Conference Paper

Extraction of Tannin From Ketapang Leaves (*Terminalia catappa* Linn)

Sintha Soraya Santi *, Febriana Irawati, Nita Prastica

Department of Chemical Engineering, Faculty of Engineering, Universitas Pembangunan Nasional
"Veteran" East Java, Indonesia

*Corresponding author:

E-mail:

sinthaay@gmail.com

ABSTRACT

Ketapang tree (*Terminalia Catappa* Linn) is a wild plant that trees is not including trees cultivated. Ketapang tree (*Terminalia Catappa* Linn) spread to almost all regions in Southeast Asia, including in Indonesia except Sumatra and Kalimantan are somewhat rare in nature. Study of Extraction Tannins from Ketapang leaves (*Terminalia Catappa* Linn) is done to find a solvent extraction and concentration on the extraction of tannins from leaves ketapang (*Terminalia Catappa* Linn) using ethanol solvent. The extraction process is done in a laboratory-scale batch and by the principles of solid-liquid extraction in a three-neck flask stirred for the specified time, namely 30, 60, 90, 120, 150 (minutes) with the concentration of solvent (ethanol) 60%, 70%, 80%, 85%, 90% as variable variables. While the weight of the sample remains variable 10 grams, $\pm$ 200 mesh particle size, extraction temperature 85 ° C, stirring speed 200 rpm, ethanol solvent type, settling time $\pm$ 30 minutes, the solvent volume 250 ml, distilled water adjuvant. The best condition of the tannin extraction using 85% ethanol for 120 minutes obtained 98.97% yield tannin concentration.

Keywords: Extraction, tannin, *Terminalia catappa* Linn

Introduction

Indonesia as a tropical country has a diversity of flora. Despite this natural resource is not fully managed and utilized to support the progress of the nation. One of the plant species with the potential to be developed utilization is ketapang tree (*Terminalia catappa* Linn.) (Pauly, 2001). This tree grows almost all over Indonesia. This ketapang tree usually grows wild on the beach and the side of the road as roadside trees. Therefore, Ketapang tree (*Terminalia catappa* Linn) is a wild plant that tree is not including trees cultivated. Ketapang tree (*Terminalia catappa* Linn) are scattered in almost all regions in Southeast Asia, including in Indonesia except Sumatra and Kalimantan were found to be somewhat rare in nature. Unfortunately, ketapang tree in Indonesia is still not well utilized when the level of production in Indonesia leaves ketapang high. The trees shed their leaves twice a year, ie in January - February-March and July - August-September. Ketapang leaves only allowed to fall then dries and becomes waste in this country.

There are several natural ingredients contained in ketapang leaves (and fruit), among others: flavonoids 20-25% (as well as kaempferol or quercetin) or known as vitamin P or Citrin, 11-23% tannin (punicalin, punicalagin or tercatin like as in tea, grape, strawberry, pomegranate, pomegranate, palm-arenan), saponins 20% is used as a surfactant, and phytosterol 10-15% (cholesterol plants with less alcohol content). Other elements contained in the leaves ketapan among others 20%; Sulfur, Nitrogen, and phosphorus in a variety of weights. While leaf - Ketapang leaves also contain metals 5% consists of Ca, Mg, Cu, Zn, etc (Risnasari, 2002).

Tannins are an important component in the plant to protect against bacterial and fungal diseases. In the process of tanning leather, tannins are used to produce high-quality leather. Besides, tannins can also be used to dye textiles. The extraction of tannin from acacia skin using a water

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solvent yields 78.64% based on the weight tannin extract (Pizzi, 1983). The extraction of betel nut produces the highest tannin extraction during 48 hours with levels of 19.9% and 29.76% using water and 96% alcohol as a solvent. Tannin extraction of tannins produce the best betel nut in betel nut ratio with solvent (acetone) 1: 2 was 21.77% with a time of 1-hour extraction (Safetri, 2001). Study of the process of making the tannins from the skin of fruit acids to produce the best tannin levels by 11.60% for 1 hour with 99.8% acetone solvent (Setyawan & Ponco, 2003).

This research was carried out by developing from previous studies, using two variables that varied the concentration of solvents and extraction time. To get tannins from Ketapang leaves can be done with the extraction process. The factors that influence tannin extraction is the extraction time and solvent concentration. the higher the ethanol concentration and extraction time will result in tannin with greater levels. This study aimed to explore the extraction time and solvent concentration on the extraction of tannins from the leaves of Ketapang (*Terminalia catappa* Linn) by using ethanol solvent.

