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QUALITY TESTING AND PHYTOCHEMICAL ANALYSIS OF SIMPLICIA POWDER OF BANGKAL STEM (*NAUCLEA SUBDITA*) AND LIME EXTRACT AS TRADITIONAL SCRUBBING INGREDIENTS

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ABSTRACT

The bark of the bangkal stem is widely used as a traditional body scrub in the community with the addition of various other plants such as lime juice to maintain the health and beauty of the skin. The distribution of traditional lulurus in the market needs to be monitored for its quality so that consumers can use it safely. This study examined the quality of bangkal stem simplicia powder macroscopically and microscopically in the form of organoleptic tests, powder fineness tests, light microscopy tests, and phytochemical screening using the reagent method. The results showed that the bangkal stem simplicia powder had good organoleptic properties and the degree of fineness of the powder was in accordance with the standards. On microscopic examination visible fragments of transport bundles, stone cells, wood vessels, and fibers. It also contains secondary metabolites in the form of phenolics, saponins, and flavonoids. So it can be concluded that the bangkal stem simplicia powder which is sold as a traditional body scrub has good quality.

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Keywords: Bangkal Stems, Quality, Simplicia.

INTRODUCTION

Bangkal (*Nauclea subdita* (*Korth.*) *Steud.*) is one of the Borneo swamp plants, an upright tree with a height that can reach 7 to 16 meters. Even so, the Nauclea species grows in almost all of the Indonesian archipelago, including the islands of Kalimantan, Papua, Sumatra and Sulawesi (Aisiah, 2020; Rahmi et al., 2021). Bangkal plants are empirically often used by the Banjar and Dayak tribes as traditional cosmetics, especially the bark of the bangkal tree which is used as a wet powder or body scrub. The purpose of using cosmetics made from bangkal bark is to protect facial skin from ultra violet radiation, smooth the skin surface, give the impression of yellowish white, remove black spots, prevent acne, and clean dead cells on facial skin (Rahmi et al. , 2021).

Traditional cosmetics are widely circulated in the community and are becoming a trend again at this time because of the back to nature lifestyle which is starting to be favored by the community (Kuncari, 2020). So many traditional cosmetic manufacturers have emerged. The large circulation of traditional cosmetics such as spice scrubs on the market,

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both direct sales and e-commerce, is a concern for the Food and Drug Supervisory Agency (BPOM) because not all traditional cosmetic manufacturers make products using Good Cosmetic Manufacturing Practices (CPKB), which will affect quality.

Traditional cosmetic products, one of which is lulur bangkal which can be sold individually or mixed with other spices. For example, the Bangkal scrub product in Palangka Raya City is in the form of powdered simplicia and its use is mixed with lime juice. Therefore, this study wanted to test Bangkal simplicia powder and lime juice which are sold traditionally in Palangka Raya City to see the standard quality parameters of simplicia powder from a macroscopic and microscopic perspective which aims to check the correctness of simplicia and will affect physical properties, storage, to the acceptability of the scrub when used on the skin (Putri et al., 2019; Raharjo et al., 2021).

In addition, a phytochemical test was carried out which aimed to see the content of secondary metabolites present in bangkal and lime juice simplicia to see the function of the scrub on the skin when used (Sulianti et al., 1970).

MATERIALS AND METHODS

Materials

Bangkal stem simplicia powder is obtained from traditional scrub producers in Palangka Raya City with legal business entities but the product does not yet have a distribution permit, distilled water, hydrochloric acid, ethanol, chloroform, chloralhydrate, spiritus, and phytochemical reagents.

Methods

1. Powder macroscopic test

Bangkal simplicia powder was observed for its organoleptic properties which consisted of shape, color, smell, and taste. Furthermore, the bangkal stem simplicia powder was tested for the fineness of the powder using a graded mesh (Rhielawati, 2018).

2. Microscopic test of powder

Bangkal simplicia powder was taken little by little and placed on an object glass, then dripped with a solution of chloralhydrate and distilled water, then heated over the spirit and then covered with a cover glass and then observed under a microscope (Fitriyanti et al., 2020).

3. Test the fineness of the powder

The simplicia powder was weighed as much as 10 grams and sieved using a graded mesh of sizes 8, 20, 40, 80 and 100. Then the remaining powder was weighed in each mesh size.

