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Standardization of Kepok Banana Peel Extract (*Musa paradisiaca* L.) With a Variety of Solvents

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Abstract. Kepok banana (*Musa paradisiaca* L.) is a fruit favored by most of the world's population. The number of kepok bananas that are very high in Indonesia results in a large amount of kepok banana waste. Kepok bananas (*Musa paradisiaca* L.) are known to contain phytochemicals, namely saponins, flavonoids, tannins, alkaloids, and steroids. Flavonoids, phenolics and polyphenols are antioxidants, antidiabetic, anticancer, antiseptic, and anti-inflammatory. Alkaloids also have antineoplastic properties. This study aims to determine the specific and non-specific parameters of kepok banana peel extract (*Musa paradisiaca* L.) with a variety of solvents. This research was started by making simplicia of kepok banana skin (*Musa paradisiaca* L.), then extracting using maceration method using 70% ethanol, ethyl acetate, chloroform solvent. The results of the study were analyzed using ANOVA or Analysis of varienc. The conclusion of this study is that banana peel extract with a variety of solvents differed from the standardization of extracts.

INTRODUCTION

Simplisia is the plural form of simplex that comes from simple words, which means one or simple. The term simplicia is used to refer to natural medicinal ingredients which are still in their original form or have not undergone a change in shape. According to the Ministry of Health of the Republic of Indonesia (1983) simplicia is a natural ingredient that is used for medicine and has not undergone any process changes, and unless stated otherwise generally in the form of dried ingredients (Utami, Widiawati, and Hidayah, 2013).

One way to control the quality of simplicia is to standardize simplicia. Standardization in pharmacy is nothing but a series of parameters, procedures and methods of measurement whose results are elements related to the pharmaceutical quality paradigm, quality in terms of meeting standard requirements (chemical, biological and pharmaceutical), including guaranteeing stability limits as general pharmaceutical products. Extruder quality requirements consist of various general standard parameters and specific standard parameters. The definition of standardization also means the process of guaranteeing that the final product of the drug (drug, extract or extract product) has a certain constant value and is determined in advance (Irsyad, 2013).

Kepok banana (Musa paradisiaca L) is a fruit favored by most of the world's population. The high amount of banana availability in Indonesia. The fast ripening time of bananas can cause a lot of bananas not to be utilized optimally, especially kepok bananas. The advantage of kepok banana is its low price and fast maturation time. Kepok bananas have a dietary fiber content of 0.50g / 100g and a sharp smell banana (Valentine, Sutedja, and Marsono, 2015).

One of the agricultural wastes that has not been used maximally is the banana peel. According to the Agriculture Information Data and System Center of the Ministry of Agriculture (2016) the volume of banana production in Indonesia from 2012 to 2015 was 6,189,046 tons, 6,279,279 tons, 6,862,559 and 7,299,266 tons respectively, while to date Pisang skin waste has not been used properly. So that in this case the banana skin has the potential to be used again as a product with high economic value. There are many benefits of this kepok banana skin, one of which is anticancer, this is due to the ability of banana peel extract which is toxic to cancer cells caused by the content of its compounds, such as flavonoids, tannins, terpenoids, saponins, and alkaloids (Wardati, 2017).

Compounds that have the potential as antioxidants are generally flavonoids, phenolics and alkaloids. Flavonoids, phenolics and polyphenolates are antioxidants, antidiabetic, anticancer, antiseptic, and anti-inflammatory, while alkaloids have antineoplastic properties which are also able to inhibit the growth of cancer

cells. The types of flavonoids in banana plants are cyanidin, delpinidine, petunidine, malvidin-3-ramnisol-1,6-glucoside. Flavonoids themselves can be obtained through extraction (Atun *et al*., 2007).

According to Vogel (1984) that extraction using solvents is the process of separating solute components based on the nature of their distribution in several solvents that do not dissolve with each other. By utilizing the solubility difference, the desired compound can be selectively separated. Several factors that influence the extraction process are differences in method, solvent, temperature, and extraction time which will affect the amount of yield and the quality of extract obtained. Using methods, solvents and suitable times will produce maximum yield and quality extract. One of the factors that influence the success of extraction is the selection of solvents. The choice of the most suitable solvent for extracting oil or fat is based on its level of polarity. One example of a polar solvent is ethanol and ethyl acetate and an example of a non-polar solvent is chloroform (Sahriawati, 2016).

