

The effect of kefir whey addition on soap characteristics

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Abstract. Soap mostly use synthetic materials that can cause side effects, the selection of natural ingredients milk kefir in soap making is expected to reduce the growth of bacteria that can cause skin irritation. The purpose of this research is to know the optimum Kefir whey measurement in soap making process and to know the characteristics of the soap produced. Variations of Kefir whey used in this study 38%, 43%, 48%. The process of making kefir soap itself using the combined method of hot and cold process. The resulting solid soaps tested for quality according to SNI 3532:2016 including moisture content, total fat matter, and pH. The physical analysis includes foam and emulsion stability. Based on the study of the water content of the three types of soap is 13.64%, 12.753%, 12.086%. amount acid fat on various composition kefir soap that is 70.56 %, 87.36%, 99.12%. For pH 10.04, 9.91 and 9.85. Foam stability 72.72 %, 86.66 %, 100 %. Value stability sample soap this is 96.3% , 95.6% , 96.2%. Thus, giving of kefir whey as much as 48% recommended for the manufacture of kefir soap.

1. Introduction

Cleansing the skin is very important to maintain and improve skin integrity [1]. Soap is often used in everyday life to clean the dirt on the skin. It is a compound that can reduce water surface tension. It is these soap properties that make the soap solution remove dirt and oil [2]. The soap-making process, called saponification, is the alkaline hydrolysis reaction of triacylglycerol [3]. The requirement of the quality of the solid soap bath set by the Indonesian National Standard Body is the soap of solid has a maximum water content of 15%, the amount of fatty acid is more than 65% (SNI 3532: 2016).

Today's cosmetic industry has been interested in developing cosmetic products made from natural [4]. Increased demand for natural-based care products due to products that use synthetic chemicals have been shown to be harmful to health [5]. Soaps can be made naturally or synthesized; soap synthesis is a bar of soap that is in its manufacture using ingredients such as fragrances, synthetic preservative colors that even have been shown to irritate the skin in some people [6]. The use of natural ingredients in soap making is expected to improve the quality of the resulting soap. One of the natural ingredients that can be used in the process of making soap is kefir whey and colostrum.

Milk kefir began favored by the people of Indonesia as a functional food. Kefir has useful properties for health, such as controlling cholesterol metabolisms, like probiotics, antitumor for animals, antibacterial, anti-fungal, and others [7]. Kefir whey formed during the manufacture of kefir, the microbes present in kefir produce acids and enzymes that separate milk into curd and whey (clear liquid). Kefir whey contains 320 kcal /L and whey protein 0.8-1%; also kefir whey contains beta-lactoglobulin



of 65%, alpha-lactalbumin 25%, burchineserumalbumin 8%, and immunoglobulin [8]. Kefir whey has efficacy in brightening the skin, the higher the concentration of whey used the better in inhibiting melanin synthesis [9]. Thus kefir is very interesting to be the object of research in making soap. The purpose of this research is to know the optimum kefir whey dose in soap making process and to know the characteristics of the soap produced.

2. Method

The experiment of making kefir whey based soap, using materials; coconut oil, palm oil, olive oil and butter and aqueous NaOH and kefir whey, kefir colostrum and honey with the composition in Table 1. The making of this kefir soap refers to the research [10] with some modifications, the first, milk replaced by kefir whey and some kind of oil, second, in the process is not entirely using cold process, in this research all oil elements were heated before used. In stirring this soap uses a mixer for mixing. The following is presented in Table 1 of the materials as well as the composition of each ingredient used.

Table 1. Variety of materials used in the manufacture of kefir soap.

