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Analysis Of Total Phenolic And Flavonoid Content Of Patikala Leaf Extract (*Etlingera Elatior* (Jack).Smith)

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ABSTRACT

Patikala (*Etlingera elatior* (Jack) Smith) is an herbal plant that belongs to the family of Zingiberaceae with the genus Alpinieae. This plant contains bioactive compounds, such as; flavonoids, terpenoids, saponins, tannins, carbohydrates, and phenolics. So we tested the total phenolic and flavonoid content of patikala leaf extract using various types of solvent. Total flavonoid testing used 1,2% $AlCl_3$ and 120 mM potassium acetate reagent with quersetin comparator, while total phenolic using Folin-Ciocalteu (1: 9) and $NaHCO_3$ 7.5% reagent with gallic acid comparator. The determination of the content was done using the UV-Vis spectrophotometric method. The results showed that the total flavonoid content of water extract, ethanol extract and purification leaf extract were 24.31 mgQE/g, 26.41 mgQE/g, and 46.5 mgQE/gr, respectively. While the total phenolic content of water extract, ethanol extract and purine leaf purification extract were 90.38 mgGAE/g, 98.94 mgGAE/g, and 228.54 mgGAE/g, respectively.

Key words : Patikala (*Etlingera elatior* (Jack) Smith), flavonoid, phenolic, UV-Vis spectrophotometric

A. Introduction

Patikala (*Etlingera elatior* (Jack) Smith) is herbs are included family Zingiberaceae the genus Alpinieae. Type plant this is original from Indonesia and Malaysia, with some synonym namely; *Etlingera elatior*, *Alpinia elatior*, *Elettaria speciosa*, *Nicolaia elatior*, *Nicolaia speciosa*, and *Phaeomeria speciose* (Chan E. W. C., et al., 2011).

Plant this contain compound bioactive, such as; flavonoids, terpenoids, saponins, tannins, carbohydrates, and phenolic and extract plant this has investigated have activity antioxidants. Where, leaves plant patikala has investigated contain compound phenolic, have activity damping radical free and activity power reduction iron more big compared flower and rhizome (Chan E. W. C., et al., 2011).

Phenol and flavonoids are compound class polyphenols known have character as catcher radical free, inhibits enzyme hydrolysis and oxidative, and work as antiinflammatory. Aim research this is analyze levels phenolic and total flavonoids from extract leaf patikala (*Etlingera elatior* (Jack)Smith) is UV-Vis spectrophotometry.

B. Methods

1. Material

Leaf Patikala (*Etlingera elatior* (Jack) Smith), 96% Ethanol, Ethyl Acetate, chloroform, hexane, Folin-Ciocalteu, sodium bicarbonate, Aluminum Chloride, Potassium acetate and Distilled water.

2. Procedur

a) Processing Sample

1. Extract Sample With Ethanol extract

Powder a 30 gram sample is added with 250 ml ethanol, then macerated for 24 hours, and do process remaserasi several times. Extract ethanol liquid obtained, then do filtering with Buchner funnel and paper strain for separate filtrate from dregs to in Erlenmeyer flask. Filtrate evaporated to obtained extract thick, then calculated the yield obtained.

2. Extract Sample With Water extract
Powder a sample of 20 grams of added with 200 ml of distilled water, then heated on waterbath temperature of 90°C for 15 minutes, then results extraction obtained difreezedry to obtained dried aqueous extract

3. Purification Extract
Extract ethanol thick as much as 20 grams included to in 100 ml of boiling water then cooled in refrigerator for 12 hours. After that filtered and extracted liquid-liquid with or ethyl acetate (each 3 x 100 ml). Extract ethyl acetate purified evaporated to obtained extract thick (Hajnos MW, *et. al.*, 2007 and Dai J., *et. al.*, 2010)

- b) **Creation Solution Sample Water extract, extract Ethanol And Extracts Terpurifikasi Leaf Patikala (*Etlingera elatior* (Jack) Smith)**

Solution water extract, extract ethanol and extract purified leaf Patikala (*Etlingera elatior* (Jack) Smith) made with way weighing 5 mg of extract samples were dissolved with 10 mL of distilled water (500 ppm) and dilution is performed at 200 ppm.

- c) **Determination of Levels of Total Phenolic**

- 1) **Creation Solution Standard Galat Acid.**

Solution standard Galat Acid 1000 ppm created with weighing 10 mg of galat acid dissolved with aquadest to a volume of 10 mL. From the stock

solution is pipetted as much 0, 25 ml of diluted with aquadest to a volume of 25 mL to generated concentration of 10 ppm and then made concentration of 1, 2, 3, 4, 5 and 6 ppm.

