

The Utilization of Traditional Bagot Ni Horbo Cheese in Cheesecake Making: A Sensory Evaluation

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Abstract

This research aimed to evaluate the sensory properties and shelf life of cheesecake prepared by using Bagot ni horbo as a replacement of cream cheese that originally used in cheesecake making. This research used the experimental method with a descriptive analysis of observation and interviews together with sensory evaluation by five expert panelists. Afterward, it is continued with long shelf life observation. The results showed that cheesecake experiments have almost similar to cheesecake controls from appearance and texture. Cheesecake experiments have small lumps and greenish color, but it can be used as a differentiator or a uniqueness. All the expert panelists agreed that cheesecake experiments are very feasible to be introduced to the public as a traditional culinary from Tapanuli. Cheesecake control extended the shelf life in the refrigerator to 6-7 days compared with cheesecake experiment that spoiled after 5-6 days. Quality of cheesecake experiments decreased faster than control because bagot ni horbo hasn't used standards of processing method, standards of packaging method and standards of cleanliness or hygiene, but if the shelf life want to be extended, it can be frozen in the freezer.

Keywords: Food Experiment, Cream Cheese, Bagot Ni Horbo, Cheese Cake

Introduction

Most of the type of cheeses are still imported. From year-to-year, it keeps increasing until 5.96% (Indonesia Central Bureau of Statistics, 2014). In Indonesia, there are many traditional cheeses that taste and the quality are similar with imported cheeses such as Dangke cheese from South Sulawesi, Cologanti cheese from Sumba, Perah cheese from Lombok, Dadiah cheese from Padang and Bagot ni horbo cheese from Tapanuli (Jauzan, 2011).

Traditional cheeses are less known by the public, utilized only by the local people. The traditional cheeses have the potential to improve the local people's economy by developing creativity, innovation and creating interesting traditional culinary products that have high economic value (Jauzan, 2011). Utilization and development of traditional cheese products are also able to encourage the Indonesian tourism sector, especially culinary tourism.

One of the traditional cheeses that are not yet widely known is the traditional Bagot ni horbo cheese from Tapanuli, North Sumatra. Bagot ni horbo is made from buffalos' milk mixed with papaya leaves juice or pineapple juice for coagulation processed. The process made Bagot ni horbo greenish white (Simanungkalit, 2008). The advantage of traditional Bagot ni horbo is the safety processed of coagulation that not used chemicals, preservatives, and buffalos' milk. Buffalos' milk contained more protein than cows' milk. The color of buffalos' milk is whiter than cows' milk because buffalos' milk has more carotene (Murti, 2002). The fat contained in buffalos' milk is easy to digest, has a softer curd, and it can be easily transformed into cheese (Murti, 2002). The original flavor of Bagot ni horbo has a slightly bitter taste (aftertaste). The tasty and creamy that disappeared after the heating processed and mixed other ingredients can cover the bit taste (aftertaste) such as coffee flavor, chocolate or fruit flavor (Giarsyah, 2017).

In Tapanuli, Bagot ni horbo ate with Arsik. Arsik is one of the traditional food from Tapanuli made from goldfish cooked with traditional spices of North Sumatra namely Andaliman (Indonesian Lemon Pepper) and Kecombrang (Torch Ginger) (Siahaan, 2016). Bagot ni horbo is well recognized as being a healthy food and additive free ingredients (Murti, 2002). A 100 g serving of Bagot ni horbo provides an excellent source of protein 11.5 %, fat 23.3%, water 62.9 % and 0 % ash (Wahniyathi, 2014).

Traditional Bagot ni horbo cheese can be made by the local peoples in Tapanuli to be a more interesting food, so it has a high economic value, enrich the local culinary and also can improve the local people economy. Traditional Bagot ni horbo cheese can be made into a pastry product, and it can be used as one of the traditional culinary product (culinary icon) or souvenir from Tapanuli, North Sumatra.

Meanwhile, cheesecake is a dessert consisting of a topping made of soft, fresh cheese, usually on a crust or base made from biscuit, pastry or sponge cake (Yasin, 2013). There are two types of cheesecake such as baked cheesecake and chilled cheesecake. Baked cheesecake and chilled cheesecake had so many variants of flavor, soft, light and melted in the mouth and easy way of making (Walidah, 2017). Baked cheesecake and chilled cheesecake usually using cream cheese. In Indonesia, the cream cheese is imported from Australia and New Zealand because of the lower price. The price of Bagot ni horbo is relatively low because it used local ingredients and has the same characteristics with cream cheese. It has a soft texture, high water content above 50% and rich flavor (Ananto, 2010).

