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Formulasi Susu Skim dan Susu Kedelai dalam Pembuatan Yoghurt
Formulation of Skim milk and Soy milk on Producing Soyghurt

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ABSTRACT

Soyghurt (yoghurt made from soymilk) is better than yoghurt made from cow's milk because of their lower in cholesterol, saturated fatty acid and lactose content. Objective of this research was to find out the effect of skim milk and soymilk formulation on the chemical and organoleptik characteristic of soyghurt produced. This research was designed with a completely randomized design (CRD) with 4 treatments i.e. formulations of skim milk and soy milk 100%:0%, 75%:25%, 50%:50%, and 25%:75%. The results showed formulation of skim milk and soy milk significantly affected the pH, flavor, aroma, and texture, of soyghurt produced, but did not significantly affected the protein content and color. The increase of the level of soy milk tends to lower the pH of soyghurt produced. Based on the sensory evaluation and chemical analysis the best formulation of skim milk and soy milk in producing soyghurt, was 25% of skim milk and 75% of soymilk. The formulation provided soyghurt with protein content of 4.85%, pH of 4.1, total acid of 0.75%; as well as color preferred, aroma rather preferred, and texture preferred by panelist..

Keywords: *soyghurt, soymilk, skim milk, formulation*

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INTRODUCTION

Soy bean (*Glycine Max* L.), the primary material for soy milk production, has been identified to be one of the most important legumes of the tropics with high protein content. It is a potential food material that contains all essential amino acids that are very important for the proper development of the body. Soy bean also has a higher content of Lysine in comparison to other plant proteins (Ade-Omowaye, *et al*., 2004). Soybean is a valuable food because of its both nutrients and bioactives content that are beneficial to the health. Soybean contains proteins, fats, minerals, isoflavone, and saponin (Dixit and Tiwari, 2011). Soy protein is a protein of high biological quality because it contains all the essential amino acids. Soybean fats is a healthy fats because it contains no cholesterol, and classified as unsaturated fats. Genistein, isoflavone compound in soybean, seems to inhibit bone breakdown (osteoporosis), because it prevents calcium loss through urine (Yamaguchi, 2002). In additions, genistein may increase the flexibility of blood vessels and has strong antioxidant activity that prevent cardiovascular disease. Saponin in soybean, potentially lowering blood cholesterol.

Soy bean can be processed in to soy milk which can be converted to yoghurt (soyghurt) which is valuable protein supplement or substitute for adult and infant feeding (Delia and Herbert, 1986). Soyghurt is lactose-free and can be consumed by the lactose-intolerant people as a substitute to milk. Soyghurt is better than yoghurt made from cow's milk because of their lower in cholesterol, saturated fatty acid and lactose content. Many soy products have limited human use due to undesirable off-flavors (Kanda, *et al*., 1976). Lactic acid fermentation has been reported as a means of reducing beany flavors and anti nutritional factors in soybean products (Pithong, *et al*., 1980). The use of soybean as raw material of soyghurt is an effort to maximize the utilization of soybean as a functional food.

This research aimed to find out the effect of skim milk and soymilk formulation on the chemical and sensory characteristic of soyghurt.

METHODS

Materials

Soy bean seed, skim milk, and plain yoghurt were purchased at lokal super market. Chemical reagent used for protein and acidity analysis were p.a. grade which were obtained at Food Analysis Laboratory, Faculty of Agricultural Technology, Udayana University.

Experiment design

The experiment was designed with a completely randomized design (CRD) with 4 treatments i.e. formulations of skim milk and soy milk 100%:0%, 75%:25%, 50%:50%, and 25%:75%. The experiment were repeated 3 times, so that obtained 12 experiment units.

Preparation of soy milk

Preparation of soy milk was conducted in such way that illustrated in Figure 1. Initially soybean was washed, soaked for 12 hours, and then boiled for 15 minutes. Cooked soybean was peeled, added water (400ml/100g), and then pulped to produce soybean slurry. The slurry obtained was squeezed to produce soy milk.

Preparation of soyghurt

The preparation of soyghurt was conducted in such way that illustrated in figure 2. Both soy milk and skim milk was heating at 85^{o}C for 30 minutes, then cooled to temperature of 45^{o}C. Soy milk and skim milk was mixed with a ratio according to treatments, and then added by 4% of plain yoghurt as source of inoculums. Incubation was conducted at 45^{o}C for 5 hours.

