PREPARATION OF SRIKAYA LEAF TEA BAG *(Annona squamosa L.)*

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A B S T R A C T

The leaves of Annona squamosa L., commonly known in Indonesia as srikaya, are widely recognized as a traditional medicinal plant used to treat various ailments. The leaves are believed to have properties that can alleviate cough, rheumatism, digestive disorders, as well as boost stamina and reduce fever. This study aims to develop a tea bag preparation from srikaya leaves and to evaluate the results of phytochemical, organoleptic, pH, and hedonic tests on the tea bag product. This research employs both qualitative and quantitative approaches using experimental methods. The findings indicate that the 2-gram tea bag formulation has a slightly brownish color and a mild aroma based on the organoleptic test. Phytochemical screening of the srikaya leaf simplicia revealed that the maceration extract contains flavonoid compounds. The hedonic test results showed that out of 10 panelists, the majority preferred the color of the tea over its aroma.

The results of this study revealed that srikaya leaves have the potential as the main ingredient for tea bags which have a myriad of health benefits. The process of making tea bags which includes selection, washing, drying, and brewing can be done quite simply, making it easier for consumers to benefit from srikaya leaves in a practical way.

The results of organoleptic and hedonic tests showed that tea bag products from srikaya leaves were well received by the panelists, especially in terms of color and aroma. Phytochemical tests prove the existence of bioactive compounds that contribute to the health benefits of this tea, such as flavonoids. Quality tests such as pH, moisture content, soluble juice content, and drying shrinkage show that tea bag preparations meet the set standards. The pH level, soluble juice content, and moisture content were within the appropriate range, while the drying loss and type weight also showed satisfactory results.

INTRODUCTION

As a country with a tropical climate that has unparalleled biodiversity richness, Indonesia holds tremendous potential in terms of biological resources, especially natural carbon compounds. The existence of more than 30,000 plant species, including 940 unique medicinal plant species, makes Indonesia a center of world flora diversity and a potential source of world-class herbal pharmaceutical raw materials.

The use of plants in traditional medicine still continues today, and although many types of plants can be used in traditional medicine, their use is generally based on experiences passed down from ancestors. For this reason, research efforts are urgently needed to provide information to all elements of Indonesian society related to traditional Indonesia medicine in the context of the development and application of the drug itself. People usually use plant leaves as traditional medicine by boiling or squeezing finely. The part of the plant that is commonly used in traditional medicine is the leaf part which contains essential oils, fats, resin, mineral salts, triterpenoids, as well as tannins and flavonoids and has anti-diarrheal properties.

Srikaya (*Annona squamosa L.*), one of the typical members of the genus Annona in the tropics, is very interesting to research because of its promising pharmacological potential. Often equated with soursop (*Annona muricata L.*), Srikaya has unique botanical characteristics and diverse phytochemical content, making it an interesting research subject.

Srikaya Plant (*Annona squamosa L.*) has great potential to be used as a raw material for medicine. The leaves of srikaya (*Annona squamosa L.*) is specifically believed to have anti-cancer properties. Based on empirical data, srikaya leaves can be used as an astringent, anti-inflammatory, anthelmintic, anti-fertility, ulcer ripening agent, as well as as an anti-tumor. (Dalimartha, 2015).

The use of leaves in herbal plants is carried out because there are flavonoid compounds, flavonoids are polyphenol compounds that are abundant in leaves. Flavonoid compounds have a molecular structure that contains a number of hydroxyl groups (-OH). The existence of this hydroxyl group causes flavonoids to be polar, so they are able to form strong hydrogen bonds with polar solvent molecules such as ethanol, methanol, and butanol. This intermolecular interaction allows flavonoids to dissolve well in these solvents. Various studies have shown that flavonoids have a wide range of biological activities related to their ability as antioxidants, anti-inflammatory, and immunomodulators. This mechanism of action allows flavonoids to play a role in accelerating wound healing, increasing hematopoiesis, and inhibiting the growth of cancer cells, viruses, and bacteria. (Yolandari & Mustiqawati, 2022).

