

Original Article

An Explorative Study of Indonesian Traditional Cheese 'Dangke' as High Protein Food from Enrekang, South Sulawesi

Mertien Sa'pang^{1*}, Abdul Salam², Harna³, Andi Rahmayanti R⁴, Seprianto⁵, Mieke Nurmalasari⁶, Nur Ayu Ruhmayanti³, Prita Dhyani Swamilaksita³

¹ Department of Dietitian Professional Education, Faculty of Health Sciences, Universitas Esa Unggul, DKI Jakarta, Indonesia

² Department of Nutrition Science, Faculty of Public Health, Universitas Hasanuddin, South Sulawesi, Indonesia

³ Department of Nutrition Science, Faculty of Health Sciences, Universitas Esa Unggul, DKI Jakarta, Indonesia

⁴ Department of Food Science and Technology, Faculty of Agriculture, Universitas Hasanuddin, South Sulawesi, Indonesia.

⁵ Department of Biotechnology, Faculty of Health Sciences, Universitas Esa Unggul, DKI Jakarta, Indonesia.

⁶ Department of Health Information Management, Faculty of Health Sciences, Universitas Esa Unggul, DKI Jakarta, Indonesia.

(Correspondence author's email, mertien.sapang@esaunggul.ac.id)

ABSTRACT

This study aimed to examine the historical and cultural values of dangke as a traditional food, its potential as a source of animal protein, and the methods of its preparation and presentation. This qualitative descriptive study used in-depth interviews with key informants, focus group discussions with primary and supporting informants, and observation to collect data. The findings of this study indicate that dangke, which was originally made from buffalo milk and enriched with enzymes from papaya sap, reflects the culinary heritage of the Massenrempulu tribe in Enrekang Regency, South Sulawesi. However, the limited supply of buffalo milk has led to the modification of dangke using cow's milk in some parts of Enrekang. Historically, dangke has been served with rice or "pulu mandoti" to guests since the colonial era. The origin of the term "dangke" itself has roots in the Dutch language, possibly from the expression "dank je wel" (thank you) used by Dutch soldiers after tasting this delicious dish. In addition, previous studies have shown that dangke has a high protein content, making it a valuable food source to support the diversification of animal protein sources. In conclusion, dangke has a high cultural value for the people of Enrekang and is a traditional food with high nutritional value, especially in terms of protein content.

Keywords: Dangke, Culinary Heritage, High Protein Food, Indonesian Traditional Cheese

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INTRODUCTION

Over the last few years, the Indonesian government has made stunting a priority nutritional problem in the 2024 RPJMN, with a

target of stunting prevalence reaching 14% in 2024. However, data from the 2022 Indonesian Nutrition Status Survey (SSGI) shows that the national stunting prevalence is 21.6% which the value is quite far from this target. Even though

the SSGI results have shown a decrease in prevalence from 2021 of 2.8%, other supports are still needed to achieve the national development target of the government program¹.

Indonesia's government conducted programs to overcome this problem, one of them was providing supplementary food that contain high protein. However, during its implementation several obstacles were encountered, such as the menu being served being less varied and the nutritional content not meeting standards. While there are various kinds of traditional foods that can be used as basic ingredients for making supplementary food. The utilization of traditional food also has additional value because it shows ethnic, religious and cultural identity, which is reflected in various flavors, cooking techniques and serving methods.

Dangke, a traditional cheese from Enrekang Regency South Sulawesi, is a potential traditional food for supplementary food. Dangke is one of the superior products in the Massenrempulu tribe's culinary delights which has a cheese-like taste with a soft texture like tofu^{2,3}. The Massenrempulu tribe is a tribe that lives in Enrekang Regency, South Sulawesi. This tribe is one of the tribes in South Sulawesi which is not as popular as the other three tribes such as Makassar, Bugis and Toraja.

