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Investigation Of In Vivo Antioxidant Activities Of Extract Karamunting (*Rhodomyrtus Tomentosa*(Ait.) Hassk) Fruit From Tarakan Island

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ABSTRACT

In vivo test of karamunting fruit powder as a source of antioxidants was carried out using the MDA (malondialdehyde) test, which is a parameter commonly used to determine the extent of cellular damage caused by free radicals. In vivo testing in this study used male Wistar (*Rattus norvegicus*) rats aged 12 weeks with initial body weight of 216 grams to 258 grams. Prior to measurements, the samples were conditioned by oxidative stress. The purpose of this study was to determine the extent of the function of karamunting fruit extract in reducing MDA levels in the blood of experimental animals. The study consisted of treatment with karamunting fruit extract doses of 50 mg/kg, 100 mg/kg, 200 mg/kg, and 400 mg/kg per day for four weeks. The study was repeated 6 times. The research parameter is a decrease in MDA levels. Based on in vivo tests on experimental animals, karamunting fruit powder is proven to have the ability as a source of antioxidants, this is indicated by the decrease in MDA levels in experimental animals. The dose of karamunting fruit powder 200 mg/kg bw was able to reduce MDA levels from 11.315 nmol/ml to 2.54 nmol/ml. Quantity) method can save on inventory costs at the Tarakan Brewing House coffee shop by Rp. 4,591,177 for a year.

Keywords:

Antioxidant,
in vivo,
karamunting,
MDA.

INTRODUCTION

Karamunting fruit (Rhodomyrtus tumentosa, (W.Ait), Myrtaceae) is a very potential fruit in Kalimantan. Karamunting plants are very easy to grow and difficult to control, this is indicated by the density of karamunting plants of 2.18 trees/m2, with a wet leaf production range of 2.5 – 3 tons/ha [1]. Karamunting fruit contains bioactive compounds of flavonoids, alkaloids, steroids and saponins [2]. Flavonoids are known to play a role in capturing free radicals or function as natural antioxidants. In lowering blood sugar, flavonoids have a mechanism of action, including inhibiting the activity of the -glucosidase enzyme, inhibiting fatty acid oxidation, and capturing free radicals. In addition, saponins have the ability to lower blood sugar, precipitate intestinal mucous membrane proteins and form a layer that protects the intestines, thereby inhibiting glucose intake and the rate of increase in blood glucose [3]. With the bioactive content in the karmunting fruit, the karamunting plant has great potential to be developed into phytopharmaca, especially as a source ofantioxidants.

Antioxidants are bioactive compounds that can inhibit free radicals and inhibit substrate

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oxidation, which have an important role in protecting cells from damage by blocking the process of oxidative damage caused by free radicals. Where free radicals cause chain reactions that can damage cells, causing cellular aging and chronic degenerative diseases such as cancer, diabetes, cardiovascular and neurovascular diseases[4].

Free radicals are compounds or free molecules that contain one unpaired electron and are reactive [5]. One of the damages that caused by oxidative stress conditions is lipid peroxidation which produces lipid peroxides, one of which is aldehyde compounds. The resulting aldehyde compounds include malondialdehyde (MDA) [6].

In vivo test of karamunting fruit powder as a source of antioxidants was carried out using the MDA test. MDA or malondialdehyde is a parameter commonly used to determine the extent of cellular damage caused by free radicals [7]. Free radicals that enter the body will cause lipids to increase and will decompose into MDA in the blood, the higher the free radical level, the higher the MDA level will be. This research aims to determine the antioxidant potential of caramunting fruit powder in vivo by measuring MDA levels.

METHOD

Research methods Ingredient The materials used in this study were male Wistar (Rattus norvegicus) rats aged 12 weeks weighing 216 g to 258 g, karamunting fruit powder, reagents for measuring MDA (malondialdehyde), rat food produced by PT Japfa Comfeed Indonesia with a protein composition of 66%. , 7% fat, 6% crude fiber,
ash, 7%, 1.1% calcium, 0.9% phosphorus, and 12% water.

