

PHYSICO-CHEMICAL PROPERTIES AND ANTIOXIDANT ACTIVITIES OF RHODOMYTUS TOMENTOSA SYRUP

Widia Dara* and Nurhamidah

STIKES Perintis Padang

* Corresponding author email: widianurja@gmail.com

ABSTRACT

Antioxidants are natural compounds found in many fruits, as well as in *Rhodomyrtus tomentosa*. The research, *Rhodomyrtus tomentosa* will be processed in form of syrup. The results of the organoleptic test of syrup ranged from like to very like by panelists. Determine the physical and chemical properties on syrup *Rhodomyrtus tomentosa* were acidity value is 4,41, total acid is 0,003%, total dissolved solids 23,74°Brix and sugar level of syrup is 21%. The results of Vitamin C content analysis of 1.25 mg / 100 g. The syrup contains Fe 0.525 mg / L and Cu 0.220 mg / L. In the *Rhodomyrtus tomentosa* syrup there is no lead (Pb), cadmium (Cd), Mercuri (Hg), Arsenic (As) and Stanum (Sn) metal. The content of antioxidant activity sirup is 10.31 %.

Keywords: *Rhodomyrtus tomentosa*, sirup, antioxidant activity, Vitamin C, metal

INTRODUCTION

Rhodomyrtus tomentosa is wild plants that grow in shrubs. *Rhodomyrtus tomentosa* is one of Indonesia's biodiversity. *Rhodo-myrtus tomentosa* fruits are dark purple, the taste of the fruits is sweet. The result of organoleptic test showed that the leaves are green with a sense of fast and bitter, stems brown greenish, the roots are brown black rather red and purplish pink flowers with a distinctive smell and bitter taste. Blackish purple fruit after cooking, distinctive smell and taste sweet (Sutomo, 2010).

Active substances in fruit *Rhodomyrtus tomentosa* are flavonoids and saponins which are the polar compounds. According to Wong (2008) the type of flavonoids in *Rhodomyrtus tomentosa* is quercetin. The result of its extract with ethyl acetate is a betulinic acid. 70% methanol extracts of leaves, stems and *Rhodomyrtus tomentosa*'s flowers can kill bacteria *S. aureus* *S. cerevisiae* and *F. oxysporum* (Grosvenor, . *Rhodomyrtus tomentosa* fruits used to lower trigliseride concentration level wistar strain male (Noorrafiqi, 2013).

Acute toxicity study (LD50) of leaf water extract of *Rhodomyrtus tomentosa* was collected in doses of 62,5, 125, 250, 500, 1000 and 2000 mg/kg. given to rats orally. The result was not found to be a sign of general symptoms of poisoning and death for 48 hours. Studies show *Rhodomyrtus tomentosa* that given up to 2000 mg / kg dose for mice have nomortality and there

were no clinical signs of general weakness in animals. This suggests that *Rhodomyrtus tomentosa* are safely consumed even at the highest doses 2000 mg / kg (Sunilson *et al*, 2009). So that needs follow-up research. The aim of the research is to make a safe and healthy drink of *Rhodomyrtus tomentosa* syrup. This syrup were determined by antioxidant activity, physical and chemical properties content vitamin C, Fe and other metals

MATERIALS AND METHODS

Materials used in this study were *Rhodomyrtus tomentosa*, sugar, water. Chemical used were HNO₃, HCL, Fe metal standart, ascorbic acid, methanol, ethanol, 2,2-diphenyl-1-picrylhydrazyl (DPPH),

Tool to analyze is the UV-VIS spectrophotometer, analytical balance, erlenmeyer, baker glass, filter paper, funnel glass, pipette, pH meter, hand refracto-meter, atomic absorption spectrophotometry.

RESEARCH DESIGN

Research has second steps: First steps to known organoleptic assessment. Selected one of the most preferred syrup by panelists to be Ready-to-Eat product. Second step to know the physical and chemical properties, antioxidant activity, the metal content and Vitamin C in the syrup,

Making of *Rhodomyrtus tomentosa* syrup

The study design was experiment with 3 treatment. The data obtained were analyzed using analysis of variance and Duncan's New Multiple range test (DNMRT) at 5%. The treatment in this study: (A). Fruits is cutted and boiled and added sugar 55%, (B)Fruits is cutted, boiled and crushed then added sugar 55%, (C). Water is boiled and added fruits then fruits is cutted added sugar 55%. After that all the syrups were filtered and stored in sterile bottles. Sensory assesment that includes color, aroma, consistenscy and taste. The most preferred hedonic test results, followed by testing in the laboratory.

