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Phytochemical Screening Of Acacia Auriculiformis Leaf Ethanol Extract

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***Abstract*— Indonesia is one of the countries that has a very diverse biodiversity of more than 38,000 plant species, about 55% of which are endemic plants. Based on data from the WHO (World Health Organization), approximately 3.4 billion people in developing countries depend on traditional medicine derived from plants. In fact, about 20,000 plant species originating from the Indonesian Tropical Forests are widely used as ingredients for natural medicines by residents throughout Indonesia, one of which is the acacia plant. (Data from the Ministry of Environment in 2010 The purpose of this study was to determine the content of secondary metabolites contained in the ethanol extract of acacia leaves. phytochemical tests that have been carried out using ethanol solvent, obtained secondary metabolite content in the ethanolic extract of acacia leaves, namely alkaloids, flavonoids, phenols and saponins while terpenoid compounds were not found. This is because the solvent used is ethanol which is polar. Alkaloid compounds, flavonoids, and saponins are polar and generally can be attracted by polar solvents such as ethanol. Terpenoid compounds were not found because these compounds are non-polar and can be dissolved by non-polar solvents such as n-hexane.**

***Keywords*— *Acacia auriculiformis*, Ethanol, Flavonoid,**

I. INTRODUCTION

Indonesia is one of the countries that has a very diverse biodiversity of more than 38,000 plant species, about 55% of which are endemic plants. Based on data from the WHO (World Health Organization), approximately 3.4 billion people in developing countries depend on traditional medicine derived from plants. In fact, about 20,000 plant species originating from the Indonesian Tropical Forests are widely used as ingredients for natural medicines by residents throughout Indonesia, one of which is the acacia plant. (Data from the Ministry of Environment in 2010).

Acacia has been widely used as a traditional plant to treat various medical complications such as eye pain, aches and pains, rheumatism, allergies, itching and rash (Girijashankar, 2011). In addition, acacia has been proven pharmacologically as an antidepressant for the central nervous system, antioxidant, antimalarial, antifilariae, antimutagenic, spermicide, chemopreventive, wound healing, antidiabetic and as a good hepatoprotective (Sathya and Siddhuraju, 2013; Urmi et al., 2013; Rangra). , Samanta, and Pradhan, 2019).

Acacia can grow well in degraded soil conditions, with its ability to fix free nitrogen. Acacia is also quite tolerant of environmental stress, on bare, loamy, high saline soil or waterlogged soil (CABI, 2018). Acacia has pseudo leaves or phyllodia, ie incomplete leaves that do not have a leaf blade, but the petiole is wide (the leaf is a modification of the petiole). Acacia has a phylotactic with a scattered type. Filodia shaped bent like auricle (auricle). This character is the basis for naming clues to this species. Venation on phyllodia is dominant in the longitudinal direction, phyllodia length is 10-20 cm, phyllodia width is 2-6

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cm (Orwa et al., 2009).

Acacia is a type of plant that is commonly used as a shade plant planted on the side of the road. The stems of this plant are commonly used as raw material for making paper and are also used as raw materials for making handicrafts and furniture as well as energy wood in the form of charcoal industry materials and raw materials for pellets. In addition to having benefits as energy wood, this acacia plant also has biological activities, including as an antioxidant and antifungal. Naturally, plants that contain antioxidants are scattered in various parts of the plant such as roots, stems, bark, twigs, leaves, fruits, flowers and seeds, including plants of the Fabaceae family. One type of Fabaceae plant that contains antioxidants is acacia (Acacia auriculiformis). Sari and Putra (2018) reported high antioxidant activity in acacia leaf extract with IC50 and AAI values of young and old A.auriculiformis extracts of 464.2361 ppm (AAI = 0.0861), 433.6332 ppm (AAI=0.0922). The purpose of this study was to determine the content of secondary metabolites contained in the ethanol extract of acacia leaves.

II. Research Methodology

This research was conducted at the Laboratory of Organic Chemistry and Natural Materials, Department of Chemistry, Faculty of Mathematics and Natural Sciences, Andalas University, Padang, West Sumatra. Fresh samples of acacia leaves were taken as much as 4 kg obtained from the environment around the Andalas University campus, Padang, West Sumatra and air-dried for 2 weeks in open air that is not exposed to direct sunlight. The dry sample was then ground with a grinder to form a fine powder and weighed. The dry sample that has been mashed and obtained as much as 1.5 kg is then macerated in a dark bottle and technical ethanol solvent is added until the sample is completely submerged, approximately 2 cm above the sample surface. Maceration was carried out for 3x24 hours. The maceration results were then filtered using filter paper and concentrated with a rotary evaporator at 40°C to obtain a thick extract (Rahman et al., 2020). Ethanol The thick extract obtained was weighed and dissolved with distilled water according to the needs.

