ORIGINAL ARTICLE

Quarsetin Levels, Antioxidant Activities Ethanol Extracts and Karamunting Fruits (Rhodomyrts Tomentosa)

WIDIA DARA, DEWI YUDIANA SHINTA
STIKES Perintis Padang, Indonesia
Correspondence to Widia Dara, Email: widianurja@gmail.com

ABSTRACT

Aim: Quercetin content in karamunting fruit is very high, contains flavonoids, polyphenols which are natural antioxidants in fruit.
Aim: To analyze the levels of quercetin and antioxidant activity in fruit ethanol extract and karamunting syrup.
Methodology and result : This study uses the HPLC method for quercetin analysis and antioxidant analysis with DPPH method. Quercetin content in ethanol extract was 2 mg/g dry weight and in syrup amounted to 0.0416 mg quartetin per 1 mL karamunting fruit syrup. The results of antioxidant analysis showed that the ethanol extract of karamunting fruit had antioxidant activity of 11.81 and syrup of 60.766.
Conclusion : Antioxidant activity in fruit ethanol extract and karamunting syrup has very strong antioxidant activity which can later be used as foods that contain high antioxidants that can inhibit the onset of degenerative diseases and enhance the immune system.
Keywords: antioxidant, IC50, Rhodomyrts tomentosa

INTRODUCTION

The source of natural antioxidants is plants with high polyphenol compounds. One of the plants containing polyphenol compounds is karamunting plants (Rhodomyrtus tomentosa). Karamunting plants contain flavonoids, terpenoids, tannins, and other active compounds (Hamid, et al. 201). Karamunting contains many anthocyanin compounds and has high antioxidant properties (Rifkowati, E.E, 2018). According to Noorrafiqi's research, et al. (2013) Karamunting fruit juice can reduce triglyceride levels in white rats. Purple karamunting fruit is black after cooking, has a distinctive smell and tastes sweet. The active substances found in karamunting fruit are flavonoids and saponins which are polar compounds, so they dissolve in water. The flavonoids identified in karamunting fruit are Quercetin. Fruit extract with ethyl acetate contains betulinic acid (Wong, 2008) .

The results of the study by Maskan et al (2014) found that the highest phenolic content and flavonoid content in fruit extracts in water was 66,515 mgGAE/g and 1828 mgQE/g. Karamunting fruit extract given orally to rabbits as much as LC 50 = 616083 µg / mL did not cause any signs of poisoning. Karamunting fruit extract can reduce cholesterol levels and increase HDL levels in rabbits.

The highest oxidant activity was in karamunting syrup with variations in the addition of 0.1% citric acid which was influenced by pH and reducing sugars. The lower the pH and the higher the reducing sugar, the higher antioxidant activity (Rifkowati, E.E, et al, 2018). This study aims to analyze the levels of quercetin and antioxidant activity in fruit ethanol extract and karamunting syrup. The benefits of research are as preliminary data to make foods tha contain high antioxidants that are useful to inhibit the onset of degenerative diseases and improve the immune system.

Based on the above, it is necessary to do a study comparing the amount of quercetin and antioxidant activity between ethanol extract of fruit and karamunting fruit syrup.

MATERIALS AND METHODS

Rhodomyrtus tomentosa is obtained from the Lumpo of Pesisir Selatan district. The fruit that is used is the one that has ripe purple black color. The tool used to make syrup is a stainless steel pan.

Procedure for making karamunting syrup: Comparison of fruit and sugar is 2: 1. The fruit is cleaned and the petals are removed. The amount of water added to the making of syrup is 1: 3 between karamunting and water. The amount of water added to the making of syrup is 1: 3 between karamunting and water. Water and sugar cooked After all the sugar is dissolved added the Rhodomyrtus tomentosa fruit that has been cut into pieces. After the syrup boils the fire is turned off. syrup is filtered and stored in a sterile bottle.

Determination of Quarcetin Content in Ethanol Extract and Karamunting Fruit Syrup by HPLC Method: The quarcetin content test was carried out on ethanol extract (10 g / 100 mL and syrup (120 g/1800 mL) karamunting fruit. Quarcetin (standard) was made with several concentrations of 100, 50, 25, 12.5, and 6.25 ug / ml. Each standard compound was injected as much as 20 µL and eluted for 20 minutes using the appropriate method to obtain a standard chromatogram. The sample was then filtered with a 0.45 µL PTFE filter and analyzed according to the quarcetine compound method. the sample extract was calculated by the equation Y= a lnX + b which was obtained from the quartetail standard chromatogram concentration area versus area.

