International Jurnal Islamic Education, Research and Multiclturalism (IJIERM)

Available online https://journal.yaspim.org/index.php/IJIERM/index

ORGANOLEPTIC TEST AND ANALYSIS OF IRON (FE) ICE CREAM WITH MORINGA LEAF JUICE

Evynurachma
Email: hjevynurachma@gmail.com
Poltekkes Samarinda, Indonesia

Dwi Hendriani
Email: dwihendriani@gmail.com
Poltekkes Samarinda, Indonesia

Rosalin Ariefah Putri
Email: rosalinariefahputri@gmail.com
Poltekkes Samarinda, Indonesia

Abstract: Moringa is a type of food that is very useful and contains many nutrients, both macronutrients and micronutrients that have been widely used in dealing with malnutrition especially in pregnant women and can improve the immune system. In developing countries Ice cream is the most popular food and is very popular with all circles of society because it tastes very good and, soft texture and contains substances nutrition and can be one of the media in improving nutrition. To determine the acceptability and analysis of the Fe content of ice cream with the addition of Moringa leaves. This type of research is *experimental* with *pre* test *and post test group* designs, which are given adding Moringa leaves to the manufacture of ice cream with some concentration. Research on texture, as well as aspects of taste and value weighting results, the best formulation of ice cream with the addition of Moringa leaves is F1 compared to F2, F3, and F4, namely with a value of F1 60, F2 46.06, F3 42.01, F4 33.29, although when compared to F0 (ice cream krontrol) the value is lower at 54.65. Results of Iron (fe) analysis Ice cream with the addition of Moringa leaves increased from 3.3% to 4.1% This happened after the addition of 30 grams of Moringa leaves. From the results of the acceptability research on aspects of color, aroma, texture, and taste, the best formulation of ice cream with the addition of 30 gr Moringa leaves is F1 compared to F2, F3, and F4, namely with a value of F1 52.86, F2 42.86, F3 42.01, F4 33.29, although when compared to F0 (ice cream control) the

value is lower at 54.65. There is an increase in Iron (Fe) content in ice cream with the addition of 30 g Moringa leaves which is 0.0888g, compared to without the addition of Moringa leaves or 0 g which is 0.0686g.

Keywords: Ice Cream, Organoleptic, Fe Content, Moringa Leaf Juice

PRELIMINARY

Moringa is a type of food that contains many nutrients both macronutrients and micronutrients that have been widely used in combating anemia in pregnant women and efforts to increase endurance in pregnant women in many developing countries.[1] The problem of anemia in pregnant women in developing countries is still a major public health problem, including Indonesia. One of the causes of anemia is due to iron deficiency in pregnant women and caused by low consumption of Fe indaily food so that it does not meet the nutritional adequacy rate (RDA). Anemia that occurs in pregnant women is one of the problems that are found in many pregnant women in developing countries including Indonesia which greatly affects the welfare of the fetus in the womb which will lead to premature birth to death.[2] In Indonesia the incidence of anemia in pregnancy is quite high. According to the Indonesian Health Demographic Survey (IDHS) in 2007 and 2012 showed that there was an increase in the Maternal Mortality Rate (MMR) from 228 to 359 per 100,000 live births[3], while in Samar City in 2020 the number of pregnant women was 21,057 people, who had anemia 861 people (18.33%)[4]

[1] Krisnadi, *Moringa Super Nutrition* (Blora: Center for Information and Development of Moringa Plants Indonesia, 2015)

[2] Supariasa Hardinsyah, *Nutritional Science Theory and Application*, (Jakarta: EGC Medical Book Publisher, 2016)

[3] Ministry of Health of the Republic of Indonesia. 2017. Indonesian Food Composition Table (TKPI). Directorate General of Public Health, Directorate of Public Nutrition.

[4] Suhartini Tri, Zakaria, Pakhri Asmaruddin, and Mustamin. "Protein and calcium content in tempeh formula biscuits with the addition of Moringa oleifera (*Moringa oleifera)* leaf flour. Food Nutrition Media 25(1) 2018.:64-68.

