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Phytochemical Analysis of Traditional Medicine Ingredientsleaves of Kencur (Kaempferia Galanga L.) for Pain Head

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ABSTRACT

Research on the phytochemical analysis of the traditional medicinal herb leaves of kencur (Kaempferia galanga L.) for headaches has been carried out. Kencur leaf (Kaempferia galanga L.) is one of the medicinal plants that contains secondary metabolites that have many health benefits. Making traditional medicine from kencur leaves in the form of a mixture by pounding and then filtering and getting the water. The results of the qualitative test showed that the leaves of kencur contain phenolic compounds and saponins. Quantitative testing for phenol was carried out by UV-Visible spectrophotometric method, the results obtained were 11.17% for saponin testing using the gravimetric method, the results obtained were 1.7775% saponins.

Keywords : Kencur leaves; Migraine

PRELIMINARY

Traditional medicinal herbs are medicinal media that use plants containing natural ingredients as raw materials. Processing of traditional medicinal herbs is also not complicated, ingredients are easily obtained, can be made yourself without requiring special equipment and large costs. Generally, the raw materials for traditional medicinal herbs are in the form of fresh plant materials and are handled only by pounding, brewing, burning, grinding, grating or boiling. One of the medicinal plants and their treatment is still done by the community traditionally is kencur leaf (Agromedia, 2008).

One of the plants that has the potential as medicine is kencur (Kaempferia galanga L.). Kencur is widely used as a raw material for traditional medicine, phytopharmaceuticals, cosmetic industry, food and beverage flavoring, spices, and a mixture of cigarette sauce in the kretek cigarette industry (Syamsuhidayat and Johnny, 1991).

Kencur is a herbaceous plant, the basal trunk is not too high, and grows in clumps. Kencur provides quite a lot of benefits, one of which is kencur leaves. Kencur leaves are commonly used in food flavoring, hair oil (tonic), mouthwash and also for the cosmetic industry (Sulaiman et al., 2008). Kencur leaves themselves have antioxidant and anti-inflammatory activity that can help for the treatment of mouth, ulcers and headaches (Sulaiman et al., 2008). Saponins, flavonoids, phenols and essential oils contained in kencur leaves are secondary metabolites of a plant (Shofiyani & Purnawanto, 2010).

Migraine headaches or migraines are usually in the form of pain that is repeated, with different frequency and intensity. Sometimes accompanied by nausea, vomiting, sweating. Migraine attacks or headaches are caused by many factors such as fatigue, anxiety, menstruation, and others (Baskoro, 2014).

The Indonesian Traditional Medicines Formulary states that the ingredients from the traditional medicine of kencur leaf (Kaempferia galanga L) can be used to treat headaches. The way to make the ingredients is to take 3 pieces of fresh leaves of kencur (Kaempferia galanga L) washed and mashed and then affixed to the part that hurts, let it dry(Ministry of Health of the Republic of Indonesia, 2017).

The research of Utami et al., (2020) can be concluded that the results of research on antibiotic activity at various concentrations of kencur extract in inhibiting the growth of Staphylococcus aureus are obtained. With a value of $p = 0.001$ or $p < 0.05$ and the greater the concentration of kencur extract given, the greater the diameter of the inhibition area for the growth of Staphylococcus aureus bacteria.

Based on the research of Hasanah et al., (2011) it can be concludedthat the extract of kencur rhizome (Kaempferia galanga L.) has anti-inflammatory activity.

Based on the description above, it turns out that the phytochemical analysis of traditional medicinal herbs has never been carried out-kencur (Kaempferia galanga L) as a medicine for headaches. Therefore, researchers are interested in conducting research on the phytochemical analysis of the traditional medicinal herb kencur (Kaempferia galanga L) to treat headaches.

METHOD

Tools and Materials

The tools used in this study were UV-Vis double beam spectrophotometer (Shimadzu UV-Vis), analytical balance (Precisa), erlen-meyer (Iwaki), volumetric flask (Iwaki), beaker (Iwaki), pipette (Iwaki). , funnels (Pyrex), suction balls, aluminum foil, and other glassware thatsupport research.

The materials used in this study were fresh betel leaf (Piper betle L.), distilled water (H2O) (PT.Brataco), 96% ethanol (C2H5OH) (PT.Brataco), anhydrous acetic acid (CH3CO)2 (Merck), Methanol (CH3OH) (Merck), Iron (III) chloride (Merck), Catechins (Merck), n-hexane (C6H14) (Merck), butanol (Merck), diethyl ether (Merck), KMNO4 (Merck) , FeCl3 (Merck), Folin-Ciocalteu (Merck), Aluminum Chloride (AlCl3) 10 % (Merck), 1 M Sodium Acetate (Merck), 2 N Hydrochloric Acid (Merck).

