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Non Specific and Specific Parameter Standardization Of Banana Peel (*Musa paradisciata Sapientum*) and *Andrographis Paniculata*

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Abstract

Purpose: The aim of this study is to standardize the methanol extract of banana peel (*Musa paradisciata sapientum*) and ethanolic extract of *Andrographis Paniculata* and Phytochemical screening of banana peel extract and *Andrographis Paniculata*

Methodology: Standardization of the extract conducting with two parameters, they are specific and non-specific parameters.

Results: Content of water solvent of banana peel as many as 47.8% and as many as 35.79% in *Andrographis Paniculata*. Phytochemical screening result reveals that banana peel extract contains saponin, polyphenol, tannin, flavonoid, and terpenoid. *Andrographis Paniculata* extract contains alkaloid, steroid, terpenoid, flavonoid and saponin. Non-specific parameter can be observed based on water content, total ash content, non-soluble acid ash content and drying losses. Water content of methanol extract of banana peel as many as 8.47% and *Andrographis Paniculata* leaves as many as 7.91%. The result of total ash content of banana peel as many as 17.99% and *Andrographis Paniculata* leaves as many as 17.23%. Ash content of insoluble acid of banana peel as many as 3.15% and *Andrographis Paniculata* leaves as many as 5.10%. The result of drying loss determination of the extract of plantain peel is 9.37% and sambiloto leaves is8.82%.

Applications/Originality/Value: Based on specific and non-specific standardization parameter assay which consist of methanol extract of banana peel and *Andrographis Paniculata* leaves meet the standardization of quality.

Keywords : Banana peel, *Andrographis Paniculata* leaves, standardization, flavonoid

INTRODUCTION

The quality of herbal medicinal products is determined by testing the quality of the raw materials or extracts used. A simplicia is said to be qualified if it meets the quality requirements stated in the simplicia monograph. The quality requirements stated in the simplicia monograph include drying losses, total ash content, acid insoluble ash content, water soluble extract content, ethanol soluble extract content, and chemical simplicia content. This quality requirement applies to the simplicia used for the purpose of treatment and health maintenance (Depkes,2008).

Extracts used as pharmaceutical ingredients and products sourced from simplicia must meet the requirements to become standardized herbal medicines or phytopharmaca drugs. One of the chemical quality parameters of the extract is the content of the active compound. In addition, non-specific parameters and specific parameters are also needed to determine the quality of the extract.

Banana plant (*Musa*, sp.), is a plant that is widely available in Indonesia, but there is no complete reference about phytochemical information or pharmacological aspects so that it can be utilized optimally. During this time the use of bananas is still limited to the fruit, while the skin is discarded into organic waste or animal feed (20-30%), as well as manure and compost (60-70%)

(Husni,2009).

Banana peel extract (*Musa paradisiaca Sapientum*) has antioxidant activity (Pane, 2013). In some decades banana peels have been extensively studied and effective as antimicrobials, as hepatoprotectors, can fight cancer and heart disease, have anti-ulcer activity (Adil *et al*., 2013; Wang *et al*., 2016; Someya *et al*., 2002; Onasanwo *et al*.,2013).

Andrographis paniculata is a plant that has many properties including anti-inflammatory, anti-carcinogenic, anti-bacterial, anti-fertility, anti-malaria, anti-HIV, anti-diarrhea, anti-diabetes, and has hepatoprotective and cardiovascular activities (Jarukamjorn and Nemoto, 2008). *Andrographis paniculata* also has antioxidant activity (Wasman, 2011). Pharmacologically has properties including anti-inflammatory, analgesic, anti-inflammatory, antibacterial, antimalarial, hepatoprotective, antidote, stimulate the immune system, inhibit tumor cells, and for treatment include treatments for hepatitis, pneumonia, pulmonary tuberculosis, diarrhea, gonorrhea, pus, and abdominal typhus (Jarukamjorn and Nemoto, 2008; Mustarichie, 2011; Mahruzar, 2009).

