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Research Article

EXTRACTION OF COLOR PIGMENT AND DETERMINATION OF FLAVONOID CONTENT OF ANDONG LEAVES (*CORDYLINE FRUTICOSA* L.) SOURCE MAKASSAR CITY

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Abstract

Andong (*Cordyline fruticosa* L.) is the family of asparagaceae which knows as decorated plant, because the color is very interesting so that potentially as a source of natural pigments. This research was aimed to extract the color pigments and determine the total percentage of flavonoid content in Andong leaves (*Cordyline fruticosa* L.). The extraction uses the various of water solvent, ethanol, ethyl acetate and methanol which contain HCl P 1 % by using maseration method. The determination of the total percentage of flavonoid content is done by using colometric methanol. Based on the research was obtained the rendament extract of water 13, 49 %, ethanol 15, 69 %, methano l 8, 10 %, and ethyl acetate 9, 15 %. The total of flavonoid extract of water 1, 4 %, ethanol 2, 6 %, methanol 1, 7 %, the highest percentage of four solvent is ethyl acetat 3, 4 % calculated as a rutin.

Keywords: colour pigment, flavonoid, Andong (*Cordyline fruticosa* L.)

INTRODUCTION

Indonesia is the tropical country affluent in various species of plants that can be utilized in all aspects of human life. One of them is Hanjuang plant (*Cordyline*) or Andong which is the group of monocotyl plants is often found in gardens as an ornamental plant, because andong is the fence plant with the red leaves are very conspicuous and attractive. Root, cortex and leaf are used as traditional medicines. According the taxonomy of information systems¹, one of the species of genus *Cordyline* is *Cordyline fruticosa*, society know it as the Andong plant that contains flavonoid, saponin and glycoside of steroid. Andong plants traditionally used to treat pulmonary tuberculosis with cough blood, out spotting during pregnancy (possible misAndong), bloody urine (hematuria), bleeding hemorrhoids, bleeding wounds, diarrhea, dysentery and stomach pain². Plants of the genus *Cordyline* containing pigment of anthocyanin flavonoids³. Flavonoid pigments are the group of polyphenolic compounds that are common in plant vacuoles, isolation of flavonoid pigments can be done by extracting the material using a suitable solvent polarity with substances are extracted. To extract flavonoid compounds recommended by using acidic because the acid can denature function of plant cell membrane, then dissolve the pigment, so it can exit from the cell, as well as preventing the oxidation of flavonoid, flavonoid compounds including polar compounds and can be extracted with a polar solvent, polar solvent including ethanol, methanol, water and ethyl acetate⁴. Flavonoid including natural phenolic compounds potentially in the treatment of one disease that has antioxidant bioactivity as medicine. Flavonoid in the human body serves as an antioxidant that is very good for cancer prevention, another benefit is to protect the cell structure, increase the effectiveness of vitamin C, anti-inflammatory, prevents bone loss, as antibiotics. This is the underlying total flavonoid assay conducted on Andong (*Cordyline fruticosa* L.) leaves.

MATERIALS AND METHODS

Extraction Method

Fresh leaves of Andong as much 100 g, for extracting by using maceration method and water solution (contain HCl of 1 %) as the solvent. Andong leaves are mixed with solvent and crushed by using blender then moved in maceration containers. The same things are done on extracting solution of ethanol, methanol and ethyl acetate.

Phytochemical Screening

Alkaloid

Experiment solution; Weighed 500 mg powder sample, add 1 mL hydrochloric acid 2 N and 9 mL of distilled water. Then heated above water bath for 2 minutes, cooled and filtered.

Testing; Add 2 drops of Bouchardat solution (If there is a change of color from brown to black, it indicates that the powder contains alkaloid)⁵.

Flavonoid

Experiment solution; 0.5 g of powder were examined or dry residual liquid dosage 10 mL, with 10 mL of methanol P, using a cooling behind for 10 minutes. Filter hot through a folded small filter paper, dilute the filtrate with 10 mL of water. Once cool add 5 mL ether P, shaken it carefully and rested. Take a layer of methanol, evaporated at a temperature of 40° under pressure. The residue was dissolved in 5 mL ethyl acetate P, filtered⁵.

