Nutrient analysis of dadih from Lintau Regency, West Sumatra, Indonesia

Hurriya Alzahra¹, Sri Melia² and Susmiati³

¹Post Graduate Faculty of Animal Science, Andalas University, Padang 25163, Indonesia, email: hurriyaalzahra19@gmail.com
²Lecture at Faculty of Animal Science, Andalas University, Padang 25163, West Sumatra, Indonesia, email: srimelia75@ansci.unand.ac.id
³Lecture at Faculty of Nursing, Andalas University, Padang 25163, West Sumatra, Indonesia, email: susmiati@nrs.unand.ac.id

*Corresponding author e-mail: susmiati@nrs.unand.ac.id

Abstract. Dadih is a traditional food from buffalo milk fermentation in West Sumatra, Indonesia. Which is fermented for 24-48 hours at room temperature. This study aimed to determine the chemical properties of Dadih from Lintau Regency, West Sumatra, Indonesia. The measured Variables were protein content, fat content, water content, and pH. The research method was a descriptive method and analysis in the laboratory. The sample used was taken in Lintau Regency, West Sumatra, Indonesia. The results showed that the nutrition composition of Dadih is: protein content ranged from 7.58-8.92%, fat content ranged from 5.60-6.18%, water content ranged from 72.43-74.86%, and pH ranged from 5.1-5.4. The conclusion is that Dadih has good nutritional quality.

Keywords: Dadih, protein content, fat content, water content, pH.

1. Introduction

Indonesia has the potential for livestock to be developed where the products of these livestock products can be processed, one of which is functional food such as buffalo, whose milk used to be processed into dadih which have good nutritional value for the health of those who consume them, but there are still many people who do not know about buffalo milk and its processed remove space as dadih and the nutrients contained in dadih on public health.

Buffalo milk is a food and beverage ingredient that can be consumed by the people of Indonesia, either directly consumed or processed first. The nutritional content contained in 100 grams of buffalo milk contains 160 kcal of energy, 6.3 grams of protein, 7.1 grams of carbohydrates, 12 grams of fat, 216 mg of calcium, 101 mg of phosphorus, 80 IU of vitamin A, vitamin B1 by 0.04 mg and vitamin C by 1 mg, with an edible amount of 100%. In milk technology, milk is a product that is used for milk production obtained from one or more mammals milking processes. In general, cow’s milk is the most common milk used as raw material for milk processing plants. Milk from other mammals is also used in several countries, even more widely known by the public, such as buffalo milk in India and Pakistan [1].

Dadih is a traditional food ingredient from West Sumatra made from fermented buffalo milk [2]. Dadih is a product made from buffalo milk which is fermented for 24048 hours in bamboo at room temperature. Dadih is a lump of buffalo milk that does not change or break which is produced by boiling
the milk at room temperature (27°C). Dadih is white like tofu and consumed using a spoon. The basic ingredient in making dadih is buffalo milk which is fermented in a bamboo tube, then covered with plastic or banana leaves and there is no addition of starter to the buffalo milk [3]. Dadih is a functional probiotic food containing Lactic acid bacteria which can convert lactose into lactic acid [4]. Lactic acid bacteria are a group of Gram-positive bacteria that are non remove space and mesophyllic, facultative anaerobic, non-spore, arranged in pairs or chains, in the form of bacilli or cocci, negative catalase capable of producing lactic acid by fermenting carbohydrates [5].

Probiotics are live microorganisms that, when consumed by humans have beneficial effects on health. According to ISAPP probiotics are living organisms which is consumed in sufficient quantities are capable of providing beneficial effects to their hosts. Probiotic bacteria have various benefits that are good for human health such as in the immune system, urogenital system, intestinal system, reducing energy effect, and have other benefits [6].

Dadih which has good quality has the characteristics that it has a distinctive aroma of sour milk, is white with a consistency resembling yogurt, has a distinctly sour taste with a blend of bamboo and milk aroma, yellowish-white with a specific aroma [7]. The nutritional content is dadih depends on the area of production. This causes the nutritional content of dadih to vary. Previous research results from [8] the protein content in dadih is 5.7-6.6%, fat content is 7.9-8.2% water content is 69-73%. Dadih contains high protein, namely 39.80% with a fairly complete content of essential amino acids, calcium, vitamins B and K which are formed during the fermentation process [9]. In general, dadih contains high protein and fat with an average protein content of 6.75% [10]. The purpose of this research was to know the chemical properties of dadih by testing the protein content, fat content, water content and pH.