This study aims to compare some specific and non-specific extract parameter values on banana peel extract and *Andrographis paniculata* leaf. The testing of specific and non-specific parameters refers to the requirements by BPOM RI so that it is limited to the value of existing parameters, such as the identity of the extract, organoleptic test, phytochemical screening, determination of water content, ash content, insoluble ash content, acid soluble ethanol content, and water soluble extracts, and drying losses. This study also aims to examine the antioxidant activity of purified plantain peelextract.

The results of this study are expected to provide information about the quality parameters of banana peel extract and the ethanol extract of the *Andrographis paniculata* leaf.

RESEARCH METHODS

Time and location of theresearch

The study was conducted at Pharmacognosy–Phytochemistry Laboratory of Pharmacy study of STIKES Mandala Waluya Kendari and Chemistry Laboratory of Pharmacy Faculty of Halu Oleo University in July–August 2019.

Tools andmaterials

The tools used are a stirring rod, glass beaker, separating funnel, Erlenmeyer, measuring cup, filter paper, spatula, dropper, aluminum foil, oven, analytical scale, 20D spectrometer, rotary evaporator R-144 Buchi with the Buchi B-169 vacuum system , burner funnel, vials, micropipette, filtration equipment (vacuum system), blender, drip plate.

The ingredients used are plantain peel, methanol, aquades, ethanol, ferrochloride in 30% hydrochloric acid, DPPH, Lieberman-Burchard reagents, Mayer, Dragendorff, Wagner, Mg, HCl, 10%NaOH.

Samples of banana peel were purchased at banana farmers in Poleang, Bombana Regency, Southeast Sulawesi. Banana peel is taken as much as 1 kilogram and washed from dirt.

Andrographis paniculata leaves are obtained from the of Yogyakarta. *Andrographis paniculata* leaves are taken 1 kilogram and washed fromdirt.

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Researchprocedure

Extraction of banana peel and *Andrographis paniculata*

As much as 1 kilogram of each other banana peel and *Andrographis paniculata* mashed with a blender to form powder. Banana peel powder and *Andrographis paniculata* is put in a container each other and macerated with methanol (3x600 mL) solvent for banana peel and macerated with 70% ethanol (3x600 mL) for *Andrographis paniculata* for 4 days, stirred and remaserated until clear. It is extracted into a new container until a liquid extract is obtained and the extraction result is evaporated using a rotary evaporator under boiling point until a thick extract is obtained (BPOM RI,2000).

Specific parameter determination

a. Extract identityparameter

The extract identity parameter is performed to provide an objective identity of the plant name. The nomenclature description includes the name of the extract, the Latin name of the plant, the part of the plant used and the name of the Indonesian plant (Depkes, 2000).

b. Organolepticassay

Organoleptic assay is an initial, simple and objective introduction. Organoleptic test is conducted by observing the shape, color, smell, and taste (Depkes, 2000).

c. Water Soluble CompoundAssay

A total of 5 grams of extract was macerated for 24 hours with 100 ml of water-chloroform using a clogged erlenmeyer while being shaken for the first 6 hours and then left for 18 hours, then filtered. Steam 20 ml of filtrate to dry in a shallow cup based on a flat that has been tarred. The residue is heated at 105°C until the weight remains. Calculate the level in percent of water-soluble compounds against the weight of the initial extract (Depkes, 2000).

d. Ethanol Soluble CompoundAssay

A total of 5 grams of extract was macerated for 24 hours with 100 ml of ethanol (95%) using a clogged erlenmeyer while being shaken repeatedly for the first 6 hours and then left for 18 hours. Filtered quickly by avoiding evaporation of ethanol, then evaporating 20 ml of the filtrate to dry in a cup of evaporated cup, the residue is heated at 105°C until the weight remains. The levels in percent of compounds that are soluble in ethanol are calculated against the weight of the initial extract (Depkes, 2000).

