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Physicochemical characteristics of kefir milk from lotus (*Nelumbo nucifera*) seed milk

Firliansyah Yusrin Setiadi and Ace Baehaki *

Fisheries Products Technology Study Program, Faculty of Agriculture, Universitas Sriwijaya, Tangerang, Banten.

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Abstract

This study aims to determine the physicochemical characteristics of milk kefir from lotus seed milk (Nelumbo nucifera) and to determine the effect of increasing the concentration of lotus seed milk (Nelumbo nucifera) on physical and chemical properties. physical composition which includes lightness, chroma and hue color tests as well as viscosity and chemical composition which includes moisture, ash, fat, protein and carbohydrate content as well as to determine the best treatment for the manufacture of kefir milk. The research method used was a randomized block design (RDB) with treatment with different concentrations of lotus seed milk with 5 levels of treatment, namely A0 (100% cow's milk, 0% lotus seed milk), A1 (75% cow's milk, 25% lotus seed milk), A2 (cow's milk 50% lotus seed milk 50%), A3 (cow's milk 25% lotus seed milk 75%), A4 (0% cow's milk 100% lotus seed milk) and was repeated 2 times. The results showed that the lightness and chroma color test of kefir milk with lotus seed milk concentration treatment decreased but the hue color and viscosity of kefir milk increased. The ash, fat, protein and carbohydrate content values of milk kefir with lotus seed milk concentration treatment decreased, but the water content value increased.

Keywords: Concentration; Fermentation; Kefir; Nelumbo Nucifera; Lotus Milk.

1. Introduction

This modern lifestyle is changing people's eating patterns, especially urban communities who tend to consume fast food which has an impact on reducing the quality of health and the emergence of various degenerative diseases, such as cancer, coronary heart disease and stroke. Intestinal microflora has an important role in the absorption of nutrients so that all the nutrients in the food consumed can be properly absorbed by the body. Maintaining intestinal microflora can be done by adjusting your diet with foods that have physiological functions for health, known as functional foods. One example of functional food is kefir (Julianto et al., 2016).

Lotus plant (Nelumbo nucifera) is a swamp plant that has many benefits. Traditionally the lotus plant has been widely used to treat various diseases. This plant also has active compounds such as antioxidants and antibacterial compounds. Currently lotus seeds have been widely studied which say that the content of lotus seeds has a lot of potential for health. The existence of various kinds of nutritional content and bioactive components in lotus plants (Nelumbo nucifera) (Budiwati and Kriswiyanti, 2014). So the lotus plant can be used as food and drink ingredients such as milk.

Milk kefir is a probiotic drink produced by fermenting milk by lactic acid bacteria and yeast that has good health benefits. Kefir can stabilize the digestive microflora by removing pathogenic bacteria through adhesion to the walls of the digestive tract and competition for nutrients. Kefir is easier to digest and does not cause digestive problems when consumed by people with lactose intolerance (Susilawati et al., 2018). Kefir is generally similar to yogurt, but kefir is thinner and the milk lumps are softer. The uniqueness of kefir compared to other fermented milks is that it is made

* Corresponding author: Ace Baehaki.

using kefir grains, which contain a variety of beneficial microorganisms. Analysis of the composition of kefir shows the presence of bioactive compounds that provide unique health benefits. When the fermentation process begins, it is formed from peptides and exopolysaccharides, which are rich in bioactive compounds. Kefir is a complex probiotic because of the large number of microorganisms in it and the wide variety of bioactive compounds that can be formed during fermentation (Wisudanti, 2017).

The advantages of kefir have a longer shelf life and the content contained in kefir is a good content of yeast and contains vitamins and minerals, essential amino acids. It is now known that kefir is not only produced using raw materials such as cow's and goat's milk, but now kefir can be produced from lotus seeds. The existence of processing lotus seed milk (Nelumbo nucefera) into kefir milk is one of the efforts that can be seen that in addition to producing lots of other processed lotus seed milk, it can also be used as an ingredient for making kefir milk, where lotus seed milk and kefir milk are ingredients that contain antibacterial and anti-bacterial properties. antioxidants.

2. Materials and method

2.1. Tools and materials

The tools used for the analysis are, biuret, bunsen, porcelain cup, desiccator, erlenmeyer 250mL, food processor (Philips), measuring cup, stove, oven, pan, stirrer, dropper, filter, thermometer, and digital scale.

Ingredientused for analysis, namely, alcohol, aquadest, HCL, H_2SO_4, concentrated and NaOH.

2.2. Research methods

The research method used in this study was Randomized Block Design (RDB) with a level of 5 observations and 2 repetitions. The level of observation in this study is as follows:

- A0= 100% Cow's Milk, 0% Lotus seed milk.
- A1= 75% Cow's Milk, 25% Lotus seed milk.
- A2= 50% Cow's Milk, 50% Lotus seed milk.
- A3= 25% Cow Milk, 75% Lotus seed milk.
- A4 = 0% Cow's Milk, 100% Lotus seed milk.

