The Effect of Goat Milk Soap Innovation With Mangosteen Peel Extract (Manggiskin Milk Bar) Efforts To Improve the Economy of Cosmetics Entrepreneurs

Cut Afiifah Tia Qurrotu'ainii*, Ulfah Fauziyah, Mutimanda Dwisatyadini, Ananda Nursofiyah, Rendy Nur Fazly, Dea Puji Lestari, Nurul Fatimah
University Terbuka, Indonesia
*Corresponding author e-mail: afiifahfiifah@gmail.com

Abstract
The 2017 National Social and Economic Survey (SUSENAS) conducted by the Central Statistics Agency (BPS) found that 99.8% of Indonesians use soap to protect their skin. Because of a return to nature, cosmetics continue to move toward natural products as knowledge and technology in the sectors of agriculture and kimia progress. Development of soap products using goat milk and mangosteen peel extract as the main ingredients with superior and innovative quality, as well as improving the welfare of goat farmers by adding value to goat milk products through partnerships with the cosmetics industry. Therefore, the objective of the project "Innovation of goat milk soap with mangosteen peel extract: Efforts to improve the economy". Creating high-quality, unique soap products with goat milk and mangosteen peel extract as the primary ingredients, as well as enhancing the well-being of goat farmers by enhancing goat milk products through collaborations with the cosmetics sector. Therefore, the goal of the project "Innovation of goat milk soap with mangosteen peel extract: Efforts to improve the economy of cosmetics entrepreneurs" is to develop innovations that foster economic growth and welfare for local businesses, including farmers and cosmetics entrepreneurs, in addition to being environmentally friendly and good for skin health. Methods for preparing tools and materials, the processes used in soap making consist of three methods, namely the cold process method, the hot process method, and the melt and pour method, as well as organoleptic analysis testing, soap acidity level (pH) testing, and laboratory testing for heavy metal, bacteria, and fungus content in accordance with SNI 06-3532-1994. Organoleptic analysis was carried out by visually observing the results of the soap formulation which included dark brown color, softer texture, fragrant aroma of mangosteen fragrance extract, foam that foams easily, sensation when and after use is rough and moist. Analysis of the degree of acidity pH 7 is normal. The results of the simplo and duplo heavy metal tests from the PT Saraswanti Indo Genetech laboratory include; mercury, lead, cadmium, arsenic, and 1.4 dioxane no detected. The simplo and duplo bacteria tests for Pseudomonas aeruginosa and Staphylococcus aureus were negative. The simplo and duplo fungus tests for Candida albicans were negative, but the simplo and duplo yeast mold fungi were found to be <10 according to the total plate count (ALT) of simplo 6.0x101 and duplo 3.0x101, so in the process we must improve its hygiene production and packaging. Originality produces of innovation in goat milk soap with mangosteen peel extract: Efforts to improve the economy through new knowledge.

Keywords: Innovation in Soap, Goat Milk, Mangosteen Peel Extract, Economic Development, Cosmetics Enterpreneurs.

1. Introduction

Goat's milk has several advantages over cow's milk, including higher protein and fat content, which is more easily digested by the body. Furthermore, goat's milk contains fluorine, which can inhibit the growth of pathogenic bacteria. Susanto and Budiana (2005) stated that goat's

milk has a higher fluorine content than cow's milk. This fluorine content is useful as a natural antiseptic and can help suppress the growth of pathogenic bacteria. Sutrisna (2014) added that goat's milk contains 4.3% protein and 2.8% fat, which is relatively better than cow's milk, which contains 3.8% protein and 5.0% fat. Furthermore, goat's milk is more easily dispersed, the mixture is more homogeneous, and it is easily digested because its fat globules are smaller, at 3.49 mm, while cow's milk has fat globules measuring 4.55 mm and consisting of short- and medium-chain fatty acids. However, if goat's milk is not processed properly, it can easily spoil. Therefore, goat's milk can be fermented using lactic acid bacteria. Lactic acid bacteria are beneficial bacteria with many benefits and can be widely used in the processing of livestock products such as milk. Fermented goat's milk using lactic acid bacteria has the potential to be a source of probiotics and a functional food. According to Suter (2013), functional foods are foods that, due to their active components, provide health benefits beyond those provided by their nutrients. According to Suter (2013), functional food is food that, due to its active components, can provide health benefits beyond those provided by its nutrients. Functional food must meet sensory, nutritional, and physiological requirements. Functional food can prevent or reduce degenerative diseases. The physiological properties of functional food are determined by the bioactive components it contains, such as dietary fiber, inulin, FOS, antioxidants, PUFAs, prebiotics, and probiotics. To improve the quality of fermented goat's milk and make it a functional food, probiotics and mangosteen peel extract are added, which can improve the quality and nutritional value of fermented goat's milk as a functional food, making it interesting to study. According to Srihari et al. (2015) stated that mangosteen rind contains xanthone compounds, which are bioflavonoids with antioxidant, antibacterial, anti-allergic, antitumor, antihistamine, and anti-inflammatory properties. Jannah, et.al., (2024) added that xanthone's antioxidant properties even surpass those of vitamins A, C, and E, which are known to be the most effective antioxidants in fighting free radicals in the body. Xanthones are very beneficial for health as antioxidants, antihistamines, anti-inflammatories, and antimicrobials.

