Original Article

Evaluation Goat Milk Yogurt Ice Cream With Varian Of Sucrose Levels

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Abstract

Aim: The aim of this study was to determine the effect of ice cream combination with yogurt. and the use of sucrose levels on melting power, yogurt ice cream was made from goat's milk. **Methods:** The design which was used is a complete rendomized design 5 x 5 factorial pattern with 3 repeats. **Results**: The result of variety analysis showed that the treatment of adding sucrosa levels, the treatment of ice cream dough combination with yogurt and the interaction between the two treatments had a very real effect (P<0,01) towards melting power, sweetness, texture. Based on the result of the study was concluded that the higher addition of sucrose to yogurt affect on sweetness, texture, but the content melted power decreases. the higher ratio of yogurt in combination of yogurt ice cream on melted power, sweetness, texture decreases.

Keywords: Evaluation, Goat Milk, Sucrose Levels

INTRODUCTION

Ice cream is a dairy product that is widely loved by various ages. The ice cream is also very good for health for being rich nutrition and incl food with nutrition high. Composition greatest ice cream is milk which is a good source of protein and energy help growth (Chan, 2008). Content ice cream nutrition originate Milk contains vitamins A, D, K and B12. Vitamin A plays a role for eyes. Vitamin K opens cell blocked blood _ while vitamin B12 increases memory and system nerves. Content nutrition in 100 g of ice cream is Carbohydrates 20.6 g, protein 4 g, and fat 12.5 g (Astawan, 2008). Principle ice cream making is form cavity air in the mixture ice cream ingredients or ice cream mix so obtained volume development that makes ice cream Becomes more light, no too solid, and have soft texture (Padaga & Sawitri, 2005). Ice cream has a high nutritional content. Ice cream can be made from goat's milk.

Milk is something ingredient food that has mark nutrition high, because milk is found content complete nutrition _ like lactose, fat, protein, various vitamins and minerals (Wilujeng & Mustikowati, 2018). Goat milk is milk from results milking udder goat. Nutrition in goat 's milk more good than cow 's milk (Setiawan & Tanius, 2002). For every 100 g of goat 's milk there are 3.6 g of protein, 4.2 g of fat, 4.5 g of carbohydrates, and 69 calories. Ingredients in goat 's milk that is milk casein as activity binding antioxidants _ metals (metal 40 chelators) and binders radical free (Farwin et al., 2010; Allenisan et al ., 2017). Besides that fat globules in goat milk more small compared to cow's milk so that more easy hydrolyzed and absorbed by the body (Al–Baarri, 2003). Benefits of goat 's milk other that is for therapy tuberculosis, help recover new people healed from sick, capable control rate cholesterol in blood, and good for health skin (Sodiq & Abidin, 2002). Goat milk has a characteristic aroma of prengus, this aroma is an important concern when made as a processed product of goat milk. The smell of fresh goat milk prengus is caused by the content of laurate saturated fatty acids, myristic and palmitic (Legowo et al., 2007). The combination of ice cream and yogurt is expected to minimize and eliminate the aroma of prengus.

Yogurt is product processed milk to drink sour fermented made _ of bacterial starter sour lactate (Suharyono & Kurniadi, 2010). Yogurt has four the benefits obtained from fermented milk ie as preservative natural, increase mark nutrition, get the preferred taste and texture as well as Upgrade variation food Sunarlim et al. (2007). Fermentation have essence in metabolic processes microbe for get results from something product that has mark sell high, like _ sour organic, cell proteins single, antibiotics and biopolymers (Sari et al., 2020). Other ingredients found in yogurt include: ie minerals like calcium, phosphorus, sodium and potassium, as well have complete vitamins such as vitamin A, vitamin B complex, B1 (thiamin), B2 (riboflavin), B6 (pyridoxine), B12 (cyanocobalamin), vitamins B, vitamin D, vitamin E (Maharani & Ayuningtyas, 2018). According to Rahayu (2009), yogurt with addition variation bacteria probiotics, accounts for the largest market in Indonesia namely about 36.6% of whole product fermented milk. According to Surono (2004) S. thermophilus and L. bulgaricus mutually support. S. thermophilus produces sour pyruvate, formic acid and CO2, as well sour stimulating folate _ growth L. bulgaricus. As in return, L. bulgaricus will let go the amino acids valine, glycine and histidine needed by S. thermophilus (Prayitno, 2006). Whereas bacteria L. acidophilus and Bifidobacterium spp. grow slow during the yogurt -making process (Shah, 2000). Chandan (2006) results metabolism of milk sugar (lactose). sour organic will influence taste and go determine yogurt quality. Chandan & Shani (1993) added a distinctive yogurt flavour obtained with formation sour lactate, acetaldehyde, acid acetate and diacetyl. Which substance produced by bacteria sour lactate and components volatile give characteristics sour and aromatic yogurt (Widodo, 2002). Yogurt itself contains probiotic bacteria and can have a beneficial effect on human health. Yogurt has various benefits such as nourishing the digestive tract, helping to overcome diarrhea, preventing the occurrence of osteoporosis, and has a variety of nutrients that are useful for preventing cancer (Tangapo & Mambu, 2019).

Methodology

This study was conducted experimentally with a Factor A treatment (sucrose level) namely A1 = Sucrose 0%; A2 = Sucrose 3%; A3 = Sucrose 6%; A4 = Sucrose 9%; and A5 = Sucrose 12%. And factor B (a combination of ice cream dough and yogurt) which is B1 = 100%: 0%; B2 = 75% : 25%; B3 = 50% : 50%; B4 = 25% : 75%; B5 = 0% : 100%.