Based on data sources obtained from the Loa Bakung Health Center in Samarinda City in 2018 the number of pregnant women examined for Hb was 209 people with the number of anemic pregnant women 78 people (37.3%), in 2019 the number of pregnant women examined for Hb was 303 people with the number of anemic pregnant women 131 people (43.23%), while in 2020 the number of pregnant women examined Hb 421 people with the number of pregnant women who were anemic 258 people (49.65%) so that in The last 3 years at the Loa Bakung Health Center have experienced an increase in the number of pregnant women who experience anemia, namely in 2018 there was an increase of 5.93% and in 2020 there was another increase of 6.42%.[5] One of the efforts to prevent anemia, especially in pregnant women, is to take advantage of the potential of local food that is easy to find and reach and meet the numbers nutritional adequacy so that it can be utilized by the wider community. Moringa plants are plants that grow a lot in tropical countries and are used as yard fence plants, including Indonesia, especially in East Kalimantan Province, Samarinda City. Moringa plants are often consumed by the community in the form of vegetables. But now Moringa leaves seem to be forgotten along with the many varieties of food. Even though this plant contains many benefits and contains nutrients that are so high and can be used as a superior product such as ice cream.[6]

Moringa leaves have a very high iron content, which is as much as 5.18 mgkg / 100 g (weight that can be eaten). Moringa leaves still contain several other nutrients that are good for growth such as protein 6.71% / 100 g, fat 7.13 %/ 100 g , carbohydrates 26.12 % / 100 g , calcium 2.61 mg / 100 g, sodium 61 mg/100 g iron 5.18 mg /100g , vitamin C 22mg /100 g. Moringa leaf juice is one of the ingredients that can be added to make ice cream. The addition of Moringa leaf juice to ice cream can increase nutritional value, especially iron (Fe). Moringa leaf juice contains

[5] Indonesian Standardization Agency, *Ice cream Quality Standards SNI- 3713-1995*, (Jakarta: National Standards Agency, 1995)

[6] Citra Bella Nikita, et al. 2018. "Haice Moringa (Health Of Ice Cream) Innovation of Moringa Leaf Processed Products (Moringa) as a promising student business prospect." *National Seminar on Service Results*: 9–17.

nutrients in 100 g, namely Fe 5. 18 mg / kg, vitamin A in the form of betacarotene 11.92 mg, calcium (ca) mg, iron 35.91 mg, and magnesium as much as 28.03 mg, consuming Moringa leaves is an alternative to overcome the problem of anemia in pregnant women in Indonesia.[7] Currently, many use Moringa leaf juice as a basic ingredient or fortification in making a processed product. One of the processed products of Moringa leaf juice that is known in all levels of society is ice cream.[8]

According to National Standards in Indonesia, ice cream is a type of food made by freezing ice cream or from a mixture of whole milk, eggs and sugar with or without other foodstuffs and permitted foodstuffs.[9] Ice cream is one of the most popular food products in the world and is very popular with all circles of society because it tastes good, and its soft texture and contains high nutrients that can be one of the media in improving nutrition[10]. According to (Chan, 2008) in Hasanuddindkk,[11] that the largest composition of ice cream is milk which is a source of energy and protein that can help growth, because of the various contents and benefits that exist in Moringa leaves which are currently still not widely known to the public, ice cream with the addition of Moringa leaf juice can be a local food innovation that has a fairly high nutritional value. This study aims to determine the acceptability and analysis of iron (Fe) content in ice cream with the addition of Moringa leaf juice.

[7] Zakaria, Abdullah Tamrin, Sirajuddin, and Rudy Hartono. "The addition of Moringa leaf flour to the daily diet in an effort to overcome undernutrition in children under five." *Food Nutrition Media XIII 2012, (*1): 41– 47

[8] Stella Faubun, and H. Sinay. "Fat Content of Moringa Oleifera Ice Cream Based on Volume Variation of Peanut Juice (Arhacis Hypogea)." *Biopendix,* 2(2) 2016.

[9] Ministry of Health of the Republic of Indonesia. 2017. Indonesian Food Composition Table (TKPI). Directorate General of Public Health, Directorate of Public Nutrition, 2018.

