The Composition of Water and Ash of Secang Wood’s Simplicia and Secang Wood Herbal Drink Powder

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Abstract. Empirically, secang wood (Caesalpinia sappan L.) has medicinal properties and is consumed as a health drink. Secang wood contains tannin, gallic acid, brazill, tannic acid, essential oils, polyphenols and sappanin. Switching people's tastes from consuming the basic form of sappan wood to a more attractive and practical form, which is an herbal drink that contains the properties. The secang drink is measured by water and ash content. Water content is related to the stability index while ash content about minerals is filled. The initial probability of the quality of the secang herbal drink can be compared with that of both aspects. The lower the water content in a product, the better the quality, the higher the stability which can be further improved during storage. While the higher the ash content, the higher the probability of mineral content. Based on the analysis of water content and ash content, it is known that the simplicia of the secang wood is 1.542% while the water content of the herbal drink powder is 0.266%. Meanwhile, based on the analysis of ash content, ash content of simplicia secang bark is 9.449% while the water content of herbal beverage powder is 0.009%.

1. Introduction
Indonesia is a mega diversity country for medicinal plants in the world. Indonesia's tropical forests have high biodiversity. Of the 40,000 species of flora in the world, as many as 30,000 species are found in Indonesia and 940 of them are known to be efficacious as drugs that have been used in traditional medicine for generations. The number of medicinal plants covers about 90% of the number of medicinal plants found in the Asian region [1, 2].

The use of traditional medicines in Indonesia is essentially part of the culture. The advantage of using herbs in principle is relatively small side effects compared to modern medicine. Although empirically herbal medicine can cure various diseases, but its efficacy and ability have not been proven scientifically or clinically. Also, it is not yet known what chemical compounds are responsible for the efficacy of these herbs [3].

One of the plants that is widely used in traditional medicine is secang (Caesalpinia sappan L.). The main content is brazill, which is red-sappan, tannic acid, and gallic acid. Brazilin from sappan wood is scientifically tested to be antioxidant, antibacterial, anti-inflammatory, anti-photoaging, hypoglycemic (reducing fat content), vasorelaxant (relaxing blood vessels), hepatoprotective (protecting the liver) and anti-acne (anti-acne) [4]. Secang wood extract is also suspected to have anti-tumor, antivirus, immunostimulant and other efficacy [5]. Traditionally, secang wood pieces are commonly used as a mixture of medicinal ingredients.
The factor that most influences a person's health condition is food and beverage intake. This is because food and drinks contain nutrients needed by the body in the form of bioactive compounds [6]. Secang wood in addition to having an attractive color when brewed, also has a distinctive and refreshing taste. Seeing the many benefits of secang, secang drinks were developed in the form of powder so that they could meet the demands of modern society. On the other hand, the demands of a person's need for a healthy life must still be met, therefore also developing food or health drinks, one of which is secang powder drink which is commonly called wedang secang. The main ingredient of wedang wedang secang besides spices is sugar and salt which serves to improve the organoleptic properties, especially taste.

Water in food is not only used to meet human needs, but water also plays a role in the food itself. The presence of water in food is often related to the quality of food, as a measure of dry or solid parts, determinants of stability indexes during storage, and determinants of organoleptic quality, especially taste.

In addition to organic matter and water, food ingredients contain inorganic compounds called minerals or ash. Although the amount is very small, the presence of minerals in food is needed by the human body. In the body minerals function as builders and regulators. Certain minerals are needed as a constituent of bones, teeth, and soft tissues, muscles, blood, and nerve cells, and other metabolisms. Because of the diversity of available mineral sources, ash and mineral analysis is very important to know the nutritional quality of food. Besides being able to know the nutritional quality, ash analysis is very often done as an indicator of food quality. From the ash analysis it can be seen the level of purity of the powder product. Based on the level of importance of knowing the water and ash content in a secang simplicia product and the herbal secang powder, it is necessary to analyze the water content/ash content and the ash content of the two products.

