JOURNAL LA LIFESCI

VOL. 05, ISSUE 03 (250-260), 2024
DOI: 10.37899/journallalifesci.v5i3.1457

Test of Total Solids and Melting Rate of Coconut Milk-Based Ice Cream Combined with Cashew Milk

Salsa Iwank Afifa[1], Pramudya Kurnia[1]

[1]*University of Muhammadiyah Surakarta*

**Corresponding Author: Salsa Iwank Afifa*
Email: salsaiwank112@gmail.com

Article Info

Article history:
Received 25 June 2024
Received in revised from 19 July 2024
Accepted 4 August 2024

Keywords:
Ice Cream
Coconut Milk
Cashew Milk
Total Solids
Melting Power

Abstract

Ice cream is one of the most popular foods, favored by people of all ages, from children to adults. Cow's milk is generally the primary ingredient for making ice cream. However, due to limited production and relatively high prices of cow's milk, alternatives such as coconut milk and cashew milk combinations are being explored. The quality of ice cream is influenced by total solids and melting rate. This study aims to determine the total solids and melting rate of coconut milk-based ice cream with the addition of cashew milk. This research is an experimental study using a Completely Randomized Design (CRD) with three treatments, varying the composition of coconut milk to cashew milk in ice cream production: 60%:40%, 50%:50%, and 40%:60%. The research procedure consisted of three stages:(1)Ice cream production;(2)Testing total solids in ice cream products;(3)Testing the melting rate of ice cream products Data were processed through editing, coding, tabulating, and entry. Statistical analysis was performed using a one-way ANOVA test. Results showed a significant difference in total solids among the treatments with varying ratios of coconut milk to cashew milk. Ice cream A had the highest total solids at 23.412%. However, the total solids values did not meet the quality requirements of the Indonesian National Standard (SNI). Regarding melting rate, no significant difference was found among the treatments. Ice cream A exhibited the highest melting resistance with an average value of 0.865. The melting rate values met the SNI quality requirements, with an average melting time of 45 minutes.

Introduction

Ice cream is one of the most popular foods and is favored by many people from children to adults. Ice cream is popular because it has a unique taste, delicious, and soft texture. Ice cream itself is classified as a semi-solid food with a frozen form. Ice cream is known to have a high content of nutrients and nutrients so that this food is beneficial for health. (Chan, 2008; Zahroh et al., 2023). With good nutritional content, ice cream is a common food consumed by various groups in many countries including Indonesia. Based on research (Khalish et al., 2020) the level of ice cream consumption in Indonesian society has increased every year with an achievement of 51.9% from 2013 to 2018 with consumption per person ranging from 0.63 L / person / year then increased to 0.7 L / person / year in 2019, and in 2020 increased again to 0.73 L / person / year. (Habieb et al., 2024).

The increase in the number or level of ice cream consumption in Indonesia is directly proportional to the need for cow's milk as the basic ingredient for making ice cream. Cow's milk is the basic ingredient in making ice cream which will produce ice cream that feels creamier. According to the Central Bureau of Statistics, the average amount of milk consumption in Indonesia was 16.27 kg/capita/year in 2020 (Badan Pusat Statistik, 2021).

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

These results show that the consumption of cow's milk in Indonesian society is low due to the small population of dairy cows which has an impact on the low production of milk. It is known that the dairy cattle population in 2021 is 578,579 heads only, with the amount of fresh milk production in Indonesia amounting to 962,676.66 tons. (Badan Pusat Statistik, 2022). With limited cow's milk production, the price of cow's milk is relatively more expensive. (Brilianty et al., 2022).

Coconut milk is a commodity that can be used as a basic ingredient in making ice cream to replace cow's milk which is experiencing limited production and has a high price. Based on the Indonesian Food Composition Table (TKPI) in 2019, it is known that coconut milk with water per 100 grams has a fairly high nutritional content, namely energy of 122 kcal, protein 2.0 grams, fat 10.0 grams, and carbohydrates 7.6 grams. Meanwhile, cow's milk per 100 grams has 61 kcal of energy, 3.2 grams of protein, 3.5 grams of fat, and 4.3 grams of carbohydrates. (Kementerian Kesehatan RI, 2020). The nutritional content of coconut milk with water and cow's milk shows that coconut milk with water has an advantage in energy, fat and carbohydrate content. Meanwhile, cow's milk has an advantage in protein. To obtain higher protein nutrients, ice cream with coconut milk can be combined with other ingredients such as vegetable milk. (Anasari et al., 2022).

