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Characterization and Phytochemical Screening of Rambai Leaf Extract (*Baccaurea motleyana* Mull.Arg) from Peureulak, Aceh.

M. Alfaruqi[1], Zulmai Rani[1*], Gabena Indrayani[1], Haris Mundar Nasution[1]
[1]Faculty of Pharmacy, Universitas Muslim Nusantara Al-Washliyah, Medan, 20147, North Sumatera, Indonesia
Coressponding authors: zulmairani22@gmail.com

Abstract

The rambai plant (*Baccaurea motleyana* Mull.Arg) contains flavonoid compounds scattered in various parts of the plant such as roots, stems, bark, twigs, leaves, fruit, flowers and seeds. Rambai leaves have various properties that have been empirically proven to cure various diseases, including wound medicine, smallpox medicine, and flu powder. The aim of this research is to find out whether rambai leaf extract contains phytochemicals and to determine the characteristics of rambai leaf extract. Phytochemical screening of rambai leaf extract (*Baccaurea motleyana* Mull.Arg), including examination of flavonoids, tannins, saponins, steroids/triterpenoids, alkaloids and glycosides. Phytochemical screening was carried out on simplicia powder and simplicia extract and characterization of simplicia was carried out. Testing the water content of rambai leaves was 8%, the water soluble essence content was 33.22%, the ethanol soluble essence content was 13.163% and the total ash content was 5.1% and the acid insoluble ash content was 0.3%. Rambai leaf extract positively contains alkaloids, flavonoids, saponins, tannins, steroids/triterpenoids, and glycosides.

Keywords: Rambai leaves, ethanol extract, characterization, phytochemical screening.

Abstrak

Tumbuhan rambai (*Baccaurea motleyana* Mull.Arg) mengandung senyawa flavonoid tersebar di berbagai bagian tumbuhan seperti akar, batang, kulit kayu, ranting, daun, buah, bunga dan biji. Daun rambai memiliki berbagai khasiat telah dibuktikan secara empiris untuk menyembuhkan berbagai penyakit, antara lain obat luka, obat cacar, dan bedak flu. Tujuan penelitian dari ini adalah untuk mengetahui apakah ekstrak daun rambai memiliki kandungan fitokimia dan untuk mengetahui karakterisasi dari ekstrak daun rambai. Skrining fitokimia ekstrak daun rambai (*Baccaurea motleyana* Mull.Arg), meliputi pemeriksaan senyawa golongan flavanoid, tanin, saponin, steroid/triterpenoid, alkaloid dan glikosida. Skrining fitokimia dilakukan terhadap serbuk simplisia dan ekstrak simplisia dan dilakukan karakterisasi simplisia. Pengujian kadar air daun rambai sebesar 8%, kadar sari larut air sebesar 33,22%, kadar sari larut etanol diperoleh 13,163% dan kadar abu total diperoleh 5,1% dan kadar abu tidak larut asam diperoleh 0,3%. Ekstrak daun rambai positif mengandung alkaloid, flavonoid, saponin, tanin, steroid/triterpenoid, dan glikosida

Kata Kunci: Daun rambai, ekstrak etanol, karakterisasi, skrining fitokimia

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INTRODUCTION

Rambai plants contain scattered flavonoid compounds in various parts of the plant such as roots, stems, bark, twigs, leaves, fruits, flowers and seeds. Rambai leaves have various properties that have been empirically proven to cure various diseases, including wound medicine, smallpox medicine, and flu powder[1]. Rambai leaves are one of the mangrove plant species known to the local community as sealing. In terms of ecology, rambai plants thrive in forests[2].

Based on the research, it is stated that the results of phytochemical screening of rambai leaves contain secondary metabolites of phenols, flavonoids, saponins and tannins[3]. Plants that contain these compounds are no exception and hemp plants have the potential to be developed in wound treatment as an antibacterial[4].

