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The Traditional Local Product Gulo Puan in Chocolate Bar Making

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Abstract: ***The research was conducted at Agriculture Product Chemistry Laboratory, Faculty of Agriculture, Universitas Sriwijaya, Indralaya, Indonesia. In this research, cacao powder and honey were used as combination treatments to make chocolate bar. Randomized block factorial design was used. There were three levels of cocoa powder concentration, and two levels of honey concentration. The main ingredient of chocolate bar mix was gulo puan. Gulo puan is a traditional food product originally made from swamp buffalo milk. The result showed that the increase the levels of cacao powder tended to increase texture and ash content of chocolate bar, but tended to decrease moisture content. When the levels of honey concentration increase tended to decrease texture of chocolate bar, but tended to slightly increase moisture content and ash content.***

Keywords: Gulo Puan, Traditional Product, Chocolate Bar, Cocoa Powder

1. Introduction

Pampangan is one of the local districts in South Sumatera Province. There are about 2000 swamp buffalos, and about 200 female milk productive buffalo. The people of Pampangan who own female milk productive buffalo is milking once a day in the morning. The milk is soon processed to what the local people named it as “gulo puan”. There is no modern processing of buffalo milk in Pampangan. The fresh milk then soon is processed to be gulo puan, due to the lack of equipment such as refrigerator and pasteurizer. The way to make it is quite simple by mixing buffalo milk and brown sugar and heated for not later than five hours or until it formed to be semi solid texture. The amount of sugar added to fresh milk is about one half.

The problem is that mostly the people outside the district of Pampangan do not like gulo puan, because of the oily taste. Alternatively, gulo puan is modified to other product such as chocolate bar that much more acceptable by most people. In this research chocolate bar was made using gulo puan as primary ingredient by adding cacao powder. To make more acceptable taste, honey is also added to the mix. The total mix was cooked until formed into the solid texture, and put in bar 1.0 cm x 0.5 cm x 3.0 cm. Further, it is leaved in room temperature until semi hard texture is formed.

2. Materials and Methods

Buffalo Milk

Traditional processing of buffalo milk with no refrigerator and no pasteurizer, consequently, the milk will be vulnerable to adulteration [1][2]. Also swamp buffalo frequently has parasitic and pathogenic microbial diseases. The diseases may affect the quality of milk [3][4]. Buffalo milk is different from cow milk in composition and appearance. Buffalo milk much whiter color than that of cow milk. Moreover, buffalo milk is lower moisture content than that of cow milk [5][6]. Buffalo milk is much higher in lipid content, as well as higher in dry matter content [7][8].

Gula Puan

Gulo puan is a traditional product, especially in Pampangan district, South Sumatra Province, Indonesia. Gulo puan is made from fresh buffalo milk as primary ingredient. Then brown sugar is added the amount of one half of mix. The mix is heated until it is formed into a semi solid texture.

Table 1: Chemical composition of gulo puan

Composition	(%)
Protein	9,52
Lipid	20,85
Moisture	14,15
Ash	1,48
Phosporus	0,027
Calsium	0,010
Cane Sugar and Lactose	53,99

Source: [6][9][10]

Chocolate Bar

Chocolate bar is known worldwide. Generally, chocolate bar is made from buttermilk, sugar, and cocoa powder [11]. Cocoa powder is made from roasted seed of cocoa fruit. Cocoa plants grow well in tropical area, such as Indonesia. There are some people living in villages in Pampangan Distict grow cocoa plant. The people harvest cocoa fruit, and the cocoa seed then dry under the sun, and roast it. The roasted cacao seed, then, ground to form cocoa powder. The people just consume the cocoa powder like coffee. The do not know how to make a chocolate bar.

In this research, Randomized Block Factorial was employed. There were two factors, namely, the concentration of cocoa powder and the concentration of honey. There were three concentration level of cocoa powder, namely, 20% (w/w), 25% (w/w), and 30% (w/w), respectively. Further, there were two concentration level of honey, namely, 20% (w/w) and 30% (w/w), respectively. The combination treatments were repeated three times. The mixes then cooked and dried simultaneously with vacuum oven (Memmert) for six hours (temperature of 105 degrees Celcius). Then the mixes were put in the small cake mold (1.0 cm x 0.5 cm x 3.0 cm), and

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left it in room temperature until the mixes form slight hard chocolate bar. This research particularly observed texture, moisture content, and ash content as parameters. The data is analyzed with SAS (Statistical Analyzed System). We used branded Cocoa Java Classic powder and branded Nusantara Honey in term of chocolate bar making.