In making coconut milk-based ice cream, cashew milk can also be added. Cashew milk is made from cashew nuts which has nutritional content per 100 grams in the form of energy of 52 Kcal, protein 1.31%, fat 3.16%, carbohydrates 4.74%. (Chalupa-Krebzdak et al., 2018 dalam Smith et al., 2022). Cashew nuts are one of the local foods that are often found in Indonesia, so that the selection of cashew ingredients can support increased consumption and add innovative products for making ice cream from cashew nuts combined with coconut milk. (Agustina et al., 2020). With high fat and protein content in the composition of coconut milk and cashew milk can make the total solids in ice cream will be higher.

Solids have their own function in ice cream in the form of higher nutritional content, a fuller dough, and stabilize the level of cold, and provide a smoother ice cream texture. However, too low total solids can cause the ice cream mixture to be rough, while too high total solids make the ice cream mixture soft, sticky, and too dense, and reduce the chill level of the ice cream. (Goff et al., 2013; Mahrita et al., 2022). Thus, total solids must have a balanced proportion so that the taste of ice cream can be perfect. This has also been regulated regarding the total solids of ice cream where according to the Indonesian National Standard (2018) states that the minimum value of total solids in ice cream is 31%.(Manurung et al., 2024). This rule then becomes a parameter so that the total solids of ice cream are not less than the standard limit imposed.

In general, ice cream is a food that melts easily at room temperature. The melting power of ice cream can be influenced by the composition of ice cream such as fat, solids, and stabilizers. In addition, the manufacturing process such as homogenization can make an influence in the melting power of ice cream. Improper homogenization causes the spread of fat content to be uneven, making the texture coarser and the overrun to increase. (Puspitasari et al., 2021). This is in accordance with the statement of Alenta et al., (2024) which provides a statement that good melting power in an ice cream has a time range between 15-25 minutes.

Based on the above background, this study aims to determine the total solids and melting power of coconut milk-based ice cream with the addition of cashew milk.

Methods

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

The method used in this research is experimental, employing a factorial design and a Completely Randomized Design (CRD) with three treatments. The research factors include differences in the composition of coconut milk and cashew milk in the process of making ice cream products. Each of the three treatments was replicated twice. (Choirunnisa et al., 2022), i.e. 60% : 40% (A1); 50% : 50% (A2) and 40% : 60% (A3). This research was carried out in June 2024 at the Food Science Laboratory, Nutrition Study Program, Faculty of Health Sciences, University of Muhammadiyah Surakarta.

The free variable in this study was the treatment of differences in the composition of coconut milk percentages with combinations. The bound variables are the total solids and melting power, while the control variables are the composition of the dough (ingredients), the size and cooling time of the ice cream.

The tools used in the study were digital scales, stoves, basins, spoons, spatula, thermometers, baking pans, freezers, mixers, pots, measuring cups, plates, glasses, rotary ice cream tools, exchange rate scales, wire strainers, stopwatches, analytical scales, and small bowls. The ingredients used in this study are coconut milk, cashew milk, sugar, ovalet, carboxy Methyl Cellulose (CMC), vanilli and aquades.

The research procedure in this study has several stages, namely; (1) the stages of making ice cream; (2) The stage of testing the total solids in ice cream products; (3) The melting power testing stage of ice cream products. The data obtained will be processed using the process of editing, coding, tabulating and entry. Furthermore, the data was analyzed using statistical tests in the form of the Anova One Way Test and the Kruskal-Wallis Test to determine the effect of the treatment of the number of combinations of coconut milk and cashew milk on ice cream products related to the results on chemical properties including total solids and physical properties including melting power.

Results and Discussion

The treatment in the study of total solids and solubility was with the difference in the composition of the percentage of coconut milk and cashew milk, respectively by 60%:40%, 50%: 50% and 40%: 60%.

Total Solids

Table 1. Total Solids of Coconut Milk and Cashew Nut Milk Ice cream

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	23.412 ± 0.271^{a}	0.000
B (50:50)	22.467 ± 0.281^{b}	
C (40:60)	21.448 ± 0.263^{c}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

Based on table 1, a significance score of $0.000 \leq 0.05$ is obtained, which means that there is a significant difference in the total solids of coconut milk ice cream with a combination of cashew milk, either treatment A 60%: 40%, B 50% : 50%, and C 40%: 60%. Further interpretation of the Duncan test shows that there are significant differences from all treatments A, B, and C. The graph of the ice cream total solids test is presented in Figure 1.

