The quality and quantity improvement efforts for Geblek Kulonprogo as a millenial healthy snack

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Abstract. Geblek is a traditional food made from wet cassava starch that has become an icon of Kulonprogo District, Special Region of Yogyakarta. The characteristics of geblek are white, number eight shapes, savory taste, and chewy texture. Some problems of Small and Medium Enterprises (SME), Patimurni Andani as the producer of geblek, are the cooking equipment for geblek dough, label and packaging that do not accorance with the goverment regulation. The objective of this community service is to improve the quality and quantity of geblek production as a milenial healthy snack. The method of this study consisted of the design and manufacture of the geblek dough cooker, the nutritional composition analysis, and the improvement of label and packaging. The results of this community service showed that the specifications for the geblek dough cooker were 75 cm in height and 45 cm in diameter, the material was from stainless steel 304, the maximum pressure was 5 kg/cm², the maximum temperature was 145⁰C, the tank volume was 190 liters, the capacity was 150 kg, and the gas consumption was 0.8 kg/hour. These results suggested that the quality and quantity improvement of geblek could be implemented in SME to produce it as healthy snacks.

1. Introduction

Indonesia is an archipelago country consisting of 17,504 islands and only around 6000 inhabited islands. The ethnic groups in the islands of Indonesia are around 300 ethnic groups or 1340 ethnic groups based on the 2010 BPS census [1]. Ethnic diversity in Indonesia contributes to cultural diversity, including the food. One of the identities of a community and ethnic group is from its food. Foods that are closely related to an area and inherited from generation to generation as part of the tradition, usually called traditional food, local food, or culinary specialties [2].

Every region in Indonesia has a culinary diversity as the characteristic or identity of the region. Kulonprogo is one of the districts on the west side of the Special Region of Yogyakarta which is known for its various tourist destinations and unique regional products. One of the traditional or local food in Kulonprogo District is known as geblek. It is a snack food made from wet cassava starch (tapioca) with addition of seasoning and then fried before ready to eat. The sensory characteristics of geblek consist of white color, a number of eight shapes, savory taste, and chewy texture. Its chewy texture is obtained when the geblek is warm. If geblek is stored at room temperature for several hours and became cold, the geblek’s texture turns into tough.
Related to this potential of Geblek, the Regent of Kulonprogo, Hasto Wardoyo, has launched Bela Beli Kulonprogo (Bela Beliku) program since 2015 to encourage the people and government officials of the Kulonprogo to buy local products from the Kulonprogo community, including geblek. Geblek has turned into an iconic food of Kulonprogo, even the local government of Kulonprogo uses the geblek pattern as a special batik pattern which becomes a compulsory uniform for the local government officials as well as the school uniform from elementary to high school level in Kulonprogo [3, 4]. It proves that geblek patterns have been local wisdom as the identity of Kulonprogo.

In Kulonprogo, there are many geblek makers and sellers that can be found, particularly in the form of micro small and medium enterprises (MSMEs). However, until now there has not been found accurate data on the number of geblek producers so the data on the number of geblek production has not been known accurately. The geblek producer sells its products in traditional markets, food stalls, souvenir shops, and even online stores. The New Yogyakarta international airport in Kulonprogo District increases the opportunity of geblek as an icon and souvenir food from Yogyakarta in addition to bakpia, yangko and gudeg.

One of the MSMEs that have been pursuing cassava processing into geblek is Patimurni Andani. This MSME is located in Klepu, Banjararum, Kalibawang, Kulonprogo about 33 km from the city of Yogyakarta. UMKM Patimurni Andani was founded by Mr. Supriadi in 2006. In the beginning, the UMKM only produced cassava starch as raw material for geblek. Since 2014 Mr. Supriadi has been producing geblek that is different from the common products on the market. The characteristics of geblek which was considered old-fashioned, tough, sour aroma, and short shelf life, are slowly converted into the millennial geblek with several variants of flavor with longer shelf life for 2 months because it is packaged with a vacuum sealer. Geblek produced by UMKM Patimurni Andani uses the brand of Mr. Telo with four flavors, i.e. original, shrimp, tuna and mackerel.