[10] Hasanuddin, Kurnia Harlina Dewi, and Insi Fitri. "The Effect of Ice Cream Making Process on the Quality of Ice Cream Made from Bananas." Journal of Agroindustry Volume 1(1) 2011 : 1–7.

[11] Hasanuddin, Kurnia Harlina Dewi, and Insi Fitri. "The Effect of Ice Cream Making Process on the Quality of Ice Cream Made from Bananas." Journal of Agroindustry Volume 1(1) 2011 : 1–7.

RESEARCH METHODS

The study was conducted in 2022 using 30 untrained panelists. The type of research used is *experimental,* which is carried out at the Laboratory of Mulawarman University and the Nutrition Laboratory of Poltekkes Kemenkes Kaltim. Receive data resources obtained from forms filled out by panelists. The form contains 4 aspects of assessment, namely color, aroma, texture, and taste. Assessment using *a hedonic scale.* Data analysis using SPSS program, *Kruskal Wallis* test with *Mann-Whitney follow-up* test. The data is presented in the form of a table and accompanied by narasi and analysis of iron (fe) content of ice cream addition of Moringa leaf juice using the *micro kjeldahl* method. The ingredients used in this study were Ultra Pure milk, cornstarch, sugar, *egg yolks*, salt, and moringa leaf juice. The equipment used is basins, pots, spoons, blenders, mixers, *freezers*, ice cream glasses, and food scales.

RESEARCH RESULT

Acceptability of Ice Cream with the Addition of Moringa Leaf Juice (*Moringa leaf extract)*The results of research with organoleptic tests conducted on November 23, 2022 at the Poltekkes Kemenkes Kaltim, with a sample of 30 panelists, are students of Nutrition and Dietetics, organoleptic testing using a *hedonic* scale 1-5 namely, very like, like, neutral, dislike, very dislike and obtained the following data: Panelists' receptivity to the color aspect of ice cream involves the sense of sight using the eyes. The data obtained can be seen in table 01 below Acceptability (Color) of Ice Cream with the Addition of Moringa Leaf Juice.

Table 1
Acceptability (Aroma) of Ice Cream with the Addition of Moringa Leaf Juice

	F0	**F1**	**F2**	**F3**	**F4**	**P,Value**
	N %	N %	N %	N %	N %	
S.Like	7 23.3	7 23.3	6 20	5 16.7	-	
Like	19 63.3	17 56.7	9 30	13 43.3	14 46.7	
Neutral	4 13.3	6 20	12 40	10 33.3	14 46.7	0.088

Tdksuka	-		3 6.7	2 3.3	2 6.7	
S.tdksuka	-					
Sum	30 100	30 100	30 100	30 100	30 100	

Table 2
Panelists' receptiveness to the texture aspect of ice cream involves the senses of sight and taste

	F0	**F1**	**F2**	**F3**	**F4**	**P,Value**
	N %	N %	N %	N %	N %	
S.Like	9 30	5 16.7	2 6.7	-	-	
Like	16 53.3	15 50. 3	14 46.7	5 16.7	8 26.7	
Neutral	5 16.7	6 20	9: 30	12 40	11 3 6.7	0.000
Tdksuka	-	4 13.3	4 13.3	11 36.7	8 26.7	
S.tdksuka	-	-	-	2 6.7	3 10	
Sum	30 100	30 100	30 100	30 100	30 100	

Table 3
Shows that the acceptability of Moringa leaf ice cream from the aspect of texture is most preferred is F0 and F1.

	F0	**F1**	**F2**	**F3**	**F4**	**P,Value**
	N %	**N %**	**N %**	**N %**	**N %**	
S.Like	6 20	3 10	1 3.3	-	-	
Like	21 70	1 756.7	14 46.7	13 43.3	10 33.3	
Neutral	3 10	6 20	8 26.7	13 43.3	13 43.3	0.002
Tdksuka	-	4 13.3	7 23.3	3 10	5 16.7	
S.tdksuka	-	-	-	1 3.3	2 6.7	
Sum	**30 100**	**30 100**	**30 100**	**30 100**	**30 100**	

Table 03 shows that the acceptability of Moringa leaf ice cream from the aspect of texture is most preferred is F0 and F1. Based on the texture aspect of ice cream with the addition of Moringa leaf juice at F0 as much as 70%, and F1 46.7% of panelists said like, and strongly dislike as much as 3.3% At F3. The results of *the Kruskal Wallis* test showed that there was a difference in the acceptability of the texture aspect of ice cream with the addition of Moringa leaf juice (p = 0.002). *Mann-Whitney* further test, the formula that shows the difference is F0 with F2 and F0 with F3, F0 with F4, F1 with F4. The receptivity of ice cream involves the taste buds of the tongue. The data obtained can be seen in the following table 04.

