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FORMULATION AND EVALUATION OF BODY SCRUB CREAM FROM CARROT DREGS (*Daucus carota* L.)

FORMULASI DAN EVALUASI KRIM BODY SCRUB DARI AMPAS WORTEL (*Daucus carota* L.)

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Abstract

Carrot (*Daucus carot*a L.) is a natural ingredient that is efficacious in removing dead skin cells and contains many skin-nutrient-rich compounds, including β-carotene, which is also found in carrots. This compound has a brightening effect on the skin, playing a crucial role as a precursor to vitamin A and an antioxidant. Carrot pulp is a natural ingredient that can be used as a *base for body scrub cream preparations*. This study aims to determine whether carrot pulp can be effectively incorporated into the formulation of body scrub cream. In this study, four formulas were created with varying concentrations: F1 (2.5%), F2 (5%), and F3 (7.5%). The preparation tests included organoleptic, homogeneity, pH, spreadability, emulsion type, irritation, and liking tests. The results showed that the preparation met the physical evaluation criteria, specifically a semi-solid texture and a distinctive odour from the carrot pulp. Homogeneous preparations, with a pH range of 6.0-6.2, body scrub cream preparations exhibit a spreadability of 5.1-5.5 cm, utilizing an oil-in-water emulsion. Emulsion type, all preparations do not irritate the skin, and the irritation index value is equal to 0. The results of the liking test showed that the formula most often preferred by respondents was F3, based on three parameters: texture, color, and aroma of the preparation. The results of the study indicate that the formulation and evaluation of *body scrub* cream preparations can be combined with carrot pulp to create adequate *body scrub* cream preparations.

***Keywords*:** N*atural ingredients, preparation, cream, body scrub, carrot pulp*

Abstrak

Wortel (Daucus carota L.) merupakan bahan alami yang berkhasiat mengangkat sel kulit mati dan mengandung banyak senyawa kaya nutrisi kulit, termasuk β-karoten, yang juga terdapat dalam wortel. Senyawa ini memiliki efek mencerahkan kulit, berperan penting sebagai prekursor vitamin A dan antioksidan. Bubur wortel merupakan bahan alami yang dapat digunakan sebagai bahan dasar sediaan krim lulur badan. Penelitian ini bertujuan untuk mengetahui apakah bubur wortel dapat secara efektif diinkorporasikan ke dalam formulasi krim lulur badan. Dalam penelitian ini, empat formula dibuat dengan berbagai konsentrasi: F1 (2,5%), F2 (5%), dan F3 (7,5%). Uji sediaan meliputi organoleptik, homogenitas, pH, daya sebar, jenis emulsi, uji iritasi, dan uji kesukaan. Hasil penelitian menunjukkan bahwa sediaan memenuhi kriteria evaluasi fisik, yaitu tekstur semi-padat dan aroma khas bubur wortel. Sediaan homogen dengan rentang pH 6,0-6,2, krim lulur badan menunjukkan daya sebar 5,1-5,5 cm, menggunakan emulsi minyak dalam air. Semua sediaan berjenis emulsi dan tidak mengiritasi kulit, dengan nilai indeks iritasi sama dengan 0. Hasil uji kesukaan menunjukkan bahwa formula yang paling sering disukai responden adalah F3, berdasarkan tiga parameter: tekstur, warna, dan aroma sediaan. Hasil penelitian menunjukkan

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bahwa formulasi dan evaluasi sediaan krim lulur badan dapat dikombinasikan dengan ampas wortel untuk menghasilkan sediaan krim lulur badan yang memadai.

Kata kunci: Bahan alami, sediaan, krim, lulur badan, bubur wortel

INTRODUCTION

Skin is the outermost part of the body that encloses muscles and organs. The role of the skin is vital for the body, including serving as a protector from trauma, bacterial, viral, and fungal infections, as a temperature regulator, and as a sense organ for touch. Skin care offers numerous benefits tailored to individual needs, promoting healthy skin. The most commonly observed skin problems include dull skin, a shrivelled texture, and premature ageing. To overcome these issues, body scrub cream can be used (Sari & Anggraeny, 2021). Body scrub cream is a cosmetic product that contains coarse particles to gently remove dead skin cells. This helps keep the skin clean and promotes regeneration by opening clogged pores, resulting in brighter and whiter skin (Hairiyah & Nuryati, 2020). Public trust in natural active ingredients is increasing because they are relatively safer than synthetic chemical compounds (Patrishia, 2019). Some natural ingredients that can be used as exfoliating ingredients on the whole body include coffee, bengkoang, carrot pulp, and others. Carrot (*Daucus carota* L.) is a natural ingredient that is effective in removing dead skin cells and contains many skin-nutrient-rich compounds, including β-carotene. The β-carotene content found in carrots has been shown to have a brightening effect on the skin (Sari *et al.*, 2019).