3. Result and Discussion

Table 2: The Effect of Cacao Powder Concentrations and Honey Concentrations on Texture

CPC and CoH	TXT LS MEANS	p>t comparison of all means					
		1	2	3	4	5	6
20 and 20	862	---	0.0046	0.0065	0.0043	0.0024	0.0086
25 and 20	877		---	0.5423	0.0065	0.0076	0.7654
30 and 20	892			---	0.0067	0.0046	0.3423
20 and 30	765				---	0.0054	0.2746
25 and 30	782					---	0.0075
30 and 30	796						---

Notes:
C.V. = 1.63
CPC = Concentration of Cacao Powder, % (w/w)
CoH = Comcentration of Honey, % (w/w)
TXT = Texture (gf)

The result showed (Table 2) that the used of cacao powder at different level (20%, w/w), 25%, w/w) and 30%, w/w) and honey with the same level (20%, w/w), the higher the concentration of cacao powder the texture tended to be higher. The concentration levels of cacao powder at 20% (w/w), 25% (w/w), and 30% (w/w) had textures of 862 gf ($p<0.01$), 877 gf ($p<0.01$), and 892 gf ($p<0.01$), respectively.

Although there were slightly increased textures yet the concentration of honey increased from 20% (w/w) to 30% (w/w), the textures become lowered. The concentration level of cacao powder at 20% (w/w), 25% (w/w), and 30% (w/w) had textures of 765 gf ($p<0.01$), 782 gf ($p<0.01$), and 796 gf ($p<0.01$), respectively. It indicates that the increase of honey concentration may affect the texture, due to soft form of honey.

Table 3: The Effect of Cacao Powder Concentrations and Honey Concentrations on Moisture

CPC and CoH	MOIST LS means	p>t comparison of all means					
		1	2	3	4	5	6
20 and 20	17.43	---	0.0065	0.0072	0.0054	0.0043	0.0066
25 and 20	17.39		---	0.3986	0.0052	0.0055	0.4657
30 and 20	17.12			---	0.0023	0.0036	0.3654
20 and 30	18.32				---	0.0042	0.3214
25 and 30	18.21					---	0.0082
30 and 30	18.11						---

Notes:
C.V. = 1.93
CPC = Concentration of Cacao Powder, % (w/w)
CoH = Comcentration of Honey, % (w/w)
MOIST = Moisture (%)

The result showed (Table 3) that the used of cacao powder at different levels (20%, w/w), 25%, w/w) and 30%, w/w) and honey with the same level (20%, w/w), the higher the concentration of cacao powder the moisture content tended to be slightly lower. At concentration levels of cacao powder 20% (w/w), 25% (w/w), and 30% (w/w) had textures of 17.43% ($p<0.01$), 17.39% ($p<0.01$), and 17.12% ($p<0.01$), respectively.

Although there was slightly decreased moisture content, but when the concentration of honey increased from 20% (w/w) to 30% (w/w) the moisture content become higher. At concentration level of cacao powder 20% (w/w), 25% (w/w), and 30% (w/w) had moisture content of 18.32% ($p<0.01$), 18.21% ($p<0.01$), and 18.11% ($p<0.01$), respectively. It indicates that the increase of honey concentration may affect the moisture content, due to high water retention capacity of honey.

At Table 4, the data showed that the used of cacao powder at different levels (20%, w/w), 25%, w/w) and 30%, w/w) and honey with the same level (20%, w/w), the higher the concentration of cacao powder the ash content tended to be slightly higher. At concentration levels of cacao powder 20% (w/w), 25% (w/w), and 30% (w/w) had textures of 0.71% ($p<0.01$), 0.89% ($p<0.01$), and 0.94% ($p<0.01$), respectively.

