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Qualitative Phytochemical Screening and Antioxidant Activity of Ethanol Root Extract of *Spatholobus littoralis* Hassk

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A B S T R A C T

Spatholobus littoralis Hassk is a medicinal plant in Central Kalimantan. This plant in Indonesia is called Bajakah Tampala. The ethanolic wood extract of Bajakah was subjected to preliminary phytochemical screening and antioxidant activity test. The phytochemical tests were carried out using standard methods of analysis, and these investigations revealed the presence of alkaloids, flavonoids, and Steroids. Antioxidant activity was performed by DPPH (1,1diphenyl-2-picrylhydrazyl) radical scavenging method for ethanol extracts. It exhibited strong antioxidant DPPH radical scavenging activity with an IC_{50} value of 8.25 µg/ml for ethanol Bajakah Tampala Root extract.

INTRODUCTION

Bajakah Tampala Stem (*Spatholobus littoralis* Hassk) is a medicinal plant that has been used for generations by Garong Pulang Pisau village communities in Central Kalimantan (Noorlaili et al., 2019). *Spatholobus littoralis Hassk* (SLH) is a plant of one genus with the *Spatholobus suberectus*. High-pressure hot-water *S. suberectus* extract has the potential to be used for glioma treatment (Kim et al., 2018). there is an effect of the ethanol extract ointment preparation of the Bajakah Tampala Stem on the effectiveness of anti-wound (healing time) (Saputera and Ayuchecaria, 2018).

Tang et al. (2012) had been reported that *Spatholobus suberectus* contained acidic compounds, such as protocatechuic acid and flavonoids, such as naringenin. Protocatechuic acid could be used as a protective agent against cardiovascular diseases and neoplasms. The mechanism is mostly associated with antioxidant activity, including inhibition of generation as well as scavenging of free radicals and up-regulating enzymes that participate in their neutralization (Szumiło, 2005). Salehi et al. (2019) also reported that Naringen had biological activity such as antioxidants. At the same time, preliminary phytochemical screening and antioxidant activity of SLH from Central Kalimantan were not known. The initial phytochemical screening and antioxidant activity of ethanol root extract of SLH were investigated using by DPPH (1, 1diphenyl-2-picrylhydrazyl) methods.

METHODS

Collection and Identification of Plants

SLH was collected from Palangkaraya, Central Kalimantan. The plants were identified in the Biology Laboratorium, Department of Biology, FMIPA, Tanjungpura University. Phytochemical screening and antioxidant activity have been

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carried out in Chemistry Laboratorium, Department of Chemistry, FMIPA, Tanjungpura University.

Preparation of Plants and Plant Extract

The roots of SLH was prepared by air-dried at room temperature. Dried samples were powdered and macerated with ethanol. Whatmann no.1 filter paper was used to filter the mixture. The filtrate was concentrated using a rotary vacuum evaporator to evaporate the residue of solvents. Then, the ethanol extract of SHL is stored in the refrigerator for further use.

Phytochemical Screening Analysis

Identification of Alkaloid. Identification of alkaloids performed by Mayer, Wagner, and Dragendorff. 0.5 gram concentrated root extract SHL was added with 1 mL of HCl 2M and 9 mL of distilled water, heated for 2 minutes, cooled, and then filtered. The filtrate was divided into three parts, each supplemented by Mayer's reagents, Wagner, and Dragendorff.

Identification of Flavonoid. Identification of Flavonoid performed by dissolving the concentrated extracts in hot ethanol and add 0.1 grams of Mg powder and five drops of concentrated HCl.

Identification of Steroids. Identification of Steroids was carried out by dissolving the concentrated extract in 0.5 mL chloroform, then add 0.5 mL of acetic anhydride and drop the mixture with 2 mL H2SO4 thick through the tube wall.

Identification of Tanin. Identification of Tanin performed by dissolving the concentrated extracts in 10 mL distilled water, then filtered and filtrate added with three drops of 1% $FeCl_3$.

Identification of Saponin. Identification of saponins performed by dissolving the concentrated in 10 mL of hot water and shaken vigorously for 10 seconds.

Antioxidant Test

The antioxidant activity test was carried out by the DPPH method dissolved in the ethanol solvent p.a. Then the maximum wavelength measurements were carried out using a UV-Vis spectrophotometer at a wavelength of 517 nm. In this study, a comparison is used ascorbic acid. The stock solution was prepared by dissolving 10 mg of sample in 10 mL of ethanol p.a to obtain a concentration of 1000 ppm stock solution. Variations in the concentration of a comparative sample of ascorbic acid are made with 2, 4, 6, 8, and 10 ppm. While the variety of SHL root extract sample is 50, 100, 200, 400, and 800 ppm. A total of 1 mL of sample solution of various concentrations was added with 2 mL of ethanol p.a, then 1 mL of DPPH 100 ppm was added, after which it was left homogeneous, then incubated in a dark place at room temperature for 30 minutes (Kuntari et al., 2017).

The absorbance of each sample variation is measured at a predetermined maximum wavelength. The ability of DPPH radical inhibitors is determined from the absorbance value. The amount of concentration of the extract of the test solution to reduce 50% of free radical activity was determined by the IC_{50} value calculated by the percentage of absorbance inhibition of the extract solution from a linear regression curve.

$$\% \text{ Inhibition} = \frac{\text{Abs of DPPH} - \text{Abs of Sample}}{\text{Abs. of DPPH}} \text{ x } 100\%$$

The sample concentration and percent inhibition were processed using SPSS to obtain a linear regression equation. The equation is used to determine IC_{50}.

RESULTS AND DISCUSSION

The extract of SHL qualitatively contained alkaloids, flavonoids, and steroids. Flavonoid compounds had substantial contributions towards antioxidant activity (Wang et al., 2020).

Table 1. Phytochemical test results

Tests	Reagents
Alkaloids	
Mayer	+
Wagner	+
Dragendorff	+
Flavonoids	+++
Steroids	+
Tannin	-
Saponin	-

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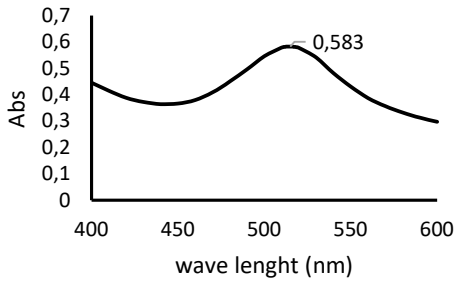

Figure 1. DPPH solutions maximum wavelength

The maximum wavelength (λ_{max}) of DPPH solutions standing at 514 nm with absorbance 0.583 (Figure 1). The λ_{max} was used to measure absorbance values on the ascorbic acid and the samples. The percentage of inhibitions from the samples (y) were plotted with each concentration (x). The equation resulted

$y = 2.17x + 32.091$

So with inhibitory concentration (IC_{50}) of SHL extract stood at 8.25 ppm. This concentration showed potent antioxidant activity. The compound can be said to have very strong antioxidant activity if the IC_{50} value is less than 50 ppm, 101-150 ppm moderate, and weak if the IC_{50} value> 150 ppm (Batubara, 2018).

CONCLUSIONS

The ethanol extract of SHL roots from Central Kalimantan was determined the antioxidant activities. The IC_{50} values of the extract 8.25 ppm. It showed the extract had very strong antioxidant activity.

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