Table 4
Acceptability (Taste) of Ice Cream with the Addition of Moringa Leaf Juice

	F0	F1	F2	F3	F4	P,Value
	N %	N %	N %	N %	N %	
S.Like	5 16.6	3	2	-	-	
Like	21	18	16	7	5 16.6	
Neutral	4 13.3	6	8	6	5 16.6	0.000
Tdksuka	-	3	4	15	17 16.7	
S.tdksuka	-	-	-	2	3 10	
Sum	30 100	30 100	30 100	30 100	30 100	

The table above shows that the acceptability of Moringa leaf ice cream from the aspect of the most preferred taste is F0 and F1. Based on the taste aspect of ice cream with the addition of Moringa leaf juice on F0 as many as 60% of panelists said they liked it, and on F1 as much as 46.7%. The results of *the Kruskal Wallis* test showed that there was a difference in acceptability of the taste aspect of ice cream with the addition of Moringa leaf juice (p = 0.000). *Mann-Whitney* further test, the formula that shows the difference is F0 with F1, F0 with F2 and F0 with F3, F0 with F4, F1 with F2, F1 with F3, F1 with F4. After obtaining the acceptability test results of each formula, then weighting or ranking ice cream samples is carried out to find the best / selected formulation. The results of the questionnaire obtained are then averaged and multiplied by the panelists' favorability scores (*hedonic* test results).[12] The results of the overall assessment of the panelists can be seen in table 05 below:

[12] Rahmawati, Wahyuni, Fitri, and Hariati, Niken Widyastuti. "The effect of oyster mushroom flour substitution on the acceptability and nutritional content of dried noodles". *World Journal of Nutrition.* 1(2) 2018: 119-127.

Table 05
Results of Ice Cream Organoleptic Quality Assessment with the Addition of Leaf Juice

Average (X)		3.873.173.532.94
Hedonic score (Y)	F0 F1 F2 F3 F4	4.14.133.973.93 4.033.533.74.43 3.72.733.52.57 3.82.673.372.37 3.732.83.12.4
(X) x (Y)	F0 F1 F2 F3 F4	1613.0914.0111.5554.65 15.5911.1913.0613.0252.86 14.318.6512.357.5542.86 14.78.4611.896.9642.01 14.438.8710.947.0533.29

Table 05 shows that the ice cream formula that has the highest value from the panelists' organoleptic test results is F1 has a value the highest compared to F2, F3 and F4, namely F1 52.86, F2 42.68, F3 42.01, and F4 33.29, although when compared to the control ice cream (F0) the value is lower at 54.65 which means F1 and F0 are the best formulas. The selected formula is then analyzed for iron content. Analysis of iron content in ice cream with the addition of Moringa leaf juice was carried out twice (*duplo*) with *the micro kjedhall* method. It can be seen in table 06 below:

Table 06
Results of Fe Ice Cream Analysis with the Addition of Moringa Leaf Juice

F0 and F1
FeSample No(g/100)

1	F0	0,0686
2	F1	0,0888

Table 06 shows that the results of the analysis of the Fe content of ice cream increased from 0.0686g

DISCUSSION

Color is one of the most important factors and can influence a person to determine whether or not a product likes or not. Color is the first thing that can affect a person's acceptability.

Based on the results of the acceptability test assessment, it shows that the color of ice cream in each concentration is no difference. Among the five treatment groups, F1 has a higher level of color preference than F2, F3 and F4, namely F1 56.7%, F2 30%, F3 43.3%, and F4 46.7%, although when compared to control ice cream (F0) the favorability rate was lower at 63.3%. Control ice cream (F0) has a pure white color, in contrast to F1, F2, F3 and F4 which added Moringa leaf juice in ice cream, the panelists' acceptability decreased. This is because the addition of Moringa leaf juice produces ice cream to 0.0888 g. This increase occurred after ice cream was added Moringa leaf juice of 50 gr. Which is a deep green color that makes the ice cream less attractive and affects the acceptability of the panelists.