Research Procedure

Yogurt ice cream making

Ice cream dough was combined with yogurt with a ratio of (100%: 0%); (75% : 25%); (50% : 50%); (25% : 75); and (0% : 100%). Next it was mixed with a mixer with speed for 15 minutes. The last step of the dough mixture was putted in ice cream cups, and was frozen at a temperature of ± - 10o C for 24 hours and yogurt ice cream was ready for testing.

Measured Parameter

The parameters which were observed in this study included testing the content, melting powder, sweetness and texture of yogurt ice cream.

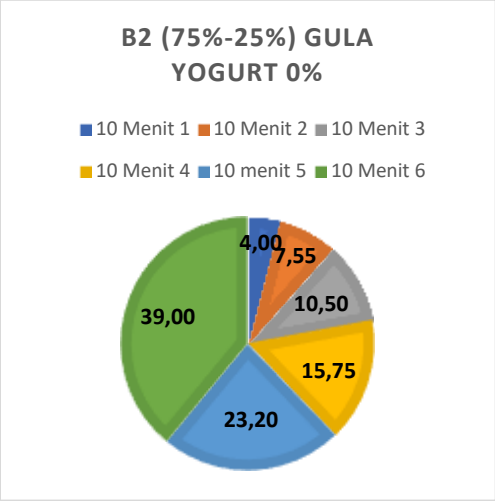
Data Analysis

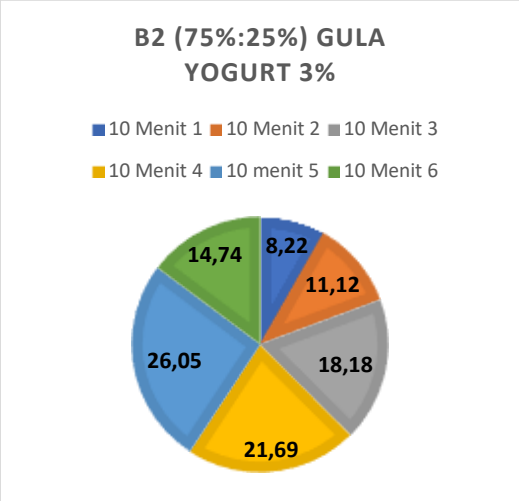
The data were analyzed using variance analysis according to the Complete Randomized Design (RAL) of factorial patterns using the SPSS program. The treatment with real effect was further tested using the Duncan test.

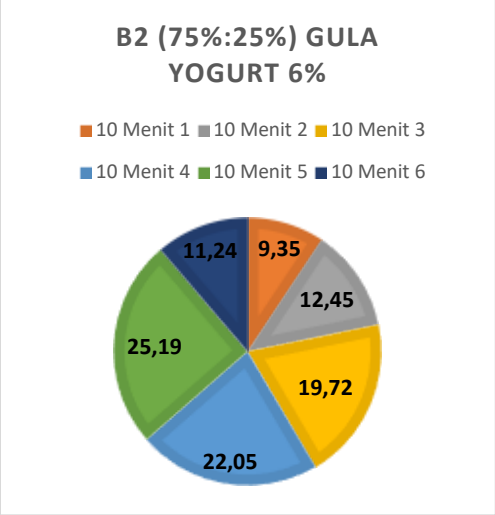
Results

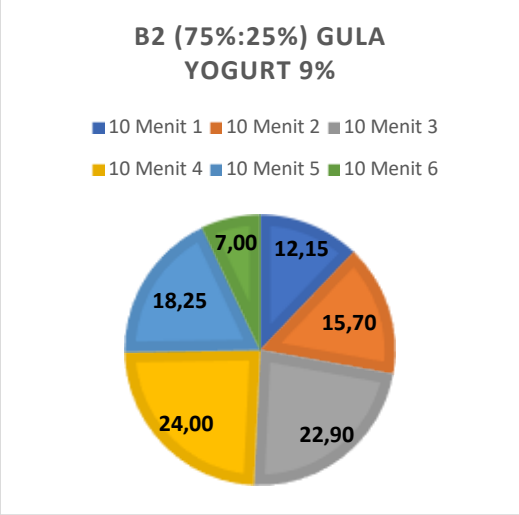
Melting Power

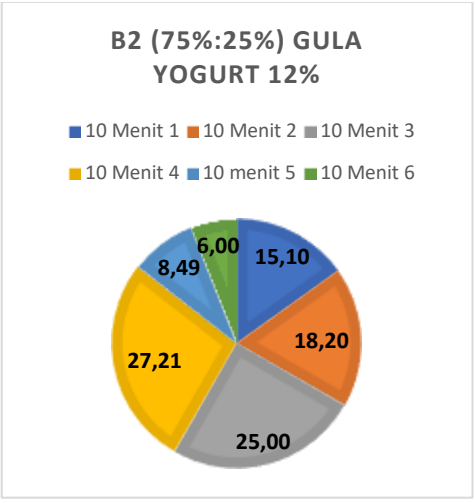
Melting power identical with the time it takes for the ice cream for melt perfect (Malaka, 2014). Muse and Hartel (2004) time melt ice cream influenced by quantity trapped air _ in ingredient ice cream mixture, formed ice crystals, as well fat content in it. Speed melting ice cream as one of the parameters used for look quality of ice cream (Kasanah et al., (2020). time required until all sample melt be measured with stopwatch and recorded the results (Zahro & Fithri, 2015). Assessment results to average power melt (minutes) yogurt ice cream with addition of sucrose level and combining presented in Figure 1 below this.