Research Method

Tannin extraction is a process for removing tannin extraction from plant tissue using a solvent. Extract from pure tannins can not be 100%, because besides consists of tannins there are also non-tannin substances such as glucose and hydrocolloid which has a high molecular weight (Pizzi, 1983). Browning (1966) and Harborne (1987) explained to obtain extracts with high quality and quantity, it is commonly used ethanol or acetone with less water volume ratio comparable. The first step before extraction is ketapang leaf (*Terminalia catappa* Linn) previously dried in an oven at 100°C for 1 hour. Once dried and crushed to the size becomes smooth, then at $\pm$ 200 mesh sieve. Ketapang which has smooth leaves (powder) weighed to the weight of 10 grams. After it is inserted into the Extraction tool coupled with the ethanol concentration was determined by the volume of 250 ml. When the extraction process is maintained up to 85°C temperature, stirring speed 200 rpm, and the extraction time is determined. After the extraction is complete the solution is allowed to stand for a while and then filtered with a filter paper and the filtrate produces pulp, and pulp discarded and the filtrate in a bottle to put in a container in the analysis of the levels of tannins in the filtrate.

Figure 1. Schematic extraction three-neck flask

Result and Discussion

Results of the extraction ketapang leaves depict in Figure 2 and show that relationship between the concentration of ethanol as solvent and tannin level.

Figure 2. Relationship between the concentrations of the solvent with Resulting tannin levels

According to Carter et al (1978), has the properties of soluble tannins in ethanol because many contain tannins which have a phenol OH group, while in figure (2) it appears that the levels of tannin extract obtained from the leaves of Ketapang (*Terminalia catappa* Linn) by ethanol is dependent the concentration of ethanol as a solvent, where the greater the concentration of ethanol obtained tannin levels will be even greater. This is caused by the concentration gradient between the solute (Ketapang leaves) with ethanol grew result would increase the displacement of solute material tannin (ketapang leaves) to ethanol so that the tannins are extracted more and more, and the concentrated solution increases (Browning, 1966). However, at a concentration of 90% solvent resulting tannin levels decreased. This is because at these concentrations had a point of saturation or equilibrium phase to obtain the best conditions based on an image (2) the solvent concentration of 85% where the tannin content of 12.45% was obtained with a yield of 98.87% results tannins.

Figure 3. Relationship between the time extractions with Resulting tannin levels

Figure 3 shows that Time extraction influence the amount of tannin extraction were drawn. The longer the time, the more tannin extraction is obtained, this is because the contact time between solute (ketapang leaves) with a solvent (ethanol) is getting longer, so the solute (ketapang leaves) will be more soluble in ethanol and tannin levels of solute substances (leaf ketapang) to ethanol, the greater the tannins will be extracted more and more (Smith, 1981). But if it takes a little time, the result is also a bit of tannin that is picked up anyway. Therefore, the extraction time greatly affects the tannins extracted during the extraction process takes place. So that the observations can be seen in Figure 4.2 are marked with the length of time the greater the percentage extraction of the tannin levels is drawn. Time extraction with extracted tannins levels produces the best time is 120 minutes. Because at the time of 150 minutes has reached equilibrium or in other words the mass transfer of dissolved substances (tannins) from the solid to the body no

longer solvent although ethanol extraction time plus. According to Houghton and Raman (1998), longer heating temperatures higher than the optimal value will result in lower levels of tannins due to the tannins produced will oxidize. Besides, it will also cause the tannins hydrolyzed to the acid - acid-insoluble polyphenols in the solvent so that the content of soluble non-tannins are greater, the tannin levels thus obtained becomes smaller.

Conclusions

Results obtained in this research is inferential that:

- a) Leaves Ketapang (*Terminalia catappa* Linn) can be utilized as a producer of tannin.
- b) Intake of tannin extraction method influenced by extraction time and solvent concentration.
- c) The greater the concentration of ethanol and the longer the extraction time, the greater the amount of Tannin levels are drawn. The amount of tannin levels drawn on the largest is 12.45% with a 85 ethanol. Concentration extraction time 120 min. The yield of the greatest results generated is 98.97%

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