Some problems are found in UMKM Patimurni Andani as the geblek producers, including the aspects of production, marketing, business management, facilities, and human resources. The production has become a priority issue that must be overcome immediately, i.e. the limitations of the geblek dough cooking equipment and the packaging labeling that is not fulfilled BPOM standards since there is no nutritional content information, and the product brand image. Therefore, the aim of this community service is to improve the quality and quantity of geblek products at Patimurni Andani SMEs so that it could be healthy snacks and can be presented as a unique souvenir from Yogyakarta. The results of community service activities can contribute to improving the quality and quantity of traditional food MSMEs towards regional superior products in accordance with the government regulations

2. Methods and Equipment

2.1. Designing and manufacturing the geblek’s dough cooker
The design of the geblek’s dough cooker was referred to as an autoclave.

2.2. Analysis of nutritional composition
Geblek’s nutritional composition was conducted by proximate analysis, i.e. analysis of moisture, ash, protein, lipid, and carbohydrate (by difference) contents.

2.3. Designing of labeling and packaging of geblek
Labeling and packaging of geblek was designed according to Regulation of Drug and Food Control Center Number 9 the year 2016 regarding the reference of the nutritional label and also Number 13 the year of 2016 regarding claim of label and advertisement food products.
3. Results

3.1. Geblek’s dough cooker

Geblek dough cooker is a tool used in the process of boiling raw geblek dough. So far, Patimurni Andani MSME uses a boiling pot to cook raw geblek dough with a capacity of 25 kg. To increase the production capacity of geblek, a cooker with a larger capacity is needed. Geblek dough cooker that has been made to increase the production capacity of geblek has the following specifications: the material of stainless steel 304, height of 75 cm, diameter of 45 cm, maximum pressure of 5 kg/cm², maximum temperature of 145°C, tank volume of 190 liters, capacity of 150 kg, and gas consumption of 0.8 kg/hour. The geblek dough cooker before and after community service activities is presented in Figure 1.

![Figure 1. The geblek’s dough cooker before and after the community service activities](image)

3.2. Nutritional composition of geblek

The nutritional composition of geblek based on proximate test results is shown in Table 1. Geblek has a water content of 46.24-46.76%, ash of 0.43-1.57%, fat of 0.14-1.42%, protein of 0.08-1.16%, and carbohydrates of 50.23-51.96%.

| Sample           | Moisture (%) | Ash (%)  | Lipid (%) | Protein (%) | Carbohydrate (by difference, %) |
|------------------|--------------|----------|-----------|-------------|---------------------------------|
| Original geblek  | 46.24±0.02    | 1.57±0.05| 0.15±0.02 | 0.08±0.00   | 51.96±0.04                      |
| Shrimp geblek    | 46.66±0.11    | 1.23±0.01| 0.14±0.01 | 0.76±0.03   | 51.21±0.12                      |
| Mackerel geblek  | 46.76±0.01    | 0.43±0.07| 1.42±0.11 | 1.16±0.01   | 50.23±0.06                      |

The geblek proximate test results were calculated for its nutritional value as presented in Table 2 for original geblek, Table 3 for shrimp geblek, and Table 4 for mackerel geblek.
3.3. Labeling and packaging of geblek

The geblek label and packaging is shown in Figure 2. The label included on the packaging includes the product brand, product name, composition, net weight, production place and address, nutritional value information, P-IRT number, halal certificate number, frying instruction, expired date, and website address. Geblek packaging consisted of OPP plastic bags as primary packaging and food-grade plastic boxes as secondary packaging.
4. Discussion

Food quality is defined as a collection of several characteristics that distinguish one product unit from another product and it has significance in determining the degree of acceptability of the product by consumers [5]. Meanwhile, the food quality refers to the food attributes that attract the customers to consume the food [6] including positive factors such as color, flavor, texture and nutritional value, and its safety from negative factors, such as harmful microorganisms and compounds [7].

The food quality attributes are grouped into two, namely intrinsic and extrinsic quality attributes [8]. The intrinsic quality attributes of food products are quality attributes that are directly related to the physical properties of food products and are part of the physical products that have a dominant influence on product acceptance. This quality includes nutritional value and food safety, sensory properties (color, shape, size, aroma, taste, texture, and appearance), shelf life, ready-to-eat food convenience, and reliability. Meanwhile, the extrinsic quality attributes on food products are the quality attributes that do not have a direct influence on the physical properties of the product but can affect consumer acceptance of the product. This quality contains aspects related to the production systems, environmental implications, food production, and marketing.