Some previous studies relevant to this topic include a study entitled "Formulation and Organoleptic Testing of Kersen Leaf Tea Bags (*Muntingia calabura L.*) to Maintain Blood Sugar Levels and Add Ginger Rhizomes (*Zingiber officinale*) as a Body Warmer." The results of the study showed that kersen leaf tea provided significant changes, especially in the organoleptic aspect, with the main difference lying in the distinctive aroma of kersen leaves (Ulis Triyani et al, 2020).

Based on the description above, there has been no research specifically discussing the preparation of tea bags from srikaya leaves (Annona squamosa L.). Therefore, the author is interested in exploring this topic through research with the title "Making Srikaya Leaf Tea Bag Preparation (*Annona squamosa L.*)" which has a similar concept but uses a different sample. This study aims to evaluate the potential of srikaya leaves as a raw material for herbal tea, which is suspected to contain useful active compounds such as. This research will be carried out in several stages, including phytochemical tests, organoleptic tests, pH tests, and hedonic tests.

METHODOLOGY

Type of Research

This research is experimental in nature and focuses on evaluating the quality of srikaya leaf tea bag preparations. Through a series of tests, namely organoleptic tests to assess physical and sensory properties, phytochemical tests to identify the content of bioactive compounds, standardization tests to determine the level of marker compounds, hedonic tests to assess consumer acceptance, and pH tests to determine acidity levels, it is hoped that comprehensive data on the characteristics of srikaya leaf tea bag preparations can be obtained.

Research Time and Location

The entire series of research activities was carried out in a laboratory environment, precisely at the Pharmacy Laboratory of Halu Oleo University and the Pharmacy Laboratory of Baubau Polytechnic, during the period from July 1 to August 6, 2024.

Tools

The equipment used in this scientific research can be classified into several categories. namely sample preparation equipment (sieve, blender), extraction equipment (Buchner funnel, filter paper), volumetric equipment (measuring cups, measuring flasks, pipettes), heating equipment (hot plate), and special equipment for the drying process (vacuum rotary evaporator).

Materials

The materials used in this scientific study include organic solvents such as 97% alcohol, 96% and 70% ethanol, as well as chemical reagents such as concentrated HCl and water-chloroform mixtures. In addition, natural materials in the form of srikaya leaves and inorganic materials such as magnesium powder are also used.

Procedure

Materials

The srikaya leaf samples used in this scientific study were obtained from plants that grew in the Bone-bone Village, Batupoaro District, Baubau City. This study will use the young leaves of the srikaya plant.

Simplisia Process

The srikaya leaves used as research materials need to go through a selection process to obtain healthy leaves and free from damage. The leaves that have been selected are then washed and drained and then wilted. The drying process takes place under sun exposure for 72 hours. The dried srikaya leaves are then mashed using a blender and sieve number 20 to obtain a uniform particle size. The resulting simplicia powder is then used for the brewing process.

The Process of Making Srikaya Leaf Tea Bags

Two grams of srikaya leaf powder that has gone through the sieving process are put into tea bags. Next, the tea bag is brewed with 100 mL of distilled water at 100°C during a two-minute infusion time.

Making Srikaya Leaf Extract

The extraction of secondary metabolite compounds from srikaya leaves was carried out using the maceration method with a 96% methanol solvent. The maceration method was chosen based on the principle of selectivity of methanol solvents against various types of polar and nonpolar compounds (Syafriah & Teheni, 2023). The extraction process was carried out by soaking 250 grams of crushed simplicia in 2000 mL of methanol for 72 hours at room temperature. After the maceration process, the resulting filtrate is then concentrated with a rotary vacuum evaporator to produce a viscous extract, then stored in a tightly closed container for further analysis.