The lack of cultural exploration of the Massenrempulu tribe, including its culinary culture, has resulted in the popularity of dangke being lower compared to other traditional foods such as tempeh and dadiah. There is a concern that the presence of dangke might gradually fade due to the influence of the free market and globalization⁴. Through this research, it is hoped that it can provide a new perspective on dangke as a cultural product of the Massenrempulu tribe and its potential as a high-protein food. This research aims to examine the historical and cultural value of dangke as a traditional food, the potential of dangke as a food source of animal protein, then observing how dangke is made and served.

METHOD

This qualitative descriptive study uses data collection methods through in-depth interviews with key informants, focus group discussions with key and supporting

informants, and observation.

Research informants were selected using a *purposive sampling technique* with the criteria of having knowledge of cultural practices related to dangke. Informants include community leader (key informants), dangke producers and sellers (main informants), as well as dangke consumers (supporting informants). The research locations were carried out in dangke producing areas, Anggeraja District, Curio District, and Cendana District in Enrekang Regency, South Sulawesi Province.

Instrument data collection uses guidelines in-depth interview for community leaders to gather more information about: 1. The typical food of the Massenrempulu ethnic group; 2. History and philosophy related dangke as food traditional; 3. The production process of dangke; 4. Method of served, development food, and types consumer dangke; 5. Empiric information from community about nutrition substance, benefits, and effects negative from dangke.

In addition, focus group discussion also used guidelines to gather information about: 1) History and philosophy related dangke as traditional food; 2. The production process of dangke (election material raw materials and manufacturing dangke) in a way traditional; 3. Quality control in production, packaging, storage, and distribution of dangke; 4. Method to served and types of dangke's consumer; 5. Empiric information of nutrition substance, benefits, and effects negative from dangke; 6. Suggestion from participant for product development for child.

Data analysis resulting from qualitative research uses an interactive type of analysis by Miles & Huberman which includes data reduction, data presentation, and drawing data conclusions. This research procedure has passed ethical review by the Esa Unggul University Research Ethics Commission with number 0923-10.063/DPKE-KEP/FINAL-EA/UEU/X/2023

RESULTS

This research used 2 community figures as key informants, 32 producers and sellers and 3 sellers as main informants, and 10 consumers as supporting informants from the research location.

Table 1. Informants Characteristics

Characteristics	n=47	%
Gender		
Man	13	27.6
Woman	34	72.4
Work		
Village head		
Farmer Group Secretary	1	2.1
Dangke Producer and Seller	1	2.1
Seller Dangke	32	68.1
Dangke Consumer	3	6.4
Work	10	21.3

Source: Primary Data, 2023

Table 2. Protein and Fat Content of Cow's Milk, Buffalo Milk, Cow's Dangke, and Buffalo Dangke

Nutrients	Cow's milk*	Cow's Dangke** min-max (mean)	Buffalo Milk*	Buffalo Dangke **min-max (mean)	High Protein Claim	
					Codex	BPOM
Protein (g/100 g)	3.2	15.7-33.3 (23.8)	6.3	14.5-26.1(21.3)	20% of NRV/100 g ⁵	35% ALG/100g ⁶
Fat (g/100 g)	3.5	8.8-21.6 (14.8)	12	10.1-23.9 (15.9)		
Water conten (%)	88.3	49.3-62.4 (55)	73.8	43.3-62.8 (52.7)		
Ash content (%)	0.7	1.9-2.4 (2.1)	0.8	1.9-2.7 (2.3)		

*Source: List of Indonesian Food Composition (<https://www.panganku.org/id-ID>)

**Source: Wahniyathi Hatta et al., 2013

NRV (Nutrition Reference Value) protein = 57 g/day⁷

ALG (Nutrition Label Reference) protein = 60 g/day⁶

DISCUSSION

Historical study and cultural value of dangke as a traditional food

Traditional Indonesian food displays a variety of culinary riches that are reflected in the creativity of local people and the use of abundant natural resources. One of them is milk production in the highlands of Indonesia. Milk is the basic ingredient used in various traditional foods in several regions such as 'dadiah' from

South Sumatra and 'dan 'dangke' from South Sulawesi. Dangke is a type of traditional cheese that has a soft texture and rich taste^{2,3}.

