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Tests of Ash Content, Moisture Content and Dry Shrinkage of Ethanol Extracts of Capidada Leaves (*Sonneratia alba*) and Ketapang (*Terminilia cattapa*)

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Abstract

Indonesian original medicine requires new development, one of the important stages is by testing which can be used as a parameter to determine standards for certain extracts. Capidada leaves (Sonneratia alba J. Smith) and ketapang leaves (Terminalia cattapa L.) are a type of mangrove that have various activities such as anti-bacterial, anti-inflammatory, antioxidant, as well as the benefits of capidada leaves and ketapang leaves. Therefore, it is necessary to standardize extracts to ensure quality that matches the quality. This research tries to test the water content, ash content, and drying shrinkage levels, which later can be used as a reference for the determination of extract quality standards. The extract was obtained through maceration using 96% ethanol. Test results obtained on capidada leaves are water content (10,38 ±0,52%v/b), total ash content (17,97±1,75%), drying shrinkage levels (10,35±0,35%), and the test results obtained for the ketapang leaves are water content (7,08±0,38%), total ash content (10,51±0,43%) and drying shrinkage levels (13,67±1,58%). To find out all aspects that are not directly related to pharmacological activities but affect the aspects of quality, safety, the stability of extracts and preparations produced, this research studied the ash content, water content, and drying shrinkage levels on ethanol extracts of mangrove capidada leaves (Sonneratia alba) J. Smith.) And ketapang (Terminalia cattapa L.)

Keywords: capidada leaves, ketapang leaves, water content, ash content, drying losses

INTRODUCTION

Mangroves are a potential source in coastal areas to provide bioactive metabolites (Thuoc, 2018). Secondary metabolites that are commonly found within them are alkaloids, phenolics, steroids, and terpenoids compounds, each of which has important pharmacological effects (Bandaranayake, 2002). Mangrove chemical compounds have many uses such as those used in anti-septic treatment, asthma, diabetes mellitus, diarrhea, hepatitis, leprosy, neuralgia, skin disease, paralysis, eye diseases, and other infectious diseases (Suryanti et al., 2007) ...

Terminalia catappa L or ketapang is an associated mangrove, which is a type of plant that can adapt to coastal ecosystems but is unable to remove salt from the body (Kitamura et al, 2003). The leaves of T. catappa have been widely used in Indonesia as traditional medicine (Moses, 2013).

According to the Decree of the Minister of Health of the Republic of Indonesia No: 55 / Menkes / SK / 1/2000, traditional medicines circulating in Indonesia must meet the quality, safety, and health benefit requirements. Previous research and development had been carried out by utilizing technological advancements as efforts to improve product quality and safety. The effort to guarantee the quality and safety requirements is by conducting standardization. Community trust in the benefits of medicines derived from mangroves is expected to increase with standardization. In addition to increasing public confidence, the economic value will also increase far greater than those who have not yet experienced the standardization process.

To find out all aspects that are not directly related to pharmacological activities but affect the aspects of quality, safety, the stability of extracts and preparations produced, this study evaluates tests on ash content, moisture content, and drying shrinkage on ethanol extracts of mangrove capidada leaves (Sonneratia alba) and ketapang leaves (Terminalia cattapa L.)

METHODS

1. Tools

The tools used are glassware, blender, desiccator, silicate crucible, distillation flask, moisture balance, analytical balance, oven, pycnometer, and rotary evaporator.

2. Material

The materials used were diluted with hydrochloric acid, aqua dest, mangrove and kapapada leaves, ethanol 96%, and filter paper.

3. Sample preparation

Mangrove leaves were dried and then crushed using a blender (Putri, 2016). The next step was to macerate with 96% ethanol solvent for 3 days with periodic stirring once a day. After that, the sample was filtered and evaporated with a rotary evaporator until the solvent had dissolved and a dry extract was obtained (Krisyanella et al., 2013).

4. Determination of testing

a. Determination of total ash content

The sample was carefully weighed 2 to 3 g and put into an incandescent silicate crucible and tamed, lighted slowly until the charcoal was used up, then cooled and weighed. If during the process the charcoal could not be removed, hot water was added, stirred, and filtered through ash-free filter paper. The filter paper was flattened along with the rest of the filtering in the same crucible then the filtrate was put into the crucible, evaporated, and flattened to a fixed weight. Total ash content was calculated against the weight of the test material, expressed in % w/w.

b. Determination of water content

Approximately 3 grams of the extract was put into the balance system with the working procedure turned on the moisture balance system by pressing the ON / OFF button, placed aluminum-plate into the Moisture Balance meter then pressed

the tarra button to position the aluminum-plate weight at a reading of 0.00 gram, weighed the sample into the aluminum plate, pressed the start button for the drying process of the water content and the sample, allowed the heating process to take place until the tool automatically turns off and the sound of a tit once after the water content in the sample is exhausted and the display shows the test over. The number shown on the display shows the sample water content in units of a percent (%).

c. Determination of drying shrinkage

The extract was carefully weighed 1 to 2 grams of Simplicia in a shallow, weighed bottle that had been previously heated at 105ºC for 30 minutes and tamed. The ingredients were then flattened in the weighing bottle by shaking the bottle, to a layer thickness of approximately 5 to 10 mm, and then put in a 105ºC temperature drying chamber for 30 minutes. Before drying, the bottles are left closed to cool in an excavator to room temperature.