WORK PROCEDURES

Sampling

Fresh leaf samplesaromatic ginger(Kaempferia galanga L.) as much as 1 kg was taken from the area of Jl. Gunung Sarik, Kuranji Village, Kuranji District, Padang City, West Sumatra.

Plant Identification

Plant identification was carried out at the Andalas University Herbarium (ANDA) Department of Biology, Faculty of Mathematics and Natural Sciences, Andalas University, Padang, West Sumatra.

Making Betel Leaf Potion

Traditional medicinal herbs kencur(Kaempferia galanga L.)can be used to treat headaches. The herb kencur is made by taking 3 piecesleaffresh kencur(Kaempferia galanga L.)then the fresh ingredients are washed and then mashed or finely ground, then squeezed with gauze and filtered. The juice is ready to be tested by means of a qualitative analysis test and quantitative analysis (Minister of Health of the Republic of Indonesia, 2017).

Phytochemical Screening

1. Alkaloids Check

A total of 5 mL of traditional medicinal ingredients from leavesAromatic ginger(Kaempferia galanga L.) added 1 mL of 2 N hydrochloric acid and 9 mL of water, heated on a water bath for 2 minutes, cooled and filtered. Transfer 3 drops of the filtrate to a test tube, add 2 drops of Bouchardat LP to form a brown to black precipitate, then there is a possibility that there are alkaloids. If with Mayer LP a white or yellow clotted precipitate is formed which dissolves with methanol P. If with Wagner LP a reddish brown precipitate is formed (Ministry of Health of the Republic of Indonesia, 1995).

2. Flavonoid Examination

Evaporate until dry 5 mL of traditional medicinal ingredients from kencur (Kaempferia galanga L.) leaves, the remainder is dissolved in 1 mL of ethanol (96%) P, add 0.1g of magnesium powder and 10 drops of concentrated hydrochloric acid, if a red-orange color occurs, purple red, indicating the presence of flavonoids. If there is a yellow-orange color, it indicates the presence of flavones, chalcones and aurons (Ministry of Health of the Republic of Indonesia, 1995).

3. Phenol Examination

As much as 2 mL of traditional medicinal ingredients from kencur (Kaempferia galanga L.) leaves, added with a concentrated Folin-Ciocalteu reagent solution will form a blackish green or bluish color (Hanani, 2014).

4. Saponin Check

A total of 2 mL of traditional medicinal herbs from kencur (Kaempferia galanga L.) leaves are added with 10 mL of water and shake vigorously for 10 seconds, forming a solid foam for not less than 10 seconds, 1 cm to 10 cm high. With the addition of 1 drop of 2 N hydrochloric acid, the foam does not disappear (Ministry of Health of the Republic of Indonesia, 1995).

5. Tannin Check

Dissolve 2 mL of the traditional medicinal herb from the leaves of kencur (Kaempferia galanga L.) into 2 mL of distilled water. Then

the solution was added with two drops of 1% FeCl3 solution. The presence of tannin content is indicated by the appearance of a dark green or bluish green color (Endarini, 2016).

6. Terpenoid and Steroid Examination

A total of 2 mL of traditional medicinal ingredients from kencur (Kaempferia galanga L.) leaves were added with 10 mL of n-hexane and then filtered. The solution obtained was taken 5 drops and dried on a drip spot board, added three drops of acetic anhydride and then one drop of concentrated sulfuric acid. The presence of terpenoid group compounds will be marked by the appearance of a red color while the presence of steroid group compounds is indicated by the appearance of a blue color (Endarini, 2016).

7. Essential oil check

Enter 2 mL of traditional medicinal herbs from kencur (Kaempferia galanga L.) leaves into a test tube and then add 2 drops of potassium permanganate solution, the color will turn pale or disappear (Hanani, 2014).

Quantitative Analysis of Betel Leaf Herb

1. Total Phenol

There are several steps to determine the total phenol content of betel leaf, namely:

a. Preparation of gallic acid comparison mother liquor

Weighed 10 mg of gallic acid into a 10 mL volumetric flask, dissolved with methanol pa, sufficient solvent to mark the limit, then shake until homogeneous and obtained a solution of gallic acid with a concentration of 1000 g/mL (Main Solution). Perform a dilution with a concentration of 100 g/mL by pipetting 1 mL of the mother liquor into a 10 mL volumetric flask. Then dissolve it with methanol Pa to the limit mark (Ministry of Health of the Republic of Indonesia, 2017).

b. Maximum wavelength determination

Pipette 0.1 mL of 100 g/mL gallic acid solution and put it in a 10 mL measure and add methanol pa to the limit mark so that a concentration of 1 g/mL is obtained. Pipette 1 mL of a solution with a concentration of 1 g/mL add 5 mL of Folin-Ciocalteu 7.5% LP solution, let stand for 8 minutes, add 4 mL of 1% NaOH and incubate for 1 hour. Then measure the absorption using UV-Vis Spectrophotometry (Ministry of Health of the Republic of Indonesia, 2017).