The important role of β-carotene in the body is as a precursor to vitamin A and an antioxidant. The utilisation of carrots as a juice drink only takes their juice, while the carrot pulp is thrown away as waste, even though the remaining carrot juice still contains quite a lot of carotene and pectin. Therefore, this aims to minimise the waste involved in the production of carrot juice by utilising carrot juice pulp as an ingredient in *body scrub* cream (Latifa, 2013).

Puspita's research results indicate that formulations using carrot tuber preparations (Daucus carota L.) as peel-off mask gels with a concentration of 5% yield excellent results in terms of organoleptic properties, pH, spreadability, adhesion, drying speed, and gel physical stability.9 Based on the background description above, researchers are interested in taking the title, namely the formulation and evaluation of body scrub cream preparations from carrot pulp with concentrations of 2.5%, 5% and 7.5%. Carrots are plants that have taproots. The primary function of carrot roots is to absorb water and nutrients from the soil. Additionally, carrot roots also serve as a storage site for food. Carrot roots will continue to grow and develop into edible tubers. The tubers measure 30 cm in length and 6 cm in diameter (Sasmita, 2022).

Carrot plants have a slightly rounded stem, which is relatively hard but not woody, with a diameter of 1 cm to 1.5 cm. The stem is usually yellow and slightly orange. Carrot stems do not have branches but have petioles that are long enough to resemble six branches. The primary function of the plant stem is to transport water from the soil and facilitate the process of photosynthesis. Carrot plants have compound leaves and stems with a striped texture; each carrot

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plant has 4-7 stems. The petiole of the carrot plant is quite stiff and thick, with a smooth surface (Sambi, 2022). Carrot pulp is a pulp that contains carotenoids, up to 80% of the total carotenoids in carrots. Carotenoids are antioxidants that can protect cells from damage caused by free radicals, which are known to contribute to the development of cancer. Carotenoids are provitamin A, which is very good for the prevention of cardiovascular disease, cataracts, cancer, and, of course, good for the health of our eyes. Carrot pulp is the pulp that remains after processing carrots for a beverage (juice). Carrot pulp contains carotenoids up to 80 per cent of the total carotenoids in carrots. Carotenoids are antioxidants that can protect cells from free radical damage, a leading cause of cancer. Carotenoids are provitamin A, which is suitable for the prevention of cataracts, cancer, and cardiovascular disease (Sasmita, 2022).

Therefore, to avoid wasting the carrot pulp, it is necessary to explore its utilisation. One of these methods is creating body scrub creams using specific ingredients (Fauzia, 2021). Cosmetics are indispensable to human beings, both men and women, from birth until the time they leave this world. These products are used repeatedly every day and all over the body, from hair to toes, so it is necessary to have requirements that ensure their safe use (Latifa, 2013). Body scrub cream, also known as bath scrub or body scrub, is a scrub that is used when the body is dry/wet (bathing). Body scrubbing is the activity of removing dirt, oil, or dead skin cells through massage throughout the body. The results are immediately visible; the skin appears smoother, firmer, fragrant, and has a healthy glow (Elmita, 2017).

The purpose of using a body scrub cream is to remove dead cells, dirt, and unclog pores, allowing air to circulate freely and the skin to become brighter. Although still new to the Western world, this method of body exfoliation has been a tradition in Middle Eastern countries for centuries (Siska, 2020). Body scrub creams help remove dead skin cells. A good scrub contains granules that are rough when held and applied, allowing it to lift and remove all dirt from the skin. The granules should not be too coarse to irritate the skin, too fine to release, too pointed, or too rounded to be slippery and release (Ryan, 2013). The use of scrubs is intended to remove and dispose of dead skin cells, preventing their accumulation and allowing the skin regeneration process to proceed smoothly. Various types of scrub cosmetics are widely available in the market, both in the form of creams and soaps that are equipped with halus granules (scrubs). Additionally, you can also use natural ingredients such as walnuts, oatmeal, barley, and honey. It is not necessary to use the scrub every day, but once every 3-7 days is sufficient (Hikma, 2022). This study formulates and evaluates the preparation of body scrub cream from carrot pulp (*Daucus carota* L.) with three variations, at concentrations of 2.5%, 5%, and 7.5%.