Materials	Composition (gram)		
	1	2	3
Coconut oil	100	100	100
Olive oil	50	50	50
Palm oil	25	25	25
Butter	100	100	100
NaOH	45	45	45
Kefir whey	200 (38%)	250 (43%)	300 (48%)
Colostrum Kefir	50	50	50
Honey	10	10	10

The first process in the manufacture of kefir soap is to heat all the elements of oil (olive oil, coconut oil, palm oil, butter) until the temperature reaches 60°C then all the ingredients are incorporated into the reactor with the addition of kefir whey NaOH solution into the reactor. Then stirred using a mixer with medium speed for 30 minutes. Then add kefir colostrum 50 grams and 10 grams of honey while stirring continuously for 10 minutes. Pour the soap mixture into the mold. Soap products in curing dive for three weeks with the help of a blower. Then the soap tested pH using pH meter, amount of fatty acid, a gravimetric method to test water content, foam stability, and emulsion stability.

3. Results and discussion

3.1. Moisture content

Determination of water content carried out by gravimetric method. In this study, soap samples weighed 5 grams and then heated to the cabinets at 105°C for 2 hours until the weight is fixed [11]. The higher the moisture content of the soap the easier it is to shrink when used. The effect of whey dye to whey variation on the moisture content is shown in Figure 1. The three compositions of kefir soap have fulfilled SNI 3532 :2016 standard that is maximal 15%. The first sample of the water content is 13.64%, the second sample is 12.75%, the third sample is 12.086%.

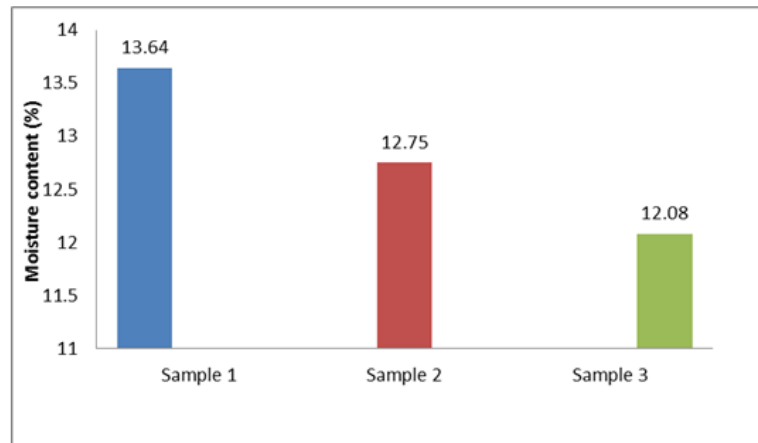


Figure 1. The relationship of adding kefir with moisture content. Soap samples one addition of kefir 38%, sample 2 additions 43%, sample 3 addition of kefir whey 48%.

3.2. Total fat matter

The amount of fatty acid in soap shows the total amount of fatty acids that stored and the free fatty acids contained in it. The results showed that the amount of fatty acid in the various components of kefir soap that is 70.56%, 87.36%, 99.12%. This value is following SNI standards that determine that the amount of fatty acids in a solid soap bath is > 65%.

Based on a third sample study (48% kefir whey composition) has the highest amount of fatty acids among the three.

3.3. pH

Acidity or pH is a chemical parameter for knowing the resulting solid soaps are acidic or alkaline. pH is an important parameter in cosmetic products because the pH value can affect the skin's absorption. In this research, pH value of each soap sample is 10.04, 9.91, 9.85. The results of this test prove that more kefir whey added to the meal will decrease the pH value of the soap. Figure 3 shows the relationship of kefir whey addition to the pH value. Good quality pH value criteria for bath soap according to SNI 3532: 2016 ranged between 8 - 11. It means that the soap produced in this study meets the quality criteria of SNI 3532: 2016.