2. Research Method

It begins with the preparation of tools and materials, formulation, and packaging. The preparation of tools and materials is shown in Table 1. The mixing process using a mixer begins by combining the lye solution and oils. After the lye solution has cooled and the oils are ready, the solution is slowly poured into the oil container. Next, a mixer is used on low speed to stir the mixture continuously for several minutes until it begins to thicken and reaches a “trace” consistency. Once this consistency is achieved, the mixer is turned off and additives such as fragrance, coloring, or honey are added, then stirred briefly until fully combined.

Table 1. Tools and Materials

Tools		Material	
Handblender	1 pair	Coconut Oil	250 ml
Scale	1 pair	Palm Oil	250 ml
Measuring cup	1 pair	Olive Oil	115 ml
Spatula	1 pair	NaOH / Soda Api	115 ml
Soap cutter	1 pair	Essensial Oil	50 ml
Mold	1 pair	Goat Milk	400 ml
Box	20 pair	Mangosteen	500 gram
Safety glassess	2 pair	Distilled Water	250 ml
Rubber gloves	4 pair	Niacinamide	50 gram
Sieve	1 pair		
Gauze	3 pair		
Stainless Steel Pan	1 pair		
Sharp Knife	1 pair		

Source: Aminudin, et al., (2019)

The finishing and drying process begins by pouring the soap mixture into molds lined with plastic wrap or wax paper to prevent sticking. The molds are then covered with a thick cloth or towel and left to set and harden for one to two days. Once hardened, the soap is removed from the molds and cut into bars of the desired size. Finally, the soap should be dried in a well-ventilated area for at least four weeks to cure before it is ready for use (Aminudin et al., 2019).

This study will analyze solid bath soap, including organoleptic analysis testing, soap acidity level (pH) testing, and laboratory testing for heavy metal, bacteria, and fungus content, in accordance with SNI 06-3532-1994.

3. Results and Discussions

Organoleptic analysis is performed by visually observing the soap formulation, including color, aroma, shape, and foam. The organoleptic analysis table for soap is shown in Table 2 below.

From Table 1 and Figure 1, it shows that after being printed and left for 2 weeks, all formulas are in solid form, this indicates that the saponification reaction has occurred thoroughly so that the reaction between the alkali base and fatty acids occurs perfectly. The color of the soap varies, ranging from yellowish white to dark brown. This occurs due to the addition of mangosteen peel extract. Meanwhile, the aroma of the soap itself has a distinctive aroma of mangosteen peel extract. The mangosteen peel extract soap produces a lot of foam, so that when used it feels rough and after use it feels rough and soft.

Study by Aminudin, et al., (2019) once all of the formulas have been formulated after one day of pencetakan and pendiaman, it may be concluded that the saponifikasi reaction has occurred

completely, resulting in a pure reaction between the alkali base and the lemak. Warna in a variety of ways, starting with putih kekuningan and ending with cokelat pekat. This is caused by the varying ekstrak kulit manggis, therefore the more ekstrak that is produced, the higher the cokelat pekat sabun that is produced. However, the scent of the sabun itself has a distinct, earthy scent. Even so, sabun ekstrak kulit manggis produces a lot of buih that are bergantung at the time of sabun formulation. Study Susanti and Juliantoro, (2021) the examination of mangosteen rind extract was carried out by observing organoleptic, drying loss and yield. Mangosteen rind extract has a thick liquid form, dark brown in color and bitter taste. The drying loss of mangosteen rind extract produced 5.52% and the yield data produced a value of 16.81%. The organoleptic results are in accordance with the literature, namely the identity of the thick mangosteen rind extract has the description of a thick extract, reddish brown color, distinctive odor and bitter taste (Ministry of Health of the Republic of Indonesia, 2017).