- Evaporated until 1 mL dry experiment solution, residue was dissolved in 1 mL to 2 mL of ethanol (95 %) P, add 0.5 g of zinc powder and 2 mL P 2 N hydrochloric acid, give a rest for 1 minute. Add 10 drops of concentrated hydrochloric acid P, if within 2 minutes to 5 minutes occurred intense red color, it indicates a flavonoid (flavonol-3-glycosides).

- Evaporated until 1 mL dry experiment solution, residue was dissolved in 1 mL of ethanol (95 %) P, add 0.1 g of magnesium powder P and 10 drops of hydrochloric acid P, if it occurs in red purple orange to red, it indicates a flavonoid. If there is yellow orange, it indicates a flavone, kalkon and Auron.
- Evaporated until 1 mL dry experiment solution, residue was wetted with acetone P, add a little finely powdered boric acid oxalate P and P fine powder, heat carefully above waterbath and avoid excessive heating. Mix the residue were obtained with 10 mL of ether P. Observe with 366 nm UV light, yellow intensive fluoresens solution, showed flavonoids.

Saponin

Enter 0.5 g of powder into a test tube, add 10 mL of hot water, cooled and shaken vigorously for 10 seconds, if the substance being examined in the form of a liquid preparation, dilute 1 mL dosage was added 10 mL of water and shaken vigorously for 10 minutes, forming a stable froth for not less than 10 minutes, as high as 1 cm to 10 cm. On the addition of 1 drop of 2 N hydrochloric acid, the froth is not lost⁵.

Determination of Total Flavonoid Content

Preparation of solution of rutin standard

Rutin as much 5 mg were dissolved in 10 mL of methanol pa. compound concentrations routinely made 37.5 ppm, 62.5 ppm, 75 ppm, 87.5 ppm, 100 ppm. 1 mL of each concentration of the compound regularly was added 3 mL of methanol, 0.2 mL of 10 % AlCl_3 , 0.2 mL of potassium acetate, and 5.6 mL aquabedistilata. The solution was incubated for 30 minutes in the dark room and at the room temperature, the absorbance was measured by using the UV-Vis spectrophotometry with the wavelength at 415 nm⁶.

Assay of flavonoid

Weighed 100 mg extracts were dissolved in 10 mL of methanol Pa. 1 ml solution was added 3 mL of methanol, 0.2

mL AlCl_3 10 %, 0.2 mL of potassium acetate, and 5.6 mL aquabedistilata. The solution was incubated for 30 minutes in the dark and at the room temperature, the absorbance was measured by using the UV-Vis spectrophotometry with the wavelength at 415 nm. It expresses the equivalent levels of total flavonoid rutin (QE)⁶.

RESULTS

The extract of color pigments of Andong leaves (*Cordyline fruticosa* L.) by using various solvent which contain HCl of 1 % showed the different result (water, methanol, ethanol, ethyl acetat) and using fresh Andong leaves as much 100 g. Ethanol solvent has greater extracts than the others (Table 1). Phytochemical screening of Andong leaves showed that chemical compounds are flavonoid and saponin (Table 2). Flavonoid content of extract of Andong leaves is ethyl acetat 3.4 %, methanol 1.7 %, ethanol 2.6 % and water 1.4 % equivalent with rutin.

DISCUSSIONS

Plant pigments are natural color of the plants, where the pigment is found in the plastids and vakuola. A variety of plant pigments, one of which is a flavonoid pigment such as anthocyanin and flavone or flavonol that commonly found in vokuola⁴. Andong leaf (*Cordyline fruticosa* L.) source of anthocyanin flavonoid pigments³, which gives the red and pink color. The plant has been used as the traditional medicine and ornamental plants. In this study, the extraction of color pigments used fresh leaves with maceration method. The extraction used a few solvent is water, ethanol, methanol and ethyl acetate containing 1 % of clorida acid, stored in a dark place and for the water solvent was stored at temperatures between 2-8° C. The selection of fresh sample caused by some previous studies using fresh samples for pigment extraction^{4,7}. This extraction, addition of HCl 1 % induce denaturation of cell membrane, then dissolve the pigment that can exit from the cell, as well as prevent oxidation of flavonoids⁴.