5. Data analysis

Non-specific data parameters are drying losses, moisture content, and total ash content which are read in percentage values.

RESULT AND DISCUSSION

1. Extraction

Capidada leaf samples used were obtained from the Cilacap area and ketapang leaves from the Tegal area. In this study, the leaves were dried using heat from the sun and then mashed using a blender until it became a fine powder. Macerated extracts were filtered into the Buchner funnel and the extracts were then collected and evaporated to separate the solvent. Evaporation was carried out using a Rotary evaporator at 60 ° C until the solvent had evaporated so that the thick extract of capidada and ketapang leaves was obtained (Krisyanella et al., 2013). After evaporating using a rotary evaporator, the existing water content was removed to produce a thick extract by using a water bath until a dry extract is obtained, which took approximately 1-2 days, then the extract was ready to be used for ash, moisture content, and drying shrinkage tests. The resulting calculation of the amendment (%) for ethanol extract of capidada leaves and ketapang leaves can be seen in table 1.

Table 1. The yield data of capidada and ketapang leaf extracts

Solvent	Mass (gram)		Rendemen (%)
	Simplisia	Extract	
Ethanol 96% Capidada leaf (A)	472,00	41,09	8,71
Ethanol 96% Ketapang leaf (B)	425,00	35,47	8,35

2. Determination of Testing

The determination of non-specific parameters in this study was conducted to test the total ash content, water content, and levels of drying shrinkage in ethanol extracts of capidada and ketapang leaves. The test results are presented in Table 2.

Table 2. Data from the test results of total ash content, water content, and shrinkage drying of capidada and ketapang leaf extracts

Parameter	Capidada leaf extract	Ketapang leaf extract	Standard (DepKes RI, 2008)
Total ash content (%)	17,97 ± 1,75	10,51 ± 0,43	≤16,60
Water content (%v/b)	10,38 ± 0,52	7,08 ± 0,38	≤10,00
Drying shrinkage (%)	10,35 ± 0,35	13,67 ± 1,58	<11,00

Based on the results shown in table 2, the total ash content obtained in ethanol extracts of Kapidada leaves was 17.97 ± 1.75%, and for the ketapang leaves the total ash content of 10.51 ± 0.43% was obtained. Ash content test is an inorganic or mineral content in the extract, this test shows the feasibility of a sample for processing into a pharmaceutical preparation. The extract is heated at 600 ◦ C for 3 hours until only inorganic mineral elements remain. The greater the total ash content in the extract shows that the extract obtained contains minerals.

Determination of water content aims to determine the stability of extracts and dosage forms (Saifudin, et al., 2011), in addition, it is also used to determine the residual water after the thickening to the drying process of the extracted sample. The importance of determining water content is to avoid the rapid growth of fungi in extracts (Soetarno and Soediro, 1997). The ethanol extract of Kapidada leaves obtained a water content of 10.38 ± 0.52% w / v and for ketapang leaves the water content obtained was 7.08 ± 0.38% w / v.

The final test was the drying shrinkage content, the purpose of determining the drying shrinkage content is to provide a maximum limit or range of the amount of compound lost in the drying process. and is lost or volatile in the drying process. Drying shrinkage obtained for capidada leaves was 10.35 ± 0.35% and ketapang leaves were 13.67 ± 1.58%. The weight of the shrinkage or drying shrinkage factor becomes the parameter of an extract to maintain quality in order to avoid mold growth.

CONCLUSION

The ethanol extract of capidada leaves fulfills non-specific parameters in the drying shrinkage test standard. While the ethanol extract of ketapang leaves meets the parameters of total ash content and water content.

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REFERENCES

Bandaranayake, W. M., (2002). Bioactivities, Bioactive Compounds and Chemical Constituents of Mangrove Plants. *Wetlands Ecology and Management* 10, 421-452

DepKes RI. (2000). Parameter Standar Umum Ekstrak Tumbuhan Obat, Dirjen Pengawasan Obat dan Makanan Vol.I. Jakarta: Depkes RI.

Kitamura, S., C. Anwar, A. Chaniago, and S. Baba. (1997). Handbook of Mangroves in Indonesia; Bali & Lombok. Denpasar: The Development of Sustainable Mangrove Management Projec. Ministry of Forest Indonesia and Japan International Cooperation Agency.

Safitri, R. (2008). Penetapan Beberapa Parameter Spesifik dan Non Spesifik Ekstrak Etanol DaunAlpukat (Persea americana Mill.). Skripsi Universitas Indonesia.

Saifudin, A., V. Rahayu, dan H.Y. Teruna. (2011). Standarisasi Bahan Obat Alam (Eds.I). Yogyakarta: Graha Ilmu.

Soetarno, S., dan Soediro,I.S., (1997). Standarisasi Mutu Simplisia dan Ekstrak Bahan Obat Tradisional. Presidium Temu Ilmiah Nasional Bidang Farmasi.

Thuoc, D. Van et al. (2018). Evaluation of Antibacterial , Antioxidant and Antiobese Activities of the Fruit Juice of Crabapple Mangrove Sonneratia caseolaris (Linn .). In*ternational Journal of Agricultural Sciences and Natural Resources.* 5(2), 25–29.