2. Materials and Methods
The moisture content of the material indicates the amount of water content of the weight of the material. In this case there are two methods for determining the moisture content of the material based on dry weight and a wet basis. The moisture content of agricultural products is usually determined based on wet weight. In this calculation the following formula applies: $KA = (W_a / W_b) \times 100\%$ [7]. Meanwhile, ash content is a mixture of inorganic or mineral components found in food. Food consists of 96% inorganic material and water, while the rest is mineral elements. The element is also known as organic matter or ash content. Ash content can indicate the total minerals in a food. Organic materials in the combustion process will burn but the inorganic components do not, because that is called ash content. Determination of total ash content can be used for various purposes, including determining whether or not processing, find out the type of material used, and as a determinant of the nutritional value parameters of a food ingredient.

The sample used was the simplicia wood secang and secang herbal drink powder produced by Griya Sehat SMEs, Trawas, Mojokerto. Both samples were analysed for water content and ash content.

2.1 Organoleptic Test
To find out the characteristics of Simplicia Secang and Secang Herbal Powder, identification was done by organoleptic observation including shape, color, and odor.

2.2 Water Content Analysis (AOAC 2000)
Homogeneous samples were weighed 2 grams and placed in an empty cup which had been weighed, the cup and lid were dried in the oven and cooled in a desiccator. The cup containing the sample is then covered and put in an oven at 100°C for 5 hours or until the weight is constant. The cup is then cooled in a desiccator and after the cold the cup is weighed. Moisture content can be calculated by the formula:

$$Water\ content\ (wet\ basis)\ (%) = \frac{W_1 - W_2}{W_1} \times 100\%$$

Information:
$W_1 = $ initial sample weight (g)
$W_2 = $ sample weight after drying (g)
2.3 Ash Content Analysis (AOAC 2000)
A sample of 2 grams was put into a grey cup which had been weighed and burned in a furnace and cooled in a desiccator. The cup containing the sample is put in a greying furnace and burned until a greyish ash is obtained. The heating temperature is gradually increased until the temperature reaches 650ºC and left for 1 hour. After the furnace temperature drops around 200ºC, the ash-filled dish is cooled in a desiccator for 30 minutes and then weighed. This treatment is repeated until it reaches a constant weight. Ash content can be calculated by the formula:

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\text{Water content (wet basis)}(\%) = \frac{\text{Ash weight (g)}}{\text{Sample weight (g)}} \times 100\%
\]

3. Result and Discussion
Simplisia and Secang herbal powder need to be characterized to get simplicia and herbal drink powder which are safe, have good quality, standardized, and tested for stability so that the resulting preparations are guaranteed quality.

| Table 1. Organoleptic test results |
|-----------------------------------|
| Parameter                        | Characteristics |
| Simplicia secang                 |                 |
| Form                             | Rough cuts      |
| Color                            | Dark red        |
| Scent                            | Fragrant sting  |
| Secang drink powder              |                 |
| Form                             | Powder granules |
| Color                            | Orange          |
| Scent                            | Fragrant sting  |

Water content is one of the physical properties of the material which shows the amount of water contained in the material. Water content is usually expressed as a percentage of water weight to wet material or in grams of water for every 100 grams of material called wet basis water content. The weight of dry or solid material is the weight of the material after having been heated for a certain amount of time so that the weight remains (constant). This is following Suharto (1991), who said that the water content is the percentage of water content of an ingredient that can be expressed on a wet basis or wet basis. Wet weight water content has a theoretical maximum limit of 100%, while water content based on dry weight can be more than 1%

Ash content is a mixture of inorganic or mineral components found in a portion of food. Food consists of 96% inorganic material and water, while the rest is mineral elements. Determination of total ash content can be used for various purposes, including determining whether the processing is good or not, knowing the type of material used, and determining the nutritional value parameters of a food ingredient. That the ash content is an inorganic substance leftover from the combustion of organic material. The ash content and composition depends on the type of material and how it is ignited.

