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CHARACTERIZATION AND SCREENING OF PHYTOCHEMICAL SECONDARY METABOLITE OF SERI (*Muntingia calabura*, L) LEAVES WHICH IS POTENTIAL AS AN ANTI-DIABETIC BASED ON INDONESIA HERBAL MEDICINE STANDARD

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ABSTRACT

Indonesia has abundant natural resources, especially plants that can be used as raw material for herbal medicine. One of the plants is seri plant (*Muntingia calabura*, L.). The potential plant part in this study is the leaf part. The leaves of *M. calabura* were taken from plants that have produced fruit in fresh conditions, cleaned and dried in an open space protected from direct sunlight. The simplicia was powdered and then quartered, then extracted with ethanol as a solvent. The simplicia powder and extract obtained were screened for phytochemicals using the standard method. The characterization results showed that the simplicia powder and extract met the national standard quality for Indonesian herbal medicines, both the simplicia powder and the extract contained secondary metabolites, including alkaloids, flavonoids, triterpenoids and steroids, saponins and tannins. The process of preparing and organizing samples from the leaves of this plant met the quality standards of Indonesian national herbal medicine and has the potential to be tested as an anti-diabetic.

Keywords: Seri Leaves, characterization, phytochemical screening, quality standards, and anti-diabetic

INTRODUCTION

Indonesia has abundant natural resources, especially plants that can be used as raw material for herbal medicine¹. The use of plant parts that can be used as herbal medicine, including leaves, fruits, flowers, seeds, stems and roots^{2,3}. One of the potential plant parts that can be used as raw material for herbal medicine is seri (*Muntingia calabura*, L) leaves. *M. calabura* is a shrub that is found in many countries in Indonesia, especially in the province of North Sumatra⁴. *M. calabura* stores a variety of potential activities that have been tested for activity as antioxidants^{5,6}, antiproliferative, anticancer⁶, antirheumatic, antibacterial⁷. Based on this information, it is important to standardize the quality standards of plants which will be processed into simplicia powders and extracts before testing both in vitro and in vivo as potential herbal medicinal candidates.

MATERIALS AND METHODS

Sample Preparation

The *M. calabura* leaves used in this study were taken from Namorambe Village, Medan Tuntungan District, North Sumatera Province, Indonesia. Sample was identified by a botanist at the Herbarium Medanense, University of North Sumatra (No. 5107/MEDA/2020). *M. calabura* used were from trees that have been fruitful and were in fresh condition. The samples were

cleaned in running water, dried in an open room protected from direct sunlight, then pollinated using a blender and obtained *M.calabura* leaves powder of simplicia.

Simplicia Preparation and Extraction Process

500 g of *M. calabura* leaves simplicia powder was extracted with ethanol and soaked for 5 days at room temperature and stirred occasionally and then filtered. The filtering process used Whatman No. 1 paper. Liquid extract obtained by crude ethanol extract in liquid conditions. The ethanol extract was concentrated using a rotary vacuum evaporator at a temperature of 50°C.

Characterization of Simplicia *M. calabura* Leaves Powder

The simplicia characterization that was carried out included macroscopic examination, microscopic examination, determination of water content, determination of total ash content, determination of acid insoluble ash content, determination of water soluble extract content, and determination of ethanol soluble extract content¹.

Phytochemical Screening of *M. calabura*

Phytochemical fraction screening was carried out for simplicia powder and leaf ethanol extract *M. calabura* leaves with the aim of knowing the secondary metabolite compounds contained in simplicia and the ability of ethanol solvents to filter various groups of secondary metabolites found in simplicia. The phytochemical screening process was carried out using the standard method^{8,9, 10}.

RESULTS AND DISCUSSION

Macroscopic Examination

Samples (*M. calabura*) leaves were oval in shape, 2.5-15 cm long, 1-6.5 cm wide with serrated leaf edges, pointed tips, and horizontal alternate structures. Light green leaf color with tight hair on the underside of the leaves.

Microscopic Examination

The results of microscopic examination showing that the seri leaves from the microscopic observation contained stomata, parenchyma, trichomes, crystals and vascular tissue.

Simplicia Powder Examination

The results of characterization carried out on simplicia powder of *M. calabura* leaves against various observation parameters were shown in Table 1.

Table 1. Characterization of Seri Simplicia Powder *M. calabura* Leaves

No.	Characterization parameters	Sebuk Simplicia		Evidence
		%	Requirements for MMI edition IV	
1.	Water soluble content	19.68	Not more than 30%	Appropriate
2.	Ethanol soluble content	9.83	Not more than 15%	Appropriate
3.	Total ash content	1.20	Not more than 12%	Appropriate
4.	Acid insoluble ash content	0.49	Not more than 1%	Appropriate
5.	Water content	4.26	Not more than 10%	Appropriate

Based on the results of observations on the simplicia powder sample *M. calabura* leaves in Table 1 it shows that all test parameters on the sample show conformity to the standards found in the

Indonesian Medical Materials Book. The determination of these various parameters is important as a mandatory standard for each plant sample designated as medicinal raw material.

Screening for Secondary Metabolites

The weight of *M. calabura* ethanol extract obtained was 6.34 ± 0.006 g. The results of screening for the ethanol extract of *M. calabura* leaves were shown in Table 2.

Table 2. Phytochemical Screening *M. calabura* leaves

Phytochemical Screening	Reagent	Simplicia Powder	Ethanol Extract
Alkaloids	Mayer	+	+
	Dragendroff	+	+
	Wagner	+	+
Flavonoids	Shinoda test	+	+
Triterpenoids and steroids	Liebermann Bouchard	+	+
Saponins	Forth methods	+	+
Tannins	FeCl ₃ 1%	+	+

Screening results showed that both the crude powder and the ethanol extract from the crude extract contained various secondary metabolites. These results indicate that both the simplicia and the extract have the potential to be tested for their activity as an anti-diabetic in vitro. This information is important in standardizing the simplicity and extracts that will be used in determining the activity as an evaluation of the pharmacological effects it causes. The simplicia and extracts obtained met the standardized quality standards of raw materials to be applied as herbal medicine¹¹. Reagents that were used in phytochemical screening use standard reagents in the identification of each class of secondary metabolites.

CONCLUSION

M. calabura leaves in the form of simplicia met the quality standard as a raw material for herbal medicine according to the Indonesian herbal national standard, and the powder of simplicity and ethanol extract has various types of secondary metabolites such as alkaloids, flavonoids, triterpenoids and steroids, saponins, and tannins. This shows the potential that it can be tested as an anti-diabetic both in vitro and in vivo.

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