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CHARACTERISTICS OF ALLAMANDA FLOWER (Allamanda cathartica L.) ETHANOLIC EXTRACT

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Abstract

Allamanda flowers were known as ornamental plants, but also have benefits as traditional medicine. Phytochemical screening is an important first step in identifying potential secondary metabolites of a plant. This study were to determine of characteristics and phytochemical screening of allamanda flowers ethanolic extract. Allamanda flowers used were natural flowers that have been air-dried for 7 days. The extract from dry sample of allamanda flowers was obtained by maceration method using 96% ethanol as solvent. The extracts were evaluated their characteristics including, yield, ash content, water content and phytochemical screening by color reaction method with specific reagent. The results were obtained that extract characteristics, namely the yield of 51.77%; water content of 1.14%; and ash content of 4.71%. The results were obtained from the phytochemical test that 96% ethanol extract of allamanda flowers contains flavonoid and saponin. It can be concluded that ethanol extract of allamanda flowers with ash content of 4.71% and water content of 1.14% contains flavonoids and tannins.

Keywords: Allamanda, Extract, phytochemical screening

1. Introduction

Allamanda (*Allamanda cathartica* L.) in Bengkulu Province is commonly found in Sebelat Village, Putri Hijau District, North Bengkulu Regency. According to some people this plant is only used for ornamental plants. Peoples do not know the efficacy or chemical content of allamanda.

Allamanda, The ornamental plant that is also known to be used as a traditional medicine. The root of allamanda can be used for jaundice, it's flowers are used to prevent complication of malaria and enlargement of the spleen. The sap of this plant has been used to kill mosquito larvae and kill maggots. In addition, allamanda liquid extract has activity as a wound healer (Hidayat dkk., 2015).

Some parts of allamanda plant have been screened for their main metabolite content. According to research conducted by Jannah et al., (2020) secondary metabolites contained of allamanda leaves ethanolic extract are alkaloid, terpenoids, flavonoids and phenolics. However, no phytochemical screening was carried out on ethanolic extract of allamanda flowers.

Kumiati et al (2014) have shown results in their study abouth phytochemical screening of allamanda leaf powder and extract contained alkaloid, flavonoid, saponin, tannin, steroid and triterpenoid. Antimicrobial activity's evaluation was showed that petroleum ether phase of alamanda leaves had the greatest zones in inhibition against *Saccharomyces crevisiae* and *Candida albicans*. However, the toxicity test on *Artemia salina* Leach larvae using the BSLT method showed that LC50 value of >50 (toxic).

Phytochemical screening is one way to identify of secondary metabolites from natural product. Phytochemical screening is a preliminary stage that can provide an overview of the content from certain compounds in natural product to be studied (Sari et al., 2021).

Based on the background, researchers are interested in characterizing and screening phytochemicals from the ethanolic extract of allamanda flowers. The extraction method that used in this research was the maceration method. This study was aimed to determine characteristics and secondary metabolites of allamanda flowers.

2. Materials and Methods

Plant material: Fresh flowers of allamanda plant (*Allamanda cathartica* L.) were obtained from Sebelat Village, Putri Hijau District, North Bengkulu Regency. Plant samples have been identified at Department of Biology Laboratory, Faculty of Mathematics and Natural Sciences, The University of Bengkulu with identification document number 142/UN30.12.LAB.BIOLOGI/PM/2021.

Plant extraction: Allamanda flowers that have been air-dried as much as 350 g were macerated with 1000 mL of 96% ethanol for 3 x 24 hours and stirred continuously. The maserate were filtered, the filtrate was concentrated with rotary evaporator and then the residue was re-macerated with 500 mL 96% ethanol for 3 x 24 hours and the maserate was concentrated again to obtain thick extract of allamanda flower.

Extract Characteristic Evaluation

Organoleptic extract. Organoleptic evaluation is an observation through the five senses by observing the shape, color and smell of the extract.

Determination of Water Content. A total of 1 g of extract was weighed in steaming cup that has been weighed. It was heated at 105ºC for 5 hours in the oven and then weighed. Water content is calculated in percent of the initial sample weight**.**

Determination of Ash Content. A total of 1 g of extract was weighed carefully (B) into a crucible and weighed first (A0). Then the temperature was increased gradually to 600 ± 25ºC until it was free of carbon, then cooled in a desiccator, and the weight of the ash (A1) was weighed. Ash content is calculated in percent of the initial sample weight.

$$\text{Ash Content (\%)} \ \frac{\text{A1} - \text{A0}}{\text{B}} \ \text{x } 100\ \%$$

Phytochemical Screening

Alkaloid. Alkaloids test was carried out using Mayer, Wagner and Dragendorff reagent. A total of 0.5 g of extract was added with 1 ml of 2 N HCl and 9 ml of aquadest, heated on a water bath for 2 minutes, and filtered. The filtrate was used for alkaloid test. Three test tubes were taken, and 0.5 ml of the filtrate was added to each tube. Each test tube was

added with 2 drops of Mayer, Wagner, and Dragendorff reagent. The formation of a precipitate indicates the presence of alkaloids.