Based on Prasetyaningrum leaf research *Baccaurea angulata* Merr. Contains secondary metabolite compounds such as flavonoids, quinones, tannins, triterpenoids, steroids and glycosides[5]. Compounds that are efficacious as antibacterial are flavonoids and tannins[6]. In general, rambai medicinal plants are commonly used as traditional plants in South Asian countries, where they have

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bactericidal activity[8].

METHODOLOGY

This study used a cold extraction method (maceration). The research phase began with data collection, plant identification, the preparation of fresh boiled water, fresh extract, and ethanol extract, phytochemical screening tests, and characterization.

Sample Processing

Simplisia is made by making rambai leaves (*Baccaurea motleyana* Mull.Arg) fresh, then cleaned from the dirt that sticks, then washed with water until clean. Next, it is dried by airing first, then dried in a dryer with a temperature of 40-60°C until the simplicia becomes dry. The dried simplicia is then mashed with a blender until it becomes a simplicia powder, then stored in a tightly closed plastic container[9].

Characterization of Simplisia

Determination of Moisture Content

The determination of water content was carried out by the azeotropy method (toluene distillation). The tool consists of a 500 mL round base flask, a storage and cooling device, a splicing tube and a 10 mL receiver. A total of 5 grams of simplicia powder that has been carefully weighed, put into a round base flask containing the saturated toluene, then carefully heated for 15 minutes. After the toluen boils, the droplet rate is set to 2 drops per second until most of the water is distilled, then the distillation rate is increased to 4 drops per second. Once all the water has been distilled, the inside of the cooler is rinsed with toluen. Distillation continues for 5 minutes, then the receiving tube is allowed to cool at room temperature. After the water and toluene are completely separated, the volume of water is read with an accuracy of 0.05 mL. The difference between the two volumes of water read is in accordance with the water content contained in the material being examined. Moisture content is calculated in percent (v/b)[7].

Determination of water-soluble juice content

A total of 5 grams of simplicia powder was macerated with 100 mL of chloroform P (2.5 mL of chloroform in 100 mL of aquadest) for 24 hours using a clogged flask while occasionally beaten for the first 6 hours, then left for 18 hours and filtered. 20 mL of filtrate is evaporated until dry in an evaporation cup then heated at 105°C and weighed until a fixed weight is obtained. The water-soluble pollen content is calculated in percent of the material that has been air-dried[10].

Determination of Ethanol-Soluble Sari Levels

A total of 5 grams of simplicia powder was macerated for 24 hours with 100 mL of ethanol (96%) in a clogged flask while occasionally shaken for the first 6 hours and then left for 18 hours. It is then filtered to avoid ethanol evaporation, then 20 mL of filtrate is evaporated until dry in an evaporation dish and then heated at a temperature of 105°C until a fixed weight is obtained. The content in percent soluble in ethanol is 96% calculated against the material that has been air-dried[11].

Determination of Total Ash Levels

A total of 2 grams of simplicia powder is weighed carefully, then put into a porcelain crust that has been grated and

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weighed (weighed until a fixed weight) then the crew is slowly glow until the charcoal runs out, the claw is carried out at a temperature of 600°C for 3 hours then cooled and weighed until a fixed weight is obtained. The ash content is calculated for the dried material[12].

Determination of Acid Insoluble Ash Content

The ash obtained at the determination of total ash content, cooled with 25 mL of dilute hydrochloric acid, stirred for 5 minutes, the insoluble part in the acid is collected, filtered through ash-free filter paper, then washed with hot water, residue and filter paper are incandescent at 600°C for 3 hours then cooled and weighed until a fixed weight is obtained. The content of insoluble ash in acids is calculated against materials that have been air-dried[12].