This research aims to evaluate the sensory properties and shelf life of cheesecake prepared by using Bagot ni horbo as a replacement of cream cheese that originally used in cheesecake making. This research uses the experimental method with a descriptive analysis of observation, interviews with sensory evaluation by five expert panelists and long shelf life observation.

Literature Review

Cream Cheese

Cream cheese is a soft, mild, rich, unripened cheese that is a creamy white, slightly acidic tasting product with a diacetyl flavor. (Harbutt, 2015). Cream cheese is used as the main

ingredient to make cheesecake, cheese cream frosting, salad dressing, cake stuffing or just spreading on bread. The first standard for cream cheese was issued in 1921 by the Federal Food and Drug Act. It stated that cream cheese is the unripened cheese made by the Neufchatel cheese from whole milk enriched with cream (Phadungath, 2005). Cream cheese and related products should have a uniform white to light cream color with slightly lactic acid and cultured diacetyl flavor and aroma: off-flavors such as bitter, sulfide, yeasty, and unnatural flavor should not be present (USDA, 1994). Traditionally, cream cheese mix is pasteurized, homogenized, inoculated with lactic culture and held at 23°C. It attains a pH of approximately 4.6, the curd is heated to 52 to 63°C, and stabilizers, emulsifiers, and salt are added (Sainani, 2004). One of the traditional cheeses that are not yet widely known is the traditional Bagot ni horbo cheese from Tapanuli, North Sumatra. In picture 1 will be described step by step how to make bagot ni horbo.

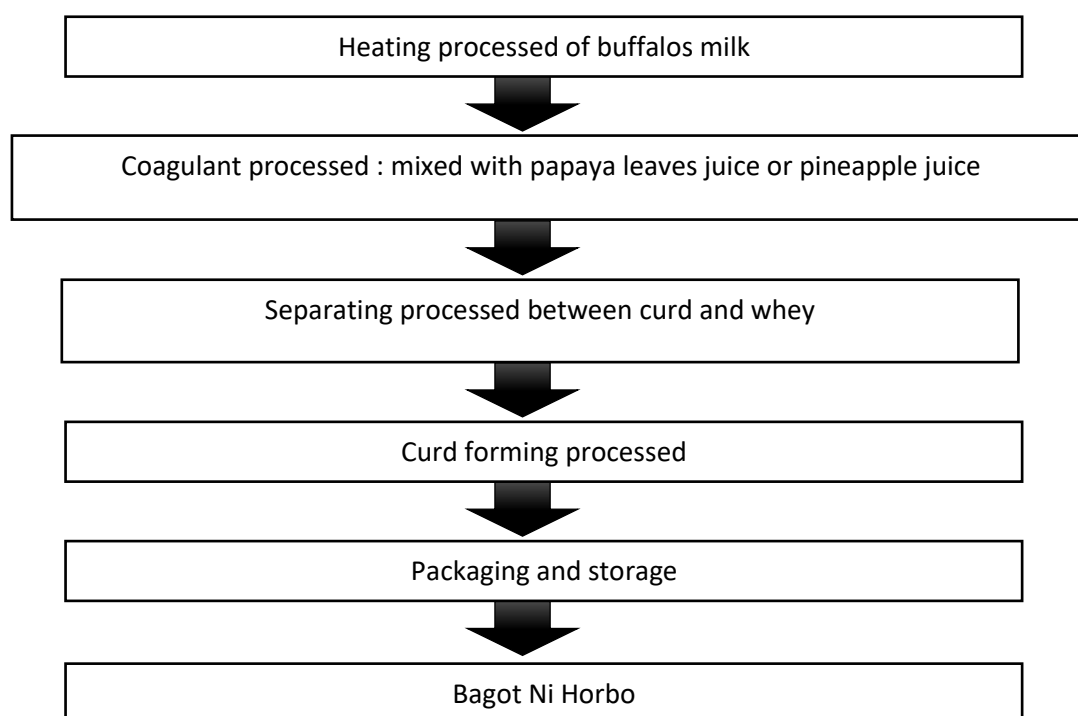


Figure 1: Step by step how to make Bagot Ni Horbo

Source: Iskundarti, 2015

First, buffalos' milk heated for 12-15 minutes that aims to eliminate bacteria and extend the shelf life of buffalos' milk. Second, the coagulant processed to mixed buffalos' milk with papaya leaves juice or pineapple juice. Third, separating processed between whey and curd; curd usually stored in the bowl. The next processed is packaging and storage, Bagot ni horbo stored in the refrigerator became more fresh and durable (Iskundarti, 2015).

