



Utilization of Giant Taro Stems (*Alocasia Macrorrhiza L.*) as a Basis for Fragrant Lemongrass Massage Lotions

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Abstract. Indonesia's geographical location causes Indonesia to have a diverse flora with many benefits. One of them is sente (*Alocasia macrorrhiza L.*). Sente is known to contain glucomannan. This compound can be used as an excipient in pharmaceutical preparations such as gel formulations and emulgators. This study aims to see the implementation of the use of sente starch as an ingredient in lotion preparations combined with citronella oil as an anti-inflammatory. This study used an experimental method with 3 variants of different formulas at sente starch levels with concentrations of 4%, 6%, and 8%. The results of organoleptic testing of fragrant lemongrass massage lotions are cream-colored liquid preparations with a distinctive aroma of citronella oil and have a smooth texture. Whereas based on homogeneity and emulsion type test, lemongrass massage lotion has good homogeneity with oil-in-water emulsion type. Lemongrass massage lotion has a viscosity ranging from 17.0 cP to 144.9 cP, and has a good spreadability with pH 6. Based on the research results, the use of sente starch as a thickener gets good results and meets the requirements in terms of characteristics and pH.

Keywords: Fragrant Lemongrass · Massage Lotion · Sente (*Alocasia macrorrhiza L.*)

1 Introduction

Indonesia is a country located between two continents and between two oceans, because of its geographical location, Indonesia is a fertile country, so Indonesia has diverse flora [1, 2]. The flora found in Indonesia has many benefits, but the Indonesian people have not used it to its full potential. One of them is the flora of the Araceae family, namely Giant Taro (*Alocasia macrorrhiza L.*) [3].

Giant Taro is a wild plant that can grow on the banks of rivers or rice fields [4]. Giant Taro contains potassium oxalate crystals which can cause itching in the mouth and throat as a result of the irritant protease [5]. When the plant is damaged, these crystals are released under pressure and embed themselves in the oral cavity [6] soft-tissue swelling, salivation, dysphagia, and even aphonia. This presentation can resemble angioedema or anaphylaxis [7]. This causes the Giant Taro to be less attractive to consume. Giant Taro

can be converted into other more useful materials because it contains starch which can be processed into glucose by acid hydrolysis or enzymes [8].

Alocasia macrorrhiza starch contains 1.3% glucomannan [9]. Glucomannan is an emulsifier in the food paper industry and cosmetics, the material in the air will form a gel that has fairly high viscosity [10]. This activity causes the reason to be developed in various topical dosage forms, one of which is lotion.

Lotion is a liquid preparation that is used for external use, that is on the skin. The lotion is meant to be used on the skin as a barrier due to the nature of the ingredients. Lotion is an oil-in-water emulsion (oil in water) [11]. Besides being used as a protector, lotions can be intended for use as a massage medication [12].

Body massage is the act of manipulating the muscles and tissues of the body by pressing, rubbing, vibrating and using hands, fingers, or manual/electrical tools to improve health conditions [13]. Body massage has long been believed to be beneficial for health, starting from relieving stress to speeding up recovery time after illness, allergies, depression, respiratory problems, insomnia, sports injuries, and chronic fatigue [14].

The ingredients commonly used as body massage drugs are essential oils. Fragrant lemongrass (*Cymbopogon nardus* L.) is a plant that contains essential oils [15]. Traditionally, people usually use fragrant lemongrass (*Cymbopogon nardus*) as a mouthwash [16], toothache [17] and swollen gums [18], laxative sweat and pain [19], as well as medicinal ingredients for urine and menstruation [20], and it is known that lemongrass has anti-inflammatory activity [21].

Fragrant lemongrass (*Cymbopogon nardus* L.) is a plant from the grass family (Poaceae) that has many benefits. The results of the distillation of fragrant lemongrass leaves obtained essential oils [22]. In the commerce field, the essential oil produced by citronella is known as *Cymbopogon nardus citratus* [23].

The use of giant taro stem exudate as a base for lotion is not widely known. This research was conducted to determine the characteristics of the lotion base obtained from the exudate of the stem of sene which has removed the potassium oxalate crystals and then combined it with fragrant lemongrass oil as a massage medicine that can be used as an anti-inflammatory.

2 Materials and Tools

2.1 Tools

The tools used in this research were analytical balance, pH indicator, blender, caliper, digital pH meter, Brookfield Viscometer, and other standard glassware.