c. Calibration curve creation

From the mother liquor of 100 g/mL as much as 1 mL, 1.5 mL, 2 mL, 2.5 mL and 3 mL were put into a 10 mL volumetric flask and added methanol pa to the limit mark to obtain concentrations of 10, 15, 20, 25, and 30 g/mL. Then each 1mL pipette was put into a 10 mL volumetric flask and then 5 mL of Folin-Ciocalteu 7.5% LP was added, allowed to stand for 8 minutes, added 4 mL of 1% NaOH, incubation for 1 hour. Then measure the absorption using UV-Vis Spectrophotometry at a maximum wavelength of 736.00 nm (Ministry of Health of the Republic of Indonesia, 2017).

d. Determination of the content of the herb leaves kencur

Pipette 1 mL of the mixture into a 10 mL volumetric flask and add methanol to the mark. Take 1 mL into a vial, add 5 mL of diluted Folin-Ciocalteu Phenol LP (7.5% in water). Let stand for 8 minutes, add 4 mL of 1% NaOH incubation for 1 hour. Then determine the phenol content by UV-Vis spectrophotometry at a maximum wavelength of 736.00 nm gallic acid. Do it three times (Ministry of Health of the Republic of Indonesia, 2017).

2. Saponins

Take as much as 20 mL of the herb plus 25 mL of 20% ethanol. The sample was heated on a water bath for 4 hours with continuous stirring at a temperature of 55oC. The mixture was filtered and the mixture residue was returned with 50 mL of 20% ethanol. The mixture of ingredients was concentrated at 90 to a volume of 10 mL. The concoction that has been concentrated is added with 5 mL of diethyl ether which will form a diethyl ether layer. The diethyl ether layer is removed and the aqueous layer is stored. The purification is repeated. The remaining water layer was added with 15 mL of butanol which would form 2 layers. The butanol layer was stored and the water layer was filtered again with 15 mL butanol. The butanol group was added with 10 mL of 5% sodium chloride. The solution is then evaporated in a water bath. After evaporating the sample was dried in an oven to a constant weight (Ajiboye et al., 2013).

RESULTS AND DISCUSSION

In this study, qualitative and quantitative analysis of the content of chemical compounds in the sample used was kencur plant taken on Jl. Gunung Sarik, Kuranji Village, Kuranji District, Padang City, West Sumatra.Kencur leaves aloneis a plant from the Zingiberaceae family. One of the properties of this plant is that it is used as a medicine for headaches. The part of the plant used is the leaves. The leaves taken to be tested are those that open completely green. Furthermore, wet sorting is carried out with the aim of separating dirt or other foreign materials from kencur leaves such as soil, gravel (Ministry of Health of the Republic of Indonesia, 1985).

Identification of plants has been carried out in the Laboratory Herbarium, Department of Biology, FMIPA, Andalas University

(UNAND) Limau Manih Campus, Padang, West Sumatra. The purpose of identification is to determine the identity of the sample to be used. Based on the identification results, it can be seen that the sample used in this study was kencur leaf with the Zingiberaceae family.

One of the plants that can be used as a medicine for headaches is kencur leaf(Kaempferia galanga L.)by means of finely ground leaves then affixed to the temples or the affected side and leave to dry (Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07/MENKES/2017). After that, an analysis of the content of chemical compounds in the form of secondary metabolites was carried out in kencur leaves with a phytochemical screening method which aims to determine the class of chemical compounds contained in plants that usually have biological activity. Basically, phytochemical screening is in the form of qualitative tests, most of which are color reactions, including the alkaloid test, flavonoid test, saponin test, phenol test, tannin test, steroid and terpenoid test, and essential oil test. From the research that has been done, positive results were obtained for the phenol test and saponin test on kencur leaves (Figure 1).

a. phenolb. Saponins

Figure 1. Positive Phenol and Saponins

The results of the qualitative test of kencur leaf herb were positive for saponins. Saponins are detergents with surface active properties that are amphiphilic or soluble in polar and non-polar, where the large molecular weight and structure of saponins consists of steroid aglycones or triterpenes called sapogenins and glycons containing one or more sugar chains. The foam formed in the saponin test is due to the presence of compounds that have hydrophilic and hydrophobic groups. When the solution is shaken the hydrophilic group will bind to H2O. While the hydrophobic group will bind with air to form foam (Sirohi et al., 2014). In qualitative testing, the addition of 2 N hydrochloric acid aims to increase the polarity so that the hydrophilic group will bind more stable and the foam formed becomes stable (Tandi et al., 2020).

