

Utilization of Melon Skin Waste (*Cucumis Melo* L.) in Syrup Preparations as an Immunostimulant to Prevent Covid-19

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ABSTRACT

Today, the world is being shaken by a great pandemic called Covid-19 (Corona Virus Disease). The increase from day to day in the number of patients infected with the Covid-19 virus is already difficult to control. A clear and straightforward plan is needed from the government to tackle this problem. Efforts to increase the body's resistance so as not to be easily attacked by viruses are also important. The immune system can be increased by consuming nutritious foods and sources of bioactive components that have immunostimulant activity. Natural ingredients that can be used to prevent Covid-19 are melons. The utilization of melon peel waste is currently still not optimal, this melon skin actually contains a lot of substances that are useful for health. Melon peel is rich in nutrients such as carbohydrates (69.77%) and ash (3.67%). They contain a large amount of total dietary fiber (41.69%) and antioxidants as polyphenols and flavonoids (332mg/100g extract and 95.46mg/100g extract, respectively). Identification and quantification of melon peel phenolic compounds. showed that hydroxybenzoic acid and flavones constituted their main phenolic class. 3-Hydroxybenzoic acid was the main phenolic compound in melon peel at 33.45mg/100g, followed by apigenin-7-glycoside (29.34mg/100g. This research was conducted by formulating melon peel extract in three concentration variations, namely FI (extract 10 %) FII (15% extract) and FIII (20% extract). The syrup preparation of melon peel extract obtained was then subjected to accelerated stability test. The phagocytosis test was carried out by calculating the phagocytic activity of macrophage cells. Data analysis using the Graphad Prism® application. The results obtained the watermelon rind extract syrup formula is stable after storage and can act as an immunostimulant.

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INTRODUCTION

Covid-19 is still a cause of unrest in society that affects all sectors of life. Various efforts by the government and the public to control the spread of the virus through hygienic living procedures, social distancing, limiting crowds, use of masks, frequent hand washing and the use of disinfectants

that are effective enough to break the chain of the spread of the Corona Virus (Deressa, W. et al, 2021). In addition to these efforts, increasing the body's resistance so that it is not easily attacked by viruses is also important. The body's resistance not only prevents from being easily infected, but also accelerates healing and recovery from illness. The immune system can be increased by consuming nutritious foods and sources of bioactive components that have immunostimulant activity. This encourages efforts to survive and live a healthy life by utilizing various existing potentials. One of them is the potential of natural ingredients that can be used as a Covid-19 prevention (Sanna et al, 2016). The use of herbal preparations has become very popular for various types of diseases and infectious conditions, especially those that affect the body's defense mechanisms. Immunomodulatory agents derived from plants can increase the immune response against invading organisms by activating the immune system (Hendry AP, 2020).

Melon (*Cucumis melo L.*) is a fruit that contains several vitamins and minerals that are beneficial for the health of the body and the immune system. The use of melons in the community is only based on the fruit while the skin is used as waste (Mallek-Ayadi, Bahloul, & Kechaou, 2018). The utilization of melon peel waste is currently still not optimal. Melon peel is rich in nutrients such as carbohydrates (69.77%) and ash (3.67%). They contain a large amount of total dietary fiber (41.69%) and antioxidants as polyphenols and flavonoids (332mg/100g extract and 95.46mg/100g extract, respectively). Identification and quantification of melon peel phenolic compounds was carried out by means of high performance liquid chromatography. The results obtained indicate that hydroxybenzoic acid and flavones are their main phenolic class. 3-Hydroxybenzoic acid was the main phenolic compound in melon peel at 33.45mg/100g, followed by apigenin-7-glycoside (29.34mg/100g) (Zhu, Cai, Sun, & Corke, 2008).

Melon (*Cucumis melo L.*) is a fruit that contains several vitamins and minerals that are beneficial for the health of the body. Melon is a good source of vitamin C, vitamin A, potassium, vitamin B6, folic acid, and niacin. The content of vitamin A and vitamin C in fruit is 54% and 49% of the daily nutritional adequacy rate, respectively. The mineral content in melons includes potassium, calcium, iron, magnesium, phosphorus, sodium, and zinc (Lester, 2008). In the use of natural materials, it is necessary to make them in dosage forms to facilitate their use, one of which is in the form of syrup (Handayani, 2018). A good preparation is stable in storage, both in terms of pH, viscosity, etc. Therefore, researchers are interested and curious to examine the utilization of melon peel waste in the form of syrup as an immunostimulant to prevent Covid-19 (Makiyah, 2016).

RESEARCH METHOD

Research Place

The research location is in the Pharmacy Technology Laboratory, Pancasakti University Makassar.

Materials Used

Melon peel, mice, cotton, tissue, aluminum foil, 96% ethanol, 70% alcohol, distilled water, Na-CMC, ether, nutrient agar (NA), NaCl, imboost force®, sucrose, methyl paraben, gelatin, essence, glycerin, Giemsa dye 4%.

Tools Used

Autoclave, bunsen, climatic chamber, porcelain dish, erlenmeyer, electromantel, measuring cup, beaker, incubator, filter paper, analytical balance, jar, object glass, glass slide, mortar and pestle, electric microscope, stirrer, tweezers and scalpel, oven, ose round, spoit, analytical balance, rotavapor.