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

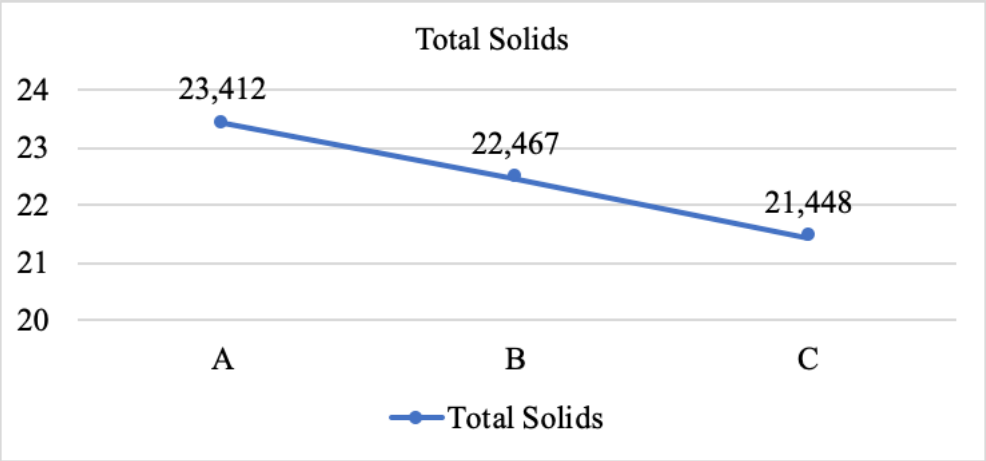

Figure 1. Graph of Total Solids Result of Coconut Milk Ice Cream with Milk Combination Cashew Nuts

Based on Figure 1 shows coconut milk ice cream with a combination of cashew milk with the treatment of 60%: 40% produces the highest total solids with a value of 23.412% and the lowest value in the treatment of 40%: 60% treatment of 23.412%.

There is a significant difference between the use of coconut milk and cashew milk with the treated ratio on total solids in ice cream. This difference can be seen from the statistical test results which show the value of p=0.000<0.05. The highest total solids were found in ice cream A with a value of 23.412% in the ratio of coconut milk and soy milk 60%: 40%, then followed by ice cream B with a value of 22.467% at a ratio of 50%: 50%, and finally ice cream C with a value of 21.448% at a ratio of 40%: 60%. This makes the total solids in the ice cream made do not meet the Indonesian National Standard (SNI) 3713-2018 which has a minimum value of 31%. The lack of protein value makes the water binding power unstable so that it affects the viscosity of the ice cream made. (Suwita & Hadisuyitno, 2021). In addition, cashew milk as a combination ingredient has a per 100 gram nutrient content of 3.16 g fat, 1.31 g protein, and 4.74 g carbohydrate. This content is known to be lower than liquid coconut milk as the basic ingredient which has a content per 100 grams of nutrients of 10 g fat, 2 g protein, and 7.6 g carbohydrates. Therefore, coconut milk ice cream with a combination of cashew milk can be said to be not too significant in providing an influence that can play a role in increasing total solids in order to achieve the quality requirements for total solids in ice cream according to SNI. To get good total solids in ice cream, solid ingredients are also needed that can be useful in increasing viscosity. This is in line with the research of Arbuckle and Marshall (2000) in their study. (Zainuri et al., 2020) which shows that the addition of solids in the ice cream dough makes the amount of water frozen become less and can affect the freezing point.

Another supporting factor is caused by the fat content of coconut milk which plays a role in the air capture process associated with the formation of dough viscosity in ice cream. The thicker the ice cream produced, the more the total solids increase. Research (Junita et al., 2023) The results show that the total solids of ice cream will increase with the amount of coconut milk and the amount of whipping cream used. This is because the total solids of coconut milk are higher than the total solids in whipping cream. The higher the fat content and total solids of ice cream, the lower the overrun. The use of coconut milk can thicken the ice cream mixture where the thicker or higher the viscosity of the mixture causes the air trapped during the agitation process to decrease, so that the resulting overrun value becomes low. In this case it can be said that total solids basically have a significant influence on the texture of ice cream. High total solids in ice cream can make the texture of ice cream soft and sticky, while when ice cream has

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

low total solids, the texture of the ice cream becomes rough. (Mahrita et al., 2022). This is in line with the research of Amal et al 2015 in (Hafids et al., 2019) that excessive total solids will thicken the texture of the ice cream, while too low total solids will result in an ice crystal formulation and also a coarser texture.

