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The effectiveness of watermelon rind extracts waste (citrullus lanatus l.) in removing free radical in oral leukoplakia patients

Shafira N. Khaera,[1*] Ainiyyah F. Zaizafun,[1] Andi N. Anisa,[2] Acing H. Mude[1]

Abstract

Objective: Therefore, this study will reveal the effectiveness of watermelon rind extract waste in inhibiting free radicals in patients with oral leukoplakia.
Material and Methods: The extraction method used is maceration. One hundred grams of watermelon rind powder (112 g) added 700 ml of 96% ethanol. Then soak for 3 days. The extract is filtered using a filter to separate the filtrate and its residue. After that solvent evaporation was carried out until the dried extract was obtained, then tested the antioxidant activity of the extract using DPPH free radical catcher.
Results: Watermelon rind extract is classified as a powerful antioxidant because it has a ppm value ranging from 50-100 ppm.
Conclusion: It can be proven that the watermelon rind which is more often disposed of can also be used, contains vitamin C and lycopene which can connect freely to patients with leukoplakia and can be used as a support therapy for surgical therapy as a cause of leukoplakia disease.

Keywords: Antioxidant, Watermelon Rind Extract, Leukoplakia
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[1]Department of Prosthodontic, Faculty of Dentistry, Hasanuddin University, Makassar, Indonesia
[2]Faculty of Pharmacy, Hasanuddin University, Makassar, Indonesia

Introduction

The prevalence of leukoplakia is in the range of 0.4% to 0.7% in the world. In a study conducted in India there were 3.28% having leukoplakia, in America leukoplakia was found in 2.9% of 23,616 white adults.[1] In Southeast Asia the frequency of oral malignant tumors is higher when compared to other countries around the world, such circumstances are thought to have something to do with the habit of chewing tobacco which is carried out as a community in the Asian region.

Leukoplakia is a clinical term used for white patches or plaques on the oral mucosa that cannot be swept away and cannot be determined clinically as a special disease. Most cases of leukoplakia are related to the habit of consuming tobacco, although alcohol, invasive candida infections, hematinic deficiency (Plummer-Vinson syndrome), and chronic trauma can also play a role.[2] Tobacco consumption results in several changes in the oral cavity. These changes are usually caused by the effects of irritation, toxicity, and carcinogens in cigarette smoke. One change in soft tissue in the oral cavity is leukoplakia. This is because tobacco increases the frequency of mutations in the oral mucosa so that it becomes a predisposing factor in leukoplakia.[3] Therefore supportive therapy is needed so that the transformation of the lesion does not become malignant.

Efforts to overcome this problem, usually using antimicotic chemicals which are expensive and cause side effects such as gastrointestinal disorders to hepatotoxic if consumed in the long term. Efforts to find alternative ingredients that do not have side effects are a solution to the above problems.[4]

The right alternative ingredients to be the solution to these problems, namely herbs. Watermelon is a fruit plant in the form of herbs that grow vines, in English it is called Water Melon.[5] Watermelon is a fruit with high commodities in tropical area. The red fruit is very often consumed in the community. While the rind has a white layer that contains many substances that are beneficial to health such as antioxidants.[6] The need for antioxidants that play a very important role as an antidote to free radicals due to consumption of tobacco which is the main trigger factor of leukoplakia.

Watermelon pulp / rind which is more often disposed of and becomes environmental waste can also be utilized, there is a vitamin C and lycopene contain in it that has the ability to control free radicals 100 times more efficient than vitamin E or 12500 times than gluthation.[7] Therefore, this study will reveal the effectiveness of watermelon rind extract waste in inhibiting free radicals in patients with oral leukoplakia.

Antioxidant testing usually uses the DPPH (2.2-diphenyl-1-pikrilhidrazil) method. DPPH is a stable radical that is widely used to determine the antioxidant activity of plant extracts. The DPPH method can be used in solid samples as well as in the form of solutions and is not specific

*Correspondence to: Shafira N. Khaera.Department of Prosthodontic, Faculty of Dentistry, Hasanuddin University, Makassar, Indonesia
shafiranurulk@gmail.com

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to certain antioxidant components. This method is used because according to Rosyana the use of it are simple, accurate, fast, and inexpensive to experiment with the ability of components to capture free radical compounds.[8] In this test method, DPPH acts as a free radical soaked by antioxidants from the test material, where DPPH acts as will react with these antioxidants to form 2,2-diphenyl-1- pikrilhidrazine.[9]

Material and Methods

The research will be conducted for five months at the Pharmacics Laboratory, Phytochemical Laboratory, Biopharmaceutical Laboratory, Faculty of Pharmacy, Hasanuddin University. This research is experimental research.

The tools used are spoit, autoclave, basin, stirring rod, blender, sterile petri dish, scissors, knives, watch glasses, homogenizer, incubator, calipers, electric stove, laminar air flow, micropipette, pH meter, oven, rotary evaporator, glassware (pyrex), roche friabilator, horn spoon, IF / FT-IR spectrometer, analytic scales, vortex, and smoke pump.

The ingredients used are wistar rats, distilled water, aluminum foil, acetic acid, acetone, watermelon rind, watermelon essence, candida albicans, HCl, HPMC, parchment paper, filter paper, paper disk, silica gel, mask, menthol, candy oil, NaOH, FeCl3, MgCl2, nipagin, nipasol, Potato Dextrose Agar (PDA), starch, 70% sorbitol, tissue, methanol PA, DPPH, alcohol, and methylated spirit.