Flavonoid. A total of 0.5 g of extract was added 5 ml of ethanol and heated for 5 minutes in a test tube. Then add 2 drops of concentrated HCl and 0.2 grams of Magnesium powder. The appearance of dark red (magenta) color indicates the presence of flavonoids.

Terpenoid. A total of 0.5 g of extract was added 0.5 ml of CHCl3 and 0.5 anhydrous acetic acid in test tube. Then added 1-2 drops of concentrated H2SO4. The appearance of purple or red color indicates terpenoid positive.

Saponin. A total of 0.5 g of extract was added 10 ml of hot water, cooled and then shaken vigorously for 15 minutes. Positive saponins are indicated if 1-10 cm high foam is formed for 10 minutes and persists after the addition of 2 N HCl.

Tannin. A total of 0.5 g of extract was added 1-2 ml of aquadest in a test tube then added 2 drops of 5% FeCl3 and added gelatin. The appearance of white precipitate indicates a positive tannin.

3. Results and Discussion

Allamanda (*Allamanda cathartica* L.) is an ornamental plant that also has biological activity that has been proven in several studies. It's sap was proven to kill mosquito larvae and kill maggots. In addition, the liquid extract of the allamanda plant also has activity as a wound healer (Hidayat et al., 2015). This study was aimed to determine characteristics and phytochemical screening of allamanda flowers extract.

The extraction procedure that used in this study was maceration method. Maceration is a simplicia extraction method by immersing in a solvent at room temperature so that damage or metabolite degradation can be minimized (Hanani, 2017). The maserate was evaluated for characteristics including determination of the water content and ash content as the non-specific extract parameter components that can be seen in Table 1. Organoleptic evaluation and phytochemical screening were also carried out on the extract as an evaluation of extract-specific parameters that can be seen in Table 2.

The extraction result from 350 g of allamanda dry flower obtained 181.2 g of thick extract with a yield of 51.77%. And extract has organoleptic characteristics of a distinctive odor, blackish yellow color and thick form.

Table 1. Water and ash content of allamanda flower ethanol extract

Parameters	Value	Standard (Indonesian Herbal Pharmacopoeia)
Water content	1,14%	≤ 10%
Ash content	4,71%	< 16,6%

In determining of extract parameters, water content and ash content were measured. The purpose of determining the water content is to provide a minimum limit or range of the amount of water content in the material that affects the shelf life. High water content causes susceptibility to microbial activity. The water content in the extract is a medium for the growth of molds or fungi. The results of the water content test showed that the water content of the extract was 1.14% in accordance with the standards set in the Indonesian Herbal Pharmacopoeia (≤ 10%) (Ministry of Health, 2017).

The determination of ash content was aimed to provide an overview of the internal and external mineral content from the initial process to the formation of the extract. At this stage the extract is heated until the organic compounds and their derivatives are destroyed and evaporated until only mineral and inorganic elements remain (Rahmadiah, 2009). The test result of the ash content is 4.71%. This result was showed that the ash content standard for extracts according to the Indonesian Herbal Pharmacopoeia, which is <16.6% (Kemenkes RI, 2017).

Table 2. Phytochemical screening of allamanda flower ethanol extract

No	Test	Result	Appearence
1	Alkaloid	-	No Yellow precipitate (Mayer test)
		-	No Brown precipitate (Wagner test)
		-	No Orange precipitate (Dragendorff test)
2	Flavonoid	+	Light red (Shinoda test)
3	Terpenoid	-	Solution is not purple or red
4	Saponin	+	solid foam 1 - 10 cm, not reduced from 10 minutes
5	Tannin	-	No White precipitate(FeCl3 + Gelatin)

Based on the results of phytochemical screening, it was found that the 96% ethanol extract of allamanda flowers from Sebelat Village, Putri Hijau District, North Bengkulu Regency was positive for flavonoids and saponins, while the screening for alkaloids, terpenoids and tannins showed negative results. Phytochemical screening aims to provide an initial description of the chemical composition of a plant.

Flavonoids were screened on allamanda flower extra using a shinoda test with magnesium powder and concentrated sulfuric acid, which resulted in dark red color. Flavonoids are generally water-soluble components. Flavonoids are very effectively used as antioxidants, antibacterials and inhibitors of α-glucosidase enzyme (Agustina et al., 2016).

Flavonoids and saponin are antibacterial and anti-inflammatory agent . Flavonoids are the largest group of phenolic compounds which have effective properties to inhibit the growth of viruses, bacteria and fungi. With this compound, Alamanda flowers can be used as raw materials for potential drugs because they may contain high level of antioxidant or antibacterial (Pertiwi et al., 2022).

Phytochemical screening research on allamanda leaf ethanol extract showed different results from allamanda flower. The ethanol extract of allamanda leaves contains secondary metabolites of alkaloid, triterpenoid, flavonoid and phenolic based on phytochemical tests. The secondary metabolite content of plant parts can be different, this can be influenced by biotic and abiotic factors from plants (Jannah et,al, 2020).

4. Conclusion

The results of this study can be concluded that the characteristics of ethanolic extract of allamanda flower (***Allamanda cathartica* L.)** were showed that yield of **51,77%,** water content of 1,14%, ash content of 4,71% and it's phytochemical screening were positive for flavonoid and saponin.

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