

**PHYTOCHEMICAL STUDY, ANTIFUNGAL ACTIVITY  
TEST OF METHANOL EXTRACT OF QUININE LEAVES  
(*Chinchona officinalis* L)**

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***Abstract***

*This study aims to determine the quality characteristics and phytochemical screening of Simplisia performed on quinine leaves simplisia and the methanol extract of leaves. Extraction was done by maceration with methanol. Furthermore, antifungal activity test for Candida albicans is done to the extracts to determine how much the minimum inhibitory concentration. The result of the research indicated that the simplisia quality characteristics and phytochemical screening results showed positive results contain alkaloids, flavonoids, steroids / triterponoid and quinones and antifungal activities to Candida albicans which is indicated by the results of MIC compared by nystatin standard. In conclusion, the methanol extract of the quinine leaves have antifungal activity against Candida albicans.*

**Keywords:** *Quinine leaves (Cinchona officinalis L), Phytochemycal Study, Antifungal Activity Test*

## INTRODUCTION

Utilization of plants as ingredients the main treatment has become part of the culture of almost every nation in the world (Lee et al., 2000). About 60% of the world's population is almost entirely dependent on plants to maintain health (Farnsworth, 1994). Whereas according to WHO estimates, more than 80% of the population of developing countries depend on traditional ingredients to overcome health problems (Khan et al., 2002). The role of plants as medicinal ingredients is as important as their role as food (Raskin et al., 2002).

Plants produce various kinds of active compounds that give effect pharmacology. Generally, active compounds it does not play an important role in plant metabolism, so it is often referred to as secondary metabolites (Stepp and Moerman, 2001; Liu et al., 1998). Secondary metabolites have long been recognized as an effective and important source of medical therapy, for example as an anti-bacterial drug and anti-cancer (Cragg, 1997). This compound continues to be the main source of various important medicinal drugs (Harvey, 2000). In the practice of traditional medicine, people have used compounds active from various plants in the form medicinal herbs, to cure diseases. Active compounds in plants have become source of inspiration for the treatment of diseases difficult or expensive treatment (Raskin et al., 2002).

Active plant compounds can grouped into four groups, namely: phenols, alkaloids, terpenoids, and non-protein amino acids. This classification is based on precursors, basic structures and biosynthetic pathways (Edwards and Gatehouse, 1999; Smith, 1976). These compounds have wide variations in chemical diversity, distribution and function (Smith, 1976). The phenol group is characterized by the presence of an aromatic ring with one or two hydroxyl groups.

The phenol group consists of thousands of compounds, including flavonoids, phenylpropanoids, phenolic acid, anthocyanin, quinone pigment, melanin, lignin, and tannins, which are widespread in various types of plants (Harbone, 1996).

*Cinchona officinalis* L or more commonly known as quinine is plants originating from Bolivia and Peru which also grow in Indonesia. Quinine (*Cinchona officinalis* L) is known to

have high kinin levels of 4-13% (Astika, 1975). Kinin is used as medicine antimalarials, while kinidin is used as an antimalarial drug as well can be used as a medicine to normalize a heartbeat that is not cardiac arhythmic (Verstrijden, 1975). In the soft drink industry, kinin is usually used as a flavoring agent because of its bitter taste (Anderson et al., 1986). Quinine leaves are used by the community empirically as an antifungal drug, research on the study of phytochemicals is still very limited. In addition, scientific publications on the content of secondary metabolites from quinine leaves and their efficacy have not been found.

## METHODS

### Tools and Materials

#### Tools

Maceration tool, rotary evaporator (Buchi rotary evaporator R-124), separating funnel, silicate crucible, micropipette, chamber, capillary pipe, a set of distillation devices, weighing bottles, ultraviolet lamps  $\lambda$  254 nm and  $\lambda$  366 nm (Desaga Sarstedt), microscopes, object glass, tools used in research are UV-visible spectrophotometers (SHIMADZUUV mini-1240), autoclaves (HIRAYAMA), round ose, tweezers, Klinifet (1000 $\mu$ L), petri dishes (HERMA), mortars and stampers, desiccators, mycelium crushers (Potter), distillation devices, destruction tools, saucer tongs, porcelain saucers, ovens (SAKURA), incubators (SAKURA), fire heaters, filter paper, analytic balance and commonly used laboratory glassware.