Antioxidant activity with DPPH method: Antioxidant activity test was carried out using DPPH method (1,1-diphenyl-2- picryl hydrazyl) by Molyneux, (2004), using a microplate reader. Samples with a concentration of 1000 µg / mL were diluted by the two fold dilution method in a 96-well microplate so that a concentration of 1000 - 31.25 µg / mL was obtained, each with a final volume of 50 µL then added 80 µL DPPH with a concentration of 100 µg/ mL and incubated for 30 minutes in a dark place. The mixture absorbance was measured at a wavelength of 520nm. The same thing was done in the quercetin. All measurements were done with triplo.

Data analysis: The results obtained are processed with the following formula:
% Inhibition value is calculated by the following formula:

$$\% \text{ Inhibisi} = \frac{(A_{kontrol} - A_{sampel})}{A_{kontrol}} \frac{(A_{kontrol} - A_{sampel})}{A_{kontrol}} \times 100$$

Description : A control = Absorbance does not contain a sample
A sample = Absorbance of the sample

RESULT AND DISCUSSION

Quarcetin analysis in ethanol extract and karamunting fruit syrup was carried out by HPLC method with quarcetin chromatogram (A) and ethanol extract (B) and karamunting fruit syrup (C) as follows.

Figure 1. Quercetin chromatogram as a standart

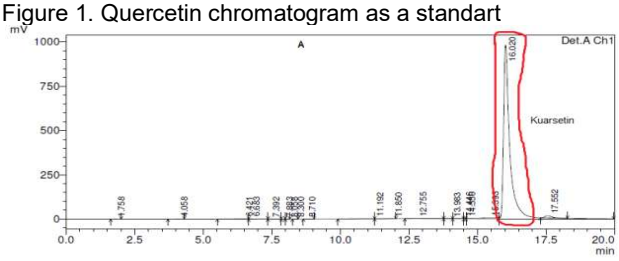


Figure 2. Chromatogram of ethanol extract of karamunting fruit.

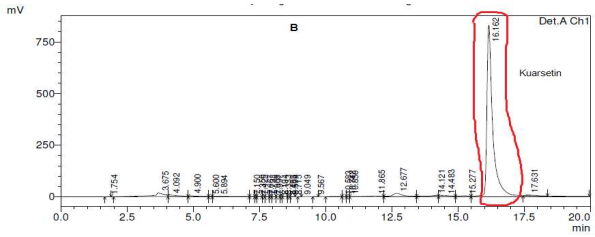
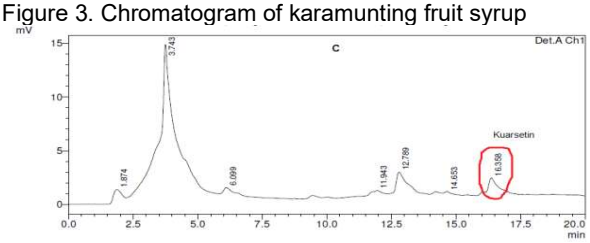


Figure 3. Chromatogram of karamunting fruit syrup



Retention time and area of chromatogram from several quarcetin concentrations can be seen in table 1. Linear regression equation analysis of the standard curve obtained by the equation Y = 150998x-360815.

Table 1. Extensive area and quarcetin retention time

Quarcetin concentration (ug/mL)	Area	Retention time (minute)
100	15740559	16,020
70	9175922	16,172
40	4740790	16,124
10	2119103	16,058

Results Determination of Quaretine levels in ethanol extract and karamunting fruit syrup can be seen in table 2 below.

Table 2. Quarcetin content in fruit ethanol extract and karamunting fruit syrup.

Sampel	Retention time	Area	levels (mg K/g) or mg K/mL)
Ekstrak Etanol	16.162	12874948	2,5436
Sirup	16.358	4543787	0,0416
Kuarsetin	16.020	-	-

From table 2 it can be seen that the content of the quarcetine in fruit ethanol extract was 2 mg/g dry weight and in fruit syrup 0.0416 mg quartetin per 1 mL karamunting fruit syrup. The content of quarcetinin in karamunting fruit ethanol extract is very high.

Antioxidant Activity with DPPH method: Analysis of antioxidant activity was carried out to determine the IC value of 50 ethanol extracts of fruit and karamunting fruit syrup. Testing was carried out from ethanol extract of fruit and karamunting fruit syrup.

The antioxidant activity of ethanol extract of fruit and karamunting fruit syrup with the quarcetin standard can be seen in table 3.

Table 3. Antioxidant activity of ethanol extract and karamunting fruit syrup

Sampel	IC 50 (ug/mL)
Ekstrak etanol	11,8073
Sirup buah	60,766
Kuarsetin	1,4817

DISCUSSION

Antioxidants are substances that can protect the body from the effects of free radicals that can damage body cells so that they can cause degenerative diseases such as cancer and heart.