Research Steps

1. Sample Processing

- The skin of the fruit is chopped and dried.
2. Melon Peel Extract
Melon peel powder was soaked using 70% ethanol solvent for 1x24 hours. The maserate was filtered using a funnel and concentrated using a rotary evaporator, then evaporated over a water bath.
 3. Preparation and Stability of Preparations
The stability test of the preparation was carried out using a climatic chamber (Climacell Sartorius®)
 4. Test Group Setup
For one week given orally

Group I: giving Formula 1 (10%)
Group II: giving Formula 2 (15%)
Group III: giving Formula 3 (20%)
Group IV: giving boost force
Group V: administration of Na-CMC
 5. Phagocytosis Test
The phagocytosis test was carried out on the eighth day, the mice were infected intraperitoneally and waited for one hour. The mice were euthanized, then the stomach was dissected using surgical scissors and sterile tweezers. Peritoneal fluid is taken using a syringe. Peritoneal fluid was stained on a glass object and fixed with methanol for 5 minutes, and stained with 4% Giemsa dye, allowed to stand for 20 minutes, rinsed with running water. After the preparation was dry, it was observed under a microscope using immersion oil with a magnification of 10×-100×, the phagocytic activity of macrophages was calculated.
 6. Data analysis
Analysis using the Graphad Prism® application.

RESULTS AND DISCUSSIONS

Based on the organoleptic test, stable results can be obtained in all formulas based on aroma, color, taste and shape. Melon-specific syrupy aroma, with a greenish tint. The homogeneity test performed on each formula showed homogeneous results in each storage (Wati, S. et al, 2019).

The viscosity test showed results that met the requirements for all formulas before and after storage which were marked by the viscosity value of the preparation in the range of 10 - 30 cps. The pH test obtained stable results before and after storage, because it was in accordance with the recommended pH, namely pH 4-7 (Kurniawansyah I. S. et al, 2020).

Immunostimulant Test

Table 1. Macrophage Observation

Group	macrophages		Replication
	Active	Not active	
I (10%)	475	31	1
	470	35	2
	460	32	3
	550	31	1
II (15%)	577	35	2
	586	37	3
	897	32	1
III (20%)	910	31	2

	905	35	3
	145	132	1
IV (Control -)	137	145	2
	148	150	3
	1021	38	1
V (Control +)	1005	37	2
	905	30	3

Table 2. Percent (%) Phagocytic Activity

Group	Replication	% Activity	Average
I (10%)	1	92.90	93.55
	2	96.70	
	3	91.05	
II (15%)	1	95.70	96.23
	2	96.70	
	3	96.70	
III (20%)	1	97.65	97
	2	96.45	
	3	96.90	
IV (Control -)	1	42.90	43.42
	2	43.17	
	3	44.20	
V (Control +)	1	97.60	97.73
	2	97.90	
	3	97.71	

The syrup preparation of melon peel extract was tested for stability by accelerating it using a climatic chamber (Climacell Sartorius®) (Ermawati, E. et al, 2022). Based on the results of observations on the formula with variations in the concentration of melon peel extract before and after accelerated storage, it showed that the syrup preparation did not change in terms of color, aroma, taste and shape (Islam, M, 2017). while the results of the statistical test showed that it was not significantly different from the positive control used. And based on organoleptic testing and statistical data obtained, it can be said that the syrup is stable in storage for organoleptic testing (Sukmayadi et al, 2014). In the homogeneity test, it can be seen that there are no coarse grains in the preparation, this indicates that the syrup shows a homogeneous composition. While the pH measurement can be obtained results that meet the physical quality because it is in accordance with the recommended pH, namely pH 4-7 (Sethi J et al, 2015).

And the viscosity test before and after storage showed that the viscosity of the preparation was in the range of 10 – 30 cps. This indicates that the preparation is stable after storage. The calculation of macrophage phagocytic activity was carried out to see an increase in the activity of active macrophage cells in destroying antigens that entered the body of mice after being given melon peel extract syrup (Wulandari R L. et al, 2018).

Macrophage phagocytic activity was calculated to determine the increase in active macrophage cell activity in destroying antigens that entered the body of mice after being given melon peel extract syrup (Arnita AL, 2017). The calculation results show that the FII, FIII and positive control formulas can act as immunostimulants with an average percentage of phagocytic activity, namely 96.23%, 97% and 97.73%, and the phagocytic activity was found in the administration of the extract with a high dose concentration. 0% then increased with increasing dose of the given extract concentration. An increase in macrophage phagocytosis along with an increase in the concentration of melon peel extract indicated that the active ingredients contained in the melon peel extract had

the potential to increase macrophage activity (Handayani N, 2018). The results of statistical tests using the Graphad Prism® application showed an alpha value of 0.05 which was not significant or showed the same results in positive controls for all formulas (Aderiye et al, 2020).

CONCLUSION

Based on the results of the tests carried out, it can be concluded that the syrup of melon peel extract (*Cucumis Melo L.*) can have an effect as an immunostimulant in Formula II (15%) and Formula III (20%) and can be stable in storage. It is hoped that this research can be continued or developed by conducting toxicity testing so that it can be developed into standardized herbal medicinal preparations.

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