2. Materials and methods

The method used in this research is survey and laboratory analysis at the Laboratory of Livestock Product Technology Faculty of Animal Husbandry, Andalas University, Padang. The sample used as material for this research is dadih from Tanjuang Bonai, Lintau Regency, West Sumatra.

![Figure 1. Map of the Tanjuang Bonai, Lintau Regency, West Sumatra, Indonesia.](image)

The material used in this research for the nutritional value of dadih are H₂SO₄, 30% NaOH, distilled water, methyl red indicator, 0.1 N NaOH, spiritus, and benzene. The equipment used in this research
were porcelain plates, label paper, electric oven, pH meter, analytical scales, Kjeldahl flasks, funnels, beaker glasses, Erlenmeyer, distillation flasks, fume hoods, Bunsen, hyacinth pipettes, volumetric flasks, a set of Soxhlet tools, grease paper, and aluminium foil. The method used in this study is a descriptive method and laboratory analysis.

2.1 Protein content
Dadih protein content was determined based on the guidelines of [11] using the Kjedhal method with the following work procedures:

2.1.1 Destruction stage. Dadih sample dry using analytical scale were weighed as much as 1 gram and put into a Kjeldahl flask. Then to the Kjeldahl flask, 1 gram of selenium catalyst was added and 25 mL of concentrated H₂SO₄ was added and then heated so that destruction occurred. Heating is carried out continuously so that the solution becomes clear or colorless, occasionally shake the Kjeldahl flask so that the answer is homogeneous. The purification process is faster. Cool the pumpkin once it is clear.

2.1.2 Distillation stage. The solution was transferred to a 500 mL volumetric flask and then diluted with distilled water to mark the line. Then take 25 mL of sample solution plus 25 mL of 30% NaOH, which has been mixed with 150 mL of aqua dest, and put it in a distillation flask. The answer is heated (2/3 distill) until all N from the liquid in the flask is captured by H₂SO₄ 0.05 N, which is first mixed methyl red indicator drops and Erlenmeyer.

2.1.3 The titration stage. Erlenmeyer containing the distillate was titrated with NaOH 0.01 N (Z mL). Another Erlenmeyer added 25 mL of H₂SO₄ 0.05 N and three drops of methyl red indicator and titrated with 0.1 NaOH to change the color from pink to yellow as blank (Y mL).

2.2 Fat content
Calculating the dadih fat content was determined by the Soxhlet method based on the guidelines of [11], with the following work steps: 1 gram of dried sample was wrapped in grease paper and then dried in an electric oven for 12 hours at 105°C, the packages were weighed hot then extracted with benzene for 4-6 hours until the benzene became clear in Soxhlet. The extraction was stopped while the sample was cooled to dry, where the benzene would evaporate. The samples were dried in an electric oven at 105°C for 4 hours to obtain a constant weight. The packages are weighted individually when hot. The weight difference before and after extraction is the weight of fat in the food.

2.3 Water content
The water content of the sample dadih was determined based on the guidelines of [11]. The aluminium plates were oven-dried at 110°C for 1 hour and then cooled in a desiccator. The dishes are weighed and filled with a sample of 5 grams. Then dry in the oven at 105°C for 8 hours. Cool in a desiccator and weighed the carried out repeatedly until the weight becomes constant.

2.4 pH
Dadih pH value can be observed based on the guidelines of [11] as follows; the sample was weighed as much as 50 mL and were put into a beaker glass. The pH meter is standardized using a standard buffer solution with a pH of 7 (sterile distilled water). Next, the electrode is immersed in the beaker glass, which contains the sample; pH readings are made after the pH meter scale stabilizes.