Preparation of Ethanol Extract of Rambai Leaves (Baccaurea motleyana Mull.Arg)

Manufacturing of rambai leaf ethanol extract (*Baccaurea motleyana* Mull.Arg) It is carried out by maceration using 96% ethanol solvent. 10 parts (500 g) of simplicia powder is put into a vessel, then 75 parts (3750 mL) of ethanol filter liquid are poured and then closed while stirring occasionally and left for 5 days protected from sunlight[13]. After 5 days the pulp mixture is squeezed. Wash the pulp with enough ethanol strainer until 100 parts (5 liters) of maserate are obtained. The fibers are then transferred into a closed vessel, left in a cool place, protected from light between 2 days, and filtered. The maserat is then concentrated with a rotary evaporator and then weighed[14].

Phytochemical Screening

Phytochemical screening of rambai leaf extract (*Baccaurea motleyana* Mull.Arg), including examination of flavanoid compounds, tannins, saponins, steroids/triterpenoids, alkaloids and glycosides. Phytochemical screening was carried out on simplicia powder and simplisia extract[9].

Flavonoid Examination

Simplicia powder and extract of 10 grams each are weighed then 100 mL of hot water is added, boiled for 5 minutes and filtered in a hot state, the filtrate obtained is then taken 5 mL then added 0.1 grams of Mg powder and 1 mL of concentrated HCl and 2 mL of amyl alcohol, shaken, and left to separate. Flavonoids are positive if red, yellow-orange on the amyl alcohol layer[15].

Tannin Inspection

The powder and extract simplicia were each weighed 0.5 grams of samples extracted with 10 mL of aquadest, then the filtrate was diluted with aquadest until colorless. 2 mL of solution is taken and then 1 to 2 drops of iron (III) chloride reagent are added. The occurrence of blue or blackish-green color indicates the presence of tannin[16].

Saponin Examination

The powder and extract simplicia were each weighed as much as 0.5 grams of samples were put into a test tube and added hot aquadest as much as 10 mL, cooled then beaten vigorously for 10 seconds, a steady foam/foam appeared for no less than 10 minutes as high as 1-10 cm. Add 1 drop of 2N hydrochloric acid solution, if the foam does not disappear indicates the presence

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of saponins[17].

Steroid/ Triterpenoid Examination

The powder and extract simplifications were each weighed as much as 1 gram of the sample was macerated with 20 mL of n-hexane for 2 hours, then filtered. The filtrate is evaporated in a vaporizer cup. On the leftover, 2 drops of anhydrous acetic acid and 1 drop of concentrated sulfuric acid are added. The occurrence of purple indicates the presence of triterpenoids or the green color indicates the presence of steroids[18].

Alkaloid Examination

0.5 grams are weighed, 1 mL of hydrochloric acid and 9 mL of aquadest are added, heated with water for 2 minutes then cooled and then filtered after that an experiment is carried out using three reactors, for mayer reagent 3 drops of filtrate are added 2 drops of mayer reagent, if a white or yellow precipitate is formed, the result is positive. For boucardat reagents, if positive, it is marked by the formation of brown to black deposits. For dragendrof reagents, the positive reaction is characterized by red precipitate[19].

Glycoside Examination

The powder and extract symplisia were weighed by 3 grams each, then extracted with 30 mL of a mixture of 7 mL of 96% ethanol and 3 parts aquadest plus 10 ml of HCL 2N. Refluxed for 30 minutes, cooled and filtered. 20 mL of filtrate was taken, 25 mL of aquadest and 25 mL of lead(II) acetate 0.4 M were added, shaken, then let stand for 5 minutes and filtered. Filtrate was extracted with 20 mL of a mixture of 3 parts chloroform and 2 parts isopropanol repeated three times. Collect the juice of the evaporated water at a temperature of no more than 50°C. The rest is dissolved in 2 mL of methanol. Then 0.1 mL of the experimental solution was taken and put into a test tube, evaporated in a water bath. To the rest are added 2 mL of water and 5 drops of molish reagent. Then slowly add 2 mL of concentrated sulfuric acid through the tube wall, if a purple ring is formed at the second border of the liquid indicates the presence of glycoside[20].