MATERIAL AND METHODS

Materials

The materials used in this study were carrot pulp, distilled water, stearic acid, cetyl alcohol, propylene glycol, triethanolamine (TEA), methyl paraben, propyl paraben, sodium lauryl sulfate, paraffin, and perfume.

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Procedure

Research Locations

This research was conducted at the Herbarium Laboratory of the Department of Biology, USK, Banda Aceh, for plant identification, and at the Pharmaceutics Laboratory of the Pharmacy Department of Poltekkes Kemenkes Aceh for the manufacture and evaluation of body scrub cream preparations.

Sampling Sample

Carrot (*Daucus carota* L.) plants, which are yellowish-orange in colour and 10-15 cm in size, were obtained from the Lambaro market in Aceh Besar.

Processing of Carrot Dregs (*Daucus carota* L.)

Carrots weighing as much as 2 Kg are peeled of their skin until clean. Then, the carrots are washed and chopped into small pieces before being mashed using a juicer. Carrots are filtered with a white cloth and allowed to stand for 2-3 hours. Then the carrots are dried in the oven at 40-60 ºC (Hafidzah, 2023).

Table 1. Body Scrub Cream Formulation

No.	Material	Total (%)			
		F0	F1	F2	F3
1	Carrot Dregs	-	2.5	5	7.5
2	Cetyl Alcohol	3	3	3	3
3	Stearic Acid	15	15	15	15
4	Triethanolamin	3	3	3	3
5	Sodium Lauryl Sulfate	2.5	2.5	2.5	2.5
6	Propylenglycol	15	15	15	15
7	Methyl Paraben	0.3	0.3	0.3	0.3
8	Propyl Paraben	0.05	0.05	0.05	0.05
9	Paraffin	5	5	5	5
10	Parfum	q.s	q.s	q.s	q.s
11	Aquadest ad	100	100	100	100

RESULT AND DISCUSSION

The organoleptical test results obtained showed that all preparations were semi-solid in shape. The colour of preparation F1 is beige to faded orange, while F2 and F3 are beige to bright orange. The odour of the formulations has a distinctive smell of dried carrot pulp. A homogeneity test can be performed by observing the homogeneity; the three formulas show homogeneous results.

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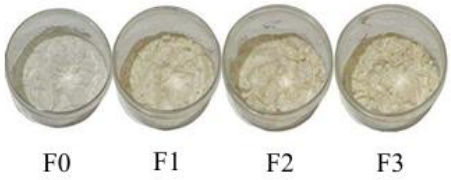

Figure 1. Body Scrub Cream

The pH test was conducted to determine the acidity level of the cream preparation. The pH value is good, according to the pH range of the skin, which is typically between 4.5 and 8.0. The results of the pH test for the preparation in all formulations meet the requirements, with values of 6.2 (F0), 6.1 (F1), 6.1 (F2), and 6.0 (F3). The spreadability test was conducted using a Petri dish to measure the diameter of the spread produced by the body scrub cream preparation. Good spreadability is 5-7 cm in diameter. The results of the spreadability test for the preparation in all formulas meet the requirements, with values of 5.3 (F0), 5.3 (F1), 5.2 (F2), and 5.5 (F3). The emulsion type test of this preparation is carried out to determine the type of emulsion of the cream preparation that has been made. The results of the emulsion type test on the preparations in all formulas have a semi-solid form with an oil-in-water ($^{o}/_{w}$) emulsion type.