Melting Power

The treatment in melting power research is the weight of melted ice cream recorded every 5 minutes from 0-5 minutes to 0-45 minutes.

Table 2. Melting Power of Coconut Milk Ice Cream and Cashew Milk Ice Cream at 0-5 minutes

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	0.453 ± 0.004^{a}	0.055
B (50:50)	0.703 ± 0.036^{b}	
C (40:60)	0.763 ± 0.130^{b}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

Based on Table 2, a significance score of $0.055 \geq 0.05$ was obtained, indicating that there is no significant difference in the melting power of ice cream at 0-5 minutes. Further interpretation of the Duncan test shows that the melting power of A is significantly different from the melting power of B and C. The melting power of B is significantly different from the melting power of A but not significantly different from C. Similarly, the melting power of C is significantly different from the melting power of A but not significantly different from B.

Table 3. Melting Power of Coconut Milk Ice Cream and Cashew Milk Ice Cream at 0-10 minutes

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	0.739 ± 0.023^{a}	0.067
B (50:50)	0.862 ± 0.049^{ab}	
C (40:60)	0.882 ± 0.041^{b}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

Based on table 3, a significance score of $0.067 \geq 0.05$ was obtained, which means that there is no significant difference in the melting power of ice cream at 0-10 minutes. Further interpretation of Duncan's test shows that melting power A is significantly different from melting power C, but not significantly different from melting power B. Melting power B has no significant difference with melting power A and C. Melting power of C was significantly different from melting power of A, but not significantly different from melting power of B.

Table 4. Melting Power of Coconut Milk Ice Cream and Cashew Milk Ice Cream at 0-15 minutes

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	0.853 ± 0.014^{a}	0.185
B (50:50)	0.925 ± 0.061^{a}	
C (40:60)	0.940 ± 0.012^{a}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

Based on table 4, a significance score of 0.185 ≥ 0.05 was obtained, which means that there is no significant difference in the melting power of ice cream at 0-15 minutes. Further interpretation of the Duncan Test shows that there is no significant difference from each treatment.

Table 5. Melting Power of Coconut Milk Ice Cream and Cashew Milk Ice Cream at 0-20 minutes

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	0.924 ± 0.014^{a}	0.084
B (50:50)	0.958 ± 0.033^{ab}	
C (40:60)	1.002 ± 0.009^{b}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

Based on table 5, a significance score of 0.084 ≥ 0.05 was obtained, which means that there is no significant difference in the melting power of ice cream at 0-20 minutes. Further interpretation of Duncan's Test shows that melting power A is significantly different from melting power C, but not significantly different from melting power B. Melting power B has no significant difference with melting power A and C. Melting power of C was significantly different from melting power of A, but not significantly different from melting power of B.

Table 6. Melting Power of Coconut Milk Ice Cream and Cashew Milk Ice Cream at 0-25 minutes

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	0.968 ± 0.006^{b}	0.276
B (50:50)	0.979 ± 0.014^{b}	
C (40:60)	1.021 ± 0.050^{b}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

Based on table 6, a significance score of 0.276 ≥ 0.05 was obtained, which means that there was no significant difference in the melting power of ice cream at 0-25 minutes. Further interpretation of the Duncan Test shows that there is no real difference between the treatments.

Table 7. Melting Power of Coconut Milk Ice Cream and Cashew Milk Ice Cream at 0-30 minutes

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	1.009 ± 0.001^{a}	0.632
B (50:50)	0.987 ± 0.025^{a}	
C (40:60)	1.023 ± 0.055^{a}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

Based on table 7, a significance score of 0.632 ≥ 0.05 was obtained, which means that there is no significant difference in the melting power of ice cream at 0-30 minutes. Further interpretation of the Duncan test shows that there is no significant difference from each treatment.