Traditional Indonesian food is shaped by several factors such as nature, history and culture. Geographically, Indonesia is the largest archipelagic country in the world with 17,508 islands. The tropical climate and high humidity support rich and unique natural resources, including beaches, volcanoes, tropical forests and biodiversity⁸.

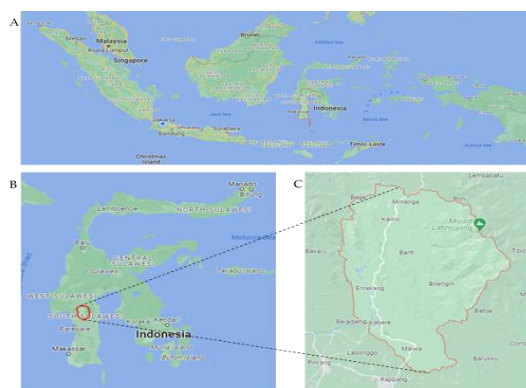


Figure 1. A) Map of Indonesia (the area outlined in red is South Sulawesi Province); B. Map of Sulawesi Island (the area outlined in red is Enrekang Regency); C. Enrekang Regency Regional Map (Source: <https://www.google.com/maps>).

Apart from that, Indonesia has various ethnic groups, each of which has its own uniqueness. This high cultural diversity sometimes results in a lack of information regarding the culture of certain tribes, one of which is the Massenrempulu tribe.

The Massenrempulu tribe is one of the tribes found in the South Sulawesi region (Figure 1). So far, several history and culture learning books only write about three tribes, namely Bugis, Makassar and Toraja. However, in recent years, various tribes have been fighting for their identity to be recognized. One of them is the Massenrempulu tribe, this tribe lives in the district. Enrekang, South Sulawesi ². The location of this tribe is close to the traditional territory of the Toraja tribe, so they are sometimes considered part of the Toraja tribe. However, key informants said that their customs and culture were actually quite different, especially in traditional and religious ceremonies.

"... Basically, Massenrempulu has its own identity. The language might be similar to Toraja, but the way of life, funeral ceremony, and the religion are different..."
(A, Community Leader)

The word 'Massenrempulu' in the Enrekang language is translated as "stick like sticky rice". Therefore, the name Massenrempulu tribe is understood as a symbol of the inherent unity of the three small tribes that inhabit the district. The Enrekang are the Duri, Maiwa, and Enrekang ⁹. However, there is also literature which states that the Massenrempulu tribe consists of the Duri, Enrekang and Maroangin tribes.

"...If Massenrempulu is part of one district then it is not separated...so that is what unites Massenrempulu..."
(A, Community Leader)

"...Masserempulu...it means one unit of enrekang... Right here there are the Enrekang, Maiwa, and Duri tribes... That 's what makes the place different from the language. So duri is a different language, enrekang is a different language, maiwa is also a different language..."
(FM, Community Leader)

Additionally, diverse traditions and cultural values play an important role in the way traditional food is prepared and served. Cooking methods, preservation techniques, and serving procedures are often passed down from generation to generation. This creates food that has the distinctive flavors and characteristics of a particular culture. This is also reflected in the Massenrempulu tribe, there are various kinds of traditional food including dangke, pulu mandotti, and nasu cemba ^{4,9,10}.

"...O, if there are many, what are they starting with, hm dangke, second is nasu cembanya, and third is sokko from sticky rice, the term is mandotti...well, these three are the main term...."
(A, Community Leader)

Dangke is a processed milk product that is coagulated using papaya sap (Figure 2). Dangke is also often referred to as the traditional cheese of the Massenrempulu tribe. Dangke has a distinctive and unique taste and is claimed to not be found in other regions. This can also be proven by the registration of dangke as communal intellectual property with registration number P73202100022.