In this study using ethanol extract of karamunting fruit. The results showed higher levels of quercetin and antioxidant in the ethanol extract of karamunting fruit compared with karamunting fruit syrup. This is due to the process of ethanol extract does not use the heating process, only using maceration techniques by soaking karamunting fruit with ethanol for 3 days. So there is no heating process that will cause damage to the active compound in karamunting fruit.

Quercetin is a group of flavonoids. Flavonoids also include polar compounds which can dissolve well in polar solvents such as ethanol. The use of ethanol solvent in extraction is very good in attracting polar compounds such as quercetin so that the ethanol extract of karamunting fruit detected higher levels of quercetin compared to karamunting fruit syrup

The results of the antioxidant analysis showed that ethanol extract and karamunting fruit syrup had very strong antioxidant activity. The antioxidant activity of ethanol extract and karamunting fruit syrup has very strong antioxidant activity due to the high content of quarcetines in karamunting fruit. In addition karamunting fresh fruit also contains anthocyanins of 0.65 mg CGE / g DW, phenol of 15.05 mg GAE / g DW and flavonoids of 15.15 mg RE / g DW (Elly Jumiati et al, 2017). the ability of free anti-radical compounds in high amounts in them.

The free radical commonly used as a model in measuring the free radical capture power is 1,1-diphenyl-2-

pikrihidazil (DPPH). DPPH is a stable free radical compound so that if it is used as a reagent in the free radical capture test, it is sufficiently dissolved and if stored in dry conditions with good and stable storage conditions for years. DPPH absorbance values range from 515-520 nm. (Vanselow, 2007).

DPPH free radical reduction method is based on the reduction of DPPH free radical methanol solution which is colored by inhibition of free radicals. When the purple DPPH solution meets the electron donor material, DPPH will be reduced, causing the purple color to fade and be replaced by yellow from the pikril group. (Prayoga, 2013).

Antioxidant activity in karamunting fruit syrup was lower than that of karamunting fruit ethanol extract. This is due to the process of making syrup by doing destruction and heating, will cause damage to fruit antioxidants so that the antioxidants in fruit syrup are lower.

This is in line with the research of Rahmawati and Susanto (2013) that mango fruit paste, low antioxidant in the process of making pasta in the presence of heating. The temperature in making karamunting syrup is around 70℃ which can cause a decrease in antioxidant activity. High temperature is a catalyst for reduction oxidation reactions. The temperature can also increase the activation energy so that it can increase the heating temperature which triggers the oxidation reaction in the material.

CONCLUSION

The highest quercetin level in ethanol extract of karamunting fruit compared with karamunting fruit syrup with the results on karamunting fruit ethanol extract 2mg/g dry weight and in syrup amounted to 0.0416 mg quarcetin per 1 mL karamunting fruit syrup. Antioxidant activity found that ethanol extract of karamunting fruit had antioxidant activity of 11.81 and syrup of 60.766.

Acknowledgement(s): The researchers are grateful to the Directorate of Research and Community Service, the Directorate General of Higher Education, Ministry of research, technology and higher National Education on research funding awarded through competitive grants program.

REFERENCES

1. Arief, M. Iqbal., Riky Novriansyah, Indra Tjeng Budianto, Muhammad Bimo Harmaji, Potensi bunga karamunting (melastoma malabathricum l.) Terhadap kadar kolesterol total dan trigliserida pada tikus putih jantan hiperlipidemia yang diinduksi propiltiourasil. Urnal Prestasi. Vol 1. No.2 tahun 2012
2. Hamid, Hazrulrizawati abd, et al. 2017. Rhodomyrtus tomentosa :APhytochemical and Pharmacologial Review. Asian Journal of Pharmaceutical and Clincal Research. Vol10, 1(2017)
3. Jumiati.E, Mardhiana, dan Abdiani.I.M. 2017. Pemanfaatan Buah Karamunting Sebagai Pewarna Alami Makanan. Jurnal AGRIFOR (16) 2 : 163-170.
4. Molyneux, Philip. 2004. The Use of the Stable Free Radical Diphenylpicryl-Hydrazyl (DPPH) for Estimating Antioxidant Activity." Songklanakarin Journal of Science and Technology, 26: 211 - 19.
5. Rifkowaty.E.E,dkk,2018, Aktivitas antioksidan Sirup Buah Karamunting (Rhodomyrtus tomentosa) dengan Variasi Penambahan Asam Sitrat, Jurnal Teknologi dan Industri Pertanian Indonesia, vol 10 no 01.
6. Wong. 2008. Melastoma malabathricum: Too Beautiful to Be Called a Weed, Green Culture, Singapore, 2008.