

# APPLICATION SKIM MILK ON MAKING KEFIR SOY MILK

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## ABSTRACT

Soy milk is a nutrient-rich drink. One way to improve the quality of soy milk by processing it into a probiotic drink is kefir. The purpose of this study to determine the effect of additional concentration of skim milk on the quality of kefir is seen from the physical properties of chemistry and microbiology. This research uses Completely Randomized Design (RAL) method. This research was conducted in two stages concentration of skim milk addition that is 2%, 4%, 6% and 8% . The parameters used were total microbes, pH, alcohol content and TSS. The result of statistical analysis on each parameter gives the following conclusion: . The addition of skim milk had a very significant effect on  $p < 0.01$  on total microbial, pH, alcohol content and TSS..

**Keywords:** Kefir, Skim Milk, Soy Milk.

## A. INTRODUCTION

Diversification of processed soybeans has been widely carried out both as processed foods and drinks. One of soybeans are processed drinks soy milk. Soy milk has a lot of processed both originals and with the addition of natural dyes such as red dragon fruit peel extract (MD Masyhura dkk, 2018)

One cause of underdevelopment in the consumption of soy milk is for their unpleasant taste (beany flavor) are less preferred. The cause of the unpleasant taste is a compound containing a carbonyl group that is volatile like n-hexanal. This compound is formed as a result of oxidation of unsaturated fatty acids found in soybean seeds, especially linoleic due to the activity of the lipoxygenase enzyme. The content of the lipoxygenase enzyme varies between soybean varieties / lines. In addition, the soybeans are also contained compounds and sepet cause a bitter taste that comes from glycosides and chalky taste caused by the isoflavones and derivatives (Bewley dkk, 2013).

One way to improve the quality of soy milk is to process it into a probiotic drink. The manufacture of probiotic drinks is done through a fermentation process that aims to preserve the product, give a taste or flavor to certain food products. The fermentation process carried out by certain microbes is expected to increase the nutritional value of fermented products. The fermented products that people are starting to like are kefir probiotic drinks. Kefir is fermented milk that has a taste, color and consistency that resembles yogurt and the special aroma of yeast (like tape). Kefir is obtained through the fermentation process of pasteurized milk using a starter in the form of kefir grains or seeds, white and cream granules from a collection of bacteria and several types of yeast. Traditionally, kefir is made from cow, goat and sheep milk but can also be made from vegetable milk which is milk derived from plants such as beans. Soy milk can be used as a raw material in making kefir (Widowati, 2007).

Raw materials that are commonly used in making kefir are fresh whole milk (whole milk) or skim milk which is intended to make kefir produced low in fat and can be consumed by consumers who avoid fat. According to (Fратиwi dkk, 2008) skim milk added in the manufacture of kefir plays an important role in the formation of alcohol, foamy and kefir-smelling that is not owned by soy milk. Addition of skim milk can affect the taste and aroma (flavor) and texture of soy milk during fermentation. The fermentation time in making kefir determines the quality of kefir microbes. The longer the fermentation, the more microbes forming kefir probiotic drinks are produced.

## B. MATERIAL AND METHODS

### Materials Reserarch

Materials used are kefir, soy milk and skim milk.

### Research Methods

This research uses Completely Randomized Design (RAL) method. This research was conducted in two stages concentration of skim milk addition that is 2%, 4%, 6% and 8% .

### Making Kefir Soya

1. Soybean is sorted as much as 1 kg.
2. Soaked with clean water for 3 hours, then clean the arinya skin.
3. Then the cleaned soybean is put into a blender 1 and added with water in a ratio of 1: 3.
4. Blend the soybeans until smooth and filtered.
5. The filter results (soybean juice) are cooked at a temperature of 80<sup>0</sup>C while stirring, add skim milk according to treatment.
6. After 15 minutes the soybean extract is removed and cooled to 40-45<sup>0</sup>C.
7. Then the kefir starter is added according to the treatment and incubated for 24 hours at room temperature of 28<sup>0</sup>C. So that the kefir is obtained.
8. After that, total microbial, pH, alcohol and TSS levels are analyzed.

