congress Phytopharm St Petersburg Russia*. 2006.

[12] Fabian M. Dayrit, The Properties of Lauric Acid and Their Significance in Coconut Oil. *J Am Oil Chem Soc*. 2015, *92*, 1-15.

[13] Bassetti A, Sala S. The Great Aloe Book. *Trento: Zuccari Pty Ltd*. 2005, *50*, 95–155.

[14] Chandegara V, Varshney AK. Aloe Vera L. processing and products: A review. *Int J Med Arom Plants*. 2013, *3(4)*, 492–506.

[15] A Kurek-Gorecka, M Gorecki, A R Stojko, R Balwierz, J Stojko. Bee Products in Dermatology and Skin Care. *Multidisciplinary Digital Publishing Institute*. 2020, *25*, 1-17.

[16] F Fratini, G Cilia, B Turchi, A Felicioli. Beeswax: A Minireview of its Antimicrobial Activity and its Application in Medicine. *Asian Pacific Journal of Tropical Medicine*. 2016, *9*, 839-843.

[17] M D Navarro-Hortal, F J Orantes-Bermejo, C S Gonzalez, J I Quiles. Industrial-Scale Decontamination Procedure Effects on The Content of Acaricides, Heavy Metals and Antioxidant Capacity of Beeswax. *Multidisciplinary Digital Publishing Institute*. 2019, *24*, 1-13.

[18] Yeshitila Eshete, Tekeba Eshetie. A Review on Crude Beeswax Mismanagement and Lose. *Research Journal of Food and Nutrition* 2018, *2*, 4-12.

[19] Aglawe SB, Gayke AU, Khurde A, Mehta D, Mohare T, Pangavane A, Kandalkar S. Preparation and Evaluation of Polyherbal Facial Scrub. *J Drug Delivery and Therapeutics*. 2019, *9(2)*, 61-63.

[20] Runyoro D, Matee M, Olipa N, Joseph C, Mbwambo H. Screening

of Tanzanian medicinal plants for anti-Candida activity. *BMC Complement Altern Med*. 2006, *6*, 11

[21] S Priya Joy and Dr. D. Patric Raja. Anti-Bacterial Activity Studies of Jasminum grandiflorum and Jasminum sambac. *Ethnobotanical Leaflets*. 2008, *12*, 481-483.