Phytochemical Screening of Srikaya Leaf Extract

Flavonoid Test

The flavonoid test method using concentrated HCl and magnesium powder is a simple and fast screening method to detect the presence of flavonoids in a sample. The test mechanism is carried out by inserting 2 mL of sample into a test tube, followed by a few drops of concentrated HCl and 0.2 mg of magnesium powder. A positive result is characterized by the appearance of red, orange, or green colors.

Data Analysis

The data from the evaluation results which include organoleptic, phytochemical, simplicia, hedonic, and pH tests have been analyzed in depth using Microsoft Excel software. Quantitative analysis was carried out to obtain numerical data, while qualitative analysis was used to describe organoleptic characteristics and phytochemical test results.

RESULTS & DISCUSSION

Research Results

Picture of the preparation of srikaya leaf tea (*Annona squamosa L.*)

The image is a srikaya leaf tea bag product that has been formulated after going through several stages of processing, including drying, crushing, and packaging.

Figure 1. Tea bag with srikaya leaves (*Annona squamosa L.*)

Organoleptic Test

Table 1. Results of organoleptic tests

Formula	Organoleptic Results	Picture
Preparation of srikaya leaf tea bag (*Annona squamosa L.*)	The color is slightly brown and the aroma is not pungent	

The results of the organoleptic test that showed the tea had a slightly brown color and a non-pungent aroma provided a preliminary picture of the sensory characteristics of the formulated srikaya leaf tea bag product. The results of the organoleptic test provide preliminary information about the sensory characteristics of srikaya leaf tea bags.

Ph Test

Table 2. pH test results

Formula	Ph	Result	Standard
Srikaya leaf tea bag	5,73	Qualify	6,75 – 7,89

Based on the results of the pH test obtained, it can be concluded that the pH value of srikaya leaf tea bags (5.73) is below the standard range that has been set (6.75-7.89). This indicates that the srikaya leaf tea bag tested has properties that tend to be acidic.

The results of the pH test showed that the srikaya leaf tea bags tested did not meet the pH standards that had been set. This aspect needs to be considered in the development of product research to produce tea bags with higher quality and in accordance with consumer preferences.

Phytochemical Screening

Table 3. Results of phytochemical screening analysis

Sample Name	Types of Testing	Reagent Type	Color Change/Reaction	Test Results
Srikaya Leaf Extract (*Annona squamosa L.*)	Flavonoids	Concentrated Mg + HCl Powder	Greenish	Positive

The results of phytochemical screening tests with concentrated magnesium powder and HCl reagents showed a greenish color change in srikaya leaf tea bag samples. This color change is a positive indication of the presence of flavonoid content in the sample.

The positive results of phytochemical screening only confirm that srikaya leaf tea bags contain flavonoid compounds. This phytochemical screening test is qualitative, meaning it only shows the presence or absence of a compound. To quantitatively determine the number of flavonoids contained, further analysis using spectrophotometry or chromatography methods is required.

Simplicia standardization test

Table 4. Results of the simplicia standardization test

It	Standard Parameters of Simplisia	Inspection results (%)	Book
1	Moisture content	2,46	<10
2	Ethanol soluble juice content	12,8	>12.5
3	Water soluble juice rate	12,5	<18
4	Drying shrinkage	0,96	-
5	Type weight	1,228 g/ml	-

Interpretation of Test Results:

Moisture content (2,46%):

This figure shows the percentage of water content in simplisia, This result indicates that the tested simplisia has a relatively low moisture content and is quite stable. Excessive moisture content can trigger the growth of microorganisms and accelerate the destruction of simplisia.

Ethanol Soluble Sari Content (12.8%) and Water Soluble Sari Content (12.5%):

These two values indicate the amount of active compounds in simplicia that are soluble in ethanol and water. These results indicate that simplicia contains quite abundant active compounds, Higher soluble juice levels allow for more extraction of the active compounds.

Drying Shrinkage (0.96%):

Drying shrinkage indicates the amount of substances lost during the drying process. This value is relatively low, indicating that the simplicia has been well drained and does not contain much volatile substance.