The results of the *Kruskal-Wallis* test showed a P value of >0.05, which means there is no significant difference in the acceptability of panelists from the aspect of ice cream color with the addition of Moringa leaf juice. In line with Ramadhani's research,[13] showed that the results of receptivity to the color aspect, original ice cream was favored by panelists as much as 68%, which resulted in pure white ice cream because there was no addition. Aroma is one of the things that can affect consumer acceptance of a product, namely aroma. Aroma can also determine the quality of the product itself. Based on the results of the acceptability test study, it showed that the panelists' level of liking for the aroma aspect among the five treatment groups, F1 had a higher level of preference for the aroma aspect compared to F2, F3 and F4, namely F1 46.7%, F2 13.3%, F3 16.7%, and F4 26.7%, although when compared to control ice cream (F0) the favorability rate was lower at 53.3%. This is because F0 has a distinctive aroma that comes from the basic ingredients, namely *egg yolks* and milk. In contrast to F1, F2, F3 and F4 which added Moringa leaf juice in ice cream which has a distinctive taste of Moringa leaves that are langu so that the panelists' acceptability decreases. The results of the *Kruskal-Wallis* test showed a P value of < (0.05), which means that there is a significant difference in the acceptability of panelists from the aspect of ice

[13] A. Ramadhani, Yusmah Nurul Qamri. 2017. "Acceptability and nutritional value of ice cream with the addition of red dragon fruit (Hylocereus polyrhyzus)." *Scientific Papers of Makassar Health Polytechnic*.

cream aroma with the addition of Moringa leaf juice. *Mann-Whitney* further test, the formula that shows the difference is F0 with F1, F0 with F2 and F0 with F3, F0 with F4, F1 with F2, F1 with F3, F1 with F4. The resulting ice cream shows that the higher the concentration of Moringa leaf juice added, the lower the receptivity to the aroma aspect.

In line with Natasya's research,[14] showed that the average level of panelists' liking for the aroma of Moringa Leaf Juice ice cream) was 3.95 with a t1 treatment level (addition of Moringa 10 gr) and the lowest score of 3.65 in t5 treatment (addition of Moringa 50 gr). This shows that the higher the concentration, the lower the acceptability. Not in line with the research of Simanungkalit et al.[15] Showed that the higher the concentration of red bean addition, the higher the acceptability from the aspect of aroma. Texture is an attribute of judgment that can affect the receptivity of the researcher. The texture of a material is one element of food quality that can be felt by palpating fingertips, tongue, mouth, or teeth.

Based on the results of the acceptability test assessment, it showed that the texture aspect among the five treatment groups, F1 had a higher level of preference from the texture aspect compared to the treatment of F2, F3 and F4, namely F1 46.7%, F2 46.7%, F3 43.3%, and F4 26.7%, although when compared to control ice cream (F0) the favorability level was lower at 70%. This is because F0 has a dense and smooth texture so it is very liked by panelists. Unlike F1, F2, F3 and F4 which added Moringa leaf juice in ice cream, the panelists' acceptability decreased. This is because the addition of Moringa leaf juice in ice cream has a rough texture that affects the acceptability of panelists.

The results of the *Kruskal-Wallis* test showed a P value of < (0.05), which means that there is a significant difference in the acceptability of panelists from the aspect of ice cream texture with the addition of Moringa leaf juice. *Mann-Whitney* further test, the formula that shows

[14] Nadya Natasya, "Study of organoleptic properties and acceptability of JALOR ice cream (guava and moringa leaf juice)." *Journal of Prima Nutrition* 4, 2019.: 47–53.