The geblek processing can be seen briefly in Figure 3. Sequently, peeled cassava, washed out, shredded, squeezed, and deposited overnight. The cassava pulp is used as an animal feed. Then, the white precipitate at the bottom is taken and used as raw material for geblek. The wet cassava starch is mixed with spices (garlic and salt) and other ingredients (shrimp, mackerel, tuna) that have been previously cooked. The mixing process is done manually until it is homogeneous then boiled for 30 minutes using a boiling pot. After that, the ready geblek mixture is mixed using a mixer to form a smooth and non-sticky mixture. Geblek dough that has been smooth is then grounded to be created manually by hand like the shape of eight number. The last process is packing geblek.
The effort to increase the production capacity of geblek in Patimurni Andani UMKM is by making geblek dough cooking tools. During this time, the cooking process of geblek dough is done using ordinary boiling pots with a limited capacity of 25 kg. So, the geblek dough cooker is designed to increase capacity to 150 kg or 600%. The difference between this developed product and the autoclaves that are already on the market is on the pressure and temperature which can be regulated so it can save gas consumption more than 30%.

According to the Law of the Republic of Indonesia Number 18 Year 2012 concerning Food [9], the food packaging is a material used to contain and/or wrap food whether directly in contact with food or not. The packaging on food products is one of the quality attributes that can affect the acceptance of the product by consumers. The main functions of packaging on food products are to contain the product, to
protector the product from damage and contamination, to preserve the product, to attract consumers, to provide product information, as well as to present services and product use [10, 11]. Meanwhile, according to the Law of the Republic of Indonesia Number 18 Year 2012 concerning Food [9], the function of food packaging is to prevent spoilage and damage, to protect products from impurities, and to make the food free from microorganisms and pathogens.

The role of packaging in providing product information is realized by the presence of labels on the packaging. According to the Regulation from the Head of the Drug and Food Supervisory Agency Number 13 Year 2016 [12], food labels refers to any information regarding food in the form of images, writing, a combination of both, or other forms that are included in food that can be put in, affixed to, or part of the packaging food. The purpose of labeling on the packaging is to providing information about the contents of the product without opening the package as a means of communication to consumers, as well as giving precise instructions so that optimum product functions are obtained. It also functions as a means of advertising and giving a sense of security to consumers [13].

Meanwhile, according to the Law of the Republic of Indonesia Number 18 Year 2012 concerning Food, food labeling aims to provide true and clear information to the public about the food products that are packaged before buying and or consuming it. The label on food product packaging must at least contain information about the name of the product, list of ingredients, net weight or net content, name and address of the factory producing or importing, halal information, production date and code, date, month and year of expiration, distribution permit number for processed food products, and the origin of certain foodstuffs.

The enclosure of nutritional information on the geblek packaging label is one of the efforts to improve the quality of the geblek packaging based on the applicable BPOM regulations. This nutritional information can help consumers to find out what nutrients are contained in geblek products. Based on geblek nutrition information shown in Table 2, Table 3, and Table 4, it can be seen if geblek is a product that can contribute carbohydrates by 6% of the nutritional adequacy rate. The original geblek does not contain protein and fat, while the shrimp and mackerel geblek contain 0.3-1 grams of protein per serving. The researches on increasing the nutritional value of geblek is very limited and only those focuses on increasing protein levels with trash fish by Al-Qodri [14] and food fiber by Meiyan et al. [15]. It shows that geblek has the potential to be a healthy snack in the near future.

5. Conclusion
Some conclusion can drawn as follow: the specifications of geblek dough cooker were 75 cm in height and 45 cm in diameter, the material from stainless steel 304, the maximum pressure was 5 kg/cm², the maximum temperature was 145°C, the tank volume was 190 liters, the capacity was 150 kg, and the gas consumption was 0.8 kg/hour. Moreover, the packaging label consists of the brand, product name, composition, net weight, nutritional information, license (P-IRT and halal), expired date, frying instruction, and the producer name and address. The packaging of geblek contain the primary packaging from vacuum-sealed plastic bags and the secondary packaging from a food-grade plastic box. The shelf life of geblek was one week at room temperature and six months at freezing temperatures. One portion of geblek (3 pieces = 40 grams) contains 84 kcal of energy and 21 grams of carbohydrate (6% of the nutritional adequacy value) based on calorie needs of 2150 kcal. These results showed that the quality and quantity improvement of geblek could be implemented in SME to produce geblek as healthy snacks.

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