Dangke is thought to have been first made in the Curio area of Enrekang Regency and has been around since the 18th century ¹¹. The results of interviews with community leaders in the Curio area stated that previously in the Curio area almost all households had buffalo livestock and produced abundant buffalo milk. This is also influenced by the geographical conditions of the Curio region which is located in the highlands which are suitable conditions for raising livestock. Apart from that, this area also has many grasslands to provide animal feed. To prevent buffalo milk from being wasted without being consumed, our ancestors innovated by processing buffalo milk until it curdles and can be used as a side dish. However, because the price of raw materials is expensive, this food is only served to guests of honor.

"...In the past, the milk came from buffaloes, so we don't know why they could freeze it...if there was a lot of milk from the beginning, it was because many people kept buffaloes in the past...basically, people already knew that if a buffalo had children, it would

definitely "There's milk... Just how did the old people have the thought to make dangke? That's history. We don't know that buffalo dangke belongs to Curio sub-district. "

(A, Community Leader)

Even though most of the key informants and main informants do not know directly about the initial discovery of the dangke making process, most of them know the basis for giving the name dangke. When Dutch officers entered the Curio area. People entertain because they are considered guests and are served this dish. Impressed by the friendliness and generosity of the Masserempulu people, the Dutch officers said 'dank je wel' which means thank you. Our ancestors mistook the term 'dank je wel' as the name of this dairy dish. The name stuck around and was adapted to the people's pronunciation, namely dangke ^{11,12}. This is also reinforced by

some information from in-depth interview informants and focus group discussions.

"...in the beginning, according to the history that I know, dangke names from the colonialist. They said thank you in Dutch. Well, that's why it's called dangke. According to old people's stories..."

(Producer 1, Curio District)

Based on the explanation above, it is known that the ancestors of the Massenrempulu tribe had high creativity in utilizing natural resources which is reflected in their ability to process milk using a unique process and using papaya sap. Apart from that, the friendly nature and respect for guests is depicted through the story of the naming of the dangke. This culture is still applied from generation to generation in society by the Massenrempulu tribe.



Figure 2. Traditional dangke cheese from Enrekang Regency, South Sulawesi (Source: Research Team Documentation)

The process of making dan serving dangke

The simple dangke production process has been passed down from generation to generation and is unique in itself. The raw materials needed to produce dangke are only milk, papaya fruit sap and salt. When it first appeared in the Curio area, dangke used buffalo milk as its main ingredient. However, the decreasing number of buffalo farmers in Curio because some have shifted to becoming Kalosi coffee farmers has resulted in the availability of buffalo milk starting to decline. Apart from that, since the 20th century, the government launched a program to assist imported dairy cattle in several areas in Cendana District ¹¹.

"... it's like this, since I first started serving in the livestock service in 84, I remember exactly the cows that entered Lekkong in 81/82.... So, the beef that were distributed/received by the

Enrekang government were placed in Lekkong, then as time went by there was a government program for FH cattle (Friesien Holstein)..."

(Producer 8, Cendana District)

The production of dairy cow's milk which is greater than the production of buffalo milk is one of the factors that started to modify the main ingredients for making dangke, especially in the Cendana District area and followed by Anggeraja District. Dangke producers in the Curio District area still use buffalo milk as their own specialty.

Selection of ingredients

When it first appeared in the Curio District area, the basic ingredient for making dangke was buffalo milk. There is quite a lot of buffalo milk available in this region because most dangke producers also have buffalo farms.

The smaller amount of buffalo milk produced compared to dairy cows means that the selling price of buffalo dangke is also higher. Apart from that, buffalo farmers usually wait around 3 months from birth before the milk is taken to be sold to producers or used to produce dangke themselves. In the process of collecting raw materials there are no special requirements or certain checks that are carried out.

"...That's buffalo dam's milk, you can't say it's good or not, because it's always the good stuff if we talk about buffalo's milk, it depends on how we keep it, if you keep it for a long time and don't put it in the refrigerator, that's what's damaged. If you say it's from buffalo, that's all good. Nothing is not good. That's what is said to be damaged from the way it is stored..."

