Proximate analysis of Dadih from Kapau, Agam Regency, West Sumatera, Indonesia

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Abstract. Dadih is a traditional food from buffalo milk fermentation in West Sumatera, Indonesia which is fermented for 24-48 hours at room temperature. This study aimed to determine the proximate analysis of Dadih from Kapau, Agam Regency West Sumatera, 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 Kapau Agam Regency, West Sumatera, Indonesia. The results showed that the nutrition composition of Dadih is: protein content ranged from 7.96%, fat content ranged from 5.53%, water content ranged from 73.55%, pH ranged from 5.16. The conclusion is that Dadih has good nutritional quality.

Keywords: dadih, protein content, fat content, water content, and pH

1. Introduction

Based on the classification, there are two types of buffalo, namely, mud buffalo and river buffalo. Mud buffaloes are usually kept as working cattle and for meat production, but in some areas in West Sumatera their milk is also used as curd, while river buffalo are used as dairy cattle that produce milk which is widely developed in North Sumatra. The buffalo used as a producer of Dadih from Kapau, Agam, West Sumatra is a murah buffalo that is included in the type of river buffalo. The production of cheap buffalo milk from Kapau, Agam, West Sumatra ranges from 6 ± 8 liters/day [19]. The use of buffalo milk as raw material needs to be considered considering that buffalo milk production in the dadih production area continues to decline as the buffalo population decreases. The decrease in buffalo milk production needs to be overcome by finding alternatives to buffalo milk, for example using cow's milk to ensure the continuity of curd production. However, the characteristics of buffalo milk are different from other livestock milk, so technology is needed in the production of curd [3].

Buffalo milk is a food source that contains complete and sufficient nutrition to meet human nutritional needs. Many kinds of processed products made from raw buffalo milk have been developed in Indonesia, especially West Sumatra as they are considered as food source that has high nutritional value. Dadih (curd) is a typical dairy product obtained from buffalow milk of West Sumatra processed by a natural fermentation process in a bamboo container. The process itself is assisted by microorganisms that produce lactic acid bacteria naturally found in buffalo milk when it is put in a bamboo tube then covered with banana leaves or plastic and fermented at room temperature for 1 or 2 days until the dadih or curd is formed [1].
The bamboo used is thought to consist of molds, yeasts, and microorganisms that form protein lactic acid. The fermentation that occurs in this curd does not only come from buffalo milk, but is thought to have come from bamboo banana leaves and, buffalo milk used. The bamboo used is ± 4-5 cm in diameter and cut ± 20 cm. While the milk that is put into the bamboo is ± 250 ml per bamboo [2].

This curd can be consumed by the Lactose Intolerance group and can control and maintain intestinal microflora and is easily absorbed by the body. Dadih processing generally uses buffalo milk through natural fermentation by utilizing lactic acid bacteria [5].

The purpose of this paper is to review the potential development of curd as a functional food of West Sumatra. In particular, this paper aims to determine the characteristics of buffalo milk curd in terms of water content, fat content, protein content and, pH using the proximate analysis method which is proven to be beneficial for improving body health.

2. Materials and methods

2.1. Materials
The raw material used is dadih which comes from smelly milk from Nagari Kapau, Agam, West Sumatra. Meanwhile, the equipment used to test the nutritional value in this curd study was H2SO4, NaOH 30%, distilled water, methyl red indicator, NaOH 0.1, spritus, benzene. The equipment used in this study were label paper, pH meter, porcelain dish, electric oven, analytical balance, funnel, Kjedhal flask, distillation flask, erlenmeyer, beaker glass, Bunsen, water hyacinth, Soxhlet toolset and, aluminum foil.

2.2. Methods
This study used 17 murah buffaloes Lactation 1 from Nagari Kapau Agam, West Sumatra. This research was conducted using a survey method with laboratory analysis conducted at the Animal Products Technology Laboratory, Andalas University. The observed variables were dadih quality: water content (AOAC oven method), protein content (Kjeldahl method), fat content (Soxhlet method) and, pH [14].

3. Result and discussion
This analysis aims to obtain the nutritional value of dadih from Nagari Kapau Agam, West Sumatra. The following is the result of the nutritional value of curd which can be seen in the table below.

| Parameters     | Average (%) |
|----------------|-------------|
| Water Content (%) | 73.55       |
| Protein Content (%) | 7.96        |
| Fat Content (%)     | 5.53        |
| pH                | 5.16        |
3.1. Water content

The results were obtained with an average water content of 73.55%. The water content of dadih from swamp buffalo from Batusangkar was higher than dadih from Murah buffalo which reached 82.10%. The low value of whey water content was due to an increase in the number of components that make up curds such as protein content and fat content (Table 1). The increase and decrease in protein content and dadih fat content were influenced by the activity of lactic acid bacteria.