Table 8. Melting Power of Coconut Milk Ice Cream and Cashew Milk Ice Cream at 0-35 minutes

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	0.999 ± 0.0007^{a}	0.432
B (50:50)	0.968 ± 0.012^{a}	
C (40:60)	1.004 ± 0.431^{a}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

Based on table 8, a significance score of $0.432 \geq 0.05$ was obtained, which means that there is no significant difference in the melting power of ice cream at 0-35 minutes. Further interpretation of the Duncan test shows that there is no significant difference from each treatment.

Table 9. Melting Power of Coconut Milk Ice Cream and Cashew Milk Ice Cream at 0-40 minutes

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	0.959 ± 0.002^{b}	0.009
B (50:50)	0.916 ± 0.014^{a}	
C (40:60)	0.990 ± 0.007^{c}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

Based on table 9, a significance score of $0.009 \geq 0.05$ was obtained, which means that there is a significant difference in the melting power of ice cream at 0-40 minutes. Further interpretation of Duncan's test shows that there is a significant difference from each treatment both melting power A, B, and C.

Table 10. Melting Power of Coconut Milk Ice Cream and Cashew Milk Ice Cream at 0-45 minutes

Percentage of coconut milk and cashew milk (%)	Total Solids (%)	Sig Value (p)
A (60:40)	0.883 ± 0.011^{b}	0.462
B (50:50)	0.839 ± 0.015^{b}	
C (40:60)	0.445 ± 0.630^{b}	

Description: Different letter notations indicate significant differences in the results of Duncan's analysis.

Based on table 10, a significance score of $0.009 \geq 0.05$ was obtained, which means that there is no significant difference in the melting power of ice cream at 0-45 minutes. Further interpretation of Duncan's test shows that there is no significant difference from each treatment. The graph of the ice cream melting power test is presented in Figure 2.

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

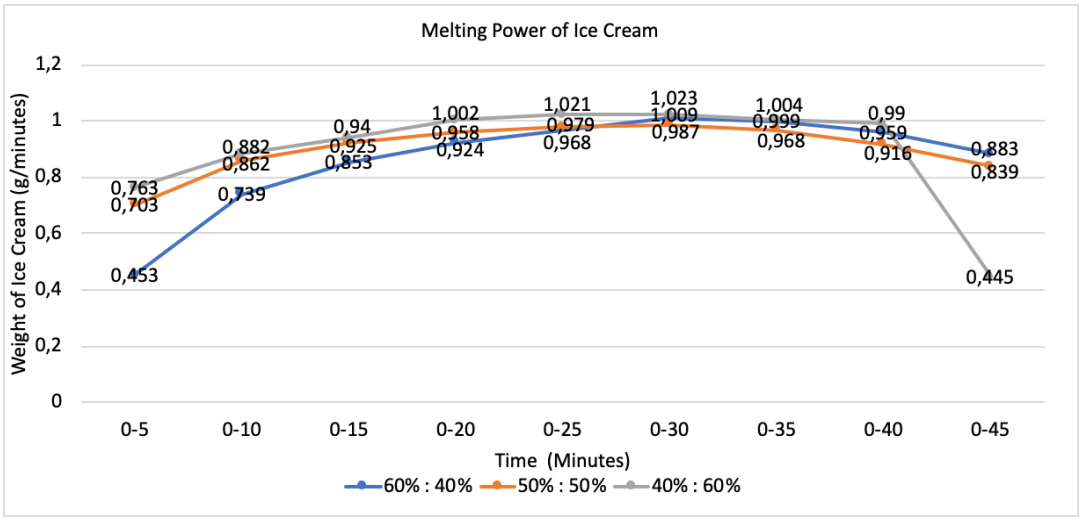

Figure 2. Melting Power Result Chart of Coconut Milk Ice Cream with Cashew Nut Milk Combination

Based on Figure 2, ice cream A, with a ratio of 60% coconut milk to 40% cashew milk, has the highest or longest melting time with an average value of 0.865. In contrast, ice cream B, with a ratio of 50% coconut milk to 50% cashew milk, has the lowest or fastest melting time with an average value of 0.904, even though the actual coconut milk concentration is higher than that of ice cream C, which has a ratio of 40% coconut milk to 60% cashew milk with an average value of 0.897. Despite this, ice cream B melts faster than ice cream C.