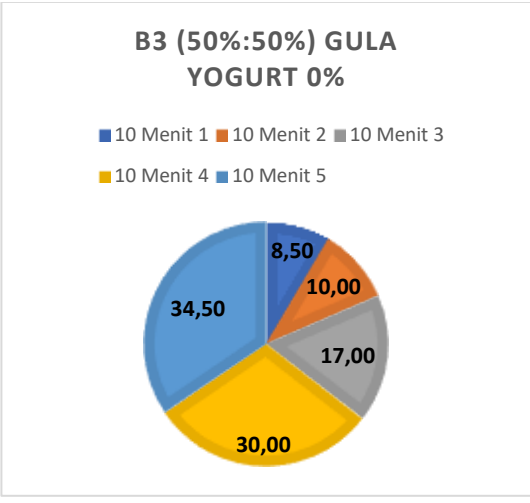

B2 (75%-25%) GULA YOGURT 0%
10 Menit 1
10 Menit 2
10 Menit 3
10 Menit 4
10 menit 5
10 Menit 6
4,00
7,55
10,50
15,75
23,20
39,00


B2 (75%:25%) GULA YOGURT 3%
10 Menit 1
10 Menit 2
10 Menit 3
10 Menit 4
10 menit 5
10 Menit 6
8,22
11,12
18,18
21,69
26,05
14,74


B2 (75%:25%) GULA YOGURT 6%
10 Menit 1
10 Menit 2
10 Menit 3
10 Menit 4
10 Menit 5
10 Menit 6
11,24
9,35
12,45
19,72
22,05
25,19


B2 (75%:25%) GULA YOGURT 9%
10 Menit 1
10 Menit 2
10 Menit 3
10 Menit 4
10 Menit 5
10 Menit 6
12,15
15,70
22,90
24,00
18,25
7,00


B2 (75%:25%) GULA YOGURT 12%
10 Menit 1
10 Menit 2
10 Menit 3
10 Menit 4
10 menit 5
10 Menit 6
15,10
18,20
25,00
27,21
8,49
6,00


B3 (50%:50%) GULA YOGURT 0%
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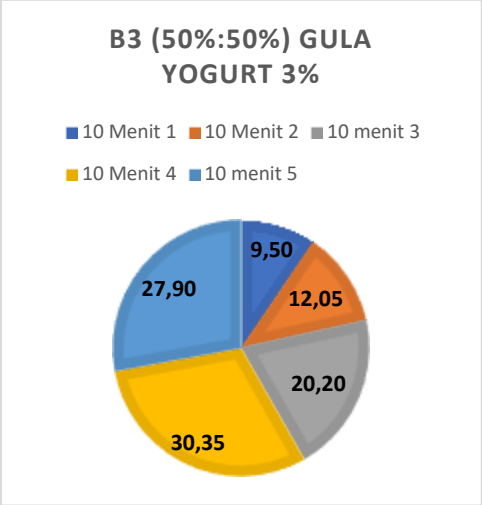
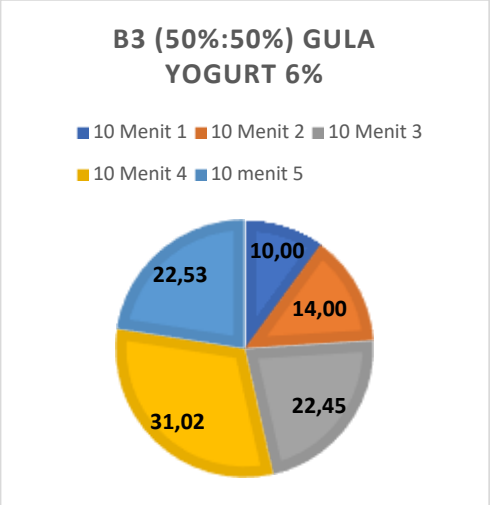
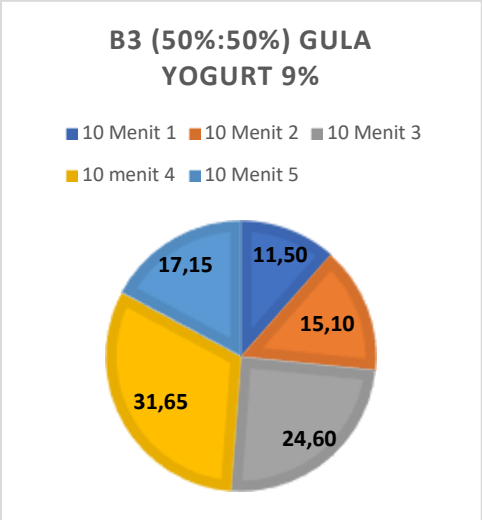
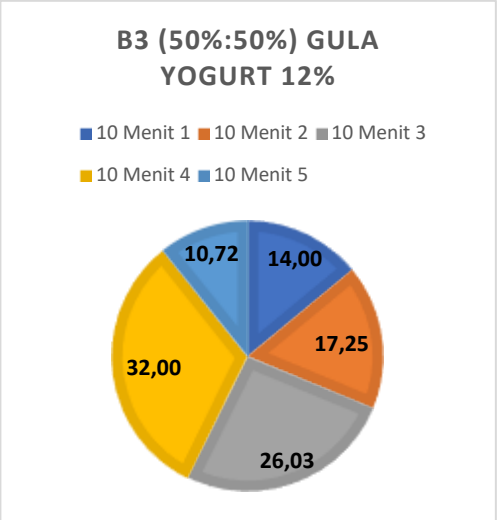
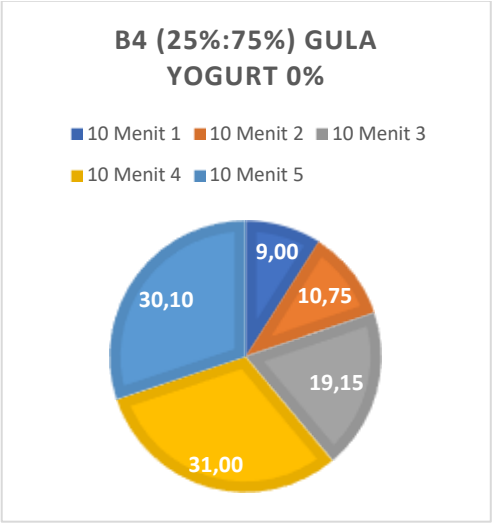
10 Menit 2
10 Menit 3
10 Menit 4
10 Menit 5
8,50
10,00
17,00
30,00
34,50