Phytochemical Profile Test

Samples of leaves that have been mashed and put into a test tube are then added with ethanol and heated with Bunsen. After that, the filtrate was separated into another test tube and then shaken. After settling, two layers will be formed and then separated. The water layer was used to test the phenolic and flavonoid content, while the chloroform layer was used to test the terpenoid content (Setyningrum, Kartika and Simanjuntak, 2017).

1.) Phenolic Examination

As much as 1 ml of the water layer was taken and put into a test tube, then added iron (II) chloride reagent. The formation of a green to purple color indicates the presence of phenolic compounds.

2.) Flavonoid examination (Shinoda test)

As much as 1 ml of the water layer was taken and put into a test tube line, then concentrated hydrochloric acid and a few grains of magnesium powder were added, the formation of orange to red color indicated the presence of flavonoids.

3.) Terpenoid Examination

The chloroform layer was taken with a dropper and inserted into the three holes of the drip plate. One hole was used as a comparison, and the other two holes were added with concentrated H2SO4 and then acetic anhydride was added. If a red to purplish red color is formed, it indicates the presence of terpenoids.

4.) Alkaloid Examination

A total of 4 g of sample was added with 10 ml of chloroform and 10 ml of ammonia. The solution was filtered into a test tube and the filtrate was added with 10 drops of H2SO4 2N. The mixture was shaken and allowed to stand until two layers were formed. The top layer was transferred into test tubes filled with ± 1 ml each. Then Mayer reagent was added, if a white precipitate was obtained, it indicated the presence of alkaloids in the sample.

5.) Saponin Check

A total of 1 g of fresh sample that has been finely chopped, put into a test tube and added 10 ml of distilled water. The test tube was shaken for 10 minutes. The formation of foam that does not disappear after 1 minute indicates the presence of saponin

compounds.

III. Result And Discussion

Phytochemical Profile of Acacia Leaf Ethanol Extract

The results of the study on the phytochemicals of the ethanol extract of acacia leaves are shown in Table 1:

Table 1. Phytochemical screening of acacia leaf ethanol extract

Secondary Metabolites	Indicator	Result
Alkaloid	There is a white precipitate	(+)
Flavonoid	There is a change in orange color	(+)
Fenol	The color changes to purple	(+)
Saponin	There is foam	(+)
Terpenoid	No color change	(−)

In Table 1 shows the results of phytochemical tests that have been carried out using ethanol solvent, obtained secondary metabolite content in the ethanolic extract of acacia leaves, namely alkaloids, flavonoids, phenols and saponins while terpenoid compounds were not found. This is because the solvent used is ethanol which is polar. Alkaloid compounds, flavonoids, and saponins are polar and generally can be attracted by polar solvents such as ethanol. Terpenoid compounds were not found because these compounds are non-polar and can be dissolved by non-polar solvents such as n-hexane.

Utami and Putri (2020); Puspitasari, Swastini and Arisanti (2013) stated that the extraction solution is usually adjusted to the polarity of the desired compound. According to the principle like dissolves like, a solvent will tend to dissolve compounds that have the same level of polarity. Polar solvents will dissolve polar compounds and vice versa. One of the commonly used solvents is a polar solvent, namely ethanol. Ethanol is a universal solvent with a polarity index of 5.2. Ethanol is able to dissolve almost all secondary metabolites such as alkaloids, flavonoids, saponins, and tannins. According to Saidi et al. (2018) generally terpenoids and steroids are non-polar to semi-polar, so they are not detected in polar solvents such as ethanol. Commonly used solvents are n-hexane (non polar), ethylacetate, chloroform, dichloromtana or diethylether (semi polar).

The results of this study differ from Setyningrum et al. (2017) who reported the results of phytochemical tests on the ethanolic extract of acacia leaves, obtained flavonoid compounds, saponins, steroids, phenolics and no alkaloid and terpenoid compounds. Sari and Sumadewi (2019) reported that the compound group of methanol extract from acacia leaves and found compounds of saponins, tannins, alkaloids, flavonoids, and did not find terpenoid compounds. This is the same as that obtained in this study.

In addition to solvents, differences in phytochemical yields from acacia plants are influenced by many factors including environmental factors, so that the content of metabolites produced is different at different locations. According to Sholekah (2017), the phytochemical content in a plant is influenced by several factors, both internal and external. Internal factors such as physiology and external factors such as light, temperature, humidity, pH, nutrient content in the soil and altitude. This difference results in a series of metabolic processes in plants that will vary in each environmental condition.

In addition to the environment, the extracted organ parts will also produce different secondary metabolites due to the different functions of each organ so that the metabolites produced in the leaves are different from the metabolites produced by the skin, stem, and flower organs. According to Maslakhah (2018), differences in metabolites in plants are a consequence of changes in enzyme activity due to changes in gene expression. Differences in organs in plants also cause differences in the biosynthesis of metabolites so that the chemical compounds in each organ are also different.

IV. CONCLUSION

Secondary metabolites in the ethanol extract of acacia leaves are alkaloids, flavonoids, phenols and saponins, while terpenoids are not found

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