3. Results and discussion

3.1 Dadih chemical analysis
This analysis is shown to obtain the nutritional value of dadih. The results of the chemical analysis of dadih can be seen in Table 1 below.
Table 1. Results of chemical analysis of dadih from Lintau Regency.

| Sample code | Protein content (%) | Fat content (%) | Water content (%) | pH  |
|-------------|---------------------|----------------|-------------------|-----|
| DHS 1       | 7.58                | 6.18           | 74.86             | 5.1 |
| DHS 2       | 8.92                | 5.63           | 72.43             | 5.4 |
| DHS 3       | 7.92                | 5.60           | 73.84             | 5.2 |

DHS 1 (Dadih repeat 1), DHS 2 (Dadih repeat 2) DHS 3 (Dadih repeat 3).

3.2 Protein content
Based on the research that has been done, it was found the protein content in the dadih ranged from 7.58 to 8.92%. The protein content in the sample code dadih of DHS 1, DHS 2, and DHS 3 was 7.58%, 8.92%, and 7.92%. The content protein of dadih obtained from the study contained almost the same content as the research conducted by [4] who obtained the results of dadih protein content from Limapuluh Kota Regency of 8.25%. While this study had a higher protein content than [12] which had a protein content of 6.72-7.02%. In West Sumatra, the protein content of dadih ranged from 3.79-8.25%. The difference in protein content of dadih can be influenced by the composition of the original milk, the manufacturing process, and the activity of microorganisms during the fermentation process [13]. The increase in protein was caused because only a small portion of milk protein was degraded and used by microorganisms [4].

3.3 Fat content
Based on the research that has been done, it was found the fat content in the dadih ranged from 5.60 to 6.18%. The fat content in the sample code dadih of DHS 1, DHS 2, and DHS 3 was 6.18%, 5.63%, and 5.60%. The dadih fat content of the result of this research had lower fat content than the research by [4] who obtained dadih fat content from Limapuluh Kota Regency of 10.41% and the fat content of this research was also lower than [12] which had fat content in dadih ranged from 7.32-8.20%. The difference in fat content of dadih can be influenced by the composition of the milk, the manufacturing process, the activity of microorganisms during the fermentation process [13]. Another factor that causes differences in fat content of dadih was the treatment at the time manufactured such as the addition of a starter in the form of ready-made dadih into to be made, that it can reduce the fat content of dadih [4].

3.4 Water content
Based on the research that has been done, it was found the water content in the dadih ranged from 70.66 to 74.86%. The water content in the sample code dadih of DHS 1, DHS 2, and DHS 3 was 74.86%, 72.43%, and 73.84%. The results of this research are almost the same as those of [4] which stated that the water content of dadih in Limapuluh Kota Regency was 75.86%. Meanwhile, according to [12] these results have almost the same ranged of the water content of dadih was 74.05-77.63%. The water content in Sumatra ranged from 68.69 to 75.86%. Differences in water content in dadih can be caused by the lactation period, genetics, composition, and content of feed given to livestock.

3.5 pH value
Based on the research that has been done, it was found the pH in the dadih ranged from 5.1 to 5.4. The pH value in the sample code dadih of DHS 1, DHS 2, and DHS 3 was 5.1, 5.4, and 5.2. According to [12] it has a pH value ranged from 42 to 46. The difference in pH value in dadih can be used by differences in microorganisms contained in dadih. With the increasing number of lactic acid bacteria found in the dadih, the pH of the dadih will increase and the longer the fermentation time is carried out will affect the pH of the dadih [14]. The decrease or increase pH of dadih can also be caused by the conversion from lactose to lactic acid by microorganisms and enzymatic activity [15]. The results of this research have a range that is almost the same as the pH value of 5.02-6.01 conducted by [16].
4. Conclusion
Dadih is a traditional food derived from buffalo milk from West Sumatra which is fermented for 24-48 hours at room temperature. Dadih is a functional probiotic food containing lactic acid bacteria which can convert lactose into lactic acid. Based on the research that has been done, the results obtained for the protein content ranged from 7.58 to 8.92%, fat content of dadih ranged from 5.60 to 6.18%, the water content of dadih ranged from 72.43 to 74.86% and the pH value ranged from 5.1 to 5.4. Based on the research above, it can be concluded that dadih has a good nutritional value.

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