Cheesecake

Cheesecake is believed to have originated in Ancient Greece; where it was served to athletes during the first Olympic Games held in 776 BCE (Suas, 2011). In 1545, cheesecake recipes were published, where the "Neufchatel" cheese was used as the main ingredient of cheesecake. In 1872, cheesecake began to spread in the Americas, the type of cheese that is

used differently in Europe because it has a distinctive aroma (Ananto, 2017). In 1912, James L. Kraft made cream cheese with pasteurizing processed, then Kraft produced cream cheese in bulk and marketed worldwide and patented his trademark "Philadelphia Cream Cheese" (Suas, 2011). The texture of cheesecake that is favored by most peoples in the continent of Europe and America is that has a soft and dense texture because of "no-aeration processed."

Cheesecake is available in many different flavors, but mainly baked cheesecake and chilled cheesecake (Giarsyah, 2017). Baked cheesecake is made from cream cheese, egg yolks or eggs and sugar; it is baked with Bain Marie system method to kept cheesecake at a stable temperature, cooked perfectly and the cheesecake does not become cracked on the top. After baked cheesecake comes out from the oven, it should not be removed from the springform while it is hot, always chilled for at least 4 hours in the refrigerator because the texture is not yet firm. Chilled cheesecake is made from cream cheese, fresh cream, sugar and gelatine which has a texture resembling gel when combined with the mixture. Chilled cheesecake contained lemon or orange (acids) that are to help stabilized all ingredients. Chilled cheesecake typically uses the refrigerator to firm and chill. The texture of the chilled cheesecake is so smooth, velvety and melt in the mouth.

Sensory Evaluation (Appearance, Flavor and Texture)

"Evaluating food is not the same as eating for enjoyment. The sensory evaluation takes practice and deliberate concentration because of the perception of food complex" (Figoni, 2011). The food can be objectively assessed, and the taste in the food can be deeply analyzed and described. Many factors influenced a person's ability to evaluate food objectively such as gender, genetic, health, and experience. Sensory evaluation of the pastry product is divided into three main aspects. In sensory evaluation the pastry product requires the ability that involved the five senses namely sense of taste, smell, touch, hearing, and sight (Figoni, 2011).

Appearance creates the first impression to the customers; the first impressions are essential, no matter how appealing the taste. An unattractive appearance is hard to overlook. As a human, we eat by first looking with the eyes because sight is highly developed than our other senses (Figoni, 2011). The appearance of food products will undoubtedly make consumers more interested and tasteful to consume because the vision can describe the taste of the food. The appearance comes in many forms such as color, opacity, sheen, size and visual texture.

Flavor includes the basic tastes, smells and trigeminal effects (chemical feeling factors). These three sensations occur when food molecules (chemicals) stimulates the receptors throughout the mouth and nose (Figoni, 2011). Basic tastes smell and trigeminal effect is distinctly different, and it is also affected by vision. Basic flavors include sour, salty, sweet, bitter and umami. These sensations are perceived throughout the mouth and tongue when binding to receptor taste cells. Smells or aroma is the most complex because a human can detect thousands of different aromas.

Research Methodology

It is expected that the results of this study can answer all research questions. This experimental research is needed for research in the experimental culinary research because

it will create new creations and innovations or improve the quality. In this research, the authors used observation method, interview, and literature study to evaluated the sensory properties and shelf life of cheesecake prepared by using Bagot ni horbo as a replacement of cream cheese which originally used in cheesecake making.

The author and five expert panelist observed cheesecakes started from ingredients selection, preparation until production of the final products. Then the panelists evaluated the appearance, flavor, and texture of cheesecakes. Interview in this experimental research is needed to get more in-depth information so that it will get qualitative data from a different point of view. It can be more accessible to analyzed baked cheesecake and chilled cheesecake from Bagot ni horbo. The five expert panelists have the culinary background either as Academicians, pastry chef, and cake entrepreneurs.





Results

Characteristics of Baked Cheesecake from Bagot Ni Horbo

The first experimental product is a baked cheesecake experiment has the almost similar to baked cheesecake control. Table 1 presented the observation results of baked cheesecake experiment and in table 2 displayed on the expert panelist's interview for baked cheesecake experiment.