[15] H. Simanungkalit, Indriyani, And Ulyarti. "Study of Ice Cream Making with the Addition of Red Bean (Phaseolus vulgaris L)." *Jambi University Research Journal Science Series* 18(1) 2016: 20–26.

the difference is F0 with F2 and F0 with F3, F0 with F4, F1 with F4. The resulting ice cream indicates that the higher. The concentration of Moringa leaf juice added is the lower the acceptability towards the aspect of texture. In line with the research of Kartini et al.,[16] shows that the level of preference for higher texture aspects is F0 with a concentration of 0%. This is due to the addition of too much Moringa leaf juice resulting in ice cream with a coarser and inconspicuous texture compared to ice cream in general.

Taste is an important parameter to determine whether or not a product is accepted. Taste is important in judging a particular product using the five senses of taste, and everyone has different sensitivities in judging a food. Based on the results of the acceptability test assessment, it shows that the taste aspect among the five treatment groups, F1 has a higher level of liking from the taste aspect compared to F2, F3 and F4, namely F1 46.7%, F2 10%, F3 10%, and F4 16.7%, although when compared to control ice cream (F0) the level of liking is lower at 60%, this is because F0 ice cream has a sweet taste without any addition to Moringa leaf juice. Unlike the F1, F2, F3 and F4 ice cream that added Moringa leaf juice, the panelists' acceptability decreased. This is because the distinctive taste of Moringa leaves is bitter and astringent, which affects the acceptability of panelists.

The results of the *Kruskal-Wallis* test showed a P< value (0.05), which means that there is a significant difference in the acceptability of panelists from the aspect of ice cream taste with the addition of Moringa leaf juice. *Mann-Whitney* further test, the formula that shows the difference is F0 with F1, F0 with F2 and F0 with F3, F0 with F4, F1 with F2, F1 with F3, F1 with F4 ice cream produced shows that the higher the concentration of Moringa leaf juice added, the lower the acceptability of the taste aspect. In line with Ekariskawati's[17] research, shows that the panelists' acceptability

[16] Kartini, Thresia Dewi, Nadimin, and Agung. "Acceptability and Test of Protein Levels in Ice Cream with the Addition of Tempeh Flour." Food Nutrition Media 26(1) 2019.

[17] Ekaristkawati "Acceptability and nutritional content of Bolu Cukke substitution of banana peel flour and tempeh flour as nutrient-rich snacks in malnourished toddlers." *Scientific Papers of Makassar Health Polytechnic*, 2018

based on taste aspects of local snacks bolu cukke with the addition of kepok banana peel flour and tempeh flour that most panelists like is a concentration of 10% with 23 panelists (92%), and what researchers dislike based on taste aspects to the addition of kepok banana peel flour and flour is a concentration of 15% and 20%, This shows that the higher the addition of kepok banana peel flour and tempeh flour, the lower the acceptability.

The results of the analysis of the iron content (Fe) of ice cream with the addition of Moringa leaf juice showed that the iron content of F1 ice cream increased compared to F0 ice cream (control), in ice cream the addition of Moringa F1 leaf juice increased the iron value amounted to 0.0888 g. While F0 was 0.0686 g, the increase was 0.0202 g. This is because in F1 there is an addition of Moringa leaf juice 30 g, while in F0 there is no addition of Moringa leaf juice. This is due to the nutritional content of Moringa leaf juice per 100 g, namely energy 205 kcal, protein 27.1 grams, fat 2.3 g, carbohydrates 38.2 g, calcium 2003 mg and Fe 828.2 mg.[18] The iron (Fe) content of Moringa leaf juice is higher than the iron (Fe) content of eggs. In line with research by Suhartini et al. (2018) shows that tempeh formula biscuits with the addition of Moringa leaf flour without the addition of Moringa leaf juice (0%) are lower than the addition of Moringa leaf juice concentration of 9% (13.5 g), the Fe content increases by around 18.2% (12.6% to 14.9%). This shows that the more Moringa leaf juice that is supplemented or added to biscuits, the Fe levels in biscuits become high.

CONCLUSION

The best formulation of ice cream with the addition of Moringa leaf juice is F1 is compared to F2, F3, and F4, with F1 52.86, F2 42.86, F3 42.01, F4 33.29, although when compared to F0 (Krontrol ice cream) the value is lower at 54.65. Iron content (Fe) contained in ice cream without the addition of Moringa leaf juice or 0 g is 0.0686 g and iron content contained in ice cream with the addition of Moringa leaf juice 30 g is 5.18mg.