### C. RESULT AND DISCUSSION

#### Total Microbial

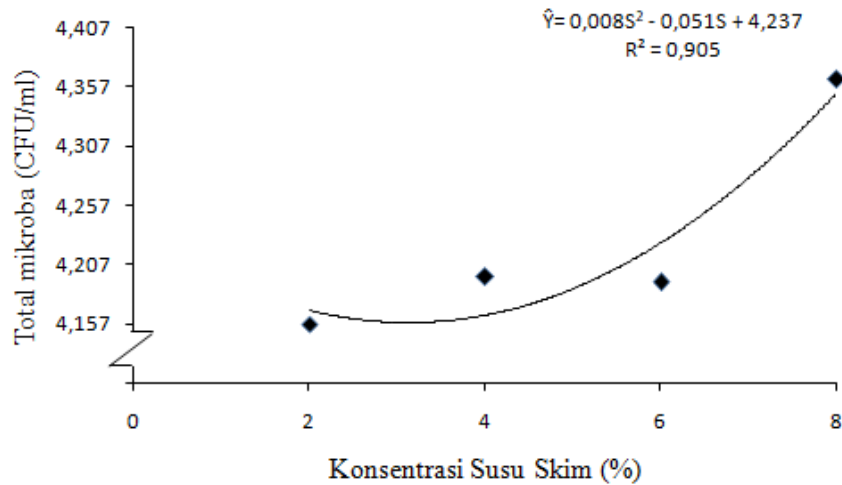


Figure 1. Relationship concentration of skim milk with total microbial.

From figure 1 . can be seen that the higher the concentration of skim milk the total microbial will increase. Microbial growth is strongly influenced by the availability of nutrients. Skim milk which is rich in carbohydrates and protein is a good medium for the survival of microbial growth. The sugar contained in skim milk (lactose) will be used by microbes as an energy source for growth. The more available the energy source, the faster the microbes

will grow. Skim milk also provides protein as a source of nitrogen for growth. Protein is also used as a cell, proteins contained in skim milk will be remodeled into amino acids. According to (Riadi, 2007), protein is an organic source of protein that will be used in the fermentation process. Microorganisms will be able to grow quickly in the presence of organic nitrogen.

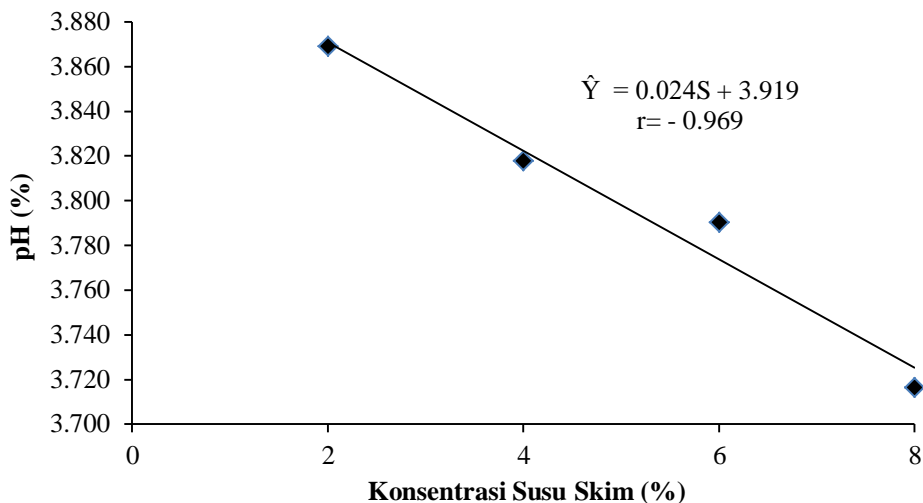


Figure 2. Relationship concentration of skim milk with pH.

From figure 2 can be seen that the higher the addition of skim milk the pH will decrease. The lowest pH value is produced at 8% skim milk concentration. Decrease in pH value in fermented drinks is influenced by the content of lactic acid produced by lactic acid bacteria. There is a decrease in the pH value of kefir drinks with increasing skim milk added. This decrease in pH is due to lactic acid produced during the fermentation process. Sucrose and lactose contained in skim milk are

transformed into lactic acid during the fermentation process which can reduce the pH value of the product. The more sugar sources in skim milk are indicated by the higher concentration of the addition, the more lactic acid is produced, the lower the pH value of the product. According to Winarno and Fernandez (2007), the pH value will be related to the amount of lactic acid, the higher the lactic acid produced, the lower the pH value of the product.

