

## PHYTOCHEMICAL SCREENING AND ANTIOXIDANT TESTING OF ARABICA COFFEE PULP EXTRACT (COFFEA ARABICA L) KERINCI JAMBI

Dona Muin<sup>1,2</sup>, Salmah<sup>1,2</sup>, Sabarudin<sup>1,2</sup>

<sup>1</sup> Department of Pharmacy, Politeknik Kesehatan Kementerian Kesehatan Jambi, Indonesia

<sup>2</sup> PUI-PK, Politeknik Kesehatan Kementerian Kesehatan Jambi, Indonesia

*Corresponding author: donamuin@yahoo.com*

### ABSTRACT

**Background:** Coffee husks are currently waste that has high economic value. Currently, coffee workers are still wasted by the community because they are considered waste that must be thrown away. In fact, coffee skin has many uses because of the nutritious compounds it contains. Apart from being a fertilizer, it can also be used as an ingredient in cosmetics. Arabica coffee skin is rich in secondary metabolites as nutritious compounds. one of them is antioxidant activity which can reduce many diseases associated with it. This research aims to determine the phytochemical content and antioxidant activity of Arabica coffee skin from farmers in the Kerinci area, Jambi Province

**Method:** Skin Coffee Powder is extracted by maceration for 5 days with ethanol. The extract obtained was then used as material for secondary metabolite tests and antioxidant activity tests. The DPPH test was used to determine antioxidant activity, while the standard Harborne method was used for phytochemical analysis

**Result:** The results showed that Arabica coffee skin provided the highest antioxidant activity, namely 57.04%, but the IC<sub>50</sub> was lower, namely 100.20 ppm.

**Conclusion:** Phytochemical research reveals that the bioactive properties of Kerinci Arabica coffee skin consist of alkaloids, flavonoids, terpenoids, saponins and tannins.

**Keywords:** Arabica, phytochemicals, antioxidants, DPPH method.

### INTRODUCTION

Coffee is a plant that is widely consumed as a drink and this plant is widely found in various parts of the world. Arabica coffee is widely grown on the plains with an altitude of more than 500 meters above sea level (Agustiniingsih 2017). Arabica coffee will grow optimally when planted at an altitude of 1000-2000 meters above sea level. With rainfall ranging from 1200-2000 mm per year (Hiwot H, 2011). The chemical content of coffee is alkaloids, flavonoids, tannins, caffeine, and chlorogenic acid which can be used as antioxidants and anti-aging.

Antioxidants can be used to repair skin cells damaged by free radicals and ward off free radicals. Antioxidants in cosmetic ingredients can provide a moisturizing and brightening effect on the skin so that the skin

is not only kept moist but looks more radiant (Arifin 2020).

Components of phenolic compounds include catechins, epicatechins, proanthocyanidins, phenolic acids, tannins, and other flavonoids that function as antioxidants that refresh the skin and regulate the balance of free radicals that can slow down the aging process. The components of phenolic compounds in the polyphenol group are catechins, epicatechins, proanthocyanidins phenolic acids, tannins, and other flavonoids that function as antioxidants in the skin (Chaves, O.S et al. 2013). The community still cannot make full use of the skin of the fruit. Plantation development, especially in coffee processing that is currently carried out, will indirectly produce a large amount of coffee skin peel waste. The skin of this coffee fruit also contains several secondary metabolite compounds. Compounds that are

antioxidants are one of the benefits of coffee peel waste. Antioxidant is a compound that binds free radicals and highly reactive molecules by inhibiting oxidation reactions, so that cell damage will be inhibited (Winarsi 2007). The antioxidant activity on the skin of Arabica coffee fruit can be used as a good utilization of waste and can have the potential for the use of cosmetics, fertilizers, and food additives (Andriani 2007).

## METHODS

### *Tools and materials*

The tools used for the research are a glass beaker, Stemper, mortar, spoon, evaporation cup, stirring rod, measuring cup, spatula, drop pipette, meter, scale, filter paper, blender, rotary evaporator, micropipette, analytical balance, vortex, UV-Vis spectrophotometer.

The research materials used are arabica coffee husk waste, ethanol solvents, liquid paraffin, stearic acid, aquades, adeps lanae, tries-no lamin, nipagin, sodium chloride, sodium hydroxide, ammonium hydroxide, sulfuric acid, hydrochloric acid, acetic acid, iron (III) chloride, potassium hydroxide, magnesium powder, Dragendorff reagent, ascorbic acid and DPPH (1,1-diphenyl-2-picrylhydrazyl).

