

## EVALUATION OF THE PHYSICAL PROPERTIES OF INDONESIAN TRADITIONAL BOREH CREAM PREPARATION

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### ABSTRACT

**Objective:** This study aimed to determine the results of the physical properties of traditional Indonesian boreh cream preparations, which included organoleptic tests, homogeneity tests, pH tests, dispersibility tests, adhesion tests, and viscosity tests.

**Methods:** This study used a descriptive research design. This research was conducted with physical tests, including organoleptic tests, homogeneity tests, pH tests, dispersibility tests, and adhesion tests on cream preparations.

**Results:** The results of the research on the cream preparations showed that the organoleptic test parameters had a light brown color, aromatic odor, semisolid form, and soft texture, the homogeneity test on the cream preparations showed homogeneity, the pH test results were 7.0, the dispersion power was 2.7–5.0 cm, and the results of the adhesion test were 1.13 seconds.

**Conclusion:** This study concludes that the physical test of boreh cream includes organoleptic test, homogeneity test, pH test, dispersibility test and viscosity test that fulfills the requirements of a good cream preparation, except that the adhesion test does not meet the requirements of a good cream preparation.

**Keywords:** Boreh, Cream, Physical test

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### INTRODUCTION

Indonesian people, in general, are increasingly moving towards the "back to nature" paradigm by choosing to use natural ingredients to overcome health problems. Indonesia is known as a producer of high natural wealth. The results of these natural resources are in the form of fruit, flowers, spices, roots and leaves that can be processed into traditional cosmetics that can beautify and nourish the skin. People are increasingly interested in using natural ingredients because they are believed to be safer and do not cause side effects for the wearer. Regularly caring for the skin is the first step to increase and maintain skin beauty naturally [1]. One example of skincare cosmetics from natural ingredients is boreh.

Boreh is one of the ingredients used by Balinese people for generations for health. Boreh is a herb obtained by smoothing a mixture of ingredients in its use mixed with liquids such as water, vinegar, or wine [2]. The use of boreh is generally dissolved in water first. This usage is less practical in today's modern era, so boreh preparations need to be innovated. Boreh can be made in the form of cosmetic preparations, one of which is cream preparations.

The cream is a semisolid preparation in the form of an emulsion containing not less than 60% water and intended for external use, and there are two types of cream, namely m/a type and a/m type. Creams that can be washed with water (m/a) are intended for cosmetic and aesthetic uses [3]. A good cream can be seen from observing the evaluation of the physical properties of the preparation.

This study aimed to determine the results of the physical properties of traditional Indonesian boreh cream preparations, which included organoleptic tests, homogeneity tests, pH tests, dispersibility tests, adhesion tests, and viscosity tests.

### MATERIALS AND METHODS

#### Place and time

This research was conducted in the Department of Herbal Medicine Laboratory, Health Polytechnic Ministry of Health Republic of Indonesia Surakarta

#### Material preparation

Boreh material was obtained from Mojosongo District, Boyolali Regency, Central Java. Furthermore, each powder was weighed with 5 grams of kencur powder, 5 grams of ginger powder, 5 grams of Javanese chili powder, 5 grams of nutmeg powder, 5 grams of galangal powder, 5 grams of cinnamon powder, then all the powders were mixed and made into boreh.

#### Extraction

The simplicia that composes boreh was extracted using 70% ethanol soaked for five days, stirred every day, and filtered. The remainder of the dregs was macerated with ethanol solvent, and the material was closed for two days. The filtrate obtained is put into one container and then concentrated over a water bath at a temperature of 60–70<sup>o</sup> to become a thick extract.

#### Cream preparation

The formulation used for boreh extract cream consisted of Simplicia extract of boreh 2 grams, paraffin liquidum 25 ml, stearic acid 14.5 grams, triethanolamine 1.5 ml, adeps lanae 3 grams, benzoic acid 0.5 grams, aqua dest add 100 ml [4]. In making the cream base, the oil phase (paraffin liquidum, stearic acid, adeps lanae) and the water phase (benzoic acid, triethanolamine, aqua dest) were heated in a water bath at a temperature of 60–70 °C until melted. The oil phase and water phase were mixed by adding the water phase little by little into the oil phase, stirring until a homogeneous cream base mass was formed. The simplicia extract that composes boreh was added little by little then stirred until homogeneous.

#### Evaluation of the physical properties of the cream

The organoleptic test was carried out visually. The components evaluated included odor, color, shape and texture of the preparation [5].

The homogeneity test was carried out by placing the cream formula between two glasses, then observing the presence of coarse particles or inhomogeneities under light [6]. The pH test of the cream preparation was weighed 1 gram and diluted with 10 ml of distilled water. Then a pH meter is used, which is part of the sensor and

reads on the monitor [7]. The dispersion test of 0.5 grams of the formulated cream was weighed and placed on a glass slide, then a petri dish was placed on it and left for 1 minute, the area of the preparation was calculated. Then, each preparation was given a load of 50 grams, 100 grams and 150 grams, left for 60 seconds and then the diameter of the resulting preparation was calculated [5].

Test the adhesion of cream preparations weighing 0.5 grams placed on a glass object with a certain area, then covered with another glass object, pressed using a weight of 1 kg for 5 min. The glass object is mounted on the test equipment, then removed with a load of 80

grams and the time required to separate the two certain glass objects [8]. The viscosity test of the preparation was put into the cup, then the spindle number 4 was installed, and the rotor was run at a speed of 12 rpm. After the Brookfield viscometer shows a stable number, the results are recorded and multiplied by a factor (500) [5].