4. Phytochemical screening

a. Alkaloid Test

The sample was added with 2 mL of 2 N HCl and a few drops of Mayer's reagent. The same steps were carried out for the Dragondorf test. The results are indicated by the formation of a white precipitate in Mayer's reagent and an orange precipitate in Dragendorff's reagent (Citrariana et al., 2021).

b. Flavonoid Test

The sample was added with 0.1 mg of magnesium powder and 0.4 ml of a mixture of 37% hydrochloric acid and 95% ethanol in the same volume) and 4 ml of 95% ethanol then the mixture was shaken. A positive reaction is indicated by the formation of red, yellow or orange in the amyl alcohol layer (Fatiqin et al., 2021; Fitriyanti et al., 2020).

c. Phenolic test

Samples were reacted with 1% FeCl3 solution. The results are indicated by the formation of green, red, purple, dark blue, blue, blackish blue, or blackish green (Fitriyanti et al., 2020; Rahman et al., 2022).

d. Terpenoid test

1 mL of sample was reacted with a mixture of 0.5 mL of ethanol and anhydrous acetic acid, then 2 mL of concentrated sulfuric acid through the tube wall. The results are shown by the formation of green and blue (triterpenoids), and red or purple (steroids) (Wardhani & Akhyar, 2018).

e. Saponin Test

Sempel dissolved in hot water, shaken and observed the formation of foam. Stable foam will continue to be visible for 5 minutes and does not disappear upon the addition of 1 drop of 2 N HCl indicating the presence of saponins (Citrariana et al., 2021).

f. Quinone Test

The sample was added with 1 N NaOH (1:1) and then the color change was observed. A positive reaction is indicated by the formation of a yellow color (Wardhani & Akhyar, 2018).

RESULT AND DISCUSSION

Macroscopic tests were carried out to visually see the characteristics of plant simplicia powder from various aspects such as shape, aroma, taste, and color (Alfanaar et al., 2021). The results of macroscopic testing of bangkal stem powder showed organoleptic properties which can be seen in **Table 1**.

Table 1 Macroscopic of bangkal stem powder

Organoleptic	Results
Form	Fine powder
Aroma	Typical of bangalore stems
Flavor	Bitter astringent
Color	Yellow

Bangkal stem simplicia powder shows a striking yellow color in accordance with the original color of the bangkal stem which will give a yellow coloring when dissolved in water. The powder has a bitter and astringent taste, a characteristic aroma of bangkal stems, and a fine powder form when applied to the skin, which indicates that the simplicia pollination process was carried out using a good method and when applied it becomes a non-irritating scrub (L et al., 2022; Raharjo et al., 2021). Visual test results show that the simplicia does not mix with impurities and gives a distorted color or odor according to the organoleptic provisions of Materia Medika V.

Microscopic examination was carried out to observe the identification fragments or fragments of the bangkal stem simplicia plant cells. The results of microscopic testing of bangkal stem powder can be seen in **Figure 1**. At 40 × 10 magnification, transport bundles, rock cells with thick cell walls, woody vessels, and fibers with spokes are visible (Partiwisari & Ariantari, 2014).

