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Characterization Test, Phytochemical Screening of Simplicia and Extract of Bawak Sabrang (Eleutherine bulbosa (Mill.) Urb.)

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A R T I C L E I N F O

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ABSTRACT

Sabrang onion (Eleutherine bulbosa (Mill.) Urb.) has been used for generations for various diseases such as breast and colon cancer, hypertension, diabetes mellitus, hypercholesterolemia and stroke. This study aims to determine the characterization and phytochemical screening of simplicia and sabrang onion bulb extract. Extracts were made by graded maceration using solvents based on their polarity levels, n-hexane, ethylacetate and ethanol as well as phytochemical screening and characterization of simplicia and extracts. The results of simplicia characterization, sabrang onion n-hexane extract (ENBS), sabrang onion ethylacetate extract (EEABS) and sabrang onion ethanol extract (EEBS) obtained water content of 8.64%, respectively; 4.98%; 8.27% and 9.11%; water soluble extract content of 8.52%; 1.12%; 9.51% and 72.19%; ethanol soluble extract content of 14.05%; 2.28%; 49.26% and 81.66%; total ash content 2.89%; 0.34%; 0.43% and 1.73% and the acid insoluble ash content is 0.59%; 0.06%; 0.07% and 0.20%. The results of the phytochemical screening of simplicia and extracts obtained groups of alkaloids, flavonoids, glycosides, saponins, anthraquinone glycosides, tannins and triterpenoids/steroids.

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1. Introduction

Herbal medicine has been widely accepted in almost all countries in the world. According to the World Health Organization (WHO), countries in Africa, Asia and Latin America use herbal medicines as a complement to the primary treatment they receive. Even in Africa, as much as 80% of the population uses herbal medicine for primary treatment. WHO recommends the use of traditional medicines including herbs in the maintenance of public health, prevention and treatment of disease, especially for chronic diseases, degenerative diseases and cancer. WHO also supports efforts to improve the safety and efficacy of traditional medicines (World Health Organization (WHO), 2013).

Dayak onions are known by various names in several areas including Sabrang onion (Java), Siyem onion (Sunda), Tiwai onion (Kutai), Dayak onion (Palangkaraya), Lubak onion (Samarinda), and forest onion (Palu). Dayak onions mostly grow in mountainous areas between 600-1500 m above sea level (Saragih et al., 2019). Dayak onions are herbs with a height of approximately 50 cm, stems grow upright or bent, bulbous with a conical tuber shape and red. Dayak leeks are ribbon-shaped with pointed ends and other leaves resemble stems and Dayak onions also have white single flowers (Hidayat et al., 2022).

Based on the analysis of variance conducted by (Hardarani & Dewi, 2019), Dayak onion bulbs from North Ulin, Banjarbaru, South Kalimantan contain secondary metabolites of flavonoids, phenolics and anthocyanins. Previous research has shown that Dayak onions have the potential to be used in the cosmetic industry, namely as a lipstick dye. Several factors that can affect the color stability of Dayak onion extract include temperature, oxidizing agent, pH and storage conditions (Mayasari et al., 2018).

One type of medicinal plant that is efficacious for health in the people of Kalimantan is the

Dayak onion (Eleutherine bulbosa (Urb.). This plant is commonly found on the island of Kalimantan. Local residents in the area have used this plant as a traditional medicine. as anticancer, anti-inflammatory, antimicrobial, and cure hypertension and diabetes mellitus (Wahyuni & Aditia, 2019). In the Dayak onion plant (Eleutherine bulbosa (Urb.) the part that can be used is the tuber, which is known to have several activities, including antibacterial (Tazkiyatul Firdaus, 2014), immunomodulatory (Muthia & Astuti, 2018), anticancer (Muti'ah et al., 2020), and inflammation (Nataline, 2021).

The results showed that sabrang onion bulbs contain naphthaquinone compounds and their derivatives such as elecanacine, eleutherine, eleutherol and eleuthernone. Naftakuinone has biological activity as antimicrobial, antiviral, anti-inflammatory, antipyretic, antifungal, antiproliferative and cytotoxic effects against colon cancer and cervical cancer (Nafisa, 2020). The ethanolic extract of sabrang onion has a cytotoxic effect on Hela uterine cervical cancer with an IC50 value of 84,027 g/ml and can reduce the level of cyclin E expression and suppress the level of Bcl-2 expression and induce the apoptotic pathway of Hela cells (Haryoto et al., 2013). The ethanolic extract of sabrang onion has a cytotoxic effect on colonic carcinoma HT29 with an IC50 value of 3.125 g/ml and can suppress mutant p53 because of the content of triterpenoids, flavonoids, anthraquinones and coumarin compounds (Sidha, 2017). Based on the results of research by (Arung et al., 2012), it was shown that sabrang onion has a cytotoxic effect on colon cancer cells. The compounds eleutherine and elecanacin inhibit the growth of colon cancer in a dose-dependent manner. Both compounds also showed selective cytotoxicity against colon cancer.