There is no significant difference between the use of coconut milk and cashew milk with the treated ratio on the melting power of ice cream, which is known by the p value at minutes 0-5, 0-10, 0-15, 0-20, 0-25, 0-30, 0-35, and 0-45 greater than the significance value of 0.05 ($p>0.05$). Except at minute 0-40 at this minute the ice cream has experienced complete melting then makes a decrease in the average value and in ice cream C so that the p value of 0.009 becomes smaller than the significance value of 0.05. The highest melting power is found in ice cream A with an average value of 0.865 in the ratio of coconut milk and soy milk 60%: 40%, then followed by ice cream C with an average value of 0.897 at a ratio of 50% : 50%, and finally ice cream B with a value of 0.904 at a ratio of 40%: 60%. This makes the melting power of the ice cream made has met the Indonesian National Standard (SNI) No. 01-3713-1995 because it has an average melting time of 45 minutes. This is in line with the statement of Goff & Hartel (2013) in (Amrullah et al., 2020) which states that the range of good melting in ice cream is about 15-25 minutes at room temperature. These results are also in line with research (Faridah et al., 2023) which shows the melting time of ice cream with a percentage of pumpkin addition between minutes 26.67-32.97 has met the Indonesian National Standard.

Through these results it can be said that high melting power is supported by high coconut milk treatment as well, because basically coconut milk has better fat and protein content than cashew milk. While the use of cashew milk with a high concentration in making ice cream, it is necessary to pay attention to the addition of stabilizers or other solid ingredients to maintain its viscosity because cashew milk has a lower fat and protein content than coconut milk. (Harumi Pardamean et al., 2022). Both fat and protein in ice cream function to form the viscosity of the mixture through a stable binding force which can then increase viscosity. High viscosity makes ice cream have a longer melting power. This is in line with the statement (Iznilillah, 2021) that melting power is related to the texture and viscosity of the dough. If the viscosity of the dough increases, the texture of the ice cream becomes smoother and takes longer to melt. (Setiawan

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

et al., 2022). The melting power of ice cream is also affected by the manufacturing process related to homogenization. Improper homogenization causes fat globules to spread unevenly into the ice cream made. This is according to research (Iznilillah, 2021) that improper homogenization makes the fat spread less evenly which causes an increase in the overrun of the rough texture of the ice cream. The use of CMC as a stabilizer in the preparation of ice cream shows an influence on the melting power of ice cream because stabilizers can form micro-sized membranes that function to bind globules of fat, water and air molecules. In accordance with the findings Violisa et al., (2012) in (Setiawan et al., 2022) that the binding prevents the formation of larger ice crystals, slows down the melting time, and produces a soft texture in the ice cream.

Conclusion

In the results of total solids, there is a significant difference between the use of coconut milk and cashew milk with the ratio treated to the total solids in ice cream. The highest total solids were found in ice cream A with a value of 23.412% at a ratio of 60% coconut milk to 40% cashew milk, followed by ice cream B with a value of 22.467% at a ratio of 50% coconut milk to 50% cashew milk, and finally ice cream C with a value of 21.448% at a ratio of 40% coconut milk to 60% cashew milk. These values indicate that each treatment has not met the quality requirements of the Indonesian National Standard (SNI).

In the melting power results, there is no significant difference between the use of coconut milk and cashew milk with the ratio treated to the melting power of ice cream. The highest melting power was found in ice cream A with an average value of 0.865 at a ratio of 60% coconut milk to 40% cashew milk, followed by ice cream C with an average value of 0.897 at a ratio of 50% coconut milk to 50% cashew milk, and finally ice cream B with a value of 0.904 at a ratio of 40% coconut milk to 60% cashew milk. The melting power is known to have met the quality requirements of the Indonesian National Standard because it has an average melting time of 45 minutes.

Suggestion

Based on the results and discussion, ice cream products made from coconut milk with a combination of cashew milk with different treatments have an influence on chemical properties, namely total solids, and do not influence physical properties, namely melting power. So further research needs to be done with more specific parameters.

References

Agustina, W., Fitri Dzakia, N., Cahyadi, W., Nanang Surahman, D., & Chandra Iwansyah, A. (2020). Optimasi Formula Dan Karakterisasi Produk Cookies Berbahan Dasar Pasta Kacang Mete (Anacardium Occidentale L) Formula Optimization And Product Characterization Of Cookies With Cashew Nuts (Anacardium Ocidentale L) Paste As Its Basic Ingredient. *Jurnal Riset Teknologi Industri, 14*(2), 176-187.