Table 1

Observation Results (Baked Cheesecake)

No	characteristic	Experimental Product (Bagot ni Horbo)	Control Products (Cream Cheese)
			
			
1.	Appearance		
	a. Color	Tawny (Yellowish-brown color)	Tawny (Yellowish-brown color)
	b. Opacity	Not transparent	Not transparent
	c. Sheen	Shiny	Shiny
	d. Shape	the surface has pores	No pores
	e. Size	according to the size of the mold	according to the size of the mold
	f. Visual Texture	Soft but looks a little bit dry	Soft and firm
2.	Flavor		

a. Basic Taste	Sweet, a little bit sour and creamy	Sweet, a little bit sour and creamy
b. Smell	Citrus scent and creamy scent	Citrus scent and creamy scent
c. Trigeminal Effect	No aftertaste	No aftertaste
3. Texture		
a. As it touch/squeeze	Soft, a little bit crumbly	Soft and smooth
b. As it bitten	Soft, a little bit crumbly	Soft, moist and smooth
c. As it Chewed	A little crumbly but easy to melt in the mouth.	easy to melt in the mouth, smooth and soft

Source: Observation Results

Table 2
 Interview Result (Baked Cheesecake Experiment)

Question	Panelist No.1	Panelist No.2	Panelist No.3	Panelist No.4	Panelist No.5
Appearance	Greenish yellow	Greenish yellow	Yellow	Yellow, a little bit green	Greenish Yellow
Flavour	sweet, fresh sour taste dan creamy	sweet and creamy	sweet, fresh sour taste and creamy	sweet, a little bit sour and creamy	Sweet, a little bit sour
Texture	Smooth, a little bit dry and crumbly	Smooth, A little bit crumbly	Crumbly, but still melt in the mouth	Melt in the mouth but a little bit crumbly	Smooth, a little bit crumbly

Source: Interview Result

In Table 2 there are no small lumps contained in the baked cheesecake experiment because of two processed of heating such as cooked and baked. When Bagot ni horbo cooked with butter and fresh cream, this mixture is not entirely smooth; there are still small lumps. The second heating is when baking processed with Bain Marie system method to keep cheesecake at a stable temperature, cooked perfectly and the cheesecake does not become cracked on the top. When baked cheesecake was eaten there are no small lumps but a little bit dry and crumbly but still soft and melts in the mouth that does not need to be chewed.

Baked cheesecake experiment has a Tawny color (Yellowish-brown color) and shiny because contained sugar (caramelize processed). It has small pores, slightly dry but still looked soft because baked cheesecake mixed with meringue. The volume of baked cheesecake experiment, 1.5 cm above the surface of the aluminum foil cup, but 15 minutes later it dropped to 1 cm below the surface of the aluminum foil cup. It happened because the baked cheesecake experiment adjusted the room temperature and had high humidity and contained with meringue. Tawny color (Yellowish-brown color) in baked cheesecake experiment because it contained egg yolks. Expert panelist 5 suggested that the color of baked cheesecake is greenish yellow because Bagot ni horbo is made from papaya leaves juice.

The second characteristic is flavor; the baked cheesecake experiment has a sweet taste, a little bit of fresh sour taste and creamy. This is because of lemon juice, orange juice, and grated orange peel create a sour taste and fresh scented. Panelist number 5 gave suggestions for adding various flavor variants to make them more interesting such as mint, chocolate, strawberry, and others.

The third characteristic is texture; baked cheesecake experiment has small pores, slightly dry and crumbly. When eaten, a little bit crumbly and dry but still soft and melted in the mouth. This is because Bagot ni horbo does not dissolve entirely. When the baked cheesecake experiment sliced into two, the texture on the baked cheesecake experiment, looked like a sponge cake, have small pores and crumbly but still soft. Panelist 1 gave suggestions to add more liquid in recipes such as fresh cream or egg yolks to be more delicate and moist.



From all the interviews with expert panelists, all agreed that the baked cheesecake made from Bagot ni horbo is very feasible to be introduced to the public as a traditional culinary or souvenir from Tapanuli. The three characteristics of baked cheesecake such as appearance, flavor, and texture have almost similar with baked cheesecake control made from cream cheese. The result would not be similar perfectly to each other, but if baked cheesecake experiment wants to be made similar perfectly with baked cheesecake control, there are other things to do such as changing the recipe and quantity on ingredients and cooking techniques. Besides, injecting a variety of flavors, shapes, and packaging, will give more values to the existing products.