2.3. Lotus Seed Preparation

Preparations that will be made before carrying out the research are making milk from lotus seeds in the following way: The lotus seeds are cleaned from the stalks using scissors or a knife.Then the lotus seeds are removed from the petals one by one. The skin of the lotus seed is peeled using a knife. After that, the lotus seeds are split in half to take the green shoots inside, this is intended so as not to affect the taste and color in making lotus seed milk because the green shoots inside have a bitter taste. The lotus seeds are washed clean to avoid sticking dirt.

2.4. Lotus Seed Making

How to make Lotus seed milk according to Nirmagustina et al. (2013) which has been modified in the following way: A total of 100 grams of lotus seeds are soaked for 3 hours. The lotus lotus seeds are then boiled at a temperature of 100°C for 10 minutes. The lotus seeds were mashed using a blender and added 300 mL of water slowly, for 2 minutes. The lotus milk is cooked at 90°C for 10 minutes and stirred gently. The lotus milk is filtered using a clean sieve, so that no sediment remains in the milk.

2.5. Production of Milk Kefir (Fermented Milk)

The method of milk kefir production was as follows: Put the lotus seed milk and cow's milk according to the treatment into a plastic container that has been washed and dried. Weigh 50 g of kefir grains. Put in 1 liter of milk, stir gently until the solution is homogeneous. Cover tightly with a lid from a container or cloth, store in a dark place and ferment for 36 hours away from direct sunlight.

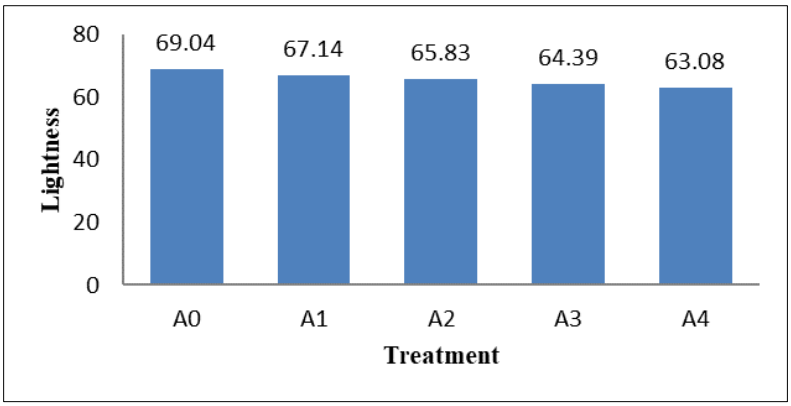
2.6. Parameter

The parameters observed in this study arephysical analysis which includes a color test consisting of lightness, chroma, hue and viscosity tests. and analysis of chemical properties including moisture content, ash content, fat content, protein content and carbohydrate content contained in kefir milk from lotus seed milk (Nelumbo nucifera).

3. Results and discussion

3.1. Lightness

The color of food or drink can be used as an indicator of the quality of a product. According to Arisyta et al. (2013), color is one of the parameters that can be used to assess a product and can support its quality. Color measurement can be done with color components, namely lightness (L), chroma (C) and hue (H). Based on the results of the study, the lightness color of lotus seed milk kefir ranged from 63.08% to 69.04%. The highest lightness color was found in treatment A0 (100% cow's milk and 0% lotus seed milk) which was 69.04% while the lowest lightness color was found in treatment A4 (0% cow's milk and 100% lotus seed milk) which was 63.08 %. Treatment A1 (75% cow's milk and 25% lotus seed milk) had a lightness color of 67.14%, treatment A2 (50% cow's milk and 50% lotus seed milk) was 65, 83% and treatment A3 (25% cow's milk and 75% lotus seed milk) was 64.39%. The results of testing the lightness color of lotus seed milk kefir can be seen in Figure 1.



A0 = 100% Cow's milk, 0% Lotus seed milk., A1 = 75% Cow's milk 25% Lotus seed milk., A2 = 50% Cow's milk 50% Lotus seed milk., A3 = 25% Cow's milk, 75% Lotus seed milk and A4 = 0% cow's milk, 100% lotus seed milk.

Figure 1 Average Lightness Color Value of Kefir Milk with the Addition of Lotus Seed Milk

Lightness to determine the reflected light that produces white, gray and black (Nurmawati, 2011). The L* value indicates the degree of brightness of kefir milk with different treatments of cow's milk and lotus seed milk with a limit between 0 (black) to 100 (white). The greater the concentration of added cow's milk causes the L value to increase. The results of the ANOVA test (Analysis of Varian) at the 5% level showed that the treatment with different concentrations of lotus seed milk and cow's milk had no significant effect on the lightness color of kefir milk. This indicates that the use of lotus and cow's milk as the manufacture of kefir milk has a brightness that has no significant effect on the resulting lightness color. The white color of milk, as well as its appearance is due to the spread of fat colloidal granules, calcium caseinate and calcium phosphate. While the main ingredients that give a yellowish color are carotene and riboflavin. The type of cow's milk and the type of material can also affect the color of the milk (Buckle et al, 2009). and the lotus has a white color. So that the lightness test of milk kefir with the addition of cow's milk has an increased brightness. This is because the raw material for cow's milk used has a yellowish white color while lotus is only white. Therefore, kefir milk with a concentration of 100% cow's milk has the highest lightness. So that the lightness test of milk kefir with the addition of cow's milk has an increased brightness. This is because the raw material for cow's milk used has a yellowish white color while lotus is only white. Therefore, kefir milk with a concentration of 100% cow's milk has the highest lightness. So that the lightness test of milk kefir with the addition of cow's milk has an increased brightness. This is because the raw material for cow's milk used has a yellowish white color while lotus is only white. Therefore, kefir milk with a concentration of 100% cow's milk has the highest lightness.