Simplisia secang wood is a herbal food product (brewed drinks) with little. Fresh secang wood is thinly sliced 0.5 cm thick, then dried in the sun for about 5 days until dry and has a constant weight. Simplisia secang wood produced can be directly consumed by brewing with warm water. While the secang herbal powder is made by smoothing the sappan wood then squeezing the juice of the starch and cooking the juice of the starch to form crystals. Furthermore, the crystals that are formed are crushed and the resulting secang herbal powder can be consumed by brewing using warm water.

Both herbal beverage products produced must have good food product criteria. One of them is from the parameters of water content and ash content. The lower the water content of a solid food product, the better the quality. While the greater ash content indicates the number of minerals in the food product.
Table 1 outlines the quality requirements for powdered drinks based on SNI 01-4320-1996. Simplisia secang wood produced has a water content of 1.542%, while the water content of herbal drink secang powder is 0.266%. Meanwhile based on the analysis of ash content, it is known that the simplicia ash content of the secang wood is 9.449%, while the ash content of the secang herbal drink powder is 0.009%.

Table 2. Quality requirements for powdered drinks are based on SNI 01-4320-1996

| No. | Testing criteria | Units | Requirement |
|-----|------------------|-------|-------------|
| 1   | Colour           |       | Normal      |
| 2   | Aroma            |       | Normal, typical spices |
| 3   | Taste profile    |       | Normal, typical spices |
| 4   | Water level, b/b | %     | 3.0-5.0     |
| 5   | Ash level, b/b   | %     | Max. 1.5    |
| 6   | Sugar (counted as saccharose) | % | Max. 85% |
| 7   | Food additives   |       |             |
| 8.1 | Artificial sweeteners |       |             |
|     | Saccharine       | mg/kg | Max. 0.2 |
|     | Cyclamate        | mg/kg | Must not exist |
| 8.2 | Food coloring additives |   | As SNI 01-0222-1995 |
| 9   | Metal contaminant |       |             |
| 9.1 | Lead (Pb)        | mg/kg | Max. 0.2 |
| 9.2 | Copper (Cu)      | mg/kg | Max. 2.0 |
| 9.3 | Zinc (Zn)        | mg/kg | Max. 50 |
| 9.4 | Tin (Sn)         | mg/kg | Max. 40 |
| 10  | Mercury (Hg)     | Mg/kg | Must not exist |
| 11  | Arsenic contaminant |       |             |
|     | Mg/kg            | Max. 0.1 |
| 12.1 | Microbial contaminant |     |             |
| 12.2 | Total plate Colon | y/g  | $3 \times 10^3$ |
| 12.3 | Coliform | APM/ g | < 3 |

If referring to table 1, the water content of the two products is below the required numbers. On the other hand, the ash content of herbal secang powder is 0.009% which means it is in the permissible range. Whereas ash content of simplicia wood products of secang is 9.449% where the number is above the permitted number. Thus between the two products, which are more recommended for consumption is the secang herbal drink powder.

From the analysis of ash content, these results are within the range set by Indonesian Herbal Pharmacopoeia that the ash content does not exceed 2% for simplicia and does not exceed 1.4% for extracts. Therefore, the ash content of simplicia produced in this study was in line with these rules, while for the secang herbal powder was above it. The water content of simplicia and herbal powder drink produced in this study was occurrence with the rules. This water content determines the stability of the extract and the subsequent dosage form.

4. Conclusion
Water content and ash content, it is known that the simplicia of the secang wood produced from this study is 1.542% while the water content of the herbal drink powder is 0.266%. Whereas based on the analysis of ash content, ash content of simplicia secang bark is 9.449% while the water content of herbal beverage powder is 0.009%. Therefore, the ash content of simplicia produced in this study was in accordance with Indonesian Herbal Pharmacopoeia, while for the secang herbal powder was above it. The water content of simplicia and herbal powder drink produced in this study was accordance with the rules.

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