Making Arabica Coffee skin Peel Extract

Simplicia is weighed as much as 500 g put into a chocolate bottle and then added solvent until the sample is submerged. Arabica coffee peel mixture that has been left for 24 hours is filtered with a filter and a sterile funnel to separate the filtrate from the sediment/dregs. The rest of the Arabica coffee peel pulp is re-macerated with a new solvent. Then evaporation is carried out using a rotary evaporator with a temperature of 400C so that a thick extract is obtained. The viscous extract obtained is weighed by weight. Then the % yield is calculated (Muzdalifa D & Jamal S 2019)

### *Phytochemical Screening*

#### *Flavonoid Test*

Arabica coffee skin peel extract is taken 1 mL then 0.5 g of Mg powder and 10 drops of concentrated HCl are added, when it reacts positively it will produce an orange, pink, or red. Tannin Arabica coffee peel extract taken 1 mL later 10 drops of FeCl solution 3 1%

when reacting positively will produce a strong green, red, purple, blue, or black color.  
*Saponin Test*

The extract is diluted with water (1:1), and then beaten for 15 minutes vertically. If the foam is 1-10 cm high and stabilizes for 15 minutes, this indicates the presence of saponins.

#### *Alkaloid Test*

Coffee skin peel extract 1-2 mL is then mixed with 1 mL of HCl 2N and 9 mL of hot aquades. After that, it is heated for 2 minutes then cooled and strained. Then the Dragendrof reagent was added. If the sample is positive for alkaloids, it will produce a red color for the Dragendrof reagent (Wulandari & Agustin 2022)

### *DPPH Solution Manufacturing*

DPPH was weighed at 4 mg, then put into a measuring flask of 100 mL and sufficient with methanol p.a to the mark, so that a DPPH solution with a concentration of 40 ppm was obtained

#### *Blanking Solution Manufacturing*

A 40 ppm DPPH blank solution was pipetted as much as 4 mL into the cuvette and measured with a UV-Vis spectrophotometer, then its absorption was recorded at a wavelength of 400-800 nm. From the absorption curve, the maximum wavelength is determined.

Preparation of Ascorbic Acid Solution as a Comparison Ascorbic acid was weighed as much as 100 mg, then put into a 100 mL measuring flask. After that, add the aquades solvent to the limit until a concentration of 1000 ppm is obtained, and diluted again to 100 ppm by pipetting 10 mL of ascorbic acid parent solution dissolved with aquades ad 100 mL in a squash. Then from the solution, a series of solutions with concentrations of 2 ppm, 4 ppm, 6 ppm, 8 ppm and 10 ppm are made. It is then measured by Uv-Vis spectrophotometry, reading its absorption at maximum wavelength.

Antioxidant Activity Test of Coffee skin Peel Extract by UV-Vis Spectrophotometry Antioxidant measurement with ethanol extract of Arabica coffee skin peel is the dissolution of 50 mg of coffee skin peel extract into methanol p.a so that a concentration of 1000 ppm is obtained, diluted again to 100 ppm. Then from the solution, a series of solutions with

concentrations of 20 ppm, 40 ppm, 60 ppm, 80 ppm, and 100 ppm will be made into a 5 mL measuring flask. It is then measured by Uv-Vis spectrophotometry, reading its absorption at maximum wavelength.

Test of Antioxidant Activity of Arabica Coffee Skin Peel Extract Cream and Positive Control by UV-Vis Spectrophotometry.

Antioxidant measurements of coffee peel extract and Cositive Chlorinal, namely vitamin c, into methanol p.a, then filtered with filter paper, so that a concentration of 1000 ppm was obtained, diluted again to 500 ppm. Then from the solution, a series of solutions with concentrations of 60 ppm, 80 ppm, 100 ppm, 120 ppm, and 140 ppm will be made into the measuring flask 5 mL. Then measured by Uv-Vis spectrophotometry, reading the absorption at the maximum wavelength (Yuhernita & Juniarti 2014).

#### Data Analysis

In this study, the analysis used is qualitative and quantitative.