2.2 Materials

The main materials used in this research were giant taro stems and lemongrass stems, Carbophol 940, Nipagin (Methyl Paraben), Nipasol (Propyl Paraben), Triethanolaminum (TEA), Paraffin Liquidum, and Propylenglikol.

2.3 Method

The method used in this research were experimental laboratory. This research was conducted on September 24, 2019 at the Pharmacy Technology Laboratory of the Poltekkes Kemenkes Tasikmalaya.

2.4 Research Process

2.4.1 Making Giant Taro Stem Starch (*Alocasia macrorrhiza L.*)

Giant taro stem starch was obtained by peeling and cutting the giant taro stem, then soaking it with water and adding 250 mL of 0.2N NaOH. After soaking and then mashed. After filtering and repeated 2x. After filtering, 96% alcohol was added to the filtrate to speed up the precipitation process. After settling, the alcohol and starch layers were separated. The obtained starch was dried in an oven for 12 hours at a temperature of 60 °C, after drying the starch was pulverized and sieved with a mesh number of 60.

2.4.2 Testing the Characteristics of Giant Taro Stem Starch

The organoleptic examination included shape, texture, color, aroma, and visually observed sensation [24].

2.4.3 Formulation of Giant Taro Stem Starch Lotion

The first step, propylene glycol was added by 10 mL of water and and methylparaben and then heated (mixture 1), prepare 20 mL of cold water was prepared to suspend starch (mixture 2), after mixture 1 boiled, mixture 2 was added little by little into mixture 1, it was stirred until a thick mass formed (gel phase). In the second step, fragrant lemongrass oil was dissolved in paraffin, and then propylene glycol and propylparaben were added. After that add emulsifier tween 80 and span 80, then add water and stir until an emulsion was formed. After the gel phase and emulsion phase were formed, the two phases were mixed and stirred until a lotion is formed.

2.4.4 Testing the Characteristics Emulgel

a. Organoleptic Test

The organoleptic examination includes shape, texture, color, aroma, and visually observed sensation [25].

b. Homogeneity Test

The homogeneity test of the lotion was done by taking a small sample of the lotion formula preparation, then placing a small amount of lotion between the two slides. The arrangement of coarse particles was observed [26].

c. Emulsion Type Test

The lotion preparation was dripped on a glass object, a few drops of aquadest were placed on the glass object that had been dripped with emulgel preparation, then 1 drop of Sudan III solution was added and viewed under a microscope [26].

d. Viscosity Test

Performed using a Brookfield viscometer with spindle number 1 and a speed of 1.5 rpm. The spindle viscometer was inserted into the bottle of preparation and the results were seen from the viscosity [26].

e. Spread Test

Testing the spread of lotion preparations was done by pouring 0,5 ml of lotion on a reversed petri dish then squeezed by another petri dish then adding 100 grams of a weight. It was let to stand for 1 minute then measured the diameter of the circle distribution [26].

f. Uji pH

Weigh 0.5 g of lotion was put in a beaker, then added up to 5 mL of distilled water, stirred, and viewed using a universal pH indicator [26].

3 Results and Discussions

A total of 2200 grams of simplicia stem sente (*Alocasia macrorrhiza* L.) was carried out for exudate extraction. The exudate obtained was then carried out by the process of removing calcium oxalate crystals by adding 250 mL of NaOH with a concentration of 0.2 N so that a pH of 10 was obtained. The treatment was aimed at obtaining starch from sente rods that were free of calcium oxalate crystals. The starch obtained from the exudate of the sente stem was 121.9 grams so that the yield was 5.54%.

After the starch, the IOCM characteristics were tested visually. The IOCM characteristic test was conducted to determine the physical properties of the starch obtained from sente stems. Based on the results of the IOCM, sente stem starch had a white-brown crystal powder form, slightly sour taste, and non aromatic.

In this study, starch obtained from sente stems was made into gel preparations with three different formulas (Table 1).

Gel or jelly is a semisolid system consisting of a suspension made of small inorganic particles or large organic molecules, penetrated by a liquid [27]. Meanwhile, fragrant lemongrass oil was made into an emulsion preparation. Emulsion is a colloidal system in which the dispersed phase and the dispersion medium are immiscible liquids. The two pharmaceutical preparations are mixed to form a lotion. Lotion is a semi-solid dosage form that is applied to the body, containing one or more drug ingredients dissolved or dispersed in a suitable base material and formulated as a water-in-oil or oil-in-water emulsion.