The results of the qualitative test of positive kencur leaves contain phenol which is indicated by a bluish green solution after the Folin-Ciocalteu solution is added because the phenolic compound can react with folin to form a colored solution whose absorbance can be measured (Adhayanti et al., 2018). And negative results on the alkaloid test, flavonoid test, tannin test, steroid test, terpenoid test and essential oil test.

Based on the results of qualitative analysis obtained using very little kencur leaves, namely phenols and saponins, compared to the content obtained by (Shofiyani & Purnawanto, 2010) containing saponins, flavonoids, phenols and essential oils, while (Syamsuhidayat & Johnny, 1991) contains saponins. , flavonoids, phenols and essential oils and products from (Efendi, et al., 2020) contain phenols. These qualitative results can be influenced by several factors, namely when making potions, namely when the withdrawal of the active substance is not perfect so that it affects the phytochemical test. Another factor is that it can also be based on where the plant grows (Ministry of Health of the Republic of Indonesia, 1985).

Determination of phenol levels with gallic acid using a standard solution of gallic acid, first carried out the maximum wavelength of gallic acid obtained 736.00 nm with a concentration of 1□g/mL (Figure 2). This wavelength is used to determine the absorption of the standard solution and the absorbance of the test. Standard solutions were made with several concentrations, namely 10, 15, 20, 25 and 30□g/mL obtained absorbance 0.269; 0.357; 0.447; 0.538 and 0.626 and obtained the linear regression equation y = 0.01789x + 0.08971 (Figure 3). Then the phenol content in the kencur leaf was determined by measuring the absorbance of the sample at a concentration of 10□g/mL was repeated 3 times. In the mixture of kencur leaves, the absorbance was 0.291; 0.290 and 0.288 and obtained levels of 11.25%, 11.19% and 11.08% obtained an average phenol content of 11.17%. The results showed that the phenol content in kencur leaves has a level of 11.17% so that phenolic compounds have a role as a headache.

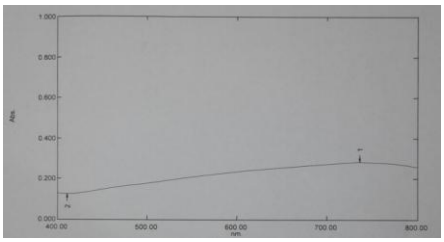

Figure 2. The absorption spectrum of gallic acid with methanol pa at a wavelength of 736.00 nm

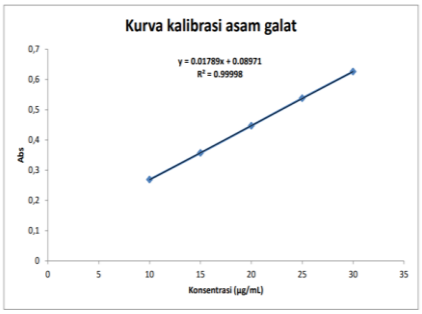

Figure 3. Calibration curve of various concentrations of gallic acid standard solutions to their absorption values at length maximum waveform 736.00 nm

The determination of saponin levels was carried out by the gravimetric method. The gravimetric method is a simple method and does not require a comparison in assay. Saponin is a compound that has a high or large molecular weight, distributed in several plants, is a form of glycoside with a sugar molecule bound to a triterpene or steroid aglycone (Kristanti et al., 2008). Based on the tests that have been carried out, the saponin content in kencur leaves is 1.7775%.

Pain is a protective mechanism against tissue damage that causes the individual to react by moving his body position. Pain can be caused by temperature stimulation (Gutyon et al., 2007). Pain is caused by mechanical or chemical stimulation, heat, or electricity, which can cause tissue damage and release substances called pain mediators (Arief, 2000).

Analgesics are drugs used to reduce pain without losing consciousness. Analgesic drugs affect the threshold for pain awareness. Pain-blocking drugs (analgesics) affect the first process by increasing the threshold of awareness of painful feelings, while narcotics suppress psychological reactions caused by painful stimuli (Arief, 2000). Based on the research of Sulaiman et al., (2008) proved that kencur leaf itself has antioxidant activity, as well as anti-inflammatory which can help for the treatment of mouth, ulcers, headaches and according to (Wijaya, et al., 2017) stated that phenol has anti-inflammatory activity. inflammatory or anti-inflammatory that can be used to treat headaches.

CONCLUSION

From the data obtained in this study, it can be concluded that:

1. The content of chemical compounds from the herb kencur leaves are phenols and saponins. Phenolic compounds and saponins are known to have anti-inflammatory activity so that they are thought to play a role in overcoming headaches.
2. The total phenol content in the kencur leaf herb is 11.17% and the total saponin content in the kencur leaf herb is 1.7775%.

SUGGESTION

It is hoped that future researchers will carry out phytochemical screening tests with other extraction methods from kencur (Kaempferia galanga L.) leaves.

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