## RESULTS AND DISCUSSION

### Results of Arabica Coffee Skin Peel Extract Yield

Simplisia Arabica Coffee Skin Peel (Coffea Arabica. L) weighed as much as 500g, then macerated using a 96% ethanol solution of 6 L and evaporated by means of a rotary evaporator, an extract of 95.05 g was obtained with yield of 19%.

### Phytochemical Test Results

**Table 1.** Phytochemical Test Results Extract Skin Arabica Coffee and Vitamin C

Compound	Results	Information
Alkaloids	Formed red color	+
Tannins	Formed red color	+
Flavonoids	Formed red color	+
Saponins	Foam formed	+

**Table 2.** IC value results 50

Treatment	R2	IC50 (ppm)	P
Vitamin C	0,993	6,08	0,003
Arabica Coffee Skin Extract	0,994	72,96	0,000

Arabica coffee peel is extracted by maceration method using 96% ethanol solvent. The result of the maserate is concentrated using a rotary evaporator to remove 96% ethanol solvent used during the extraction process so that the result is a

viscous solution. The thick extract solution obtained was 95.05 g from 500 g of dried powder of Arabica coffee peel. Then the yield value was calculated and a value of 19% was obtained.

After obtaining the extract, then the chemical content of Arabica coffee peel extract (Coffea Arabica L) was identified to see whether or not there were secondary metabolites which are dissolved in the solvent used. A qualitative analysis of this chemical content was carried out to see the presence of the desired compounds, namely flavonoids, tannins, alkaloids, and saponins. The results of the phytochemical screening examination were obtained that 96% ethanol extract of coffee skin peel contained secondary metabolites, namely flavonoids, tannins, alkaloids, and saponins.

The antioxidant activity of coffee husk waste extract is compared to preparations on the market or positive controls containing vitamin C antioxidants. Positive control has an IC value of 50.

## CONCLUSION

From the results of the research that has been carried out, it can be concluded that: Arabica coffee skin peel extract contains flavonoids, tannins, saponins, and alkaloids and Effective antioxidant activity has IC value 50.20 ppm.

## ACKNOWLEDGMENT

Author acknowledgment to the Jambi Ministry of Health Polytechnic, and all parties involved in this research. Acknowledgement is not given to other authors in the manuscript.

## CONFLICT OF INTEREST

All authors declared that there was no conflict of interest.

## REFERENCES

- Agustiniingsih, S., 2017, 'Utilization of Coffee Grounds and Date Seeds in Making Traditional Body Care Scrubs as an Alternative to "Green Cosmetics"', Journal of Cosmetology, (Query date: 2023-05-08 14:34:05).
- Andriani, Y., 2007, 'Testing the Antioxidant Activity of Betaglucan Extract from *Saccharomyces Cerevisiae*', 3(1).
- Arifin, M., 2020, Analysis of Antioxidant Content in Coffee Skin and Beans as a Learning Resource - PhD thesis, Muhammadiyah University of Malang.
- Chaves, O.S, Ghomes RS, Claudia, A, Fernandes M. G., Leonidas, Agra F, Braga V. A & Venderlei F, 2013, 'Secondary Metabolites from *Sida rhombifolia* L. (Malvaceae) and the Vasorelaxant Activity of Cryptolepinone, Molecules', 18; 2769-2777.
- Muzdalifa D & Jamal S, 2019, 'Antioxidant Activity Test of Arabica Coffee Bean Shell Fraction Extract (*Coffea canephora* Pierre ex A. Froehner) Against DPPH Reagent (1,1-Diphenyl-2-Picrylhydrazyl). Indonesia Natural Research Pharmaceutical. Vol 4, No.2 (2019) pp.41-50.', Indonesia Natural Research Pharmaceutical. Vol 4, No.2 (2019) pp.41-50.
- Winarsi, 2007, 'Natural Antioxidants and Free Radicals: Potential and Application in Health', Yogyakarta. Canisius Spreader.
- Wulandari, S. & Agustin, Y., 2022, 'ARABICA PEABERRY GREEN BEAN COFFEE BEANS: PHYTOCHEMICAL SCREENING, HERBAL LOTION FORMULATION', Journal of Pharmaceutical And Sciences, (Query date: 2023-05-08 14:34:05).
- Yuhernita & Juniarti, 2014, 'Analysis of Secondary Metabolite Compounds from Methanol Extract of Surian Leaves Which Have Potential as Antioxidants.', Makara Sains, 15 (1): 1.