Non Specific Parameter Assay

a. Drying lossesdetermination

The extract was carefully weighed as much as 1 g to 2 g and put into a shallow closed weighing bottle that had been previously heated at 105°C for 30 minutes and was tapped. Before weighing, the extract is flattened in a weighing bottle, shaking the bottle until it is a layer of less than 5 mm to 10 mm thick, then put into the drying chamber. Open the lid, dry it at 105°C until the bottle remains. Before each drying, let the bottle in the closed state cool in the applicator to room temperature. Then dry it again at the fixing temperature until the weight remains (Depkes, 2000).

b. Water content
Gravimetricmethod

Put approximately 1 gram of the extract and weigh carefully in a container that has been tarred. Dry at 105°C for 5 hours and weigh. Continue drying and weighing at a distance of 1 hour

until the difference between 2 consecutive weighings is no more than 0.25% (Depkes, 2000).

c. Ashcontent

1) Total ash contentassay

Approximately 2 grams to 3 grams of extract which has been crushed and weighed carefully, put into a silicate crucible that has been flattened and tamed, flattened. Fire slowly until it runs out, cool it, weigh it. If this method cannot be removed, add hot water. Filter through ash-free filter paper. Spread the remaining paper and filter paper in the same crucible. Put the filtrate into the crucible. Steam, flare up to a fixed weight. Weigh, calculate the ash content of the material that has been dried in the air (Depkes, 2000).

2) Determination of acid insoluble ashcontent

Ash obtained from determination of ash content, boil with 25 ml of dilute sulfuric acid P for 5 minutes, the insoluble part of the acid is collected, filtered through ash-free filter paper, washed with hot water, incandescent to a fixed weight, weigh it. Calculate the levels of ash that is insoluble in acid to substances that have been dried in the air (Depkes,2000).

Identification of Phytochemistry Content (Farnsworth, 1996)

Four phytochemical tests were carried out, namely alkaloid, flavonoid, steroid and triterpen, and saponin tests.

1. AlkaloidTest

The extract is spotted on a plate, then sprayed with Dragendorf reagents, if the rising stain gives a change in color to orange or red then it positively contains an alkaloid.

2. FlavonoidTest

The extract was added Magnesium (Mg) powder, then added concentrated hydrochloric acid. If it is formed orange, red or yellow, it means that it positively contains flavonoids.

3. Test for terpenoids andsteroids

The extract is put in a small test tube, then shaken with a little ether, the ether layer is taken and then dropped on a drip plate, allowed to dry. Then 2 drops of anhydrous acetic acid and one drop of concentrated sulfuric acid are added. If it is formed green then it is positive to contain steroid compounds and if it is formed orange, red, or yellow, it is positive to containterpenoids.

4. SaponinTest

The extract is put into a small test tube, then shaken with a little ether, a layer of water in the fraction is taken, then shaken vertically. If a stable foam is formed for 10 minutes, it contains positive saponin compounds.

RESULT AND DISCUSSION

Standardization is the process of ensuring that the end product of a drug (drug, extract or extract product) has a certain parameter value which is constant and predetermined. There are two factors that affect the quality of the extract, namely biological factors from ingredients of medicinal plants and factors of chemical content of these medicaments (Depkes, 2000).

Standardization is the process of determining properties based on certain parameters to achieve the same degree of quality. In this study, extracts were standardized with two parameters, they are specific parameters and non-specific parameters (Handa *et al.*, 2008).

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The identity of the extract is very important as an initial introduction and part of the plant used in preliminary testing. Plant identification is carried out by means of determination conducted in the Biology laboratory, Faculty of Mathematics and Natural Sciences, Haluoleo University. In this study, according to the results of plant identification using banana peel *Musa paradisiaca Sapientum* family of *Musacea* and *Andrographis paniculata* leaf family of *acanthaceae*, while the plant parts used for bananas are ripe banana peels and for *Andrographis paniculata* ones are leaves.

Organoleptic test on the banana peel and *Andrographis paniculata* leaf is shown in table 1 where the extract of banana peel is dark brown with a concentrated-tasteless taste because it contains tannin and *Andrographis paniculata* green leaf extract with a bitter taste because this plant is rich in *andrographolide* compounds which give bitter taste in tongue.

The method used in the extraction process is the maceration method is a method of extraction with immersion and simple. The results of the chemical content test showed that the extract of the plantain peel contained saponins, polyphenols and tannins, flavonoids, and terpenoids while the *Andrographis paniculata* leaf contains terpenoids, saponins andflavonoids.