B3 (50%:50%) GULA YOGURT 3%
10 Menit 1
10 Menit 2
10 menit 3
10 Menit 4
10 menit 5
9,50
12,05
20,20
30,35
27,90


B3 (50%:50%) GULA YOGURT 6%
10 Menit 1
10 Menit 2
10 Menit 3
10 Menit 4
10 menit 5
10,00
14,00
22,45
31,02
22,53


B3 (50%:50%) GULA YOGURT 9%
10 Menit 1
10 Menit 2
10 Menit 3
10 menit 4
10 Menit 5
11,50
15,10
24,60
31,65
17,15


B3 (50%:50%) GULA YOGURT 12%
10 Menit 1
10 Menit 2
10 Menit 3
10 Menit 4
10 Menit 5
14,00
17,25
26,03
32,00
10,72


B4 (25%:75%) GULA YOGURT 0%
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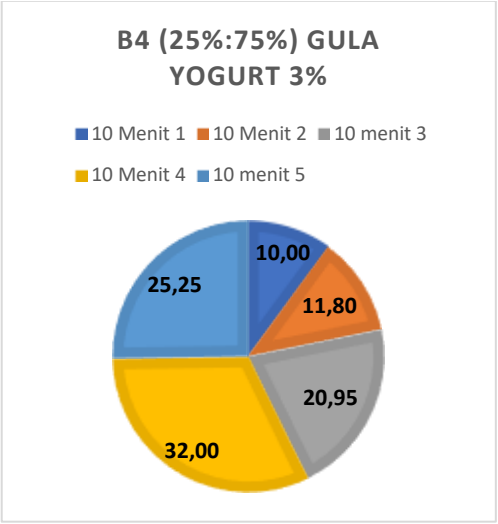
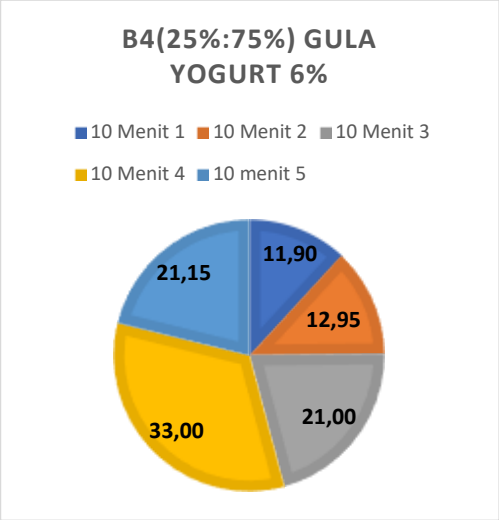
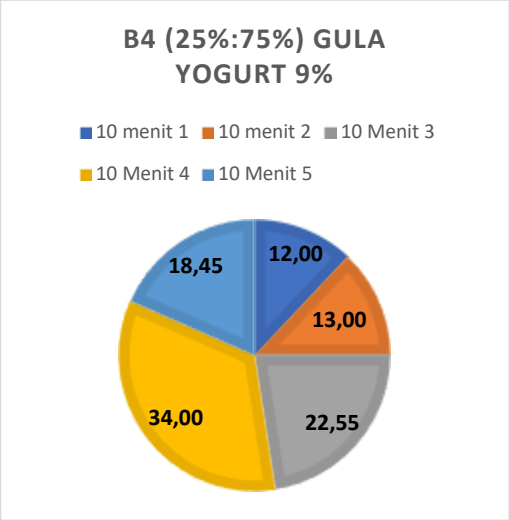
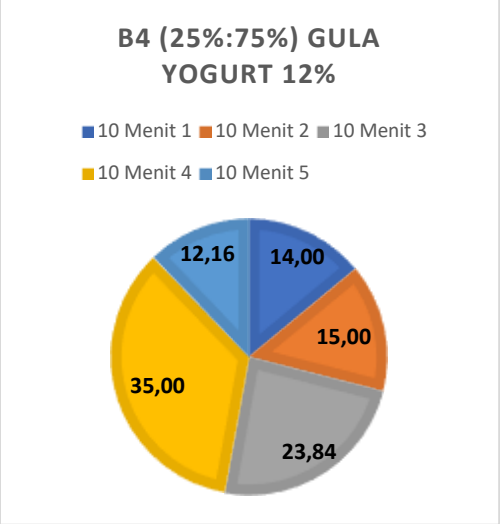
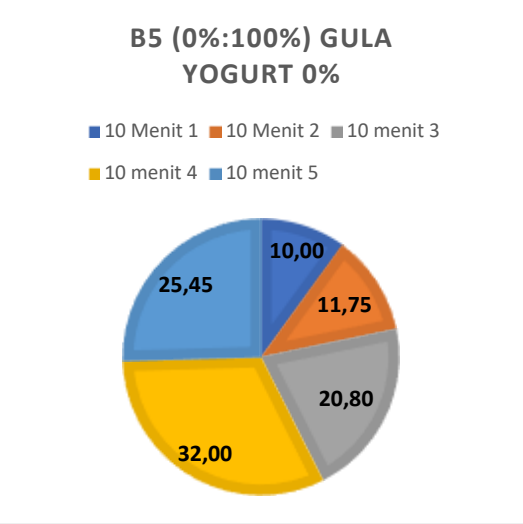
10 Menit 2
10 Menit 3
10 Menit 4
10 Menit 5
9,00
10,75
19,15
31,00
30,10