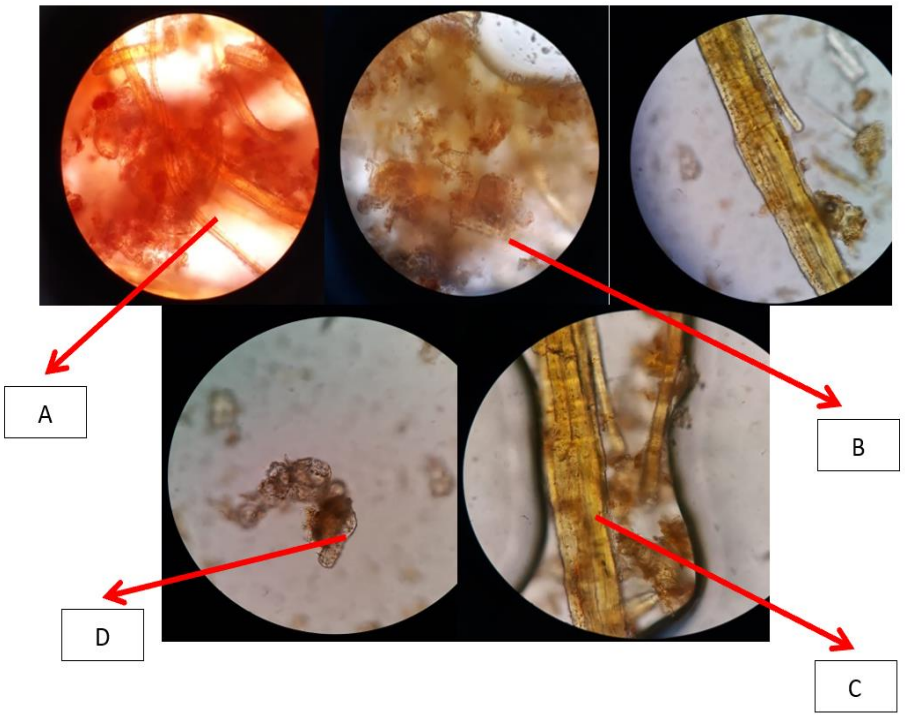

Figure 1 Microscopy of bangkal stem simplicia powder (A) Transport files; (B) Stone cells; (C) Wood vessels; (D) Fibers

Testing the fineness of the powder was carried out to measure the homogeneity of the size of the finely ground simplicia powder. The finer and more homogeneous the simplicia powder that is made will affect the effectiveness of the process of dissolving secondary metabolites through the cell pores because it increases the surface area through which the solvent passes (Fanani et al., 2018; Tristantini & Amalia, 2019). The fineness of bangkal stem simplicia powder can be seen in Table 2. Based on Materia Medika V it is explained that fine simplicia powder is the powder that passes through the sieve with the lowest number and not more than 40% through the sieve with the highest number. If seen in **Table 2**, from 10 grams of sifted powder, it leaves a small amount of residue that cannot pass, both in the mesh with the highest number (8) and the lowest number (100), namely 2.77% and 12.74%, which means that it meets fine powder requirements.

Table 2 Fine degree of bangkal stem simplicia powder

Test	Mesh size/weight of powder left (mg/g)				
	8	20	40	80	100
1	0.283	0.304	3.860 g	0.356	1.088 g
2	0.274	0.366	4.310 g	0.693	0.365 g
3	0.272	0.333	3.512 g	1.382	0.990 g
4	0.277	0.326	2.212 g	0.637	2.654 g
Average	0.277 mg	0.332 mg	3.474 g	0.767 mg	1.274 g
SD	0.005	0.026	0.902	0.436	0.974
Remainder	2.77%	3.32%	34.74%	7.67%	12.74%

Phytochemical screening was carried out to see the secondary metabolite content of bangkal stem bark simplicia and lime juice which is used as a traditional body scrub in Palangka Raya City by using a test in the form of a phytochemical reagent. The test results can be seen in **Table 3**.

Table 3 Results of Phytochemical Screening of Bangkal Stem Bark and Lime Juice

Testing	Bark Bark Bangkal	Lime Juice
Phenolic	(+) Blackish green color change	(+) Green color change
Alkoloid	(-) There is no precipitate	(+) There is a white precipitate
Saponins	(+) 1 cm foam is formed	(+) Formed foam 1 cm
Flavonoids	(+) Yellow color formed	(-) There is no color change
terpenoids	(-) There is no color change	(-) There is no color change
Quinone	(-) There is no color change	(-) There is no color change

Secondary metabolite screening results showed that bangkal powder contains phenolics, saponins, and flavonoids (Kuete & Seukep, 2023). Meanwhile, lime juice as an additional scrub contains secondary metabolites in the form of phenolics, alkoloids, and saponins. Phenolic has an anti-inflammatory function Cherbal et al., (2023), and inhibits cell proliferation activity (Vinodkumar & Packirisamy, 2023), alkaloids and saponins have a bitter taste and have an antimicrobial effect (Fitriyanti et al., 2020), and falvonoids have properties as antioxidants (Aisiah, 2020; Kandida et al., 2023; Rahman et al., 2022). This can work on the skin when the simplizaic powder of bangkal stem bark and lime juice are used as a scrub to maintain healthy skin.

CONCLUSION

The simplicia powder of bangkal stem bark has good organoleptic properties with a characteristic bitter astringent taste, bright yellow color, and a characteristic smell of bangkal stems. The degree of fineness of the powder that is in accordance with the standard requirements for fine powder. On microscopic examination found transport bundles, stone cells, wood vessels, and fibers. Secondary metabolites found in bangkal stem simplicia powder are phenolic, saponins, and flavonoids, while lime juice as an additional scrub contains secondary metabolites in the form of phenolics, alkoloids, and saponins. This shows that the bangkal stem simplicia powder which is sold as a traditional body scrub has met the good standard of simplicia powder.

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