Variables

The observed chemical variables of this research were pH, titratable acidity (AOAC, 1995), and total protein (AOAC, 1995). The observed sensory variables include color, aroma, texture, and taste using hedonic test.

Statistical analysis

ANOVA were used to analyze chemical and organoleptic data. Duncan's Multiple Range Test (DMRT) was conducted if there any significant diversity to determine the difference between treatment.

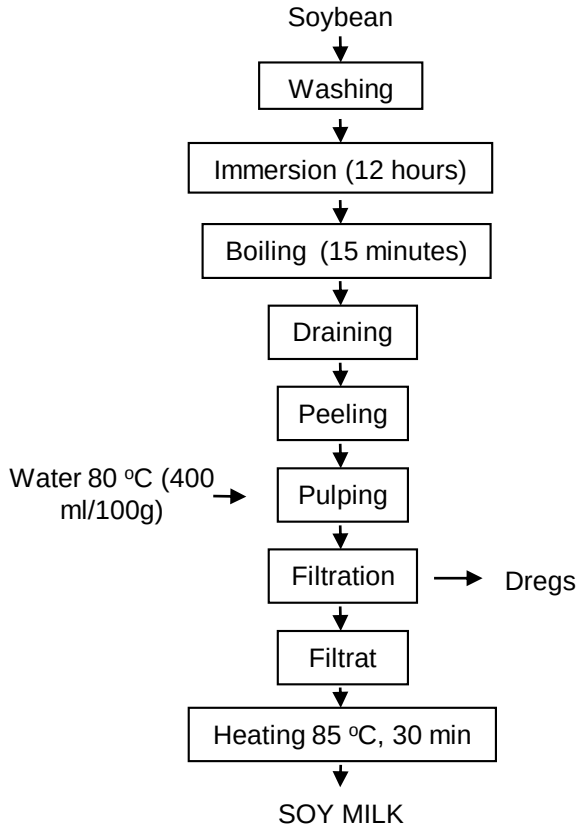

Figure 1. Preparation of soy milk

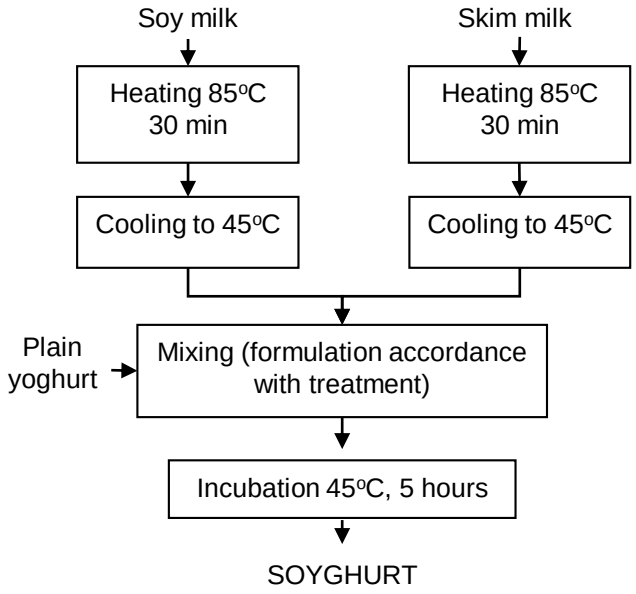

Figure 2. Preparation of soyghurt

RESULT AND DISCUSSION

Chemical properties of soyghurt

Formulation of soy milk and skim milk did not significantly ($P \geq 0.05$) affect protein content of soyghurt (Table 1). This was thought to be due to protein content of soy milk balance with protein content of skim milk. Protein content of the soyghurt was range from 4.35 to 4.85%. Soybean is the cereal with the highest protein content. Essential amino acids found in soy protein include isoleucine, leucine, lysine, threonine, valine, methionine, phenylalanine, and tryptophan, with the limiting amino acids are methionine and cysteine (Wirakusumah, 2007).