EXPERIMENTAL DETAILS

Tools and materials

The tools used in this study are vacuum rotary evaporator, porcelain saucer, test tube, chamber, KLT254p plate, capillary pipe, waterbath, oven, filter paper, clogged flask, porcelain crucible, desiccator, analytical scales, pipettes, incubators

the chemicals used in this study were ethanol 70%, ethanol 96%, ethyl acetate, chloroform, dragendroff, magnesium powder 2N, HCl, 10% 2N, concentrated HCl, FeCl3, methanol, citro borax, ammonia, n-hexane, n-butanol, aquadest, natrium agar. This research covers specific and non-specific parameter aspects.

Specific parameters include:

1. Organoleptic
2. Dissolved compounds
3. Test the extract compound content

Non-specific parameters include:

1. Shrinkage drying
2. Water content
3. Weight type

Research procedure

Plant Determination

Determination of kepok banana peel (Musa paradisiaca L.) was carried out at Materia Medica Batu, East Java

Simplicia Setup

Preparation of banana skin simplicia (Musa paradisiaca L.) is done by drying the skin of the 3-month-old kepok banana by drying it in the sun to dry. The dried skin of kepok banana is blended to become a coarse powder (Lumowa and Bardin, 2017).

Extract Making

1. Ethanol

The extraction process begins by mixing ethanol solvents on a crude powder of kepok banana peel with a ratio of 1: 7,5 (for example 1 gram of powder with 7,5 ml ethanol). After mixing with ethanol solvent, then stirring with stirrer until homogeneous. Immerse the solution for 72 hours and filter it to get the desired extract. The extract obtained was then concentrated using a rotary evaporator (Lumowa and Bardin, 2017).

2. Ethyl Acetate

The extraction process begins by mixing ethyl acetate solvents on a crude powder of kepok banana peel with a ratio of 1: 7,5 (for example 1 gram of powder with 7,5 ml of ethyl acetate). After mixing with ethyl acetate solvent, then stirring with stirrer until homogeneous. Immerse the solution for 72 hours and filter it to get the desired extract. The extract obtained was then concentrated using a rotary evaporator (Lumowa and Bardin, 2017).

3. Chloroform

The extraction process begins by mixing chloroform solvents on the crude powder of kepok banana peel with a ratio of 1: 2 (for example 1 gram of powder with 2ml of chloroform). After mixing with chloroform solvent, then stirring with stirrer until homogeneous. Immerse the solution for 72 hours and filter it to get the desired extract. The extract obtained was then concentrated using a rotary evaporator (Lumowa and Bardin, 2017).

Determination of Standardization Parameters

Specific Parameters

1. Determination of organoleptic extract
   The organoleptic determination of extracts includes shape, color, odor, and taste (Arifin et al., 2006).
2. Test the extract compound content
   a. Levels of compounds that are soluble in water

Total 5g of extract was sought for 24 hours with 100 ml of water-chloroform LP, using a clogged pumpkin while being shaken repeatedly for the first 6 hours and then left for 18 hours, strain. Evaporated 20 ml of the filtrate to dry in a vaporizer dish, the residue is heated at a temperature of 105°C to a fixed weight. Calculated levels in percent of compounds which are water-soluble against the weight of the initial extract. Identify the chemical content of extracts (Arifin et al., 2006).

   b. Levels of compounds that are soluble in ethanol

Total of 5 g of extract was macerated for 24 hours with 100 ml of 96% ethanol using a clogged flask while being shaken repeatedly for the first 6 hours and then left for 18 hours. Filtered quickly by avoiding the evaporation of ethanol, then evaporating 20 ml of the filtrate to dry in the vaporized cup that has been heated, the residue is heated at a temperature of 1050C to a fixed weight. Calculated levels in percent of compounds soluble in ethanol against the weight of the initial extract (Arifin et al., 2006).