#### Materials

Leaves of *Cinchona officinalis* L, n-hexane, ethyl acetate, methanol 90%, amyl alcohol, iron (III) chloride, sodium hydroxide, sodium acetate, magnesium powder, gelatin, ammonia, amyl alcohol, sodium hydroxide, Libermann-Burchard reagent, cloralhydrate, filter paper, ash-free filter paper, hydrochloric acid, acetic acid, sulfuric acid, distilled water, silica gel GF254, glucose, agar, SDA media powder, MH media powder, 95% ethanol, 1% H<sub>2</sub>SO<sub>4</sub>, BaCl<sub>2</sub> 1,175%, Physiological NaCl, H<sub>3</sub>BO<sub>3</sub>, Zn granule, NaHCO<sub>3</sub>, NaOH, KI, Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> 0.1N, Solution Luff Schoorl, CuSO<sub>4</sub>, NaOH 2 N, Iodine 1 N, BCG-Methyl Red, starch indicator, Tetracycline HCl, Nystatin and Aquadest.

#### Procedure

##### Preparation of Materials

Preparation of materials includes material collection, plant determination and processing to become simplicia.

##### Collection of Plant material

The material in the form of leaves of *Cinchona officinalis* L is obtained from the PPTK Garden (Tea and Quinine Research Center) Gambung.

#### Determination of plants

Determination is done at the SITH Herbarium Bandungense Bandung Institute of Technology.

#### Making Simplicia

Leaves of *Cinchona officinalis* are cleaned, drying is done by aerated air for 2 weeks, then the material is stored in a closed plastic container.

#### Characteristics of simplicia

Characteristics of simplicia include, macroscopic and microscopic examination, determination of water content, total ash content, acid insoluble ash, and water soluble ash, water soluble extract content and ethanol soluble extract and determination of drying losses.

#### Phytochemical screening

Extract component identified phytochemicals using the color reagent method which aims to determine the class of compounds contained in the extract. Phytochemical screening tests were performed on alkaloid compounds, flavonoids, steroids / triterpenoids, tannins and saponins.

#### Media

Sabouraud Agar (SDA) Media Trypticase Soy Broth is weighed as much as 30 grams, then enter into erlenmeyer and dissolve with distilled water as much as 1 lt, stir until homogeneous while heated with using a stirring rod, poured into each sterile test tube 5 mL after being sterilized inside 121 ° C autoclave for 15 minutes.

#### Microbial Suspensions

Previously made Mc standard Farland 0.5 as a comparison by mixing 9.95 mL of 1% H<sub>2</sub>SO<sub>4</sub> and 0.05 mL BaCl<sub>2</sub> 1.175% in a test tube. Making microbial suspension is done by inserting 1 round ose suspension of pure bacterial and fungal strains into a test tube containing sterile physiological NaCl then incubating for 18-24 hours at 37oC for bacteria and for fungi for 2-5 days at 25oC. Observe the turbidity of the solution visually compared to the standard Mc Farland 0.5 and measure its bacterial density with the turbidimetric method at a wavelength of 625 nm where the bacterial density is 1.5 x 10<sup>8</sup> CFU / mL (Mahon, 1995).

#### Testing of Leaf Methanol Extract

Quinine against *Candida* sp *Candida* sp samples stated positive was planted on Sabourand Dextrose Agar (SDA) media plus 50% quinine leaf extract and incubated at 37 ° C for 1-2 days.

## RESULT

Table 1. Hasil Penapisan Fitokimia Simplisia 1966 )

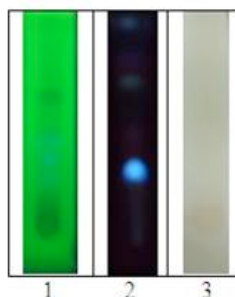
Golongan	Hasil
Alkaloid	+
Tanin	-
Flavonoid	+
Steroid/triterpenoid	+
Kuinon	+
Saponin	-

Keterangan : (+) terdeteksi, (-) tidak terdeteksi

Tabel 2. Hasil Pemeriksaan Karakteristik Simplisia

Karakterisasi	Hasil (%b/b)
Kadar abu total	0,82%
Kadar abu tidak larut asam	0,41%
Kadar abu larut air	0,47%
Kadar sari larut etanol	21,07%
Kadar sari larut air	19,31%
Susut Pengeringan	6,90%
Kadar Air	5,40%, *

Keterangan : \* (v/b)



## CONCLUSION

Simplicia and quinine leaf extract contains compounds such as alkaloids, flavonoids, steroids / triterpenoids and quinones.

Microscopic characteristics of quinine leaves are present pragemen cover hair, epidermis, vessel bond fragments, sclerenchymal fibers, trachea with spiral thickening. The results of the carcassistic determination of the quality of simplicity are stated that simplicia meets the quality standards of simplicia.

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