The solvent used in the extraction process of the banana peel is methanol because the banana peel contains a lot of water, so a semi-polar to polar solvent is needed. Banana peel extract contains a lot of flavonoids compared to Plantain peel ethanol extract (Pane, 2013). Methanol extract of banana peel is expected to be more specific to attract polar compounds such as tannins, saponins and flavonoids. While the *Andrographis paniculata* leaf uses ethanol as a solvent because it aims to attract polar-semi-polar compounds such as flavonoids, sapponins and terpenoids compounds.

The water soluble extract content in banana peel extract was 48.78% and the *Andrographis paniculata* leaf was 40.15%, while the ethanol soluble extract content of the plantain peel was 47.8% and the sambiloto leaf was 35.79% shown in Table 1 and 2. The results of testing the water soluble extract content meet the quality requirements because it has a content which is greater than 6% (> 6%).

The water content in the extract must be determined in order to give a minimum limit of the amount of water content in the material (extract) where the higher the water content, the easier it is to grow fungi and mold so that it can reduce the biological activity of the extract during the storage period. The extract water content depends on the drying time of the simplicia where the drier the simplicia the smaller the water content. The principle of extract extraction is by evaporating water in the sample by drying in the sun or by heating at 105 ° C for 5 hours (Mutiatikum, 2015).

Based on the Indonesian Herbal Pharmacopeia , the required water content is less than 10%. In this study, the water content of banana peels and *Andrographis paniculata* leaves by 8.47% and 7.91%, respectively, are shown in tables 3 and 4, thus they meet the standard qualityrequirements.

Total ash content is also used as a basis to determine the internal and external mineral content of the extract from the initial process to the end of extracting. The results of total ash content of banana peels of 17.99% are shown in table 3 and *Andrographis paniculata* leaf amount of 17.23% shown in table 4. Acid insoluble ash content of banana peels of 3.15% is shown in table 3 and *Andrographis paniculata* leaf of 5.1% is shown in table 4.

Determination of drying shrinkage in the extract is one of the requirements that must be met in the standardization of effective drugs with the aim of providing a maximum limit (range) of the amount of compound lost in the drying process. Dry shrinkage test is conducted by measuring the remaining substances after drying at 105°C for 30 minutes where the water will evaporate at that temperature and compounds that have a lower boiling point than water will also evaporate (Depkes RI, 2000). The results of the determination of drying shrinkage in Banana peel extract at 9.37% are

shown in table 3 and the *Andrographis paniculata* leaf at 8.82%. For drying shrinkage parameters no value range is required.

Table 1. The result of specific parameter standardization of Banana Peel

No	Assay	Result
1	Identity of extract	Name: *Musa paradisiaca Sapientum* Part of the plant: peel
2	Organoleptic	thick, concentrated, dark brown
3	Water soluble compound content	48.78%
4	Ethanol soluble compound content	47.8%
5	Chemical content	Saponin, polifenol and tanin, flavonoid, dan terpenoid

Table 2. The result of specific parameter standardization of *Andrographis paniculata*

No	Assay	Result
1	Identity of extract	Name: *Andrographis Paniculata* Part of the plant : leaves
2	Organoleptic	Thick, dark green, bitter
3	Water soluble compound content	40.15%
4	Ethanol soluble compound content	35.79%
5	Chemical content	Flavonoid, Saponin and terpenoid

Table 3. The result of non-specific parameter standardization of Banana Peel

No	Assay	Result
1	Water content	8.47%
2	Total ash content	17.99%
3	Insoluble acid ash content	3.15%
4	Drying Loss	9.37%

Table 4. The result of non-specific parameter standardization of *Andrographis paniculata*

No	Assay	Result
1	Water content	7.91%
2	Total ash content	17.23%
3	Insoluble acid ash content	5.1%
4	Drying Loss	8.82%

CONCLUSION

Extract of banana peel and *Andrographis paniculata* based on standardization assay with specific and non-specific parameter comply quality standard of raw material required by BPOM RI.

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