(Producer 1, Curio District)

In contrast to the Curio area which uses buffalo milk, Cendana District and Anggeraja District use cow's milk as the main ingredient. Similar to the Curio area, in these two areas most of the dangke producers also have cattle farms. The cattle raised in these two regions are also quite diverse, from local to imported cattle. However, because of the various types of cows raised, the amount of milk produced is also different. To overcome this, most breeders also raise various types of cattle.

"...Oh, we choose cow by size or their breed. If FH has a lot of milk, there is not enough milk for Simental. Let alone limousines, there aren't any..."

(Producer 2, Cendana District)

Dangke-Making Process

Based on the results of interviews and focus group discussions, it shows that the entire process of making dangke still uses the same recipe passed down from generation to generation for both buffalo dangke and beef dangke (Figure 3). The use of recipes has been passed down from generation to generation so there is no definite measurement for the use of papaya sap and salt ¹³.

"...so my experience there is that reducing the sap, if you don't have enough milk, means reducing the sap too, that's how..."

(Producer 5, Anggeraja District)

"... For me, I add 1 tablespoon of sap, salt, according to the amount of milk. Approximately 2 spoons..."

(Producer 2, Cendana District)

In general, cheese products in various parts of the world were initially developed through production at the household level, as also happened in Dangke production. However, Dangke has not been able to reach the same level of popularity as various types of cheese from other countries, such as Cheddar, Kraft, Mozzarella and Cottage ¹⁴. The process of making Dangke in Figure 3 shows many similarities with the process of making traditional cheese from various regions from all around the world, such as traditional Algerian cheese (Jben, Mechonia, and Fresh killa), as well as traditional Greek cheese (Tsalafouti). However, each unique characteristic reflects cultural heritage and local raw materials, the process generally involves the use of natural coagulants, stages of curd and whey separation, as well as the important role of local factors in shaping the final taste and texture of the cheese product ^{15,16}. The similarities in these processes highlight the shared basic principles behind global culinary diversity, as well as the importance of preserving and understanding the heritage value of traditional cheeses throughout the world.

These limitations are related to a number of factors that influence the cheese production process. These limitations are related to a number of factors that influence the cheese production process. One of the main factors that is an obstacle is the variation in the quality of Dangke products which is still high. This is caused by the absence of standardization in the production process relating to parameters such as milk heating temperature and concentration of papaya sap as a coagulant. Most manufacturers also state that the amount of papaya sap used varies and depends on individual experience. Apart from that, excessive use of papaya sap can also produce a bitter taste. Therefore, efforts are needed to standardize the manufacturing process. One option that can be done is to use the commercial papain enzyme as a coagulant ¹⁷.

"...If it's bitter it's because there's excess papaya sap...If it's normal it's

because it's new papaya sap, because sometimes we don't know how much to use. So we just let him in..."
(Producer 1, Anggeraja District)

The process of coagulating milk by enzymes begins with the gelatination stage, and when excessive protein hydrolysis occurs as a result of the influence of heating temperature and uncontrolled enzyme concentration, this

can have a negative impact on curd formation, which ultimately affects the quality of the resulting product. The lack of strict production standards and consistent control parameters in Dangke production is one of the main obstacles in efforts to increase the popularity of this product on par with cheeses from other countries that have succeeded in building a strong reputation in the global market ¹⁴.

