Determination of flavonoid and phenolics compounds in Dewandaru (Eugenia uniflora L.) by colorimetric method

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Abstract

Dewandaru (Eugenia uniflora L.) have antibacterial activity, antiradical, inhibit enzyme oxidation and anti-inflammatory. The antiradical activity is related to the content of flavonoids and phenolics substances. Therefore, the aim of the research was to determine flavonoid and phenolic compounds in dewandaru extract which extracted by percolation method using ethanol 30%, 70% and 96% as solvents. The content of phenolic compounds performs by reaction with Folin-Ciocalteau reagent and flavonoid content perform by aluminium chloride. The phenolic content equivalent with Gallic Acid (GAE), and the flavonoid content is equivalent with Rutin (RE). The result show that the content phenolics and total flavonoid compound of ethanol 30% extract, ethanol 70% extract, and ethanol 96% extract dewandaru are 327.77 ± 0.59 mg/g extract, 349.46 ± 1.53 mg/g extract, dan 269.65 ± 0.81 mg/g extract, respectively. And flavonoid contents are 58.42 ± 0.27 mg/g extract, 59.50 ± 0.30 mg/g extract, and 87.81 ± 0.27 mg/g extract. Based on statistical test, contents of phenolic and flavonoid compounds are difference by means.

Keywords: dewandaru, percolation, extract, phenolic, and flavonid.

Introduction

The use of herbal medicine in traditional therapy is not a new thing because it has lasted down through the generations. One plant that is widely used is Eugenia uniflora L. Previous studies have shown that extract of Eugenia uniflora L has antibacterial activity (Khotimah, 2004; Oliveira, et al., 2008), antifungal (Hasimoto, et al., 2002) and antihypertensive (Consolinia, et al., 1999). Radical activity of fruit extracts (Einbond, et al., 2003) and leaf extract (Utami, et al., 2005), is associated with the presence of phenolic compounds and flavonoids. In addition, flavonoids also act as free radicals scavenging, inhibiting the enzyme hydrolysis and oxidation, and anti-inflammatory (Frankel, 1995 cit., Pourmorad et al., 2006).

Therefore this study aimed to determine the concentration of flavonoids and phenolic compounds in the extract which extracted by 30%, 70% and 96% ethanol by percolation method. Determination of phenolic done by colorimetric method using Folin-Ciocalteau reagent, and flavonoids, conducted by aluminum chloride. Phenolic content obtained expressed as gallic acid equivalent (GAE) and flavonoids expressed as rutin equivalent (RE).

Materials and Methods

Blender, Filter 20/60, glassware, analytical balance (ADCo. Ltd), percolator, micropiper (Socorex), yellow tips dan blue tips, Spectrophotometer UV-Vis Genesys 10 (Genesys Co.), vacuum evaporator, ultrasonic stirer, dan stopwatch, Eugenia uniflora L. leaf powder, aluminium foil, paper filter, aquadest, ethanol (30%, 70%, 96%) technical grade (Bratachem), gallic acid standard (E. Merck), rutin standard (Sigma Co.), Folin-Ciocalteau reagent, sodium carbonate (Sigma Co.), potassium acetic (Sigma Co.), methanol (Sigma Co.), and aluminium chloride (Sigma Co.)

Preparation of extract Eugenia uniflora L

Weighed 23 grams of powdered leaf moistened with a solvent (ethanol 30%, 70% and 96%), leave for 2 hours. Put in a percolator, added solvent, perform maceration overnight, turn on the stopper, and stopped the process when the droplets been clear. Liquid extract evaporated up to solid extract.

Determination of phenolic content

The total phenolic content was determined using the Folin-Ciocalteau reagent according to the method of Waterhouse, 2002. The reaction mixture contained 40 µL extract, 1 mL aquadest, and 25 µL Folin-Ciocalteau reagent, mixture were kept in dark for 5 minute, add 75 µL sodium carbonate and aquadest up to 5.0 mL. Mixture were kept in dark for 45 minute at room temperature to complete the reaction. The absorbance at 650 nm was measured with a UV-Vis Spectrophotometer (Genesys 10). Gallic acid was used as a standard and the result were expressed as gallic acid equivalent (GAE)/ g extract.