The acidity (pH) analysis was conducted to determine the pH of the soap formulation containing mangosteen peel extract. The measured pH value was 7, indicating a neutral level. In general, the pH of bath soap typically ranges from 8 to 11 according to SNI (1994). The results of this analysis are presented in Figure 2.

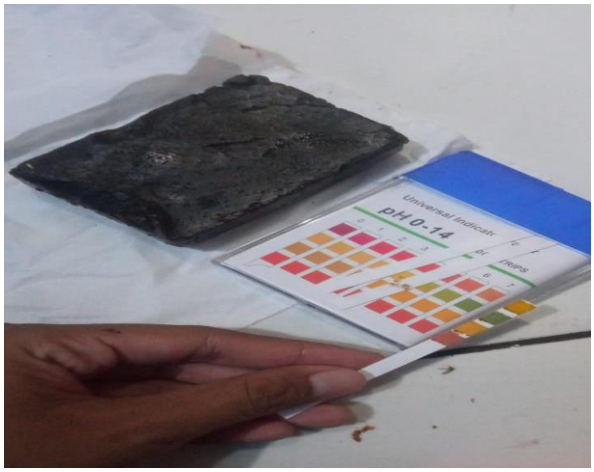

Figure 2. Soap pH Test
Source: Primary data, (2025)

The laboratory analysis conducted at PT Saraswanti Indo Genetech produced simplo and duplo test results as shown in Table 3. The results of the simplo and duplo heavy metal tests from the PT Saraswanti Indo Genetech laboratory include; mercury, lead, cadmium, arsenic, and 1.4 dioxane no detected. The simplo and duplo bacteria tests for Pseudomonas aeruginosa and Staphylococcus aureus were negative. The simplo and duplo fungus tests for Candida albicans were negative, but the simplo and duplo yeast mold fungi were found to be <10 according to the

total plate count (ALT) of simplo 6.0x101 and duplo 3.0x101, so in the process we must improve its hygiene.

Table 3. The results of the simplo and duplo test from the PT Saraswanti Indo Genetech laboratory

Parameter	Unit	Simplo	Duplo	Limit of Detection	Method
Merkuri (Hg)	mg/kg	Not detected	Not detected	0,2	18-13-9/MU/SMM-SIG (ICP OES)
Timbal (Pb)	mg/kg	Not detected	Not detected	0,05	18-13-9/MU/SMM-SIG (ICP OES)
Candida albicans	/0,1 g	Negative	Negative	-	ISO 18416:2015
Kadmium (Cd)	mg/kg	Not detected	Not detected	0,05	18-13-9/MU/SMM-SIG (ICP OES)
Angka Lempeng Total (ALT)	Colony/g	$6{,}0x10^{1}$	$3{,}0x10^{1}$	-	ISO 21149:2017
Kapang Khamir	Colony/g	<10	<10	-	ISO 16212:2017
Pseudomonas aeruginosa	/0,1 g	Negative	Negative	-	ISO 22717:2015
Staphylococcus aureus	/0,1 g	Negative	Negative	-	ISO 22718:2015
Arsen (As)	mg/kg	Not detected	Not detected	0,15	18-13-9/MU/SMM-SIG (ICP OES)
1,4-Dioxane	mg/kg	Not detected	Not detected	0,51	18-14-16/MU/SMM-SIG (GC-MS Head space)

Source: Primary data, (2025)

Study by Apriliani and Aniriani (2017) reported that from the formulations developed, the best one was selected based on organoleptic observations and subjected to several tests. The microbiological analysis showed that the Total Plate Count of 5.0×10^5 CFU/g and the yeast–mold count of 1.6×10^4 CFU/g did not meet the requirements set by BPOM. Meanwhile, contamination by *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Candida albicans*, as well as heavy metals Pb and Hg, was found to be negative.

4. Conclusion

Conclusions by organoleptic analysis was carried out by visually observing the results of the soap formulation which included dark brown color, softer texture, fragrant aroma of mangosteen fragrance extract, foam that foams easily, sensation when and after use is rough and moist. Analysis of the degree of acidity pH 7 is normal. The results of the simplo and duplo heavy metal tests from the PT Saraswanti Indo Genetech laboratory include; mercury, lead, cadmium, arsenic, and 1.4 dioxane no detected. The simplo and duplo bacteria tests for Pseudomonas

aeruginosa and Staphylococcus aureus were negative. The simplo and duplo fungus tests for Candida albicans were negative, but the simplo and duplo yeast mold fungi were found to be <10 according to the total plate count (ALT) of simplo 6.0x101 and duplo 3.0x101, so in the process we must improve its hygiene in production and packaging.

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