Alenta, M., Simatupang, B., Sutiknyawati, Y., Dewi, K., Oke, D., & Lestari, A. (2024). Karakteristik Es Krim Susu Kambing dengan Penambahan Sari Jeruk Sambal (Citrus amblycarpa) (Characteristics of Goat Milk Ice Cream With the Addition of Citrus Amblycarpa Juice). *Jurnal Agritechno*, *17*(01), 1-10. http://agritech.unhas.ac.id/ojs/index.php/at

Amrullah, A., Novieta, I. D., & Rasbawati, R. (2020). Pengaruh Penambahan Agar-Agar Sebagai Bahan Pengental dengan Konsentrasi Yang Berbeda Terhadap Kualitas Daya Leleh dan Nilai Organoleptik Es Krim. *Jurnal Ilmu Dan Industri Peternakan (Journal*

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

of Animal Husbandry Science and Industry), *6*(2), 93-106. https://doi.org/10.24252/jiip.v6i2.18314

Anasari, R., Nur, B. M., & Noviasari, S. (2022). Karakteristik Sensori Es krim Nabati Berbahan Dasar Susu Kedelai dan Ubi Jalar Ungu (Ipomea Batatas L). *Jurnal Ilmiah Mahasiswa Pertanian*, *7*(2), 401–409. https://doi.org/10.17969/jimfp.v7i2.20143

Badan Pusat Statistik. (2021). *Jumlah Rata-Rata Konsumsi Susu Tahun 2020*. Jakarat (ID): Badan Pusat Statistik.

Badan Pusat Statistik. (2022). *Jumlah Produksi Susu Segar Tahun 2021*. Jakarta (ID): Badan Pusat Statistik.

Brilianty, S. L., Studi, P., Industri, T., Pertanian, F. T., & Java, W. (2022). Penilaian Daur Hidup Produk Susu Sapi Segar: Studi Kasus Di Kpbs Pangalengan. *Jurnal Teknologi Industri Pertanian*, *32*(3), 220–228. https://doi.org/10.24961/j.tek.ind.pert.2022.32.3.220

Chan, L. A. (2009). *Membuat Es Krim*. AgroMedia.

Choirunnisa, Y., Kurnia, P., Sofyan, A., & Wardana, A. S. (2022). Protein Content and Overrun Value of Ice Cream made from Cashew Nut Milk Substitution with the Addition of Sorghum Flour Kadar Protein dan Nilai Overrun Produk Es Krim Substitusi Susu Kacang Mete dengan Penambahan Tepung Sorgum. *University Research Colloqium*, 157–164.

Faridah, R., Rahman, A., Khaeruddin, Hermawansyah, & Astuti, T. (2023). Sifat Fisik dan Organoleptik Es Krim dengan Penambahan Labu Siam (Sechium edule). *Anoa: Journal of Animal Husbandry*, *2*(1), 23–33. https://doi.org/10.24252/anoa.v2i1.35438

Goff, H., Douglas, & Richard, W. H. (2013). *Ice Cream (Seventh Edition)*. Springer Science & Business Media. https://doi.org/10.1016/B978-0-444-53563-4.10002-1

Habieb, S. F. N., Ilmi, I. M. B., Nasrulloh, N., & Marjan, A. Q. (2024). Analysis of Knowledge Level, Consumption Habits, Sugar and Calories Content in Ice Cream on the Nutritional Status of Depok Students. *Amerta Nutrition*, *8*(1), 82–88. https://doi.org/10.20473/amnt.v8i1.2024.82-88

Hafids, S., Rahmi, S. L., & Chairunisah, A. R. (2019). Study of Low-Fat Ice Cream with The Substitution of Super Red Dragon (Hylocereus costaricensis) Fruit Peel. *Indonesian Food Science & Technology Journal*, *3*(1), 23–28. https://doi.org/10.22437/ifstj.v3i1.10186

Harumi Pardamean, F., Adi Seno Mawarno, B., Shara Br Sembiring, Y., Studi Teknologi Rekayasa Pangan, P., Santo Paulus Surakarta, P., Kimia Industri, P., & Teknologi Dan, J. (2022). Evaluasi Karakteristik Fisikokimia dan Sensoris Susu Kacang Mete (Anacardium occidentale) dengan Penambahan Jenis dan Konsentrasi Zat Penstabil yang Berbeda. *JITIPARI: Jurnal Teknologi Dan Industri Pangan Unisri*, *7*(2), 119–124. http://ejurnal.unisri.ac.id/index.php/jtpr/index

Iznilillah, W. (2021). Perbandingan Overrun, Daya Leleh, dan Protein Berbagai Es Krim. *Jurnal Ilmiah Pangan Halal* , *3*(1), 34–43.