B4 (25%:75%) GULA YOGURT 3%
10 Menit 1
10 Menit 2
10 menit 3
10 Menit 4
10 menit 5
10,00
11,80
20,95
32,00
25,25


B4(25%:75%) GULA YOGURT 6%
10 Menit 1
10 Menit 2
10 Menit 3
10 Menit 4
10 menit 5
11,90
12,95
21,00
33,00
21,15


B4 (25%:75%) GULA YOGURT 9%
10 menit 1
10 menit 2
10 Menit 3
10 Menit 4
10 Menit 5
12,00
13,00
22,55
34,00
18,45


B4 (25%:75%) GULA YOGURT 12%
10 Menit 1
10 Menit 2
10 Menit 3
10 Menit 4
10 Menit 5
14,00
15,00
23,84
35,00
12,16


B5 (0%:100%) GULA YOGURT 0%
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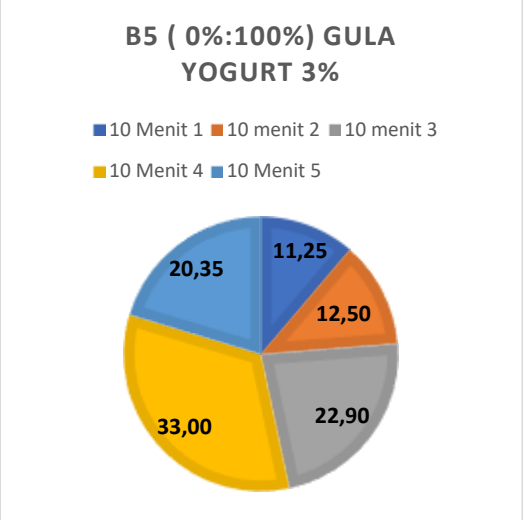
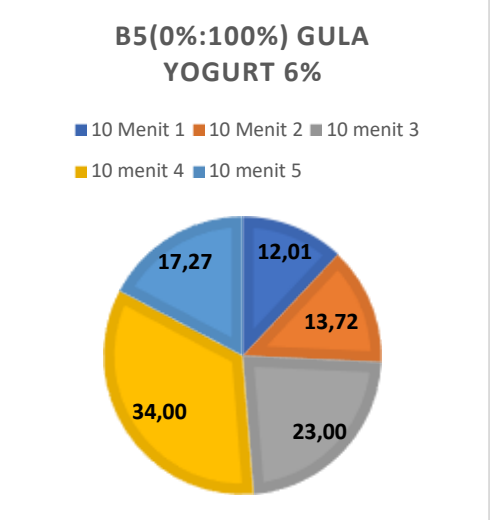
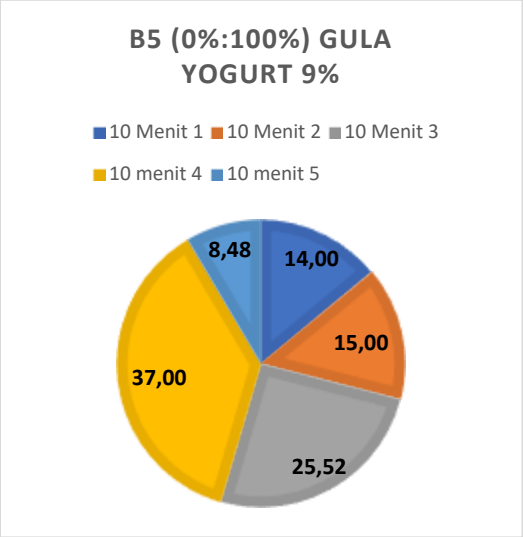
10 Menit 2
10 menit 3
10 menit 4
10 menit 5
10,00
11,75
20,80
32,00
25,45


B5 (0%:100%) GULA YOGURT 3%
10 Menit 1
10 menit 2
10 menit 3
10 Menit 4
10 Menit 5
11,25
12,50
22,90
33,00
20,35


B5(0%:100%) GULA YOGURT 6%
10 Menit 1
10 Menit 2
10 menit 3
10 menit 4
10 menit 5
12,01
13,72
23,00
34,00
17,27



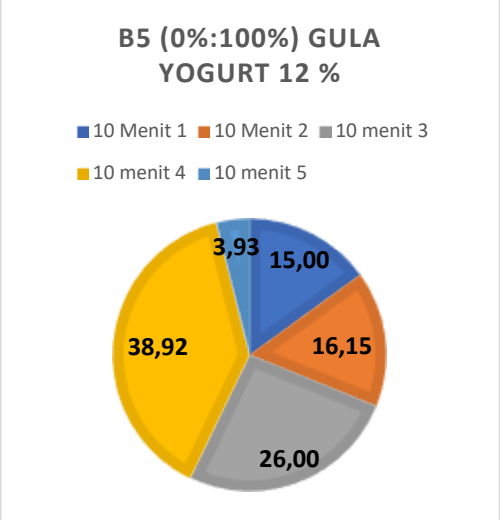


Figure 1 Average melting power (minutes) of yogurt ice cream with a combination of ice cream and yogurt and different levels of sucrose.