Organoleptic tests performed include shape, texture, color, aroma, and visual sensation. Lemongrass oil massage lotion had a creamy liquid dosage form. In addition, the citronella oil massage lotion had a distinctive aroma of fragrant lemongrass oil with a soft texture.

Table 1. Lemongrass Fragrant Massage Lotion Formula

Materials	F1	F2	F3
Phase A (Gel)			
Giant Taro Starch	4,00	6,00	8,00
Methyl Paraben	0,10	0,10	0,10
Propylene glycol	15	15	15
TEA	0	0	0
Water	34,90	32,90	30,90
Sub Total A	54,00	54,00	54,00
Phase B (Emulsion)			
Propyl Paraben	0,10	0,10	0,10
Tween 80	3,60	3,60	3,60
Span 80	1,40	1,40	1,40
Liquid paraffin	5,00	5,00	5,00
Propylene glycol	5,00	5,00	5,00
Lemongrass oil	5	5	5
Water	25,90	25,90	25,90
Sub Total B	46,00	46,00	46,00
Jumlah	100,00	100,00	100,00

The homogeneity of the three formulas macroscopically showed that the three lotion preparations had good homogeneity and based on microscopic testing it was shown in the formula 1,2,3 oil globules were evenly distributed with varying globule sizes as shown in Figure 4. As for testing the type of emulsion on the lotion Fragrant lemongrass massage with Sudan III showed that microscopically, the oil globules in the emulsion turned red. This showed that the lotion made in this study was an oil in water emulsion type.

Viscosity is an important parameter in an emulsion because the stability of the emulsion is influenced by the viscosity of the emulsion. The higher the product viscosity, the smaller the rate of separation of the dispersed phase and the dispersing phase. This causes the product to be more stable [28] (Fig. 1).

Viscosity analysis in this study used a Brookfield viscometer with spindle number 1 and a rotational speed of 1.5 rpm. Based on the test the viscosity value in formula 1 is 17.0 cP, formula 2 is 72.4 cP, and formula 3 is 144.9 cP. Based on these tests, the higher the viscosity value, the smaller the oil globule size. This happened because the coalescence of the oil globules was hindered by the high viscosity. The spreadability test was carried out by compressing the base and surface of the inverted petri dish using an additional 100 g of load (Fig. 2).

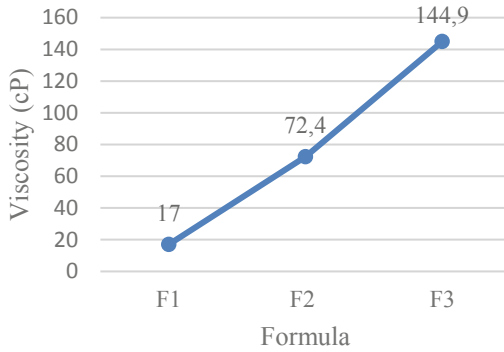


Fig. 1. Viscosity Test Results

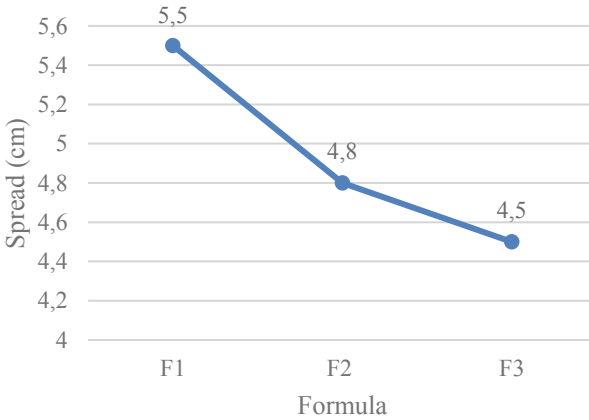


Fig. 2. Results of the Spreading Power Test

4 Conclusion

The results obtained indicate that the preparation is evenly distributed well. Based on the test results of formula 1,2,3 the dispersion of a substance will be inversely proportional to the viscosity value. The lower the viscosity value, the better the dispersion of a substance, because it is evenly distributed.

According to the National Standardization Agency (1996) which is regulated by SNI number 16-4399-1996 “The requirements for a good pH have a range of values between 4.5–8.0”. Based on the test results of the citronella oil massage lotion formulation, formula 1,2,3, and the comparison obtained a pH value of 6 which means the lotion meets the specified requirements.

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