- 2) **Determination Long Wave Maximum (λ_{maks})**

Maximum wavelength Galat Acid do with me *running* solution 1 ppm gallic acid at long range waves of 710-755 nm. Absorbance The maximum earned on long wave 755 nm.

- 3) **Measurement Solution Standard Galat Acid**

For each concentration of 1, 2, 3, 4, 5, and 6 ppm 0.5 ml, was added with 2 mL of reagent *Folin-Ciocalteu* (1:9) shaken / in the vortex and 3 minutes left, after that added 2 mL of NaHCO_3 7, 5% shake to homogeneous and let stand for 30 minutes. Measuring uptake on long wave 755 nm, then created curve calibration, relationships between concentration Galat Acid (mg/L) with absorbance.

- 4) **Determination of Total Phenolic of Water extract, Ethanol extract And purification Extracts Leaf Patikala (*Etlingera elatior* (Jack) Smith)**

The method used in accordance with method of Stankovic M.S. (2011) with a little modification. Dipipet 0.5 ml solution water extract, extract ethanol and extract purified leaf Patikala (*Etlingera elatior* (Jack) Smith) from concentration of 200 ppm, was added with 2 mL of reagent *Folin-Ciocalteu* in aquadest (1 : 9) whipped and left 3 minutes, tam even 2 mL NaHCO_3 7,5% shake to homogeneous and be silenced for 30 minutes on temperature room. Measuring uptake on long wave 755 nm which will give color complex blue. Then created 3 repetitions so levels phenolic total revenue results

obtained as mg equivalent Galat Acid/g extract.

d) Determination of Total Content Flavonoid

1) Preparation of Quarcetin Standard Solutions

Quarcetin weighed 10 mg, dissolved with aquadest and be sufficient volume up to 10 mL (1000 ppm). Solution stock piped as many as 1 mL, add with aquadest up to 10 mL (100 ppm). Created quarcetin with concentration of 3, 5, 7, 9, 11 and 13 ppm.

2) Determination Long Wave Maximum (λ_{max})

Long wave maximum quarcetin do with me *running* solution quarcetin 3 ppm on long range wave 300 - 500 nm. Absorbance The maximum earned on long wave 435 nm.

3) Measurement Solution Standard Quercetin

This solution for each 1 mL, added 1 mL of $AlCl_3$ 10% and 1 mL of 1 M CH_3COOK , next homogenized and The set aside for 30 minutes. Absorbance solution aforementioned then be measured on long wave maximum 415 nm. And then created curve raw and obtained equation line straight

4) Determination of Total Phenolic Water Extract, Extract Ethanol And Purification Extracts Leaf Patikala (*Etlingera elatior* (Jack) Smith)

The method used in accordance with method of Chanda, SV, *et al.* (2010) with a little modification. The piped as much 1 mL of solution from each extract, added 1 mL of $AlCl_3$ 10% and 1 mL of CH_3COOK 1M, next homogenized and The set aside for 30 minutes. Measuring uptake on the long wave maximum 435 nm. Done three repetitions so levels flavonoid derived results obtained unpacking mg equivalent quarcetin/g extract.

C. Results and Discussion

Leaf patikala used as sample dried more first for reduce levels water to influence weight sample, where available the water content of the sample could seen on table 1., Besides it was also determined levels ash shows amount content metallic minerals in sample becomes wrong one standard simplicia good with levels Low ash. Where levels ash sample could seen on Table 2.

Table 1. Results Depreciation Leaf Water Content Patikala

Replication	Weight Early (g)	Weight End (g)	Water content %	Average (%)
I	3.0080	2.6541	11.765	11.79
II	3.0065	2.6586	11.572	
III	3.0053	2.6431	12.052	

Table 2. Results Depreciation Levels Abu Leaves Patikala

Replication	Weight Early (g)	Weight End (g)	Ash Content%	Average (%)
I	2.0073	0.2273	11.32	11.31
II	2.0031	0.2256	11.26	
III	2.0079	0.2282	12.36	

Leaf patikala which has dried, then extracted with 3 types method extraction and 3 types extract, namely method maceration with ethanol, methods infusion with water and method purification with ethyl acetate. Selection method and different extract for get type extract with levels phenolic and the greatest total flavonoids. Results each extraction could seen on table 3, 4, and 5.