Junita, P., Rahmayuni, & Riftyan, E. (2023). Es Krim Berbasis Terung Belanda Dan Biji Saga the Use of Coconut Milk and Whipping Cream in Making Ice. *SAGU Journal: Agricultural Science and Technology*, *22*(2), 42–50.

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

Kementerian Kesehatan RI. (2020). *Tabel Komposisi Pangan Indonesia 2019* (Revisi Cetakan 1). Jakarta: Kementerian Kesehatan RI.

Khalish, L. H., Andarwulan, N., Koswara, S., & Talitha, Z. A. (2020). Formulasi dan Tingkat Kesukaan terhadap Es Krim Keju dengan Menggunakan Berbagai Keju Lunak (Cream Cheese, Ricotta dan Camembert). *Jurnal Mutu Pangan : Indonesian Journal of Food Quality*, *7*(2), 90–97. https://doi.org/10.29244/jmpi.2020.7.2.90

Mahrita, S., Faridawaty, E., & Feri, C. (2022). Pengaruh Formulasi Santan Dan Labu Kuning (Cucurbita Moschata) Terhadap Sifat Fisik Dan Kimia Es Krim. *Jurnal Cakrawala Ilmiah*, *2*(4), 1739–1752. https://doi.org/10.53625/jcijurnalcakrawalailmiah.v2i4.5053

Manurung, N. E. P., Abi Burhan, Septi Hermialingga, & Gemala Cahya. (2024). Physical-Chemical Characteristics and Antioxidants Ice Cream from Combination of Goat Milk and Black Soy Milk. *JITIPARI*, *9*(1), 10-19. http://ejurnal.unisri.ac.id/index.php/jtpr/index

Puspitasari, A., Wahyuni, F., Suherman, S., Siradjuddin, N. N., & Syafruddin, S. (2021). Identifikasi Daya Leleh Dan Overrun Serta Analisis Kadar Zat Besi (Fe) Es Krim Dengan Penambahan Tepung Daun Kelor (Moringa Oleifera). *PREPOTIF: Jurnal Kesehatan Masyarakat*, *5*(2), 980–986. https://doi.org/10.31004/prepotif.v5i2.2233

Setiawan, A. R., Setyawardani, T., & Widyaka, K. (2022). Kecepatan leleh, warna dan tekstur secara sensoris es krim dengan penambahan sari buah bit merah (beta vulgaris l.) meaning speed, color, and texture sensory ice cream with addition of red bit (beta vulgaris l.). *Journal of Animal Science and Technology*, *4*(1), 51–60.

Smith, N. W., Dave, A. C., Hill, J. P., & McNabb, W. C. (2022). Nutritional assessment of plant-based beverages in comparison to bovine milk. *Frontiers in Nutrition*, *9*(August). https://doi.org/10.3389/fnut.2022.957486

Suwita, I. K., & Hadisuyitno, J. (2021). Mutu gizi dan daya terima es krim indeks glikemik rendah berbahan polisakarida larut air umbi gembili (Dioscorea esculenta) dan tepung ubi jalar ungu (Ipomoea Batatas L. Poir). *Teknologi Pangan : Media Informasi Dan Komunikasi Ilmiah Teknologi Pertanian*, *12*(1), 79–91. https://doi.org/10.35891/tp.v12i1.2226

Zahroh, R., Febriansyah, A., Mawaddah, N., Luqman, B., & Farisi Al. (2023). Inovasi Es Krim Daun Kelor Sebagai Pemberdayaan UMKM Desa Soddara "Es Krim Marunggai". *Abdisuci: Jurnal Pengabdian dan Pemberdayaan Masyarakat, 1*(3), 104-108.

Zainuri, Sulastri, Y., & Gautama, I. K. Y. (2020). Karakteristik Mutu Es Krim Ubi Jalar Ungu dengan Penstabil Tepung Porang. *Indonesian Journal of Applied Science and Technology*, *1*(4), 134–142.

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)