## Alcohol Content

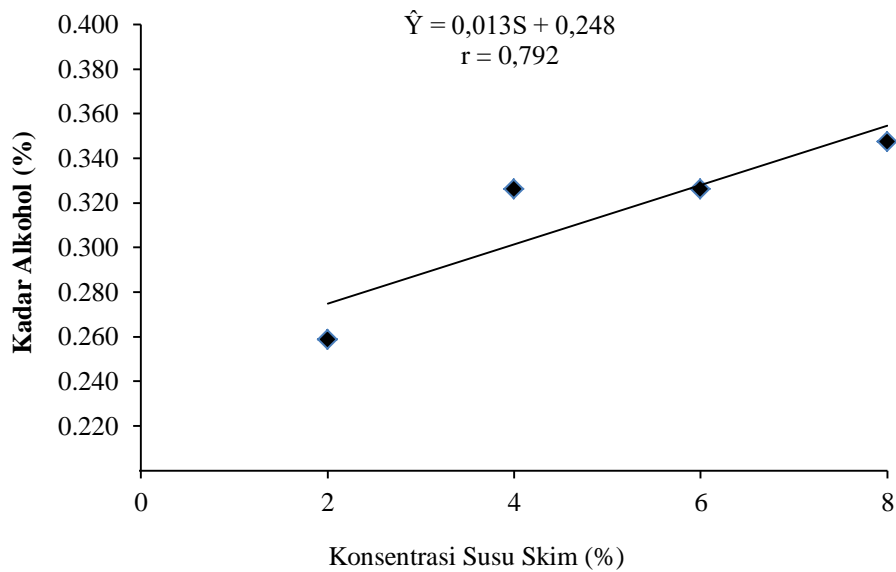


Figure 3. Relationship concentration of skim milk with alcohol content.

From figure 3 can be seen that the higher the addition of skim milk, the alcohol content will increase. This is because skim milk contains lactose sugar which is a source of nutrition for bacteria in fermenting fermented drinks. According to Desrosier (1988), the more the amount of lactose

sugar found in the ingredients, the higher the amount of alcohol produced from the sugar overhaul. The greater the amount of sugar that is hydrolyzed and the more microbes that convert sugar to alcohol, the higher the level of alcohol produced.

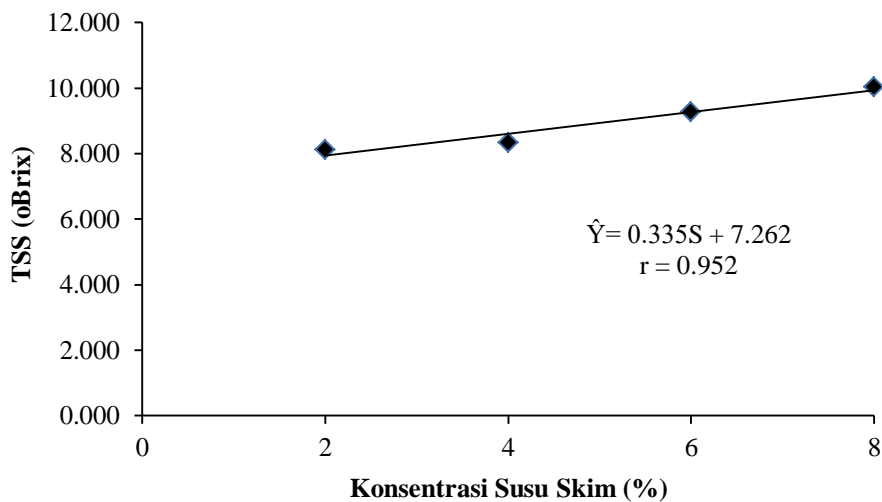


Figure 4. Relationship concentration of skim milk with TSS.

From figure 4. can be seen that the higher the concentration of skim milk the TSS will increase. This is caused by the activity of the growth of lactic acid bacteria which results in increased mass or solids from the kefir. Assuming a homogeneous kefir sample with the measured amount of milk casein as total solids is the same for each treatment, then when associated with lactic acid production it turns out that kefir with high total solids also has a high acidity level. This is presumably because lactic acid plays a role in the

process of coagulation of milk casein by using the enzyme lactase which causes an increase in total solids (Susanti, 2005).

## D. CONCLUSIONS

From the results of research and discussion about the Effect of Skim Milk on Soybean Milk can be concluded as follows:

1. Addition of skim milk has a very significant effect on the level of  $p < 0.01$  on total microbial, pH, alcohol content and TSS.

2. This research has fulfilled the kefir chemical composition seen from the average pH analysis of around 3.8% and the average alcohol content analysis of 1.26%.

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