The tools needed in this study were experimental animal cages measuring 45 x 35 x 20 cm, a device for swimming rats measuring 70 x 60 x 60 cm with a water height of 55 cm, and a water temperature of 33oC, and an

Research Procedure

In vivo testing in this study used a Completely Randomized Block Design with 4 x 2 factorial treatment (Steel and Torrie, 1995). The first treatment was the dose of karamunting fruit powder which consisted of four levels, namely K0 (0 mg/kgbw/day), K1 (50 mg/kgweight/day), K2(100 mg/kg weight/day), and K3 (200 mg/kg weight /day). While the second treatment was physical training consisting of P0 (without physical training) and P1 (with physical training), repeated 3 times so that there were 24 experimental units. Parameters observed were MDA values in experimental animals.

Experimental animals will be given karamunting fruit powder for four weeks and physical training in the form of swimming with an intensity of 70% of maximum physical activity, five times per week, for three weeks, then calculate the MDA (Malondialdhide). MDA (Malondialdhide) is the result of oxidative damage by free radicals which was determined from rat blood samples after treatment ended, using the spectrophotometric method using the TBARS assay and expressed in nmol/ml. The in vivo testing procedure is presented in Figure 1.

RESULT AND DISCUSSION

One of the main internal factors that cause oxidative stress is phosphorylation oxidation caused by maximal physical activity, for example

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strenuous exercise that stimulates an increase in the amount of MDA. During exercise and activity, in the mitochondria there will be a phosphorylation oxidation reaction to form energy (ATP) which will also form free radicals. This activity requires oxygen, which reacts with hydrogen, and some of the oxygen will turn into free radicals. Every body activity and requires ATP / energy, will definitely trigger the production of free radicals that are increasing. Based on the results of the study, the average MDA value (nmol/ml) was shown in Table 1.

Table 1. Average MDA Levels (nmol/ml) of Wistar Rat Blood After Treatment of Karamunting Fruit Powder.

Variable	Dose (mg/kg weight /day)	Physical training	
		No training (Po)	with training (P1)
MDA (nmol/ml)	K0= 0	6,275	11,315
	K1= 50	5,9825	9,5425
	K2= 100	3,5275	6,78
	K3= 200	2,475	2,54

On Table 1. it can be seen that the administration of karamunting fruit powder at a dose of 0 mg/kg weight to 200 mg/kg weight resulted in a decrease in the average level of MDA in the blood of rats, both those given physical training and without physical training. The karamunting fruit powder used in the in vivo test is a powder produced by the foam mat drying process. The dose of karamunting fruit powder is adjusted to the dose obtained in previous studies using karamunting leaf powder [8].

Based on the results of the study, after giving Karamunting fruit powder at a dose of 50 mg/kg, 100 mg/kg, 200 mg/kg per day for four weeks, it caused a decrease in blood MDA levels in wistar rats. This is probably due to the compounds contained in the karamunting fruit powder working as antioxidants by donating electrons to free radicals. Karamunting fruit powder contains flavonoid compounds, alkaloids, steroids, tannins, and saponins [2]. Flavonoid compounds can donate hydrogen atoms to free radicals which are reactive because they have one unpaired electron so that reduce the formation of free radicals such as MDA [9]. This matter in accordance with the research of
[10] which showed that the extract of Broccoli ethanol containing flavonoids can reduce MDA levels in the liver of rats.

The results of other studies that support this research are the results of research by [11], that the administration of karamunting plant extract during in vivo tests has the potential as an antioxidant and anti- inflammatory. Meanwhile, several other studies using extracts from other plants also showed similar results, including that supplementation with grape seed extract was able to reduce MDA levels in mice [12]. The study of [13] which also used grape seed extract was able to reduce MDA levels in male Sprague-Dawley rats suffering from diabetes mellitus. Then [14] used moringa seed extract *(Moringa oleifera* L,) to reduce the MDA levels of wistar rats induced by Arsenic metal.

The results showed that although physical training increased MDA levels, the administration of karamunting fruit powder together with physical training was able to reduce blood MDA levels in Wistar rats. This means that karamunting fruit powder which is given simultaneously with physical training has a major role in reducing free radicals that are

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formed during the training. This is because the bioactive compounds in karamunting fruit powder work as antioxidants, thereby preventing the initiation or propagation of reactions by donating electrons to free radicals [15].

CONCLUSION

Based on in vivo tests on experimental animals, karamunting fruit powder is proven to have the ability as a source of antioxidants, this is indicated by the decrease in MDA levels in experimental animals. The dose of karamunting fruit powder 200 mg/kg weight was able to reduce MDA levels from 11.315 nmol/ml to 2.54 nmol/ml.

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