Turnitin Originality Report

Processed on: 26-Feb-2020 09:05 WIB
ID: 1264262801
Word Count: 1588
Submitted: 1

Similarity Index	Similarity by Source	
8%	Internet Sources:	2%
	Publications:	2%
	Student Papers:	8%

Total Antioxidant Activity and Anthocyanin Content Of Purple Uwi Banggai (Dioscorea alata) By Sri Sulami

6% match (student papers from 25-Sep-2019)
Submitted to Universitas Brawijaya on 2019-09-25

2% match (student papers from 01-Aug-2019)
Submitted to Universitas Brawijaya on 2019-08-01

Total Antioxidant Activity and Anthocyanin Content Of Purple Uwi Banggai (Dioscorea alata) Ayu Puspitasari1，Nurcholis1，Sri Sulami EA1 1Department of Health Analysis, Polytehnic of Health, Surabaya, Indonesia * Corresponding authors: [ayu_depkes@yahoo.com] Abstract – On this research, qualitative and quantitative analysis of anthocyanin - functioning as antioxidant-, as well as total antioxidant activity from tuber and peel of purple Uwi Banggai with variety of purple intensity were conducted. The method used is Harborne method for qualitative analysis of anthocyanin, pH differential method for quantitative analysis of anthocyanin, and DPPH for total activity of antioxidant. Before all analysis were performed, extraction with maseration method were done on samples in order to gain extract. The result of this research showed that all samples contained anthocyanin. The anthocyanin content of tuber varied from 7.31 mg / 100 mg (mauve) to 168.01 mg / 100 mg (dark purple) while for peel were 39.82 mg / 100 mg (mauve) to 183.30 mg / 100 mg (dark purple). Total antioxidant activity on tuber varied from 1044.36 mg/L (mauve) to 127.29 mg/L (dark purple) while for peel were 263.12 mg/L (mauve) to 113.76 mg/L (dark purple). Peel of purple uwi Banggai had the highest antioxidant activity. Overall, purple uwi Banggai had quite high anthocyanin content and medium antioxidant activity and also had the potency to become a good source of carbohydrate for food, with the advantage of having antioxidant compounds, especially to prevent degenerative illness. The waste peel of purple uwi Banggai also could be utilized to obtain its anthocyanin content. 1. INTRODUCTION From many kinds of tubers growth in Indonesia, yam or uwi (Dioscorea alata L.) has a good potency to be developed as a source of carbohydrate and bioactive compound. Nevertheless, the cultivation of Uwi in Indonesia have not yet maximized due to the lack of information of Uwi's nutritional value and also its bioactive compound content. One type of Uwi existing in Indonesia is Uwi Banggai (Dioscorea alata), which have many variety and color like white, yellow, and purple [1]. Uwi Banggai contains anthocyanin when its color is purple. Anthocyanin is a bioactive- compound belong to flavonoid group. In addition to its function as natural dye that yields purplish red color, anthocyanin also has a role as antioxidant [2]. The aim of this research was

to gain information about the content of anthocyanin in several varietis of purple uwi Banggai, and also its total antioxidant activity. That information would be a benefit for adding knowledges among people consuming uwi Banggai, and also for the government to become more better in knowing the advantages of uwi Banggai especially the purple variety. 2. METHODS 2.1 Chemicals The reagent used in this research were methanol, sodium hidroxide, chloride acid, DPPH (2-diphenyl-1- picrylhydrazil), buffer solution of potassium chloride pH 1, buffer solution of sodium acetate pH 5, and vitamin C. 2.2 Procedures The population of objects for this research was uwi Banggai cultivated in Kepulauan Banggai Sulawesi Tengah. Uwi Banggai used as the objects were three types purple uwi Banggai generally consumed by people of Banggai Kepulauan. The selection of objects were selective random on purple uwi Banggai with variety stated before, having purple tuber and peel with different purple color intensity. First, tuber were peeled. Tuber and peel then were washed to eliminate any dirt. Extraction with maseration method were performed on clean tuber and peel of purple uwi Banggai. Afterwards, tuber and peel were weighed approximately 30 – 50 gram, mashed and soaked for 48 hours with 75 – 100 mL methanol. Filtering were conducted so that filtrate and residue be separated. Filtrate was collected and residue were soaked again in methanol for 24 hours. The solution then were filtered and the filtrate obtained was mixed with the first filtrate. The Total filtrate was vaporized using vacuum rotary evaporator until methanol dissapeared. On the extract, qualitative and quantitative analysis of anthocyanin were performed, as well as total antioxidant activity. Haborne method was used for qualitative analysis of anthocyanin, pH differential method was used on quantitative analysis of anthocyanin [3] while DPPH method was used on total antioxidant activity analysis [4] 3. RESULTS AND DISCUSSION The physical appereance of purple uwi Banggai is shown in picture 1. Qualitative analysis of anthocyanin was performed to identify the existence of anthocyanin on tuber and peel of purple uwi Banggai. From the experiment, it was obtained that all of objects research contained anthocyanin. The color appearance of each sample depended on its purple color intensity. The more intense the color of purple uwi Banggai, the darker the result of analysis. The final color of sample solution was red with the additon of HCl and became green with the further additon of NaOH. This test was based on physical property of anthocyanin which was red-pink colored in pH 1-6 (acid) and green colored in pH 8-14 (base) [5]. The summary of anthocyanin content and total antioxidant activity of purple uwi Banggai are presented in table 1. A1 and A2 code represented the tuber and the peel of one variety of sample that had colored dark purple tuber and colored mauve peel. B1 and B2 code represented the tuber and the peel of one variety of sample that had colored mauve tuber and dark purple colored peel. C1 and C2 code represented the tuber and the peel of one variety of sample that had colored dark purple tuber and peel. Figure 1. Uwi Banggai (Dioscorea alata) Table 1. The Average of Anthocyanin Content and Total Antioxidant Activity of Purple Uwi Banggai Sample Anthocyanin Content Total Antioxidant (mg/ 100 gram) Activity (mg/L) A1 (colored dark purple Tuber) 168,01 133,81 B1 (colored mauve Tuber) 7,31 1044,36 C1 (colored dark purple Tuber) 145,80 127,29 A2 (colored mauve peel) 39,82 263,12 B2 (colored dark purple peel) 73,60 141,32 C2 (colored dark purple peel) 183,30 113,76 Natural color purple – red on part of plant is commonly derived from anthocyanin and betacyanin content [6]. Sample A and C had a quite high anthocyanin content that was 168,01 dan 145,80 mg/100 g. While the sample of peel having the high anthocyanin content wa sample C as much as 183,30 mg /100 g. It was shown that the peel could have anthocyanin higher than the tuber. This results matched with some research that showed the peel of purple sweet potato had higher anthocyanin content compared to its tuber [7]. It could be