2. Method

The type of research used in this research is experimental which aims to investigate a cause and effect relationship, by exposing one or more experimental groups and one or more experimental conditions. The results were compared with one or more control groups that were not treated (Sudarwan Danim, 2013). The research phase includes identification of plant samples or materials, collection and manufacture of simplicia, manufacture of reagents, characterization of simplicia, phytochemical screening of simplicia and extracts, manufacture of n-hexan, ethylacetate and ethanol extracts of sabrang onion bulbs carried out in the Pharmacognosy Laboratory, Faculty of Pharmacy, University of Sumatra. North, Medan.

3. Results and Discussion

3.1 Result of Simplicia Characterization and Extract

The results of the macroscopic examination of the sabrang onion tubers were elongated ovoid, red in color, odorless, and tasted bitter. The tuber consists of 5-6 layers with the base of the leaf in the middle and usually has a length of 4-5 cm and a diameter of 1-3 cm, this result is the same as that stated in the Directorate General of POM (1989). The results of the macroscopic examination of simplicia are pink and very fragile.

Microscopic examination of the characteristics of sabrang onion bulbs was carried out to obtain simplicia identity. The results of the examination of the characteristics of simplicia powder microscopically showed the presence of starch, parenchyma, calcium oxalate crystals in the form of raffida and spiral thickening vessels. Microscopically from the cross section of the sabrang onion bulb, namely the presence of an outer epidermis, closed collateral type vessels, parenchyma containing calcium oxalate in the form of raffida and parenchyma containing starch. According to the Directorate General of POM (2000), standardization of a simplicia is a fulfillment of the requirements as a drug ingredient and becomes the determination of values for various product parameters. Simplicia to be used as raw material for drugs must meet the requirements listed in the monograph published by the official Ministry of Health (Materia Medika Indonesia). Some of the characterizations carried out each provide a purpose so that it is expected to meet the requirements of simplicia as a medicinal raw material.

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Table 1
Results of Simplicia Characterization of Sabrang onion (Eleutherine bulbosa (Mill.) Urb) bulbs

No.	Description	Results (%)	MMI V Requirements
1.	Water content	8,65	≤ 10
2.	Content of water soluble essence	8,52	≥ 4
3.	Content of ethanol-soluble essence	14,05	≥ 2
4.	Total ash content	2,89	≤ 1
5.	Ash content which is not soluble in acid	0,59	≤ 1,5

Table 2
Result of characterization of sabrang onion bulb extract (Eleutherine bulbosa (Mill.) Urb)

No.	Description	ENBS (%)	EEABS (%)	EEBS (%)
1.	Water content	4,98	8,27	9,11
2.	Content of water soluble essence	1,12	9,51	72,19
3.	Content of ethanol-soluble essence	2,28	49,26	81,66
4.	Total ash content	0,34	0,43	1,73
5.	Ash content which is not soluble in acid	0,06	0,07	0,20

3.2 Phytochemical Screening Results of Simplicia and Extracts

Table 3
Phytochemical screening results of sabrang onion (Eleutherine bulbosa (Mill.) Urb) tuber simplicial

No.	Screening	Reactor	Result (color/sediment)
1.	Alkaloids	Dragendorf	(+) brownish orange
		Bouchardat	(+) brownish yellow
		Mayer	(+) turbidity and white precipitate
2.	Flavonoids	Zn + concentrated hydrochloric acid	(+) yellow
		Mg + hydrochloric acid Concentrated	(+) yellow
3.	Glycoside	Mg + hydrochloric acid	(+) purple ring
4.	Saponins	Concentrated	(+) foam
5.	Anthraquinone glycosides	Molish	(+) intensive red on the NaOH . layer
6.	Tannins	hot water/shake	(+) green
7.	Triterpenoids/Steroids	NaOH	(+) purple

Table 4
Results of phytochemical screening of sabrang onion (Eleutherine bulbosa (Mill.) Urb) tuber extract

No.	Description	ENBS	EEABS	EEBS
1.	Alkaloids	-	+	+
2.	Flavonoids	-	+	+
3.	Glycoside	-	+	+
4.	Saponins	-	+	+
5.	Anthraquinone glycosides	-	+	+
6.	Tannins	-	-	+
7.	Triterpenoids/Steroids	+	-	-

Description: (+) = contains a group of compounds,
(-) = does not contain a group of compounds

3.3 Discussion

The result of determining the moisture content obtained is less than 10%, namely 8.65%, meets the requirements set by Materia Medika Indonesia V (MMI V) on sabrang onion bulb simplicia, water content exceeding 10% can be a good medium for fungal growth , such as Aspergillus flavus (Ditjen POM, 2000). Determination of the water soluble extract content to determine the levels of polar chemical compounds contained in the simplicia of sabrang onion bulbs which resulted in 8.52%, while the ethanol soluble extract content was carried out to determine the levels of ethanol soluble compounds, both polar and non polar compounds. the result is 14.05%. The results of the determination of the water-soluble extract and ethanol content were higher than the results stated in the MMI V for sabrang onion tuber simplicia, namely 8.52% for the water content and 14.05% for the ethanol content. Determination of the total ash content is carried out to determine the levels of inorganic compounds in simplicia, for example metals K, Ca, Na, Pb, Hg, silica, while determination of the ash content is not soluble in acid is carried out to determine the levels of compounds that are insoluble in acid, such as silica, metals. -heavy metals such as Pb, Hg.