## RESULTS

The results of evaluating the physical properties of traditional Indonesian boreh cream preparations can be seen in the table.

**Table 1: Results of evaluation of physical properties of Indonesian traditional boreh cream preparations**

No	Testing	Standard	Result
1.	Organoleptic test		
	1. Smell	Typical aromatic (boreh)	Typical aromatic (boreh)
	2. Color	Light brown	Light brown
	3. Form	Semi solid	Semi solid
	4. Texture	Gentle	Gentle
2.	Homogeneity test	Homogeneous	Homogeneous
3.	pH test	4.0-9.0	7.0
4.	Spreadability test	5-7 cm	No load: 2.7 cm
5.	Adhesion test	More than 4 seconds	50-gram load: 4.4 cm
6.	Viscosity test	2000-50,000 cP	Load 100 grams: 4.7 cm

## DISCUSSION

From the physical test results for the preparation of Indonesian boreh cream, the organoleptic test aims to determine the color, smell, and texture [9]. The results of the organoleptic test for the preparation of traditional Indonesian boreh cream are semisolid, light brown, have a distinctive aromatic odor and have a soft texture. Formulation of acne extract cream combinations of soursop leaf extract and guava leaf that in this study, soursop leaf extract cream and guava leaf have a semisolid shape, the green color corresponds to the color of soursop leaves, and guava leaves and the resulting odor is typical of the extract [4]. Physical stability test of cream formulations containing soybean extract (*Glycine max*), the organoleptic test results showed a light brown color, characteristic odor, and soft texture semisolid form [6].

The homogeneity test aims to determine the mixture of cream preparation ingredients [7]. The homogeneity test results of the cream preparation showed that the cream preparation did not contain lumps or coarse particles, and there was no phase separation, namely the oil phase and the water phase under a light. Formulation of cream preparations from red and black glutinous rice extract, which showed that there were no visible particles for the base and both formulas, which meant no visible particles that the preparation was homogeneous [10].

The pH test of the traditional Indonesian boreh cream preparation obtained a pH of 7.0 or neutral cream. The pH of traditional Indonesian boreh cream preparations follows the pH of cream preparations, regarding the formulation of cream preparations from zimadmohallil raw material extract, skin cream specifications must have a pH value of 4.0 to 9.0 [11]. Optimization of the o/w cream preparation formula with a combination of oxybenzone and titanium dioxide, that TEA is a strong base, so the presence of a high TEA concentration will cause the neutralization process to occur faster resulting in pH which is getting closer to the base, as evidenced by the results of the pH test of the preparation which reaches pH 7 [12].

The spreadability test was carried out to determine the extent of the spread of the cream when applied to the skin so that the ease of applying the preparation to the skin can be seen [10]. The results of the dispersion test in the study of boreh cream preparations before being given a load of 2.7 cm, after being given a load of 50 grams the dispersion became 4.4 cm, then given a load of 100 grams the dispersion became 4.7 cm, then given a load of 150 grams of power spread to 5.0 cm. The dispersion test results follow the research of Fatima *et al.* (2017) [11] regarding the formulation of cream preparations from the extract of raw material zimadmohallil, which showed that the results of the dispersion test 34.4-69.33 mm were

dispersed well. The test results of the spreadability of the boreh cream, which was given a load of 150 grams, followed the standard cream preparation, which was 5-7 cm [10]. The more dispersion is given, the ability of the active substance to spread and contact with the skin is wider so that it can show the impression of a comfortable use [13].

The stickiness test of the cream was carried out to determine the ability of the cream to adhere to the site of application [8]. The results of the stickiness test for traditional Indonesian boreh cream are 1.13 seconds. The results of the stickiness test of the cream preparations were not following the requirements of SNI 16-4399-1996 that the adhesion strength of the cream preparations was not less than 4 seconds, because the consistency of the cream is getting softer so that the ability to stick to it also decreases. If the cream is added with extract, the possibility of decreasing the adhesion is even greater. Semisolid preparations contain quite a lot of water, so the sticking time is short [14].

The higher the volume of the cream preparation, the higher the viscosity, so that the preparation will be more stable because the movement of particles tends to be difficult with the thicker the preparation [15]. The viscosity test results for the cream preparation of boreh were 4100 cP. The viscosity value of this cream preparation met the standard. The results of the viscosity test for the preparation of boreh cream are following the research of Praing and Kurniawan (2017) regarding the physical quality of the preparation of jatropa leaf extract cream, that the viscosity test results of the jatropa leaf extract cream are expressed by the viscosity of 5000, 4500 and 7000 so that the jatropa leaf extract cream meets the requirements [16]. According to Gozali *et al.* (2009), regarding the formulation of silicone-coated zinc oxide facial moisturizing cream, the excellent cream viscosity value is more than 5000 cP, and according to SNI 16-4399-1996 regarding the quality standard of cream preparations, a good viscosity of the preparation ranges from 2000-50,000 cP [17]. TEA is a water-soluble emulsifier because it has a polar group, so it interacts with cetyl alcohol to increase the viscosity of the cream [12].

## CONCLUSION

Based on the research results on the physical properties of the organoleptic test, homogeneity test, pH test, dispersibility test and viscosity test, it fulfilled the requirements for a good cream preparation. At the same time, the adhesion test is not following the requirements of a good cream preparation.

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#### AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

#### CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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