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Analysis of Flavonoid Ceciwis Cabbage (Brassica oleracea var. capitata alba) As An Immunomodulator With Maseration Method

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Abstract Free radical formation and oxidation reactions in biomolecules will last throughout life. This oxidation reaction can trigger the formation of very active free radicals that can damage the structure and function of cells. But the activity of these free radicals can be inhibited by antioxidants that complement the immune system. However, the lack of publication makes only a small percentage of the public know what local foods contain flavonoids such as fresh cabbage. The making of the extract is preceded by the treatment of opening the pores on fresh cabbage ceciwis using Microwave Assisted Extraction (MAE) for 5 minutes, then soaked with 70% ethanol with a 1:10 compared. Extracts that have been obtained are tested flavonoids using UV-Vis spectra. The maximum wavelength is obtained at 415 with an absorbance of 0.723. The total value of flavonoid ceciwis cabbage method of maceration by 1.1045% and maceration with MAE treatment by 2.5072%.

Keywords: *Cabbage ceciwis, maceration, flavonoids*

1. Introduction

Free radicals are constantly forming in the body. Most are thought to be involved in various degenerative disease processes1. Radical compounds damage cells causing diseases such as liver, cancer, and age-related conditions such as Alzheimer's[2]. Free radical formation and oxidation reactions in biomolecules will last throughout life. This oxidation reaction can trigger the formation of very active free radicals that can damage the structure and function of cells. But the activity of free radicals can be inhibited by antioxidants that complement the immune system[6].

Antioxidants are chemical compounds that at low concentrations can significantly prevent substrate oxidation in chain reactions. The ability of antioxidants is to protect cells from damage caused by free radicals. Examples of antioxidants include beta carotene, lycopene, vitamin C, vitamin E and flavonoids. Flavonoids are natural antioxidant compounds that are found in fruits, vegetables, whole grains and animals. Concerns about the possibility of unknown side effects of synthetic antioxidants are causing natural antioxidants to become one of the much-needed alternatives. In Indonesia, there are many local food ingredients that can be used as a source of natural antioxidants. However, the lack of publication makes only a small percentage of the public know what local foods contain flavonoids such as fresh cabbage[3].

Fresh cabbage contains water, protein, fat, carbohydrates, fiber, calcium, phosphorus, iron, sodium, potassium, vitamins (A, C, E, thiamine, riboflavin, nicotinamide), calcium, and beta carotene. It also contains senyaw a sianohydroksibutene (CHB), sulforafan, and iberine that stimulate the formation of gluglutation. In addition, cabbage plants are also traditionally often used as an itchy remedy due to Candida (candidiasis) fungus, fungus skinned head, hands and feet, high blood cholesterol levels, arthritis (arthritis), antidotum in alcohol intoxication (hangover), toxins in the heart, difficulty defecating, preventing enlarged tumors, and increasing breast milk production.

Natural antioxidants are contained in fruits and vegetables, and are found also in nuts, seeds, tea, and other food products[7]. A recent study explained that plant-based food products generally have a higher antioxidant content than animal food products. One of the vegetables that contain anti-oxidants is cabbage, which will be used in this study the end is commonly called cuciwis or ciwis with testing on the determination of flavonoid levels[6].

Materials and methods

The research was conducted in the laboratory of DIII Pharmacy Polytechnic Harapan along with the materials used including cabbage ceciwis, ethanol, methanol, kuarsetin (raw curve). As for the tools used analytically, knives, telenan, spoons, label paper, sample containers, filter paper, maceration tools, stirrer rods, erlenmeyer, measuring cups, funnels, mortars, stamfers, blenders, microwaves, rotary evaporators, uv-vis spectrophotometry.

Material Processing

In the processing of materials begins with the collection of raw materials. At this stage each material is made in powder. The preparation of making powders include the following:

1. Selection of raw materials
   This stage of raw material selection is adjusted to a good harvesting time. The sample is selected in a fresh state, so that the content of secondary metabolites contained in it can be digested properly.
2. Wet sorting
   At this stage after each material is collected then selected and separated from the impurities such as roots, soil and others.
3. Washing
   This washing is intended to clean raw materials from impurities, namely by using running water[5].