RESULT AND DISCUSSION

The samples used in this study were rambai leaves, the wet weight of rambai leaves obtained was 5000 g and the simplicia powder obtained was 1065 g. the extraction method used was maceration using 96% ethanol solvent so as to produce a thick extract of 96 g of blackish-green color with a distinctive odor.

Simplicia Characterization Examination

The results of the characterization examination of kaffir lime leaf powder can be seen in Table 1.

Testing the moisture content of simplicia powder is carried out based on the table above to determine the moisture content of simplicia powder. The moisture content requirement of simplicia in general is not more than 10% in this test, the moisture content of kaffir lime leaves is 8% and qualified, because if the moisture content exceeds 10%, fungi and bacteria will easily develop[21].

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Table 1. Characterization Examination of Rambai Leaf Powder Simplicia

No	Parameters	Yield %	Requirement %
1	Moisture content	8	≤ 10
2	Water-soluble pollen rate	33.22	≥16.2
3	Ethanol content	13.163	≥10.6
4	Total ash content	5.1	≤9.4
5	Acid insoluble ash content	0.3	≤1.2

Examination of the water-soluble content of simplicia powder to see how much can be extracted with the aqueous solvent from the simplisia. The soluble juice content in the water of rambai leaf simplicia powder of 33.22% of the results is qualified because the standard in rambai leaves is <16.2%, in the ethanol examination 19% of the results can be qualified, according to the condition is >6.5%. In the examination of the total ash content, 5.1% of the results were qualified and in the examination of the acid-insoluble ash content 0.3% was obtained, the purpose of this simplicia characterization examination was to ensure the uniformity of simplicia quality in order to meet the requirements of simplicia and extract standards.

Phytochemical Screening

Phytochemical screening is carried out to determine the secondary metabolites of phytochemical compounds contained in senggani leaf plants. Phytochemical screening of senggani leaf powder and extract by looking at the presence of alkaloid compounds, saponins, tannins, flavonoids, steroids/triterpenoids, and glycosides showed the presence of all of these compounds attached to Table 2.

The chemical components of secondary metabolites found in rambai leaf powder and extract include alkaloids, flavonoids, saponins, tannins, steroids/triterpenoids, and glycosides as seen in Table 2. When Bouchardat reagent is added, a blackish-brown precipitate is formed, and if dragendorphat reagent is added, an orange precipitate is formed indicating the presence of alkaloid compounds. The orange color on the separate layer of amyl alcohol indicates the presence of flavonoid components, this proves that rambai leaf powder and extract contain flavonoid chemical compounds. The presence of saponins can be seen by the high foam obtained from rambai leaf powder and extract, which is 2 cm. By using the $FeCl_3$ reagent, the presence of tannin compounds can be seen with a blackish-green color characterized by powder and positive rambai leaf extract containing tannin compounds. In addition, the formation of a green color indicates the presence of steroid/triterpenoid chemicals which indicate that rambai leaf powder and extract are positive for containing steroid components. The formation of a purple ring with the addition of molish reagents indicates the presence of sugar compounds in the powder and rambai leaf extract, the purpose of this molish test is to prove carbohydrates in general.

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Table 2. Phytochemical Screening Result

No	Test	Powder	Extract
1	Flavonoids	+	+
2	Alkaloids	+	+
3	Tannins	+	+
4	Saponins	+	+
5	Steroids/triterpenoids	+	+
6	Glycosides	+	+

CONCLUSION

Based on the results of the research carried out, it can be concluded that Rambai leaf extract (*Baccaurea motleyana* Mull.Arg) in the characterization test meets the standards and in the phytochemical screening test positive results are obtained. The moisture content of rambai leaves was 8%, the water soluble juice content was 33.22%, the ethanol soluble juice content was 13.163% and the total ash content was 5.1% and the acid insoluble ash content was 0.3%. Positive rambai leaf extract contains alkaloids, flavonoids, saponins, tannins, steroids/triterpenoids, and glycosides.

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