The results of the determination of the water content of n-hexane extract of sabrang onion (ENBS) ethyl acetate extract of sabrang onion (EEABS) and ethanol extract of sabrang onion (EEBS) were 4.98%, 8.27% and 9.11%, respectively. Determination of water content is carried out to provide a minimum limit of water content that can still be tolerated in the extract because the high water content causes instability of drug preparations, bacteria and fungi grow fast and the active ingredients contained therein can be decomposed. The result of determination of water-soluble extract content from ENBS, EEABS and EEBS was 1.12%; 9.51% and 72.19% as well as the determination of the content of the ethanol-soluble extract of 2.28%; 49.26% and 81.66%, respectively. Determination of water-soluble and ethanol-soluble extracts was carried out to determine the number of polar compounds soluble in water and ethanol.The content of water-soluble extract and ethanol in the ethanol extract was the highest, namely 72.19% and 81.66%, respectively. This shows that the ethanol extract has many polar compounds such as glycosides. In the ethylacetate extract, the water-soluble extract content was 9.51% while the ethanol-soluble extract content was quite high, namely 49.26%. Ethylacetate is a semipolar solvent, so chemical compounds that are semipolar and slightly polar will be extracted. Compared with n-hexane which is very non-polar which only attracts non-polar chemical compounds. This can be seen from the results of the water-soluble extract content and the ethanol-soluble extract content which showed low yields, namely 1.12% and 2.28%, respectively. Determination of total ash content and acid insoluble ash content of ENBS, EEABS and EEBS were 0.34%, 0.43%, 1.73% and 0.06%, 0.07%, and 0.20%, respectively. . High levels of heavy metals can endanger health, therefore it is necessary to determine the total ash content and acid insoluble ash content to provide assurance that the extract does not contain certain heavy metals exceeding the specified value because it is dangerous (toxic) for health.

The addition of Dragendorff, Bouchardat and Mayer reagents gave a brownish orange, brownish yellow and turbidity color, respectively, and a white precipitate indicated the presence of alkaloids. The addition of Mg powder and Zn powder with concentrated hydrochloric acid gave a yellow color, indicating the presence of flavonoid compounds. Glycoside screening was indicated by the addition of Molisch reagent and concentrated sulfuric acid which formed a purple ring. Saponin screening produced a stable foam with a foam height of 3 cm and did not disappear with the addition of 2 N HCl, the foaming nature of saponins was due to the amphiphilic structure of saponins resulting in the physical properties of saponins as surfactants with similar properties to soaps and detergents, the addition of 2 N HCl resulted in foam stability. the longer according to the nature of the soap. xamination of anthraquinone glycosides formed on the yellow benzene layer showed the presence of anthraquinones in the form of aglycones, while intensive red color on the NaOH layer because anthraquinones both in the form of glycosides and their aglycones are colored compounds because they have chromophore groups. The addition of 1% FeCl3 gives a green color which indicates the presence of tannin compounds. According to (Trevor Robinson, 1995), tannin compounds form a complex with a solution of ferric chloride (FeCl3) to produce a black blue to green color which indicates the presence of phenolic compounds. The color occurs due to the

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formation of a complex between Fe metal from FeCl3 with hydroxy groups from tannins to form a chelate structure. Increasing the number of free hydroxyl groups will increase the blue color. The addition of Liebermann-Burchard gave a purple color indicating the presence of triterpenoid compounds. According to (Puspadewi et al., 2013) sabrang onion bulbs contain almost all phytochemicals, namely alkaloids, glycosides, flavonoids, phenolics, steroids and tannins. The results of the phytochemical screening obtained are the same as those mentioned by (Puspadewi et al., 2013), but the results of the study also found the presence of saponins and anthraquinone glycosides.

4. Conclusion

Based on the results of the research that has been carried out, it can be concluded that the results of simplicia characterization, n-hexane extract of sabrang onion (ENBS), sabrang onion ethylacetate extract (EEABS) and ethanol extract of sabrang onion (EEBS) obtained water content of 8.64% respectively; 4.98%; 8.27% and 9.11%; water soluble extract content of 8.52%; 1.12%; 9.51% and 72.19%; ethanol soluble extract content of 14.05%; 2.28%; 49.26% and 81.66%; total ash content 2.89%; 0.34%; 0.43% and 1.73% and the acid insoluble ash content is 0.59%; 0.06%; 0.07% and 0.20%. The results of phytochemical screening of simplicia and extracts obtained groups of alkaloids, flavonoids, glycosides, saponins, anthraquinone glycosides, tannins and triterpenoids/steroids.

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