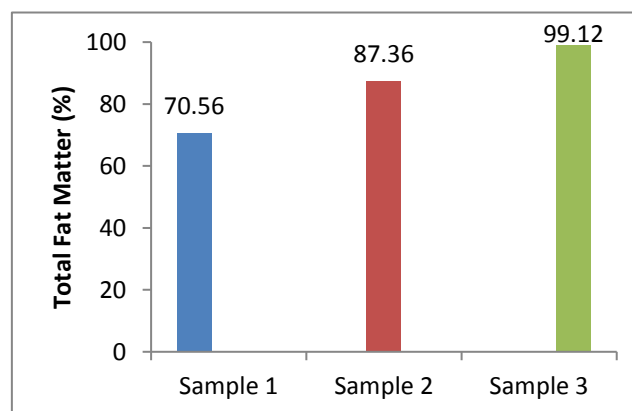


Figure 2. The relationship of the addition of kefir with total fatty acids. Samples 1 addition of kefir 38%, sample 2 additions 43%, sample 3 addition of kefir 48%.

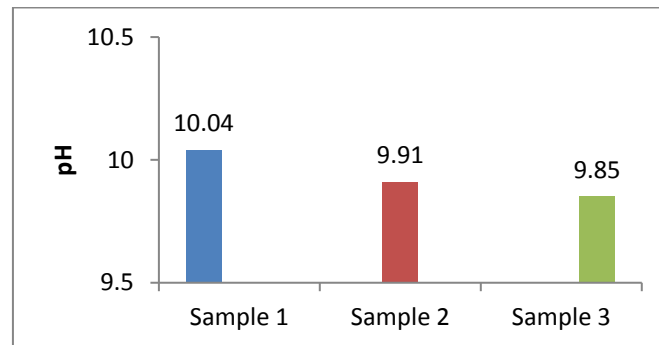


Figure 3. The relationship of adding kefir with pH. Samples 1 addition of kefir 38%, sample 2 additions 43%, sample 3 addition of kefir whey 48%.

3.4. Emulsion stability

One of the parameters for the emulsion product is its emulsion stability. A product is stable emulsified if it has a high consistency value. Soap that has high emulsion stability then the shelf life of the product will also be longer. The stability value of this soap sample was 96.3%, 95.6%, 96.2%. The results of data analysis showed that the use of kefir whey did not affect the characteristics of the resulting soap. All three samples had relatively equal emulsion stability. Table 2 shows the relationship of kefir whey addition with emulsion stability.

Tabel 2. The effect of Kefir whey addition on emulsion stability.

Composition of Kefir whey (%)	Emulsion Stability (%)
38	96.30
43	95.60
48	96.20

3.5. Foam stability

Foam is a relatively stable structure and consists of air pockets wrapped in a thin layer. Foam stability influenced by active ingredients of soap such as surfactants. Foam stabilizers and fatty acid compositions are used [12]. The results of foam stability studies, Fig. 4, on these three samples are 72.72%, 86.66%, 100%. Because kefir is a product of processed milk, kefir has a type of fatty acid that will affect the stability of the foam.

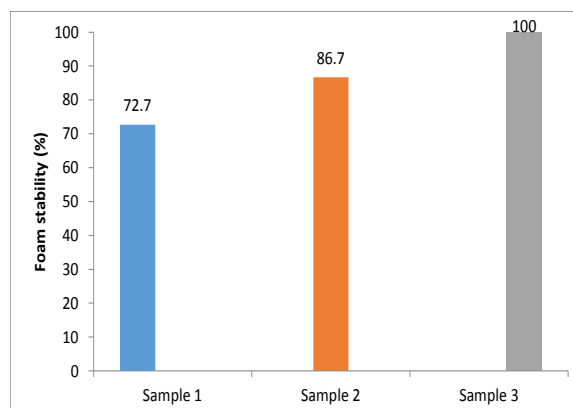


Figure 4. The relationship of adding kefir with foam stability. Samples 1 addition of kefir 38%, sample 2 additions 43%, sample 3 addition of kefir 48%.

4. Conclusion

The effect of 94% Kefir whey is the best product. The results of water content analysis, total fatty acid, pH, foam and emulsion stability showed kefir soap according to bar soap quality standard SNI 3532: 2016.

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