3. Test the content of extract compounds
   a. Alkaloid test

Prepared kepok banana peel extract and taken a few drops then put into the test tube. In this sample 2 drops of Dragendroff reagent were added. Changes that occur for 30 minutes, the test results are positive if orange is formed (Lumowa and Bardin, 2017).

   b. Flavonoid Test

Extract of kepok banana peel was put into the test tube. Added to the sample were 2 mg Magnesium 2 N powder and 3 drops of concentrated HCl were given. The sample is shaken and observed changes occur, the formation of red, orange or yellow in the solution indicates the presence of flavonoids (Lumowa and Bardin, 2017).

   c. Saponin Test

Prepared kepok banana peel extract was put into the test tube. Hot water is added to the sample. Changes that occur in the formation of foam are observed, a positive reaction if the foam is stable for 30 minutes and does not disappear by adding 1 drop of HCl 2 N (Lumowa and Bardin, 2017).

   d. Tanin Test

Prepared kepok 1 mL banana peel extract. Added a few drops of 1% iron (III) Chloride solution. Changes that occur occur, the formation of dark blue or greenish black indicates the presence of tannin compounds (Lumowa and Bardin, 2017).

Non Specific Parameters

1. Determination of drying losses

Leaf extract or stem bark in 1 gram to 2 grams is put in a weighing bottle (previously heated at 105 ° C for 30 minutes). The extract before weighing is flattened in a weighing bottle, with layers 5 mm to 10 mm thick. It is dried at 105 ° C to a fixed weight (Hidayati, Sumiarsih, and Mahmudah, 2018).

2. Determination of moisture content

Leaf extract and stem bark are weighed 1-2 grams using a closed weighing bottle that has known weight. Dry it in an oven with a temperature of 105 ° C for 5 hours, then cool it using an indicator. Considering again until a fixed weight is obtained (Hidayati, Sumiarsih, and Mahmudah, 2018).

3. Specific Weight Determination

The weight of the extract type was determined against the results of extract dilution (5% and 10%) in certain solvents (ethanol) with the picnometer (Arifin et al., 2006).

RESULTS AND DISCUSSION

The Results of Standardization Parameter Parameters

Spesific Parameters

a. Parameter Organoleptic Identity

TABLE 1. Botani of *M. paradisiaca*

Parameters	Result
Identity of Extract :	
Name of extract	Kepok banana peel extract
Latin name	*Musa paradisiaca* L.
Parts of the fruit	skin plant
Organoleptic Extract :	
Form	thick extract
Color	brown color
Taste	Bitter
Smell	distinctive smell

b. Parameters Of Extract Compound Content

TABLE 2. Total contained compound

No.	Parameter	Ethanol 70%	Ethil acetate	Chloroform
1	levels of water-soluble compounds	7,54%	7,42%	7,02%
2	levels of soluble ethanol compounds	15,88%	16,21%	13,92%

c. Parameter identification of chemical extract groups

Table 3. Secondary metabolite test

Womb		Result		
		Ethanol 70 %	Ethil acetate	Chloroform
Alkaloid :	Meyer	+	+	-
	Dragendroff	+	+	-
Flavonoid		+	+	-
Saponin		-	-	-
Tanin		+	+	-

Non Specific Parameters

non-specific parameters of kepok banana peel extract:

TABLE 4.

No.	Parameter	Ethanol	Ethil acetate	Chloroform	Term
1.	Shrinkage drying	20,6%	30,12%	26,83%	-
2.	Water content	10,22%	19, 22%	11,9%	5-30%
3.	Spesific gravity	1g/ml	1g/ml	1g/ml	-

CONCLUSION

From a series of parameter tests carried out both specific and non-specific results can be obtained that the standardization of kepok banana peel extract with variations of solvents using ethanol 70% solvent, ethyl acetate, and chloroform can be summarized as follows:

1. Organoleptic extract is a thick extract which is blackish brown, has a distinctive smell and tastes bitter.
2. solubility in water with ethanol solvent = 7.54%, ethyl acetate = 7.42%, and chloroform = 7.02%, and solubility in ethanol with ethanol = 15.88%, ethyl acetate = 16.21%, and chloroform 13.92%.
3. the chemical content contained in the extract with ethanol = alkaloids, flavonoids and tannins, ethyl acetate = alkaloids, flavonoids, and tannins, chloroform solvents = -
4. The water content obtained from ethanol solvent is 10.22%, ethyl acetate solvent is 19.22%, chloroform solvent is 11.9%.

5. The density of the three solvents can be said to be the same.
6. Drying losses obtained from ethanol solvents by 20.6%, ethyl acetate solvents by 30.12%, chloroform solvents by 26.83%.

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