Characteristics of Chilled Cheese Cake from Bagot Ni Horbo

The second experimental product is chilled cheesecake experiment almost has similar characteristics with cheesecake control. Table 3 presented the observation results of the chilled cheesecake experiment while Table 3 showed the expert panelist's interview for the chilled cheesecake experiment.

Table 3

Observation Results (Chilled Cheese Cake)

No	Characteristic	Experimental Product (Bagot NI Horbo)	Control Products (Cream Cheese)
			

1.	Appearance		
a.	Color	Greenish white	ivory
b.	Opacity	Not transparent	Not transparent
c.	Sheen	Shiny	Shiny
d.	Shape	The top is uneven	smooth
e.	Size	according to the size of the mold	according to the size of the mold
f.	Visual Texture	Smooth but there are small lumps	Smooth and no lumps
2.	Flavor		
a.	Basic Taste	sour fresh but still creamy	more creamy
b.	Smell	Aroma like yoghurt	fresh cream cheese Aroma
c.	Trigeminal Effect	Citrus taste	Citrus taste
3.	Texture		
a.	As it touch/squeeze	Soft, a little bit crumbly	Soft and smooth
b.	As it bitten	Soft, a little bit crumbly	Soft, moist and smooth
c.	As it chewed	It is easy to melt in the mouth but has small lumps and a little chewy	Easy to melt in the mouth, smooth and soft.

Source: Observation Results

Table 4
 Interview Result (Chilled Cheesecake Experiment)

Question	Panelist No.1	Panelist No.2	Panelist No.3	Panelist No.4	Panelist No.5
Appearance	Greenish white	Greenish yellow	White, little green	Yellow, a little bit green	Greenish Yellow
Flavour	sweet, fresh sour taste and creamy	sweet and creamy	sweet, fresh sour taste and creamy	sweet, a little bit sour and creamy	Sweet, a little bit sour
Texture	Smooth with small lumps	Smooth with small lumps	There are small lumps but still melt in the mouth	Melt in the mouth with small lumps	Smooth will small lumps

Source: Interview Result

In Table 4 there are small lumps contained in the chilled cheesecake experiment because buffalos' milk contained more fat and is not easy to dissolve with the mixture. Chilled cheesecake experiment has a slightly denser texture than the chilled cheesecake control because the papaya leaves juice contained pectin.

Chilled cheesecake experiment has a slightly greenish white color because Bagot ni horbo contained papaya leaves juice. Panelist number 3 gave suggestions to add another color to make it more appealing, while panelist number 5 suggested adding fruit juice to make it more appealing.

The second characteristic is Flavor; chilled cheesecake experiment has a fresh sour taste like yogurt or kefir and lemon juice. Panelist 1 suggested adding grated orange peel to make a fresh aroma. Chilled cheesecake experiment still smelled creamy because it contained whipped cream inside.

The Shelf Life of Cheese Cake from Bagot Ni Horbo

In this research, cheesecakes stored in the refrigerator (5oC) for seven days. Baked cheesecake control extended the shelf life in the fridge to seven days compared with baked cheesecake experiment that spoiled after six days. Baked cheesecake experiment grown 2-4 small points of gray fungus, has a sour taste and wet texture. Chilled cheesecake control extended the shelf life in the refrigerator to 6 days compared with baked cheesecake experiment that spoiled after five days. Chilled cheesecake experiment grown gray fungus on the top, has a sour taste and wet texture. Quality of cheesecake experiments decreased faster than control because Bagot ni horbo hasn't used standards of processing method, standards of packaging method and standards of cleanliness or hygiene. If the shelf life wants to be extended, it can be frozen in the freezer.

Conclusion

Traditional Bagot ni horbo cheese from Tapanuli can be used as the main ingredient for two types of cheesecake such as baked cheesecake and chilled cheesecake. From the interviews with expert panelists, all of them agreed that the cheesecake experiments are very feasible to be introduced to the public as a traditional culinary or souvenir from Tapanuli. The three characteristics of cheesecake experiments such as appearance, flavor, and texture have almost similar to cheesecake controls. The result would not be similar perfectly to each other, but if cheesecake experiments want to be made similar perfectly with cheesecake controls, there are some things to do such as changing the recipe and quantity on ingredients and cooking techniques.

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