The results of the irritation test showed no skin reaction in all respondents. The liking test was conducted to determine the level of respondents' liking for the body scrub cream preparations made from carrot pulp (*Daucus carota* L.) in all formulas. This test involves 10 respondents who will assess the texture, colour, and aroma of the preparation by completing the provided questionnaire sheet. The irritation test was conducted to determine whether the ingredients used in body scrub cream preparation formulations have irritating properties on the skin. The irritation test was conducted by applying body scrub cream preparations F1, F2, and F3 to the forearm, covering an area of 2.5 cm x 2.5 cm. This test was conducted on 10 respondents. After the preparation is applied, its effect is observed for 24 hours, after which the levels of oedema and erythema are noted (State, 1959). The forearm is used as an irritation test site because the skin of the forearm has the same sensitivity as facial skin. Additionally, the skin on the forearm is not overly hairy, making it easier to observe irritation. The results of the irritation test showed no skin reaction in all respondents, indicating that the preparation of body scrub cream from carrot pulp is safe to use and does not irritate the skin (Azhari, 2019). The results of the assessment of 10 respondents in the 'very like' category show that respondents, such as F3 (preparation of body scrub cream from carrot pulp, 7.5%), like both the texture, colour, and aroma. In terms of texture, seven people prefer the F3 preparation, accounting for 70% of the group. In terms of colour, eight people prefer the F3 preparation, accounting for 80% of the total. In terms of aroma, six people prefer the F3 preparation, accounting for 60% of the total. As for F1 and F2, some respondents like them.

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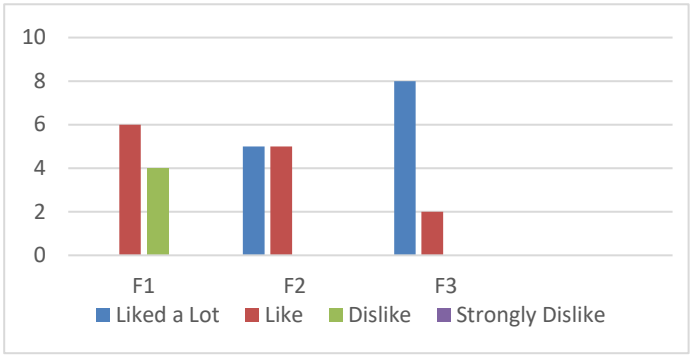

Figure 2. Results of the Body Scrub Cream Preference Test for Colour

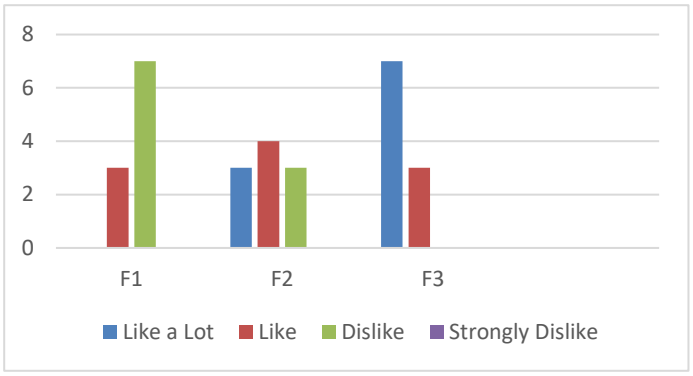

Figure 3. Results of Body Scrub Cream Preference Test for Texture

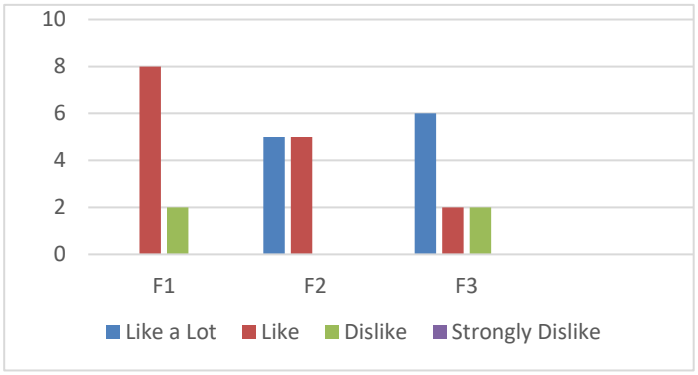

Figure 4. Results of the Body Scrub Cream Preference Test for Aroma

CONCLUSIONS

Based on the research results from the formulation and evaluation of body scrub creapreparations from carrot pulp (*Daucus carota* L.), it shows that carrot pulp can be combined into body scrub cream preparations and all body scrub cream preparation formulas from carrot pulp meet the requirements of organoleptical test, pH test, spreadability test, emulsion type test, irritation test and liking test.

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