Extract Making

Extract is made in two ways, namely by direct and indirect maceration by the treatment of the opening of pores first[4].

1. Opening of pores
   Fresh samples are put into MAE, then set the power by 100watt for 2 minutes. Take a sample from MAE and then macerate it with a solvent ratio of 1:10 for 5 days. Steam until you get a thick extract.
2. Flavonoid Qualitative Test
   The extract of 0.5 grams is added 2 mL of 70% ethanol then stirred, added 0.5 grams of magnesium powder and 3 drops of concentrated HCl. The formation of orange to red indicates flavanoids.
3. Flavonoid Quantitative Test
   a. Manufacture of quercetin master solution
      Weighed 20 mg of kuarsetin dissolved in a 50 mL measuring gourd with an ethanol solvent of 96% to a mark (400 ppm).
   b. Concentration series creation
      Made series concentration from the parent solution 400 ppm by means of the parent solution 0.5 mL; 1,25 mL; 0.75 mL; 0.85 mL is inserted into the pumpkin takar and added ethanol up to 50 mL so that the raw solution concentration is obtained 40 ppm.50 ppm, 60 ppm, 70 ppm.
   c. Determination of maximum wavelength
      0.5 ml of the parent solution of 400 ppm quercetin and put in a vial, then reacted with 2 mL aquadest and 0.15 mL NaNO2 5% then left for 6 minutes. Add as much as 0.15 mL of AlCl3 10% to the solution then let stand again for 6 minutes. The solution is reacted with 2 mL NaOH 4% then diluted with aquadest to a total volume of 5 mL and left for 15 minutes. Measured maximum uptake at wavelengths of 380-560 nm.
   d. Calibration curve creation
      A total of 0.5 mL of each solution concentration is reacted with 2 mL aquadest and 0.15 NaNO2 5% then silenced for 6 minutes. Add as much as 0.15 mL of AlCl3 10% to the solution, then let

stand again for 6 minutes. The solution is 2 mL NaOH 4% then diluted with aquadest to a total volume of 5 mL and left for 15 minutes. Measured maximum uptake at wavelengths.

e. Manufacture of blanko solution

A total of 1 ml of ethanol 96% is reacted with 4 mL aquadest and 0.30 mL NaNO2 5% then left for 6 minutes. Add as much as 0.30 mL of AlCl3 10% to the solution, then let stand again for 6 minutes. The solution is diluted with 4 mL NaOH 4% then diluted with aquadest to a total volume of 5 mL and left for 15 minutes. Then measured maximum absorption at wavelengths of 380-560 nm.

f. Manufacture of extract sample solution

Weighed 50 mg extract dissolved in a 100 mL measuring pumpkin with an ethanol solvent of 96% to a mark (500 ppm). The 500 ppm solution is then made replication 3 times. Each replication is taken as much as 0.5 mL reaction with 2 mL aquadest and 0.15 mL NaNO2 5% then silenced for 6 minutes. A total of 0.15 mL of AlCl3 10% is added to the solution, then let stand again for 6 minutes. Solution reacted with 2 mL NaOH 4% is then diluted with aquadest to a total volume of 5 mL and let stand for 15 minutes. Measured maximum uptake at wavelengths of 380-560 nm.

2. Results and discussion

Determination of maximum wavelength is done to find out the maximum uptake in reading the sample. Maximum delombang length obtained by 415, while the maximum wavelength results can be seen in figure 1