concluded that there was a potential usage of uwi Banggai peel to be extracted for its anthocyanin content. Nevertheless, the tuber and the peel of uwi Banggai colored mauve had low anthocyanin content. This result matched with its low purple color intensity on tuber, peel, filtrate from maseration process, and extract. Anthocyanin color was influenced by the concentration and types of anthocyanin [8]. The highest antioxidant activity was shown by sample C. The purple color intensity and anthocyanin content of tuber from sample C was also the highest. Generally, it was stated that the tuber and peel of purple uwi Banggai had medium antioxidant activity. Antioxidant on plant comes from several active compounds, and divided into two types, which classified as nutrient (vitamin A, vitamin E, Vitamin C, Selenium, Zinc, etc), and as non nutrient (phenolic compound and flavonoid compound) [9]. Red or purple colored fruit like dragon fruit and bit, have high anthocyanin and antioxidant activity because it hasd both types of antioxidant, while carbohydrat source of food commonly have low anthocyanin content and antioxidant activity. This research had showed that purple uwi Banggai had the advantages over others types of carbohyrates source of food due to its higher anthocyanin content. 4. CONCLUSIONS It was concluded that purple uwi Banggai (Dioscorea alata) as tuber and peel, had a good potency to become a carbohydrate source of food that also good for health especially to prevent degenerative illness, unlike other carbohydrate source of food, due to its quite high anthocyanin content -functioning as natural dye and antioxidant-, and also medium activity antioxidant. Waste product of uwi Banggai in the form of peel also can be processed to obtain its anthocyanin extract. 5. REFERENCES [1]. Yalindua, A. 2014. Potensi Genetik Klon Tanaman Uwi (Dioscorea alata L.) asal Banggai Kepulauan Sebagai Sumber Pangan Dalam Menunjang Ketahanan Pangan. Disertasi. IPB. [2]. Jordhein, M. (2007). Isolation, DIentification, and Properties of Phyranoanthocyanin and Anthocyanin Forms. Disertasi. Universitas Bergen. [3]. AOAC. (2005). Official Methods of Analysis of The Association Analytical Chemist. Inc. Washington DC [4]. Kusumawati, I., Suciati. (2015). Pengujian Penangkap RAdikal Bebas DPPH Secara Spektrofotometer UV-VIS. Skripsi. Universitas Airlangga [5]. Fossen, T., Cabrita, L., dan Andersen, O.M. (1998). Color and Stability of Pure Anthocyanins Influenced by pH Including The Alkaline Region. Food Chem. 63 : 435 – 440 [6]. Sakuta, M. (2014). Diversity in plant red pigments: anthocyanins and betacyanins. Plant Biotechnol Rep, 8: 37. [7]. Montilla, E.C., Hillebrand, S., Winterhalter, P. (2011). Anthocyanins in Purple Sweet Potato (Ipomoea batatas L.) Varieties. Fruit, Vegetable and Cereal Science and Biotechnology, 5(Special Issue 2) : 19-24 [8]. Bueno, Martín, J., Sáez- Plaza, P., Ramos-Escudero, F., Jiménez, A.M., Fett, R., Asuero, A.G. (2012). Analysis and Antioxidant Capacity of Anthocyanin Pigments. Part II: Chemical Structure, Color, and Intake of Anthocyanins. Critical Reviews in Analytical Chemistry, 42:126–151 [9]. Muchtadi, T.R. (2011). Teknologi Proses Pengolahan Pangan. PAU Pangan dan Gizi. Institut Teknologi Bogor