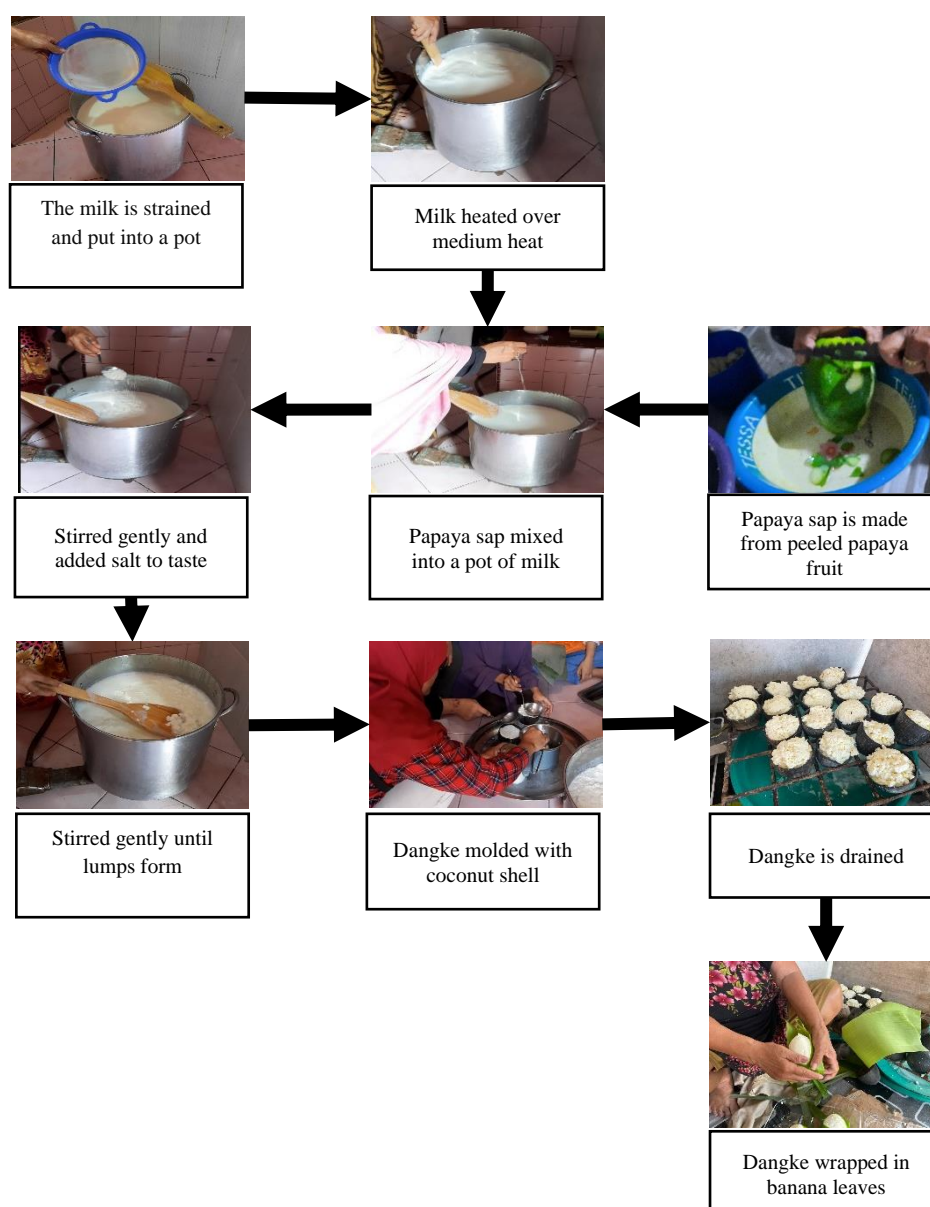


Figure 3. How to make dangke (Source: Research Team Documentation)

Serving Dangke

Different from the serving method of cheese products in general, dangke is served as

a side dish at the main meal, not as a snack. Dangke can be served in various ways that present a variety of unique flavors. First, the

remaining lumps of dangke are mixed in a panic with wai dangke (dangke water) and rice after the making process. The savory taste of wai dangke which resembles coconut milk adds to the taste of this menu. Both dangke can be eaten immediately after the molding process is complete. Then, dangke is also often fried. Thin slices of dangke are heated in hot oil to produce a crunchy and tasty outer layer, while the inside remains soft. This is a popular way to enjoy dangke.

Apart from that, dangke can also be burned. Dangke pieces are grilled on a grill to produce a distinctive aroma and deeper taste

(Figure 4). When welcoming guests, the Massenrempulu community usually serves processed dangke with rice/sokko pulu mandotti and chili sauce. The distinctive aroma of sokko pulu mandotti gives it a distinctive taste ¹⁰.