Table 1: Results of Pigment Extracted

No	Solvent (+ HCl 1%)	Extracts color	Extracts (g)	Extract Rendamen (%)
1	Aquadest	Red	13.49	13.49
2	Ethanol	Red	15.69	15.69
3	Methanol	Red	8.10	8.10
4	Ethyl acetat	Red, green	9.15	9.15

Note: Andong leaf fresh used 100 g

Table 2: Results of Phytochemical Screening

Extract	Phytochemical compounds		
	Alkaloid	Flavonoid	Saponin
Water	-	+	+
Ethanol	-	+	+
Ethyl acetate	-	+	+
Mehtanol	-	+	+

Table 4: Flavonoids content of Extract Andong Leaves

No	Extract	Absorbansi (y)	Consentration (µg/mL) (x)	% flavonoid content
1	Water	1.048	140.2	1.4
2	Ethanol	1.873	258.1	2.6
3	Methanol	1.199	161.8	1.7
4	Ethyl acetate	2.456	341.4	3.4

Figure 1: Curve of Flavonoid contents of Andong Leaf Extract

The results were obtained from the extraction of color pigments for solvent of water, ethanol and methanol produced the red color and the red color to greenish produced from ethyl acetate, and the extract was obtained by solvent water to 13.49 g, 15.69 g ethanol, methanol 8, 10 g and 9.15 g of ethyl acetate. From the results were obtained that the solvent of ethyl acetate is less good in drawing and color pigment extracts by ethanol extracts more than the solvent of water, methanol and ethyl acetate, it was caused by compounds in the leaves were extracted with ethanol which is the appropriate polar solvent, producing extracts greater than three other solvents. Analysis method of flavonoid assay is based on the colorimetric method of Chang *et al* (2002), stating the method Chang *et al* (2002) is the method chosen for the analysis of flavonoids in UV-Vis spectrophotometry with the wavelength at 415 nm and used the solution of rutin compounds as a standard. The use of standard solution of rutin, because the flavonoid found in the plants most often in the form of glycoside such as quercetin 3-rutinosida or rutin compound⁸. The measurements performed using UV-Vis spectrophotometry at maximum absorption, 415 nm. The Color resulted from solution of rutin standard is yellow. The highest concentration used, the more intense yellow color. The absorbance measurements of standard solutions inserted into Microsoft Excel to obtain a calibration curve of standard solutions described in the form of regular graphs concentration curve (C) versus absorbance (A) and can be shown in the image. Based on Images can be seen that the equation of calibrated curve regression for rutin absorbance at $y = 0.007 x + 0.066$. Standard solution of flavonoid compounds obtained linear relationship between absorbance with concentration. Absorbance measurements are shown with correlated coefficient (r) of 0.954. Value (r) is close to 1 indicates that the regression of equation is linear. The results obtained the flavonoid content of extract Andong leaves (*Cordyline fruticosa* L) are water extract by 1.4 %, 2.6 % ethanol, methanol and ethyl acetate 1.7 % and 3.4 %. it indicates to the four levels of flavonoids from the extracts produced levels of different flavonoids, which ethyl acetate extract of flavonoids content more than the third of the

extract is equal to 3.4 %, because ethyl acetate is a compound which is the semi polar solvent that can pull polar and non polar compounds, which consists of several flavonoid compounds that are polar and non polar groups, for example flavonoid anthocyanin classes are polar and non polar groups and isoflavonoids, so the compound ethyl acetate can attract all classes of flavonoid compounds because it ethyl acetate have more levels of flavonoids, which is different from the water extract of flavonoids content only 1.4 % less than the three extracts, because water is the highly polar solvent from the third to extract this water can only draw flavonoid compounds that are polar.

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