Specific Weight (1,288 g/ml):

Specific weights describe the ratio between the mass of a substance and its volume. This value can be used to identify simplicia and as one of the parameters to control the quality of simplisia.

Based on the results of the standardization test, it can be concluded that the tested simplicia has quite good quality. The low moisture content, high soluble juice content, and low drying shrinkage indicate that simplicia has been well processed and has potential as a raw material for traditional medicine.

Hedonic Test

Table 5. Hedonic test results

Test	Specifications					Total Panelists
	Very disliked	Dislike	Quite like	Like	Really like	
Color		-	-	10		10
Aroma		1	2	5	2	10

Hedonic testing is a method used in sensory analysis to measure a person's level of liking or disliking for a product. The main purpose of hedonic testing is to obtain information regarding the consumer's response to a new or modified product. Based on the results of the hedonic test, srikaya leaf tea bags were generally well received by the panelists. The color of this tea bag was considered very liked by all panelists, while for the aroma aspect, there were variations in the assessment, with the majority of panelists giving positive assessments.

Discussion

Srikaya leaves contain a variety of secondary metabolite compounds that have long been known as herbal plants with various health benefits. Especially in the content of flavonoids which play an important role in providing an antipyretic effect by inhibiting the production of prostaglandins. In addition, srikaya leaves also have the potential as antioxidant, antidiabetic, hepatoprotective, and antitumor agents, making this plant a promising source of bioactive compounds for the development of natural medicines.

This research focuses on the development of innovative tea bag products made from srikaya leaves. The manufacturing process involves a series of stages ranging from the selection of quality srikaya leaves, washing to drying to produce dried simplicia. Simplisia is then mashed into a fine powder and packaged in tea bags, ready to brew and enjoyed as a healthy herbal drink. The ease of serving srikaya leaf tea bags allows more people to access and enjoy the health benefits of this plant. Thus, srikaya leaf tea bags can be part of a healthy lifestyle and become a suitable choice for a fast-paced modern lifestyle.

Organoleptic tests are carried out to evaluate the aroma and color of the tea produced. The results showed a slightly brown color of the tea and a less pungent aroma. In addition, the hedonic test involved 10 panelists who assessed the level of preference for the color and aroma of tea. The results of the hedonic test showed that the majority of panelists liked the color and aroma of srikaya leaf tea.

The results of phytochemical screening showed the presence of flavonoid content in simplicia srikaya leaves, which was characterized by specific color changes in qualitative tests. The existence of these flavonoids is in line with the literature that states that this group of compounds is often found in medicinal plants and has various biological activities, such as antioxidants and anti-inflammatory.

pH testing shows that brewed tea bags have a pH of 5.73, according to the standard pH of tea which ranges from 6.75 to 7.89. In addition, the simplicia standardization test was carried out to ensure quality uniformity, including the determination of moisture content which showed a result of 2.46%, meeting the requirements of the moisture content standard.

The determination of the levels of water- and ethanol-soluble extracts provides information regarding the amount of soluble compounds from simplisia. The determination of the water-soluble extract content was 12.5%, while the ethanol-soluble extract content was 12.8%. Both results are within the range that corresponds to the standard parameters. The determination of drying shrinkage showed a value of 0.96%, and the determination of the weight of the simplicia type produced a value of 1.228 g/ml after dilution of the extract and measurement using a picnometer.

CONCLUSION

The results of this study revealed that srikaya leaves have the potential as the main ingredient for tea bags which have a myriad of health benefits. The process of making tea bags which includes selection, washing, drying, and brewing can be done quite simply, making it easier for consumers to benefit from srikaya leaves in a practical way.

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moisture content were within the appropriate range, while the drying loss and type weight also showed satisfactory results.

The limitations of this research lie in the formula development stage and clinical trials. The development of more optimal formulas is needed to improve the effectiveness and stability of the resulting products. In addition, more comprehensive clinical trials are needed to ensure the safety and efficacy of these products before they can be widely applied. For this reason, the next research is expected to focus on these aspects to overcome existing limitations and provide more holistic and reliable results.

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