"...In our tradition, if it's served to guests, usually it's served with sokko mandotti...that's the origin combo."
(A, Community Leader)

"...For me..I often grill it...Use butter, use Teflon...(and eat it as) a side dish, a substitute for fish..."
(Consumer 2, Cendana District)

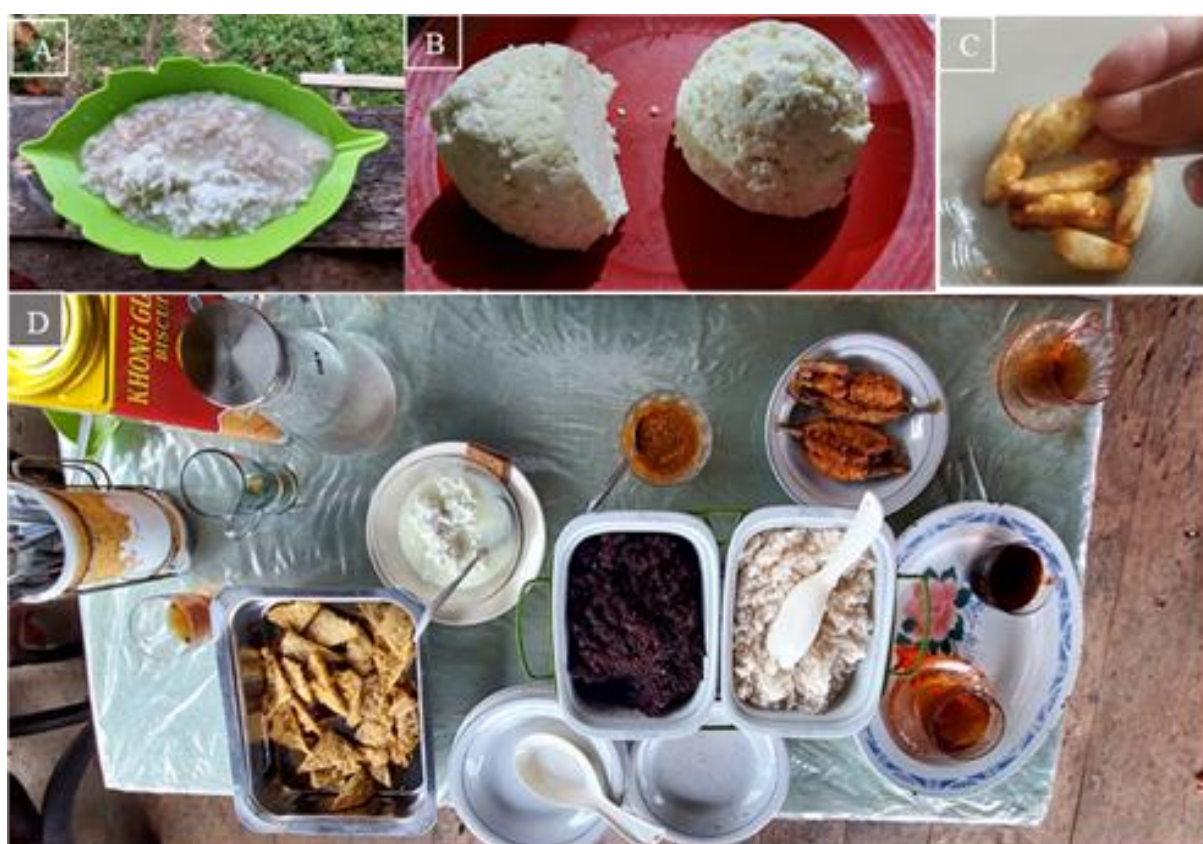


Figure 4. How to Serve Dangke A. Remaining lumps of dangke, wai dangke, and rice; B. Consumed immediately after printing; C. Dangke cut into small pieces then fried; D. Dangke and wai dangke served with sokko pulu mandotti (Source: Research Team Documentation)

The Potential of Dangke as a High Protein Food

The uniqueness of dangke lies in its equal position with other animal side dishes in everyday dishes. The basic ingredient of dangke which comes from milk makes the protein content of dangke quite high (Table 2) . The high protein content in dangke allows it to help build and repair muscle tissue, maintain bone

health, and support the immune system. Apart from that, empirically the Massenrempulu people also believe that consuming dangke can provide benefits for children's development and growth, especially for children's physical and cognitive growth.