Titratable acidity of soyghurt was not significantly ($P \geq 0.05$) affected by the formulation of skim milk and soy milk (Table 1). Titratable acidity of soyghurt was range from 0.55 – 0.75% (calculated as lactic acid). Soymilk contains various oligosaccharides including raffinose and stachyose (Scalabrini et al., 1998; Shin et al., 2000). This compounds were degraded by lactic acid bacteria during soyghurt fermentation, and produced organic acids (Sumarna, 2008). Pham and Shah (2009) stated, organic acids formed in soyghurt fermentation were lactic acid and acetic acid, in which lactic acid was the predominant organic acid. In addition to lactic and acetic acids, other organic acids including propionic, citric, and butyric are also produced in soyghurt in a small quantity.

Formulation of soy milk and skim milk significantly ($P \leq 0.05$) affected the pH-value of soyghurt (Table 1). The lowest pH-value was obtained at the formulation of skim milk and soy milk 100% : 0%; while the highest was obtained at the formulation of 20% : 75%. This results showed, the increase of soy milk composition tend to lower the pH-value of soyghurt.

Table 1. Chemical properties of soyghurt

Skim milk : soy milk	Protein (%)	Acidity (%)	pH
100% : 0%	4.35 a	0.55 a	5.80 a
75% : 25%	4.72 a	0.70 a	4.39 b
50% : 50%	4.22 a	0.70 a	4.13 c
25% : 75%	4.85 a	0.75 a	4.10 c

Hedonic score of soyghurt

Effect of skim milk and soy milk formulations on hedonic score of soyghurt was showed by Figure 3. Skim milk and soy milk formulation significantly ($P \leq 0.05$) affected taste, color, and texture of soyghurt, but did not significantly ($P \geq 0.05$) affect aroma of soyghurt. The texture hedonic score of soyghurt increased with the increase soy milk composition, but the hedonic score of taste tended to decreased with the increase of soy milk composition.

CONCLUSION

Based on the sensory evaluation and chemical analysis the best formulation of skim milk and soy milk in soyghurt production, was 25% of skim milk and 75% of soymilk. The formulation provided soyghurt with protein content of 4.85%, pH of 4.1, total acid of 0.75%; as well as color preferred, aroma rather preferred, and texture preferred by panelist.

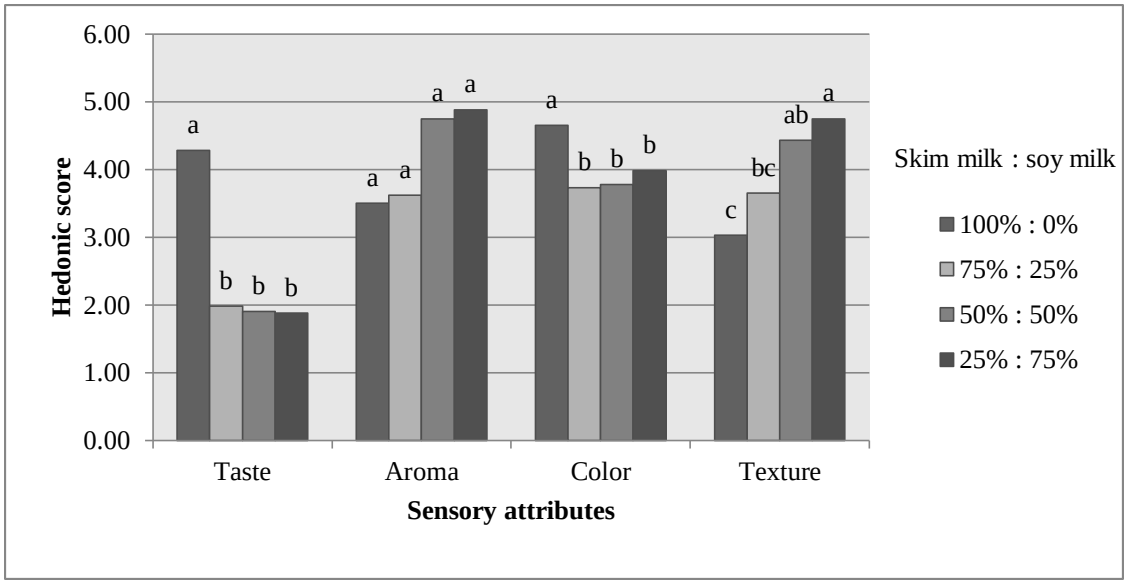

Figure 3. Hedonic score of soyghurt as the effect of skim milk and soy milk formulation

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