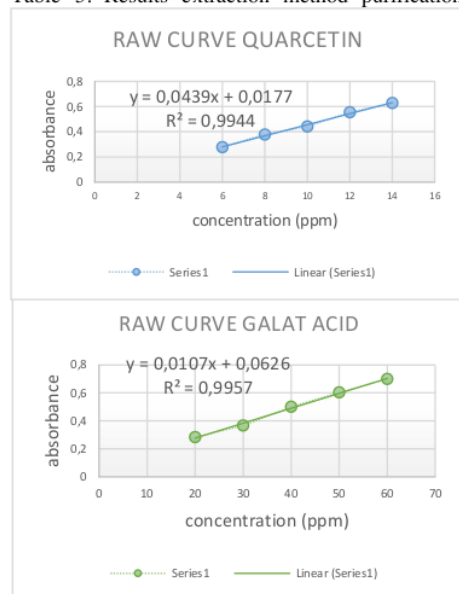
Table 3. Results extraction method maceration with ethanol

Replication	Weight Samples (g)	Weight Extract	% Rendamen	Average (%)
I	30	2.16 g	7.20	7.04
II	30	2.15 g	7.16	
III	30	2.03 g	6.77	

Table 4. Results extraction method infusion with water

Replication	Weight Samples (g)	Weight Extract		% Renda men	Average (%)
		Before cleaning Freeze	After cleaning Freeze		
I	20	100 mL	1.2174 g	6.09	5.93
II	20	100 mL	1.1996 g	6:00	
III	20	100 mL	1.1396 g	5.70	

Table 5. Results extraction method purification



with ethyl acetate				
Replication	Weight Samples (g)	Weight Extract	% Rendamen	Average (%)
I	3	0.17 g	5.66	5.33
II	3	0.15 g	5.00	
III	3	0.16 g	5.33	

Each of these extracts, tested by determining the content of phenolic and flavonoid levels, in which the compounds that have the ability of oxidation reactions are phenolic and flavonoid group compounds. The content of phenolic compounds, and flavonoids can be seen in tables 6, 7, 8, 9, 10, and 11.

Figure 1. Results of the Galat Acid Curve Calibration at 755 nm Wavelength.

Table 6. Results Measurement absorbance and levels phenolic extract ethanol

Replication	Concentration (ppm)	Absorbant	Content of Flavonoids (mgGAE/gr am)	Average (mgGAE/gram)
I	200	0,273	98.32	98.94
II	200	0,271	97.39	
III	200	0,279	101.12	

Table 7. Results Measurement absorbance and levels phenolic water extract

Replication	Concentration (ppm)	Absorbant	Content of Flavonoids (mgGAE/gr am)	Average (mgGAE/gram)
I	200	0,251	88.04	90.38
II	200	0,258	91.31	

III	200	0,259	91.78
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Table 8. Results Measurement absorbance and levels phenolic extract ethyl assets purification

Replication	Concentration (ppm)	Absorbant	Content of Flavonoids (mgGAE/gr am)	Average (mgGAE/gram)
I.	200	0,551	228.23	228.54
II	200	0,554	229.63	
III	200	0,550	227.76	

Figure 2. Results of Quercetin Calibration Curve At 435 nm Wave Length.

Table 9. Results Measurement absorbance and levels of flavonoids extract ethanol

Replication	Concentration (ppm)	Absorbant	Content of Flavonoids (mgQE/gr am)	Average (mgQE/gram)
I.	200	0,259	27.55	26,41
II	200	0,241	25.49	
III	200	0,247	26.18	

Table 10. Results Measurement absorbance and flavonoid content of aqueous extracts

Replication	Concentration (ppm)	Absorbant	Content of Flavonoids (mgQE/gr am)	Average (mgQE/gram)
I.	200	0,233	24.58	24,31
II	200	0,229	24.12	
III	200	0,230	24.24	

Table 11. Results Measurement absorbance and levels of flavonoids extract ethyl acetate purification

Replication	Concentration (ppm)	Absorbant	Content of Flavonoids (MGQE / gram)	Average (MGQE / gram)
I.	200	0,413	45.13	46.50
II	200	0,452	49.58	
III	200	0,410	44.79	

Based on results testing obtained that purification extract ethyl acetate have potential antioxidants more big compared extract the other, it this because of content compound phenolic and flavonoidnya also the biggest.

D. Conclusion

Extract ethanol, water and ethyl acetate purified leaf patikala contain compound phenolic and flavonoids, respectively as follows: 98.94; 90.38; 228.54 mgGAE/g and 26.41; 24.31; 46.50 mgQE/gram

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