Power melting ice cream on (Figure 1) shows time melting ice cream the fastest namely ice cream with combination of B3, B4 and B5 p this could seen from time melt on ice cream only arrived in 10 minutes to 5 different with ice cream with treatment combination on B2 (75% ice cream :25% yogurt) which has range longer time for _ _ melt ie up at ten Minute to six. matter This is due to the combination this contain more ice cream comparison _ many than ratio others on B2, B3, B4 and B5, the ice cream on this B2 combination is 75% ice cream containing lots of ingredients there is carbohydrate inside it start from ingredients for max creamer/ vegetable cream have 2 grams/1% total carbohydrates, whipped cream contains 18 grams/6% total carbohydrates this in accordance with the amount listed on each ingredient _ from packaging. More ice cream content _ many (75%) of these have content flour more konjac _ many compared to with combination others, Glucomannan is substance water binders and gelling agents contained in porang / konjac could function as ice cream stabilizer because ability absorbs water and thickens the solution it has as well as stabilize quality ice cream with prevent growth ice crystals (Marshall et al., 2003). this _ in accordance with Goff & Hartel (2013) who stated that addition element carbohydrate in ice cream could role in water absorption and ability coagulation dough, so Upgrade viscosity dough. More carry on Oksilia & Lidiasari (2012) suggested that thick dough _ show that that water bound the more many so that ice cream speed for melt Becomes more slow and time consuming _ for melted ice cream Becomes longer.

Sweet Taste

Sweet taste is stimulus generated by the material food in the form of a sweet taste and felt by the senses taster. A sweet taste _ food affected by usage ingredient basic. Something product could accepted by consumers if have the right taste with desire consumers (Kartika et al., 1988). In general, the taste and smell of ice cream is one very supportive unit (Padaga & Sawitri, 2005). According to Vnderrolla et al. (2002) matters at play urgent in reception or favorite consumer to something product that is characteristics sensory. Based on research on the sweet taste of yogurt ice cream in research this with addition of sucrose level and combining dough different shown in Table 1.

Table 1 Average Sweet Taste Value of Yogurt Ice Cream Treatments Combination Ice Cream Dough with Yogurt as well Sucrose Level Increase

PERCENTAGE	SWEET TASTE value					
SUGAR IN	CREAM COMBINATIONS : YOGURT				AVERAGE	CONTROL
YOGURT	(75%:25)	(50%:5)	(25%:75%)	(0%:100)		EK (100 : 0)
0%	3.13 ± 0.02 ^{e}	3.27± $^{0.01i}$	3.13 ± 0.01 ^{e}	2.52±0.04 ^{a}	3.01 ± 0.02 ^{a}	
3%	3.21± $^{0.06gh}$	3.45±0.01 ^{h}	3.15 ± 0.01 ^{e}	2.73 ± 0.02 ^{b}	3.14 ± 0.03 ^{b}	4.01±0.01
6%	3.96± $^{0.01n}$	3.64±0.01 ^{k}	3.17±0.01 ^{ef}	2.84±0.04 ^{c}	3.40 ± 0.02 ^{c}	
9%	4.23± $^{0.03o}$	3.71±0.01 ^{l}	3.19±0.01 ^{fg}	2.87±0.01 ^{cd}	3.50 ± 0.02 ^{s}	
12%	4.35±0.01 ^{d}	3.79± $^{0.01m}$	3.24±0.01 ^{hi}	2.90±0.01 ^{d}	3.57 ± 0.01 ^{e}	
AVERAGE	3.78±0.03 ^{s}	3.57 ± $^{0.01c}$	3.18±0.01 ^{b}	2.77±0.02 ^{a}	3.32 ± 0.02	

Description: Different superscripts on the same row and column show very significant difference (P<0.01)

The sweet taste of yogurt ice cream, experienced enhancement along with treatment combination (table 1). Evaluation panelist against the sweet taste of yogurt ice cream with ratio combination different reach range value 2.77-3.78 (less sweet). this _ show total ratio treatment of yogurt ice cream gives contribution of sweetness to the product end of yogurt

ice cream. Analysis variance shows that ice cream yogurt with treatment addition of sucrose level and ice cream ratio with yogurt had a very significant effect (P<0.0 1) on the value of the sweet taste of yogurt ice cream. Duncan's further test results show that Among any ice cream with yogurt treatment adding sucrose levels and combining ice cream with yogurt to experience sweet difference. _ The more tall increase in sucrose level the more tall value of sweetness , the more tall comparison of yogurt on comparison treatment combination between ice cream with yogurt then the more low value on sweetness , p this suspected because in combination B2 (75% : 25%) contain many glucose in the material in comparison ie ice cream 75% : yogurt 25% thing this causing the comparison of B2 (75% : 25%) to experience evaluation high on sweetness , in comparison ratio other , due to the comparison this contain many glucose . Condition this is what causes change Sweet taste detection by panelists. common sweetener _ used in ice cream making is manifold sucrose. Function main sucrose among other things, increase palability something food, that is with cover no taste _ fun. Bastian et al. (2013) stated that addition ingredient flavorful strong could cover the taste and raise unique taste you can _ accepted panelist. Sweet taste sucrose characteristic pure, because no there is follow - up taste. Sucrose also works repair body texture product (Arbuckle, 1986).

Texture

Texture is one of the properties of a material or product that can be felt through organoleptic tests such as through touch or the sense of taste, texture is one of the factors that influence the level of panelist acceptance of the product, after the aroma is received, the next determination is taste besides texture (Rubianty & Berty, 1985). The texture values of yogurt ice cream in this study with the addition of sucrose levels and different dough combinations are shown in table 2.

Table 2 Average Texture Value of Yogurt Ice Cream Treatment Combination of Ice Cream Dough with Yogurt and Addition of Sucrose Levels.