The high water content in the material will trigger the growth of high microorganisms, so the product cannot withstand storage. The decrease in water content will be followed by a decrease in water activity (AW) where AW is one of the factors in bacterial growth. The lower the water content in the dadih, the longer the shelf life of the dadih [15].

According to SNI, the water content of Dadih from West Sumatra ranges from 68.69% to 75.86%. Which results obtained are comparable to the water content of Dadih that comes from Kapau. The high water content in milk that undergoes a fermentation process in dadih is determined by the activity in the process of reshuffling carbohydrates, proteins and fats in foodstuffs [16].

3.2. Protein content

The protein content of dadih from Murah buffalo from Kapau Agam, West Sumatra, was 7.96%. The protein content of Kapau curd is higher than that of the swamp buffalo, which is 8.25%. Dadih contains high protein in the range (39.8%) with a fairly complete content of essential amino acids, calcium, and vitamins B and K which are formed during the fermentation process [17]. The difference in protein content obtained is influenced by the type of livestock that produces it, the animal feed is eaten, the manufacturing process and, the microorganisms during fermentation [10]. Dadih from Kapau, Agam West Sumatra is produced from Murah buffalo which is a milk-producing buffalo, while dadih from Lima Puluh Kota is produced from swamp buffalo, which is a meat animal whose milk is used. So that the protein nutrition produced will be much different, because the increase in protein content is caused by the proteolytic process of milk protein which is degraded and utilized by microorganisms [6].

Dadih is expected to have a higher protein value. This is because dadih is a traditional food derived from milk that goes through a fermentation process with the help of microorganisms. With the help of microorganisms during fermentation, it is expected to be able to enrich the protein in the curd. Protein content in curd is influenced by proteolytic processes, while the increase in protein is caused because only a small part of milk protein is used by microorganisms [6]. Factors that affect the protein content in milk to become curd include breed of livestock, feed, age, lactation period, climate, season, and disease [17].

3.3. Fat content

Based on the research that has been done, the fat content of dadih from Kapau, Agam, West Sumatra is 5.53%. The fat content obtained was lower than the fat content of dadih produced from swamp buffalo from Lima Puluh Kota, which was 10.41% [6]. Differences in dadih fat content can be influenced by acetic acid derived from forage given feed because the type of feed also affects milk production, composition, and milk fat [16].

Another factor that causes differences in the fat content of the dadih is the treatment at the time of manufacture such as the addition of a starter in the form of ready-to-use dadih into the dadih to be made to reduce the fat content in the dadih. The addition of this starter will increase the number of microorganisms that will accelerate developmental activity and produce lipase enzymes that play a role in the lipolysis process. The faster the lipolysis process, the faster the fat loss, because the lipolysis process will affect the fat content of the dadih [6].

3.4. pH

The pH value of the dadih obtained is 5.16. The results of this study were lower than the dadih from the swamp buffalo, Solok West Sumatra with the pH of the dadih obtained in the range of 5.0 - 6.1
However, it was higher than dadih from the swamp buffalo, Batusangkar West Sumatra with a pH of 4.2-4.6 [9]. The difference in pH levels in the dadih is caused by the activity of microorganisms that occur during the fermentation process in the dadih. In addition, the length of fermentation also affects the pH level in the dadih. The decrease and increase in pH is also caused by the conversion of lactose to lactic acid by microorganisms as well as enzymatic activity [11].

The decrease in pH obtained also comes from the milk fermentation process that goes well, so that metabolism runs more optimally and the production of metabolites by microorganisms becomes more abundant such as lactic acid, acetic acid, formic acid and other organic acids. Changes in the pH value of dadih are influenced by the activity and number of lactic acid bacteria in the manufacture of buffalo milk dadih. The longer the storage time, the lower the pH value of the dadih. The components of milk that play a role in fermentation are lactose and casein. Lactose is used as a source of energy and carbon which will be converted by LAB into lactic acid. The lactic acid causes the acidity of the milk to increase or decrease the pH value [13].

4. Conclusion
Dadih is a traditional fermented food typical of West Sumatra. The contents of nutritional values in curd include water with average water content of 73.55%, protein content of 7.96%, fat content of 5.53%, and pH 5.16. Therefore it can be concluded that the curd originating from the murah buffalo in Kapau, Agam, West Sumatra has the same quality as the dadih derived from the swamp buffalo.

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