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IDENTIFICATION OF SECONDARY METABOLITE COMPOUNDS ETHANOL EXTRACT OF BAKUNG ROOTS (*Crinum asiaticum* L.)

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ABSTRACT

Background: Bakungplant is a plant that has properties as traditional medicine, the Latin name of the daffodils is *Crinum asiaticum* L. Bakung provide antimicrobial, anti-inflammatory, antioxidant, anti-emetic, laxative, diuretic, rheumatic and bleeding effectiveness. **Objective:** The population in this study was daffodils taken from Tunuo Village, North Kao District, North Halmahera Regency. **Method Research:** This type of research is experimental on a laboratory scale to determine the secondary metabolite compounds of daffodils ethanol extract by phytochemical screening methods. The sample used in this study was 100 grams of daffodils simplisia powder. Maceration is carried out for 3 days, at room temperature protected from direct sunlight while occasionally stirring. For 3 days maceration is filtered and the pulp is squeezed. Then the dregs were macerated with 400 ml of 70% ethanol solvent for 3 days, then filtered, the filtrate was collected and evaporated with a rotary evaporator to produce a thick ethanol extract of bakung roots **Research Results:** of the toxicity test of sea pandan ethanol extract on shrimp larvae (*Artemia salina* Leach) obtained an LC50 value of 68.43 mg / L showing that the toxic level in sea pandan leaves has a fairly strong toxic level. **Conclusion:** from the results of the research carried out are recommended to conduct further research, namely the identification of pure compounds present in coastal pandan leaves (*Pandanus odorifer*) so that they can be used as herbal medicines or new drug findings

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PRELIMINARY

The Indonesian nation is rich in natural resources, almost a wide variety of plants can thrive in the country.¹ Especially medicinal plants. Bakung are one of the herbal plants consumed by the community as medicine.² Plants are widely used as medicines. The knowledge of the people of North Maluku about medicinal plants is passed down from one era to another. Today, there is ample help for scientific exploration of plants whose abilities are generally not seen as utilization and embellishment, but also as medicinal plants.

Traditional medicine is a material sourced from minerals, animals, and plants that has been used for generations for treatment, disease prevention, or health maintenance.⁵ Nowadays herbal medicine is very increasing both in developing and developed countries. The use of herbal medicine in each region is different-surgical because there are several factors that cause among others history, culture, and individual attitudes. Herbal remedies that are widely used throughout the country or region are herbs.

North Maluku is a society full of natural resources. Especially plants used in traditional medicine. Bakung have a significant impact on the treatment of diseases. The people of North Kao District often use this plant as one of the herbal medicines they use to treat various diseases.³ Currently the people of North Kao District, especially In Tunuo Village, many people tend to use daffodils as herbal medicine to eliminate poisoning due to rabies virus.

This bakung also has leaves, flowers, root stems and bulbs.³ The Latin name of the bakung plant is *Crinum asiaticum* L. The bakung plant is beneficial in traditional medicine due to its antimicrobial, anti-inflammatory, antioxidant, antiemetic, laxative, diuretic, rheumatism, and bleeding control properties.⁶ In previous studies lily. Ethanol extract of the bakung composed of alkaloids, flavonoids, saponins, titerpenoids, and secondary metabolites of steroids. Flavonoids, saponins, and tannins are examples of secondary metabolites found in daffodils. Alkaloids can be found in roots, seeds, and tubers.²

Secondary metabolites themselves are organic molecules that have a function as growth and development. Some plant organs, such as roots, leaves, flowers, fruits, and seeds, can make secondary metabolites.⁴ Based on the description, researchers want to conduct additional research on the identification of secondary metabolites of ethanol extract samples taken in the study, namely in bakungroot extract, which is currently found by many people, especially the coastal area of Tunuo Village North Kao District.

RESEARCH METHODS

A. Type of Research

This type of research uses phytochemical screening methods to find secondary metabolite compounds in ethanol extracts of daffodils on a laboratory scale

B. Population and Sample

Population This study used bakungroots originating from Tunuo Village, North Kao District, North Halmahera Regency as the population. This study used a sample of daffodils simplisia powder as much as 100 grams.

C. Work Procedures

1. Material collection

Bakungroots taken from Tunuo Village, Subdistrict, North Kao, Kab, and North Halmahera are used. Wet sorted, washed under running water, and then dried by aerating at room temperature.