PERCENTAGE	TEXTURE PARAMETERS					
SUGAR IN	YOGURT ICE CREAM COMBINATION				AVERAGE	CONTROL
YOGURT	EK (75%:25%)	EK (50%:50%)	EK (25%:75%)	EK (0%:100%)		EK (100 : 0)
0%	3.24±0.02 ^{s}	4.59± $^{0.01i}$	5.45±0.01 ^{n}	6.00±0.01 ^{q}	4.82 ± 0.01 ^{e}	
3%	3.19 ± 0.01 ^{c}	4.44±0.02 ^{h}	5.36± $^{0.04m}$	5.98±0.01 ^{q}	4.74 ± 0.02 ^{d}	3.01±0.01
6%	3.15 ± 0.01 ^{c}	4.36±0.02 ^{g}	5.27±0.02 ^{k}	5.97±0.02 ^{q}	4.69 ± $^{0.02c}$	
9%	3.11 ± 0.01 ^{b}	4.27± $^{0.01f}$	5.20±0.04 ^{l}	5.92±0.02 ^{p}	4.63 ±0.02 ^{b}	
12%	3.05± $^{0.01a}$	4.13 ± 0.03 ^{e}	5.08±0.07 ^{k}	5.82±0.03 ^{o}	4.52 ±0.04 ^{a}	
AVERAGE	3.15± $^{0.01a}$	4.36±0.02 ^{b}	5.27 ± 0.04 ^{c}	5.94±0.02 ^{s}	4.68 ±0.02	

Description: Different superscripts in the same row and column show very significant differences (P<0.01)

The average value of the texture of yogurt ice cream with the addition of sucrose levels and the combination of ice cream and yogurt is around 3.05-6.00 (soft - not soft). While the control texture (without the addition of yogurt dough) is 3.01. Analysis of variance (appendix 10) showed that the treatment of adding sucrose levels, the treatment of the combination of ice cream dough and yogurt and the interaction between the two treatments had a very significant effect (P<0.01) on the texture value of yogurt ice cream.

The results of the interaction Duncan test between the two treatments in this study showed that there were significant differences in the texture value of yogurt ice cream between each treatment. The texture value of yogurt ice cream increased with the increase in the use of yogurt mixture in the combination treatment. this means that the closer to the value 6, the more (not soft) . While the other comparisons have a small proportion of ice cream, causing the other comparisons to have a mixture that is more liquid and forms crystals due to the lack of stabilizers (flour, glucose, and eggs) in the other combinations. stabilizer in the manufacture of ice cream can prevent the formation of coarse ice crystals (Nuraini, 2007). Hartel's statement (1996) in Archarya, et al. (2006) that crystal size greatly influences the texture of ice cream.

In addition, Table 2 shows that a decrease in the texture value of yogurt ice cream occurs with the addition of the sucrose level. Decreasing the level of sucrose in the manufacture of yogurt causes the texture value to decrease. Increasing the texture value of yogurt ice cream with the addition of sucrose levels above 3% for combinations of 75:25, 50:50 and 25:75. However, a decrease also occurred in the texture value of yogurt ice cream with the addition of a sucrose level of more than 3% for the 0:100 combination, this decrease in textured value meant that the lower the value, the softer it was and the closer it was to 6, the less soft it was. The addition of sucrose improves the texture of yogurt ice cream. The main function of sucrose, among others, is to increase the palatability of a food, namely by masking an unpleasant taste. The sweet taste of sucrose is pure, because there is no accompanying taste . Sucrose also functions to improve the body texture of the product (Arbuckle, 1986). According to Syahbania (2012) sucrose not only functions as a sweet flavoring agent for ice cream, but also lowers the freezing point of the dough, so that the dough does not freeze too quickly during processing. This is important so that more air can enter the dough so that the texture becomes softer. De Man (1997) and Sastrohamidjojo (2005) stated that sucrose is the sweetest disaccharide. Natural sources of

sucrose include: sugarcane (100% sucrose), beets, sap sugar (50%) and jelly. Sucrose is a disaccharide which when hydrolyzed turns into two monosaccharide molecules namely glucose and fructose.

Conclusion

Based on the result of this study could be concluded that the ratio of ice cream combination with yogurt and the addition of sucrose levels on yoghurt had a very noticeable effect towards the sweetness, melting power, and texture. The best treatment is in the combination treatment of 75%: 25% with 3% sucrose.