Table 1 samples were obtained from fruit juice sellers in Makassar area. After that, wet sorting, washing, molding, drying, dry sorting and pollination were carried out. The extraction method used was maceration. One hundred grams of watermelon rind powder (112 g) added 700 ml of 96% ethanol. Then soak for three days. The extract is filtered using a filter to separate the filtrate and residue. The extracted product is then filtered and then evaporated until a dry extract is obtained.

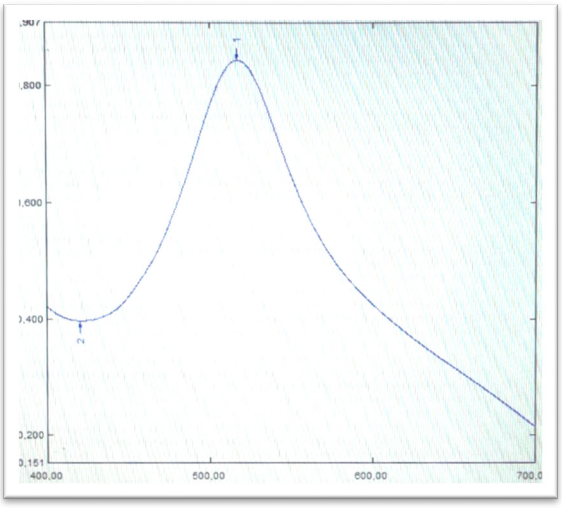

Figure 1. Grafic of result

Table 2 antioxidant activity test of watermelon rind extract using DPPH free radical catcher; making DPPH Solution 0.4 Mm: DPPH was weighed as much as 4 mg then dissolved with absolute ethanol until 25 ml volume. Making stock solution of watermelon rind extract: the stock solution was made by the rinds extract and weighed as much as 10 mg and then dissolved and filled with 44 volumes with absolute ethanol up to 10 ml, so that a stock solution with a concentration of 1000 ppm was obtained. Measurement of antioxidant activity of watermelon rind extract: each of stock solution sample pipette as much as 25 µl, 30 µl, 35 µl, 40 µl, and 45 µl respectively, then 900 µl DPPH 0.4 mM is added and the volume is complete with absolute ethanol up to 5 ml. The mixture was incubated for 30 minutes at 37±0.50C, then its absorption was measured at a wavelength of 515.7 nm using a spectrophotometer. As a blank, a DPPH solution of 0.4 mM in a 900 µl pipette into a measured flask, then ethanol was added to 5 ml and incubated for 30 minutes at 37±0.50C. Antioxidant activity is expressed by the percentage of free radical binding using the formula:

$$\text{Inhibition Power (\%)} = \frac{\text{(Control Absorbance – Sample Absorbance) x 100\%}}{\text{Control Absorbance}}$$

Results

The results obtained from the method figure 1.

Extraction

Calculation I:

$$\text{Shrinkage drying} = \frac{\text{Final Weight}}{\text{Initial Weight}-\text{Final Weight}} \text{ x } 100\%$$

$$= \frac{112 \text{ gram}}{705 \text{ gram}} \text{ x } 100\% = 15{,}9\%$$

Calculation II:

$$\text{\%rendemen} = \frac{\text{Extract Weight}}{\text{Sample Weight}} \text{ x } 100\%$$

$$= \frac{8.7}{112} \text{ x } 100\% = 7{,}7\ \%$$

Discussion

The method of testing using DPPH is a method used to determine the activity of antioxidant compounds. Measurement of antioxidant activity in the sample was carried out using UV-Vis spectrophotometry at a wavelength of 517 nm which is the maximum DPPH wavelength. Ic 50 on watermelon skin is 57.7

Table 1. Sample preparation and extraction data result

Wet Weight	Dry Weight	Extract Weight	Persent rendemen
750 gram	112 gram	8.7 gram	7.7 %

DPPH Test

Table 2. Measurement results of antioxidant activity

Concentration	Sample	Absorption (y)	Average Absorption
	I	0.777	
0	II	0.794	0.785
	III	0.785	
	I	0.733	
20	II	0.733	0.732
	III	0.732	
	I	0.685	
40	II	0.683	0.685
	III	0.674	
	I	0.636	
60	II	0.637	0.637
	III	0.638	
	I	0.576	
80	II	0.573	0.573
	III	0.572	
	I	0.481	
100	II	0.482	0.479
	III	0.475	
	I	0.367	
120	II	0.342	0.358
	III	0.347	

Note: Result of score a = 0.807; b = 3.428; y = ax+b; 50 = 0.807x+3.428; 50-3.428 = 0.807x; 46.572 = 0.807x; X = 57.7

ppm. DPPH concentration shows that the greater the concentration of watermelon rind, the greater the percentage of DPPH free radical inhibitors. Based on the literature, the IC50 value is classified into 4 groups namely very strong, strong, moderate and weak. IC50 value below 0.05 mg / ml (<50 ppm) belongs to the very strong category, IC50 value with a range of 50-100 ppm belongs to the strong category, IC50 value 100-200 ppm is classified as medium and weak if the IC50 is more from 200 ppm (> 200ppm). Watermelon rind extract is classified as a powerful antioxidant because it has a ppm value ranging from 50-100 ppm.[10]

Conclusion

Watermelon rind extract is classified as a powerful antioxidant because it has a ppm value ranging from 50-100 ppm. It can be proven that the watermelon rind which is more often disposed of and becomes environmental waste can also be used, contains vitamin C and lycopene which has the ability to connect freely to patients with leukoplakia and can be used as a support therapy for surgical therapy as a cause of leukoplakia disease.

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Conflict of Interest

The authors report no conflict of interest.

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