[18] Gopalakrishnan, Lakshmipriya, Kruthi Doriya, and Devarai Santhosh, "Moringa Oleifera: A Review on Nutritive Importance and Its Medicinal Application." *Food Science and Human Wellness* 5 (2) 2016: 49–56. http://dx.doi.org/10.1016/j.fshw.2016.04.001.

Bibliography

Indonesian Standardization Agency. (1995). Ice cream Quality Standards. SNI- 3713-1995. Jakarta: National Standards Agency

Eucharistkawati. 2018. "Acceptability and nutritional content of Bolu Cukke substitution of banana peel flour and tempeh flour as nutrient-rich snacks in malnourished toddlers." *Scientific Papers of Makassar Health Polytechnic*.

Faubun, Stella, and H. Sinay. 2016. "Fat Content of Moringa Oleifera Ice Cream Based on Volume Variation of Peanut Juice (Arhacis Hypogea)." Biopendix, 2(2).

Gopalakrishnan, Lakshmipriya, Kruthi Doriya, and Devarai Santhosh. 2016. "Moringa Oleifera : A Review on Nutritive Importance and Its Medicinal Application." Food Science and Human Wellness 5(2): 49–56. http://dx.doi.org/10.1016/j.fshw. 2016.04.001.

Hardinsyah, Supariasa. 2016 . *Nutritional Science Theory and Application*. Jakarta: EGC Medical Book Publisher.

Hasanuddin, Kurnia Harlina Dewi, and Insi Fitri. 2011. "The Effect of Ice Cream Making Process on the Quality of Ice Cream Made from Bananas." Journal of Agroindustry Volume 1(1): 1–7.

Kartini, Thresia Dewi, Nadimin, and Agung. 2019. "Acceptability and Test of Protein Levels in Ice Cream with the Addition of Tempeh Flour." Food Nutrition Media 26(1).

Ministry of Health of the Republic of Indonesia. 2017. Indonesian Food Composition Table (TKPI). Directorate General of Public Health , Directorate of Public Nutrition, 2018.

Krisnadi. 2015. "Moringa Super Nutrition." Blora: Center for Information and Development of Moringa Plants Indonesia.

Natasya, Nadya. 2019. "Study of organoleptic properties and acceptability of JALOR ice cream (guava and moringa leaf juice)." *Journal of Prima Nutrition* 4: 47–53.

Nikita, Citra Bella et al. 2018. "Haice Moringa (Health Of Ice Cream) Innovation of Moringa Leaf Processed Products (Moringa) as a promising student business prospect." National Seminar on Service Results: 9–17.

Ministry of Health of the Republic of Indonesia. 2017. Indonesian Food Composition Table (TKPI). Directorate General of Public Health, Directorate of Public Nutrition.

Ramadhani, A.Yusmah Nurul Qamri. 2017. "Acceptability and nutritional value of ice cream with the addition of red dragon fruit (Hylocereus polyrhyzus)." *Scientific Papers of Makassar Health Polytechnic*.

Rahmawati, Wahyuni, Fitri, and Hariati, Niken Widyastuti. 2018. "The effect of oyster mushroom flour substitution on the acceptability and nutritional content of dried noodles". *World Journal of Nutrition*. 1(2): 119-127.

Simanungkalit, H., Indriyani, And Ulyarti. 2016. "Study of Ice Cream Making with the Addition of Red Bean (Phaseolus vulgaris L)." *Jambi University Research Journal Science Series* 18(1): 20–26.

Suhartini Tri, Zakaria, Pakhri Asmaruddin, and Mustamin. 2018. "Protein and calcium content in tempeh formula biscuits with the addition of Moringa oleifera (*Moringa oleifera)* leaf flour. Food Nutrition Media 25(1):64-68.

Zakaria, Abdullah Tamrin, Sirajuddin, and Rudy Hartono. 2012. "The addition of Moringa leaf flour to the daily diet in an effort to overcome undernutrition in children under five." Food Nutrition Media XIII(1): 41– 47.