References

1. Al–Baarri, A. N. (2003). *Fermentasi Sebagai Upaya Menghilangkan Aroma Prengus Susu Kambing*. UNDIP. Semarang.
2. Arbuckle, W. S. (1986). *Ice Cream.* The AVI Publishing Company. Inc. Westport. Connecticut.
3. Astawan, M. (2008). *Sehat dengan Hidangan Hewani*. Jakarta: Penebar Swadaya.
4. Bastian, F., Ishak, E., Tawali, A. B., & Bilang, M. (2013). Daya Terima dan Kandungan Zat Gizi Formula Tepung Tempe Dengan Penambahan Semi Refined Carrageenan dan Bubuk Kakao. *Jurnal Aplikasi Teknologi Pangan*, *2*(1).
5. Chan, L. A. (2008). *Membuat Es Krim*. Jakarta: Agromedia Pustaka.
6. Chandan, R. C. (2006). *Manufacturing Yogurt and Fermented Milks*. Blackwell Publishing Ltd, Oxford United Kingdom.
7. Chandan, R. C. (2014). 18 Dairy–Fermented Products. *Principles and Applications*, 405.
8. De Man, J. M. (1997). *Kimia Makanan*. Bandung: ITB.
9. Goff, H. D. & Hartel, R.W. (2013). *Ice Cream Seyenth Edition*. New York: Springer Science plus Bussines Media.
10. Kartika, B., Hastuti, P., & Supartono, W. (1988). Pedoman uji inderawi bahan pangan. *Universitas Gadjah Mada, Yogyakarta*.
11. Legowo A. M, Albaarill A. N, Adnan M, Santosa U. (2007). I|ntensitas aroma prengus dan deteksi asam lemak pada susu kambing. http: milkkordie.blogspot.com/207/04(05 Mei 2010).
12. Maharani, F., & Ayuningtyas, R. D. (2018). Pelatihan Pembuatan Yoghurt Di Kecamatan Pedurungan Kota Semarang. *Abdimas Unwahas*, *3*(2), 5–9. https://doi.org/10.31942/abd.v3i2.2495.
13. Malaka, R. (20140. *Teknologi Aplikatif Pengolahan Susu*. Surabaya: Brilian Internasional
14. Marshall, R. T., H. D. Goff and R. W Hartel. (2003). *Ice Cream 6th edition*. New York: Kluwer Academia/Plenum Publisher.
15. Muse, M. R & Hartel. R. W., (2004). Ice cream structural elements that affect melting rate and hardness. *Journal Dairy Science*. 87:1-10.
16. Nuraini, H. (2007). *Memilih dan membuat jajanan Anak yang Sehat dan Halal*. Jakarta: Qultummedia.
17. Oksilia, M. I., S. & Lidiasari, E. (2012). Karakteristik es krim modifikasi dengan formulasi bubur timun suri (*Cucumis melo L*.) dan sari kedelai. *Jurnal Teknologi dan Industri Pangan 23*(1): 17-22.
18. Padaga, M., & Sawitri, M. E. (2005). *Membuat es krim yang sehat.* Surabaya: Trubus Agrisarana
19. Padaga, M., & Sawitri, M. E. (2005). Membuat es krim yang sehat. *Trubus Agrisarana. Surabaya*.
20. Prayitno, P. (2006). The content of lactic acid and lactose of yoghurt fermented with different number and percentage starter bacteria. *Animal Production*, *8*(2).
21. Rahayu, E. S. (2009). Perkembangan terkini penggunaan probiotik dalam industry susu. *Foodreview Indonesia*. *4*(6): 30-33.
22. Rubianty, S, B. Kaseger. (1985). *Kimia pangan.* Badan Kerjasama Perguruan Tinggi Negri Indonesia Bagian Timur. Makassar.
23. Sari, A. I. C., Karlina, E., & Cahyo, A. (2020). Pemanfaatan Susu Menjadi Olahan Yogurt Dan Pemasaran Online Sebagai Sarana Untuk Meningkatkan Pendapatan. *Jurnal PKM: Pengabdian Kepada Masyarakat*, *3*(2), 136–143.
24. Sastrohamidjojo, H. (2005). *Kimia Organik. Sterokimia, Karbohodrat, Lemak dan Protein*. Yogyakarta: Gadjah mada University Press
25. Setiawan, T., & Tanius, A. (2003). *Beternak Kambing Perah Peranakan Ettawa*. Penebar Swadaya.
26. Shah, N. P. (2000). Probiotic bacteria: selective enumeration and survival in dairy foods. *Journal of dairy science*, *83*(4), 894-907.
27. Sodiq & Abidin. (2002). *KambingPeranakan Etawa*. Jakarta: Agro Media Pustaka.
28. Suharyono, A. S., & Kurniadi, M. (2010). Pengaruh Konsentrasi Starter Streptococcus thermophillus dan Lama Fermentasi Terhadap Karakteristik Minuman Laktat dari Bengkuang (Pachyrrhizus erosus). *Jurnal Teknologi Hasil Pertanian*, *3*(1), 51-58.
29. Sunarlim, R., Setiyanto, H., & Poeloengan, M. (2007). Pengaruh kombinasi starter bakeri L. bulgaricus, S. thermophilus dan L. plantarum terhadap sifat mutu susu fermentasi. In *Prosiding Seminar Nasional Teknologi Peternakan dan Veteriner, Puslitbangnak, Bogor. Hal* (pp. 270-278).
30. Surono, I. S. (2004). *Probiotik Susu Fermentasi dan Kesehatan*. Jakarta: YAPMMI
31. Syahbania, N. (2012). *Studi pemanfaatan talas (colocasia esculenta) sebagai bahan pengisi dalam pembuatan es krim. Program Studi Ilmu dan Teknologi Pangan Jurusan Teknologi Pertanian*. Fakultas Pertanian. Universitas Hasanuddin. Makassar.

32. Tanggapo, A. M. (2019). Edukasi Mengenai Pentingnya Konsumsi Probiotik Untuk Peningkatan Kesehatan Pada Kelompok Wanita Di Kelurahan Banjer Kecamatan Tikala Kota Manado. *VIVABIO: Jurnal Pengabdian Multidisiplin*, *1*(3), 13-17.

33. Widodo, W. (2002). *Bioteknologi Fermentasi Susu*. Malang: Universitas Muhamadiyah Malang.

34. Wilujeng, S., & Mustikowati, R. I. (2018). Pendekatan Marketing Mix Dalam Upaya Meningkatkan Penjualan Rumah Olahan Susu Kelurahan Songgokerto Kota Batu. *Jurnal Ilmiah Pangabdhi*, *3*(1), 1–6. https://doi.org/10.21107/pangabdhi.v4i1.4575.

35. Zahro, C., & Nisa, F. C. (2015). Pengaruh penambahan sari anggur (vitis vinifera l.) Dan penstabil terhadap karakteristik fisik, kimia dan organoleptik es krim [in press september 2015]. *Jurnal Pangan dan Agroindustri*, *3*(4).