Although there were slightly decreased moisture content, but when the concentration of honey increased from 20% (w/w) to 30% (w/w) the moisture content become higher. At concentration level of cacao powder 20% (w/w), 25% (w/w), and 30% (w/w) had moisture content of 0.75% ($p<0.01$), 0.91% ($p<0.01$), and 0.98% ($p<0.01$), respectively. It indicates that the increase of levels of cacao powder tended to increase ash content of chocolate bar. Also, the increase level of honey concentration may affect the ash content, due to both inherent ash content of cacao powder and honey.

Table 4: The Effect of Cacao Powder Concentrations and Honey Concentrations on Ash Content

CPC and CoH	AC LS Means	p>t comparison of all means					
		1	2	3	4	5	6
20 and 20	0.71	---	0.0054	0.0065	0.0024	0.0038	0.0072
25 and 20	0.89		---	0.1209	0.0064	0.0067	0.5435
30 and 20	0.94			---	0.0034	0.0054	0.2543
20 and 30	0.75				---	0.0042	0.2156
25 and 30	0.91					---	0.0076
30 and 30	0.98						---

Notes:
C.V. = 1.54
CPC = Concentration of Cacao Powder, % (w/w)
CoH = Comcentration of Honey, % (w/w)
AC = Ash Content (%)

4. Conclusion

Indonesia is the third largest producer of cocoa bean in the world. Chocolate bar is one of a modern-popular processed food which composites of cocoa in form of powder as the main ingredient. However, chocolate confectionery products in Indonesia are dominated by international brands. Despite that, chocolate bar can also be produced as a representative of urban food-based traditional local products, namely gulo puan. Further, it is concluded that the use of cocoa powder as well as honey affected texture, moisture content, and ash content of chocolate bar.

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References

[1] Barraquio, Virginia L. (2014). Which Milk is Fresh? *International Journal of Dairy Processing & Research*, 1:201, 1-6.
[2] Bekumaa, A., Tadessea, T., Lemma F., dan Ulfina G. (2018). Milk and milk products processing**,** preservation and utilization in Gimbi district, West Wollega zone, Ethiopia. *Scientific Journal of Animal Science* 7(5), 504-510.
[3] Bloksma1, J., Adriaansen, R., Huber, Machteld., Lucy P.L. van de, Baars Ton and Jan de. (2008). Comparison of Organic and Conventional Raw Milk Quality in the Netherlands. *Biological Agriculture and Horticulture.* (26), 69–83.
[4] Petrov, P., Zukopha, Y., Dan Demikhop, Y., (2016). The Effects of Dairy Management on Milk Quality Characteristics. *Turkish Journal of Agriculture*, 4(9), 472-478.
[5] Thomas, C.S. (2008). *Efficient Dairy Buffalo Production*. De Laval International AB. Swedia.
[6] Nguyen van Thu. (2000). Buffalo production research and development in Vietnam. *Proc. of the Third Asian Buffalo Congress*, 27 to 31 March, Kandy (LK) : 105 115.
[7] Misra, A.K. (2005). Embryo Transfer Technology in Buffaloes : Progress and Development. *National Seminar on by Recent Advances in Conservation of Biodiversity and Augmentation of Reproduction and Production in Farm Animal Held at College of Veterinary Science and Animal Husbandry*, India, 5 – 7 March 2005. Sardar Krushinagar Danitwada Agricultural University.
[8] Ahmedsham, M., Amza, N. dan Tamiru, M. (2018). Review on Milk and Milk Product Safety, Quality Assurance and Control. *International Journal of Livestock Production*, 9(4), 67-78.
[9] Ren,D., Zou, C., Lin, B., Chen, Y., Liang,X and Liu, J. (2015). A Comparison of Milk Protein, Amino Acid and Fatty Acid Profiles of River Buffalo and Their F1 and F2 Hybrids with Swamp Buffalo in China. *Pakistan J. Zool*, vol. 47(5), pp. 1459-1465.
[10] Rini, A.O., Sumantri, C., Damayanthi. (2014). K-Casein Gene Polymorphisms In Riverine And Swamp Buffalo In Indonesia. *Journal Indonesian Tropical Animal Agriculture* 39(1): 1-9.
[11] Warner J.N. (1976). *Principles of Dairy Processing*. Wiley Estern Limitid New Delhi.

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