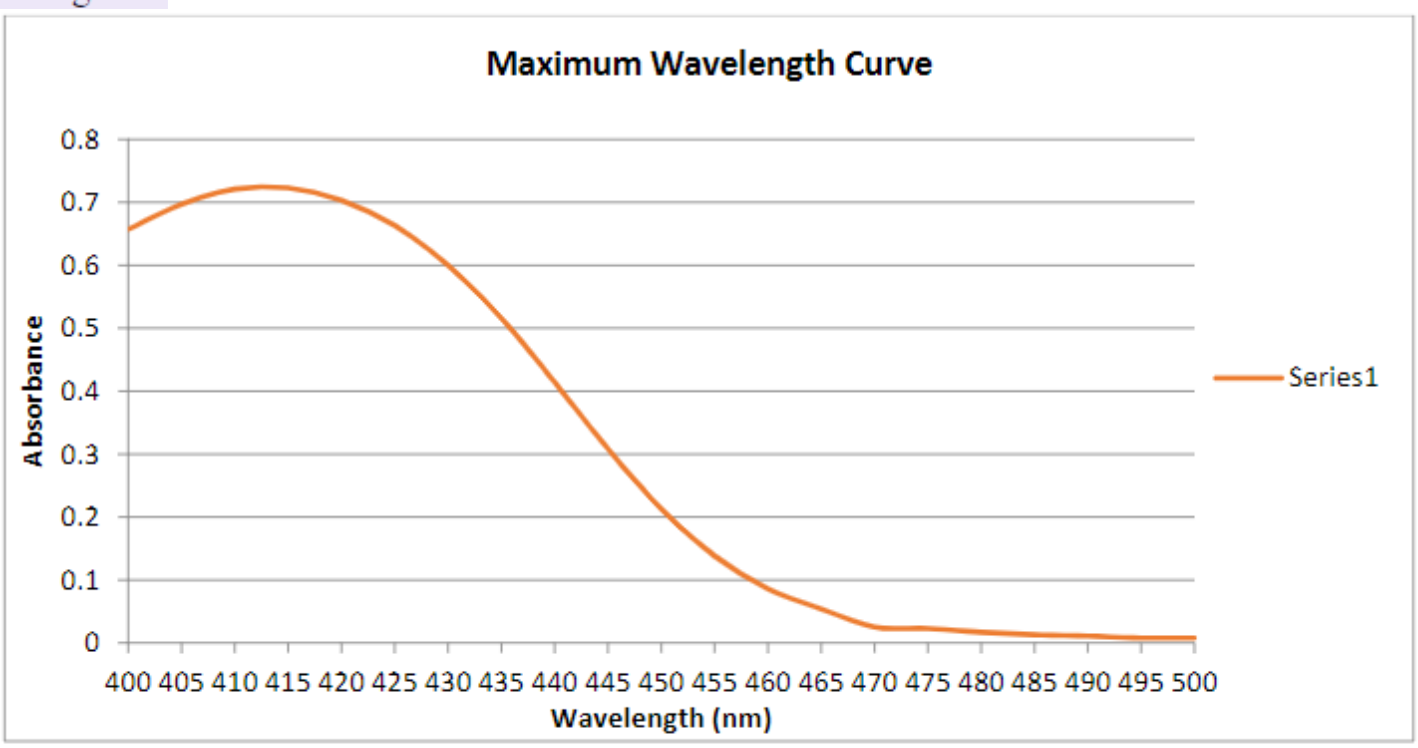

Figure 1. Maximum wavelength

The results of research analysis of flavonoids ceciwis cabbage (Brassica oleracea var. capitata alba) qualitatively obtained positive results that showed that cabbage ceciwis has flavonoid compounds. Analsis is done quantitatively which can be seen in table 1.

Table 1. Flavonoid levels of cabbage ceciwis

Replication	Maceration (%)	Maceration+MAE (%)
1	1.0580	2.0725
2	1.1605	2.2654
3	1.0950	2.1800
Average	1.1045	2.1726

Based on the data shown in table 1, the maceration extraction method with the initial treatment using MAE has a greater total flavonoid content with an average value of 2.1726% compared to the direct maceration method with a value of 1.1045%. This difference in outcomes is due to the initial treatment of MAE. This treatment causes the pores in the sample to open and the solvent easily attracts compounds present in the sample.

3. Conclusion

The maximum wavelength obtained is 415. Total withdrawal of flavonoid compounds with initial MAE treatment was obtained a value of 2.1726% and without initial treatment of 1.1045%.

4. Acknowledgment

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