"...From experience, the people there in dusun Bule', if their child's in

examination period, they give them dangke to eat. They believe it will help their child got a high IQ ..."
(Producer 3, Curio District)

Apart from that, information regarding dangke content has also been disseminated by the government. This socialization activity is held by extension workers from related services such as the livestock or agriculture service.

"...Ohhh it's high in protein, calcium. It's called milk. Vitamin A..B...(information) From the livestock and agriculture department, it is also normal for instructors to come. This is the new POM center at the regional office..."
(Producer 1, Anggeraja District)

Previous research shows that dangke, which comes from buffalo and cow's milk, has very diverse nutritional content. This is due to other factors such as the quality of raw materials, type and level of coagulating enzymes, processing methods, and product storage. There is no standardization of Dangke-making process in Enrekang Regency, people whom make Dangke used their own recipe according to their individual habits and experiences. At the end, this can influence the final quality of this cheese product.

Based on the data depicted in table 1, it shows that the protein content of buffalo dangke is 2 to 3 times higher than the protein content of buffalo milk. The table also illustrates that the protein content of beef dangke increases up to 5-10 times the protein content of cow's milk. However, the fat content of dangke also shows an increase, therefore it is still recommended not to consume dangke excessively ¹⁸.

Based on the average protein content in the two types of dangke presented in table 1, it shows that both types of dangke fulfil the requirements for the high protein food claim issued by Codex Stan and BPOM. The Codex Stan standard requires solid food to contain a minimum of 20% of NRV/100 g (11.4 g) in order to be claimed as high food. Slightly different from the high protein claim requirements in Codex Stan, BPOM Indonesia requires a minimum protein content of 35% ALG/100 g (21 g) for solid food.

Serving dangke in everyday cooking creates a varied and delicious alternative to

meet daily animal protein needs. This is also confirmed by several dangke producers and consumers, because the savory taste of dangke allows it to be used in various types of dishes.

"...It can be grilled, it can be stir-fried like tofu, we can make pepes...(dangke) crushed... Given eggs... Added celery leaves, green onions..."
(Producer 6, Anggeraja District)

"...Yes, mix it with noodles, dice it into small cubes...Cut it up, add the noodles there, then smother the noodles, (or) eat meatballs..."
(Seller 1, Anggeraja District)

The use of dangke in various dishes can increase the diversification of food sources of animal protein. It is hoped that this can be a solution to the problem of lack of protein consumption which is often experienced by several age groups, especially in groups children aged ¹⁹⁻²¹. Apart from the high protein content, the cultural identity value contained in dangke makes it an excellent local food choice for making supplementary food for toddlers and school-aged children. Implications for research in the field of nutrition. Research result show that dangke has a protein content of 22.5% , the high protein content in dangke makes it a useful food ingredient to support health. Protein is an important nutrient for growth and development, as well as maintaining body health.

The limitations of this study is language barriers because some of informant use local language. Therefore, we recruit translator to help research team.

CONCLUSIONS

Dangke, which was previously made from buffalo milk with enzymes derived from papaya sap, reflects the culinary heritage of the Massenrempulu Tribe in Kab. Enrekang, South Sulawesi. However, the limited supply of buffalo milk caused a modification to using cow's milk in several areas of Enrekang. Historically, dangke has been served with rice or 'pulu mandoti' to guests since colonial times.

The origin of the term 'Dangke' itself has roots in Dutch, perhaps originating from the expression 'dank je wel' (thank you) used by Dutch soldiers after tasting this delicious dish. In addition, previous research shows that

Dangke has a high protein content, making it a valuable food ingredient to support the diversification of animal protein sources. Therefore, follow-up research is required to develop new products that can increase dangke reception.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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