2. Making Bakung Root Ethanol Extract

A dry sample of daffodils as much as 1 kg is sorted back from the dirt left behind, Simplisia that has been sorted is then mashed by coarse mash until a small powder is obtained, then sieved using an 80 mesh sieve, intended for uniformity of simplisia size so as to facilitate the extraction process. After that, the manufacture of daffodils root extract is

carried out using maceration techniques. Bakungroot simplisia powder as much as 100 grams and 70% ethanol solvent as much as 600 ml. Maceration is carried out for three days at room temperature, in indirect sunlight, while occasionally stirring. The rest is squeezed out after maceration filtered for three days. After that, the pulp is macerated for three days in 400 milliliters of 70%. Ethanol solvent, filtered, then evaporated using a rotary evaporator to produce a thick ethanol extract of bakung roots.

3. Identify the content of secondary metabolite compounds

Phytochemical screening tests are carried out to determine secondary metabolite compounds found in bakung roots. This is done in order to find out the secondary metabolite compounds found in bakung roots.

RESEARCH RESULTS

A. Research Results

Table 1. Phytochemical Screening Results of Bakung Roots Ethanol Extract

Phytochemical Screening	Observation	Reagent	Yield
Flavonoids	Ethanol FeCl ₃	Black shaped	+
Alkaloids	HCl Wanger	Brown precipitate shaped	+
Saponins	Aquades	Bubble shaped	+
Tanins	Aquades FeCl ₃	Brownish green in shaped	+

The table above, the results of the phytochemical screening test for secondary metabolites in the ethanol extract of bakung roots. Contains saponins, alkaloids, tannins, and flavonoids.

The yield of thick bakung root extract based on the table above is 15% with a weight of 100 grams of Simplicia powder and 15 grams of thick extract.

Table 2. The yield of Thick Extract of Bakung Root

Sample	Simplicia powder (grams)	Extract (grams)	Yield %
Bakung Root	100	15	15

DISCUSSION

This research was conducted in the laboratory of the Pharmacy Study Program, at Makariwo Halmahera College of Health Sciences. In this study, the sample used was 100 grams of bakung root powder taken from Tunuo Village, North Kao District, North Halmahera Regency. The sample is cleaned using clean and running water,

washing is done to remove dirt attached to the simplicia. The simplicia is dried at room temperature and protected from direct sunlight, the purpose of drying is to reduce the water content in the simplicia. The simplicia is sorted dry by separating the remaining impurities in the dry simplicia. The simplicia is crushed using a blender, the refinement is done to make it easier for the solvent to enter the simplicia and attract more compounds into it. Simplicia is sieved using a sieve, sieving is done to separate small particles mixed in simplicia and simplify the extraction process.

The maceration method, which involves immersing simplicia in solvent at room temperature (without heating) to prevent damage to the simplicia's metabolites, is used in the extraction procedure due to its simplicity and wide application. Because ethanol can be polar, it is used as a solvent because it can extract polar and non-polar compounds at various polarities.⁷ The weight of the simplicia macerated with ethanol solvent is 100 grams of simplicia dissolved in 600 ml ethanol for 3 days while stirring occasionally. the longer the simplicia is soaked, the greater the yield value.⁷ This can happen because there is a continuous extraction process.

The chemical components or compounds in the sample are effectively isolated through repeated filtration with relatively constant amounts of solvent.¹⁶ The solvent will penetrate the cell wall and then enter the cell cavity which contains the active substance. Due to the difference in concentration between the active substance, the substance in the cell, and the solvent, the active substance will dissolve. When this is done again, the solution outside and inside the cell has the same concentration. To speed up the extraction process, stirring is carried out.⁷

The macerated simplicia is evaporated to evaporate the solvent. With various kinds of compounds found in

bakung Root, different chemical structures can have an impact on solubility and stability such as light, air. With the evaporation in the maceration process to prevent damage to the extract, because evaporation is better and it is easy to separate solvents from different extracts with light. during the maceration process it must be evaporated to produce a thick extract.⁶ With an extract weight of 15 grams and an extract yield of 15%.

Condensed extract from bakung Root was tested for flavonoids, alkaloids, saponins, and tannins, using the phytochemical test method. The purpose of the phytochemical test of this study was to determine the content of secondary metabolites of simplicia.⁸ The content of secondary metabolites in the ethanol extract of Bakung showed the presence of saponins, alkaloids, tannins, and flavonoids. Identification of flavonoids in the ethanol extract of bakung roots added to the ethanol solution and the positive addition of FeCl_3 resulted in a change in the color of the solution to black. This is because the flavonoid compounds undergo a reduction reaction caused by FeCl_3 and ethanol. In previous research it was written that flavonoid compounds found in plants are useful as medicines both as anti-bleeding and anti-hypertensive. on the identification of flavonoids by the phytochemical screening method in which Mg and 0.5 M HCl reacted to a yellow color.