Determine the physical and chemical properties on *Rhodomyrtus tomentosa* product were a total acid, pH, vitamin C, Total Dissolved Solids (TPT), Standard procedure for the chemical quality of pH and acid total were AOAC (1995), of Total Dissolved Solids (TPT) was AOAC (1995) expressed in cP. Standard procedure to measured levels of vitamin C and DPPH were UV Vis Spectrophotometer. *Rhodomyrtus tomentosa* syrup metal were measured with atomic absorption spectrophotometry. The spesification method for iron (Fe) metal is SNI 6989.4:2009. The spesification methode for Cadmium (Cd), Cuprum (Cu), and Pb metal are SNI 06-6989.16-2009. Arsen (As) and Stanum (Sn) metal methode is APHA.3500

Antioxidant activity with DPPH

The calibration curve was prepared by dissolving 5 mg DPPH in methanol in a 50 ml measuring flask. Then diluted to 5 ppm, 10ppm, 15ppm, 20ppm and 25 ppm concentrations. The absorbance was measured by a UV Vis spectrophotometer at 516 nm wavelength.

For the determination of antioxidant activity of syrup. Taken 1 ml of syrup put into a 100 ml measuring flask and added methanol to the limit. pipeted 0.2 ml sample and added 3.8 ml DPPH solution 20 ppm. Left for 30 minutes in a dark room at room temperature. measured absorbance at 516 nm. Blanks are made same procedure was methanol.

RESULT AND DISCUSSION

Vitamin C analysis

Content of vitamin C syrup measured by UV Vis spectrophotometer. The measurement begins with the determination of the maximum absorption of vitamin C. Maximum absorption was obtained at 262 nm wavelength. Linear equation of standard curve of vitamin C is $y = 0,269 + 0,0433 X$. $R^2 = 0,991$ (Fig.1). Content of vitamin C syrup is 1,25 mg/100 g. The content of vitamin C syrup is smaller than that its fruit. According research of Lai (2014) content of vitamin C *rhodomyrtus tomentosa* 3,746 fruit per 100 g fruit. High-temperature cooking process causes the loss of vitamin C

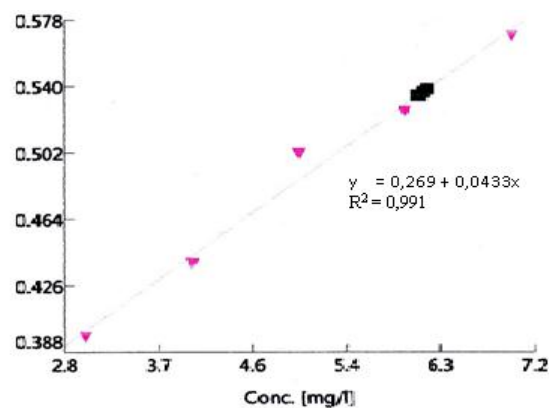


Fig. 1. The linear equation of liquor of vitamin C

Antioxidant activity

Antioxidant activity measurements begin with making standard of DPPH curve. The amount of antioxidant activity of *Rhodomyrtus tomentosa* syrup. DPPH solution was made 5 concentrations and measured at 516 nm wavelength on UV Vis spectrophotometer. Result of linear equation is $y = 0.0967 + 0.02382 X$ (Fig.2). Antioxidant activity of *Rodhomyrtus tomentosa* syrup is 10,3148 %.

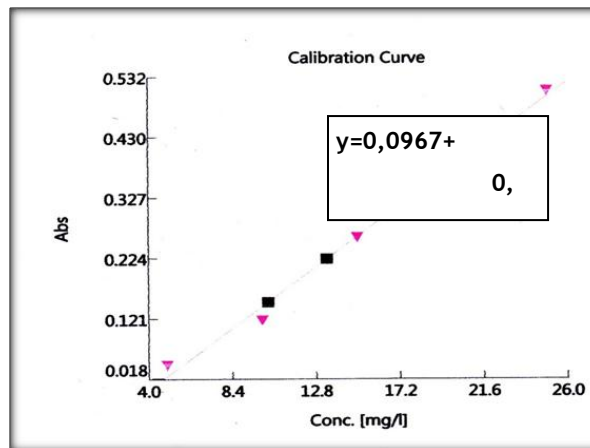


Fig. 2. The linear equation on DPPH

Content of Fe Syrup

Fe content of syrup rhodomyrtus tomentosa 0,525 mg / L. After has been processed into syrup Fe content is decreased. According to Lai (2014) content of Fe of Rhodomyrtus tomentosa for 4.2 mg/100 g. After has been boiled Fe content on the rhodomyrtud tomentosa syrup will be reduced.