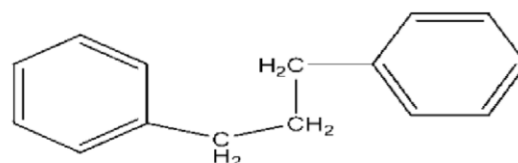


Figure 1. The basic structure of flavonoids.⁹

Identification of alkaloids in the ethanol extract of bakung roots added with HCl and the addition of positive Wanger resulted in a change in the form of a brown precipitate. The purpose of the addition of HCl was to extract alkaline alkaloids using an acidic solution.²⁰ The presence of precipitate

in the reagent is thought to occur between K^+ potassium iodide ions and nitrogen in the alkaloids so as to form a precipitated complex.¹⁰ Meanwhile, Aisyah Mentari and Nurul Hidayah tested the alkaloids of daffodil leaves. In the identification of alkaloids by the phytochemical screening method where Meyer's reagent is in the form of a yellow lumpy precipitate, Dragendorff's reagent is in the form of an orange precipitate and Bouchardat's reagent is in the form of a black brown precipitate.⁷

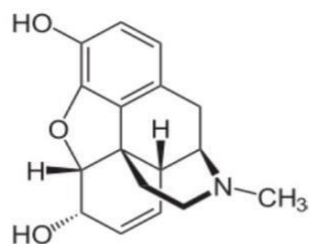


Figure 2. The basic structure of alkaloids.¹¹

Identification of tannins in the ethanol extract of bakung roots added with aquadest and the addition of positive $FeCl_3$ resulted in a change in the color of the solution in the form of a green-brown color. This is because aquadest is polar so it easily reacts with $FeCl_3$. Previous studies have written that tannins are polar compounds because they have OH groups in them. therefore a green-black color change occurs when $FeCl_3$ is added to the sample, indicating the presence of tannin compounds.¹² Aisyah Mentari with Nurul Hidayah conducted a tannin test on *C. asiaticum* L. leaves on the identification of tannins by the phytochemical screening method where there was no $FeCl_3$ precipitate which gave a negative result.⁷

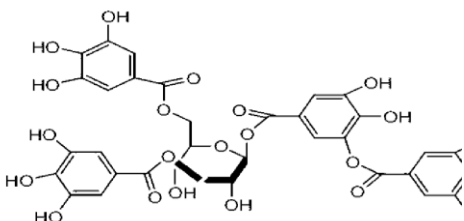


Figure 3. The Basic Structure Of Tannins.⁹

Identification of saponins in the ethanol extract of bakung roots added with positive aquadest is in the form of foam. This is because saponins can reduce the surface pressure of the water, so that foam forms on the surface of the water after shaking.¹³ Aisyah Mentari and Nurul Hidayah conducted a saponin test on daffodil leaves on the identification of saponins by the phytochemical screening method where HCl 2 N formed froth which gave positive results.⁷

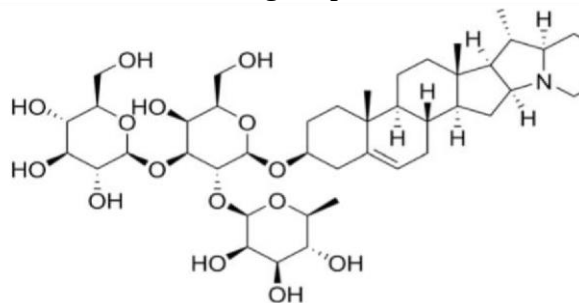


Figure 4. The basic structure of saponins.¹⁴

The results of previous research conducted on the ethanol extract of daffodil leaves using the phytochemical screening method showed that there are flavonoids, alkaloids, saponins, and tannins.¹⁵ In previous research, it was explained that flavonoids have anti-inflammatory activity so that they can inhibit several enzymes. Tannins have an anti-inflammatory effect so that they can inhibit the release of prostaglandins in the arachidonic pathway, which are inflammatory mediators.¹⁶

CONCLUSIONS AND SUGGESTIONS

A. Conclusion

Based on the results obtained from the research, it was concluded that the ethanol extract of daffodils contains secondary metabolites because there are tannins, alkaloids, flavonoid compounds, and saponins.

B. Suggestion

Based on the conclusions of the research results regarding the secondary metabolite compounds of the ethanol extract of daffodil roots, the authors provide suggestions for other researchers to conduct further research using the fractionation method.

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