The physical and chemical properties

Sugar content of syrup of *Rhodomyrtus tomentosa* is 21 %. The result of acidity of syrup is 0,003 % and pH 4,41. Total Dissolved solids 23,74° Brix. When sugar is added with high concentrations cause reduced food activity water (Aw) and inhibited the growth of microorganisms. According to the results of all metals tested, suitable to SNI standards. Cu was undetected in the standard to be considered. So this syrup is safe to drink.

(Table.1).

Table 1. The physical and chemical properties on Syrup of *Rhodomyrtus tomentosa*

No.	parameter	Unit	Syrup Rhodomyrtus tomentosa	Standart of SNI
1	Antioxidant activity	%	10,3148	-
2	Iron (Fe)	mg/100 g	4,2	-
3	Vitamin C	Mg/100 g	1,25	-
4	Sugar content	° brix	21	Min 65 %
5	pH		4,41	-
6	Total acidity	%	0,003	-
7	Total Dissolved solids	cP	23,74	-
8	Kadmium (Cd)	mg/L	0,000	Max 0,2
9	Tembaga (Cu)	mg/L	0,220	-

10	Lead (Pb)	mg/L	0,000	Max 1,0
11	Mercuri (Hg)	mg/L	0,00	Max 0,03
12	Arsen (As)	mg/L	0,000	Max 0,5
13	Stanum (Sn)	mg/L	0,000	Max 40

Organoleptic Assesment

Organoleptic assessment is one important factor to determine degree of preference for a food product. A level assessment of product made, using hedonic scale of 1 to 6, meaning that 1=dislike, 2=somewhat like, 3 = neutral, 4=rather like, 5=likes, 6=very like. In general, the panelist liked almost all the *rhodomyrtus tomentosa* syrup. The most preferred syrup is B type. The taste of syrup is sweet, the aroma like honey and fruity (Fig.3).

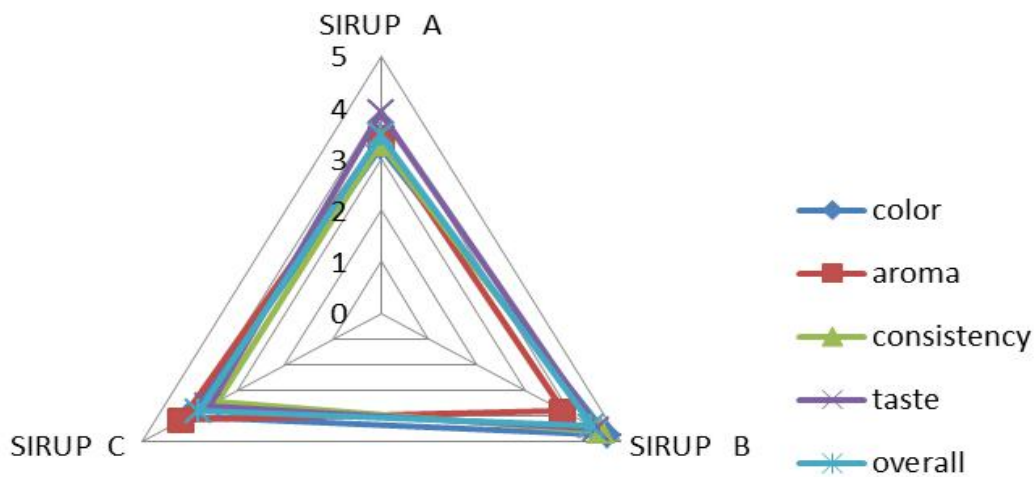


Fig. 3. Result of sensory evaluation on *Rhodomyrtus tomentosa* syrup

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CONCLUSION

Rhodomyrtus tomentosa syrup preferred by the panelists, safe, no heavy metal contamination. Content of vitamin C 1.25 mg / 100 g, Fe concentration of 0.525 mg / L and antioxidant activity is 10,3148%

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