3.2. Chroma

According to Octavianus et al., (2014), chroma is a color level based on sharpness which serves to define the color of a product that tends to be shiny or dull. Chroma follows a percentage that ranges from 0% to 100%. Chroma is also defined as the gradation of the purity of the color or the degree of differentiation of the color change from neutral gray or white 0 to another color 19. Chroma is also divided from 0 to 8, where the higher the chroma indicates the purity of the spectrum or the strength of the color spectrum is increasing. Based on the results of the study, the chroma color of lotus seed milk kefir ranged from 9.43% to 13.11%. The highest chroma color of lotus seed milk kefir was found in treatment A0 (100% cow's milk and 0% lotus seed milk) which was 13.11%, while the lowest chroma color was found in the A4 treatment (0% cow's milk and 100% lotus seed milk) which was 9.43%. Treatment A1 (75% cow's milk and 25% lotus

seed milk) had a chroma color of 11.52%, treatment A2 (50% cow's milk and 50% lotus seed milk) was 10.87% and treatment A3 (25% cow's milk and 75% lotus seed milk) which is 10.78%. The results of testing the chroma color of lotus seed milk kefir can be seen in Figure 2.

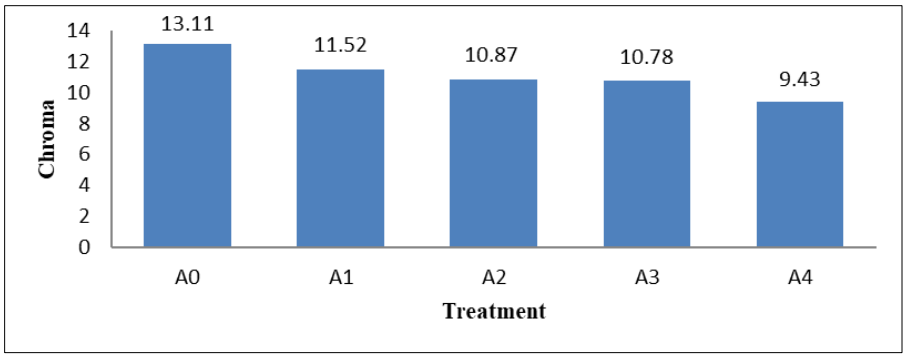


Figure 2 Average Chroma Color Value of Kefir Milk with the Addition of Lotus Seed Milk

Chroma shows the color intensity which gives the most dominant color difference in the sample which shows the level of saturation (Nurmawati, 2011). The higher the chroma value, the higher the level of saturation and vice versa (Fernandez, 2019). The results of the ANOVA test (Analysis of Varian) at the 5% level showed that the treatment with different concentrations of lotus seed milk and cow's milk had no significant effect. The resulting chroma values ranged from 9.43 to 13.11. This shows that the higher the lotus concentration given, the lower the chroma color intensity. It is assumed that milk kefir with a concentration of cow's milk has a white color compared to lotus seeds which only have a slightly pale white color, so that the color intensity decreases with the addition of lotus seeds.

3.3. Hue

*Hue*is a color that has an identity, the point is to distinguish it from other colors, so that it remains clearly recognizable to show the name of a color such as red, purple, blue, green, yellow and other colors. The hue value represents the dominant wavelength that will determine the color of a material (Winarno, 2004). Determination of color is done based on the provisions as in table 1.

Table 1 Determination of color (0hue)

No	Color Criteria	Range
		^{0}*hue*
1	*Red Purple*(RP)	342^0-18^0
2	*Red*(R)	18^0-54^0
3	*Yellow Red*(YR)	54^0-90^0
4	*Yellow*(Y)	90^0-126^0
5	*Yellow Green*(G)	126^0-162^0
6	*Green*(G)	162^0-198^0
7	*Blue Green*(BG)	198^0-234^0
8	*Blue*(B)	234^0-270^0
9	*Blue Purple*(B)	270^0-306^0
10	*Purple*(P)	306^0-342^0

Sources (Hutching, 1999).

Based on the results of the study, it was shown that the color of the hue kefir of lotus seed milk ranged from $92,92^0$ (yellow) to $97,51^0$ (yellow). The highest hue color of lotus seed milk was found in treatment A4 (0% cow's milk and 100% lotus seed milk) which was $97,51^0$ (yellow), while the lowest hue color was found in treatment A0 (100% cow's milk and 0% lotus seed milk). which is 92,920 (yellow). Treatment A1 (75% cow's milk and 25% lotus seed milk) had a hue color of $93,44^0$ (yellow), treatment A2 (50% cow's milk and 50% lotus seed milk) was 94.97^0 (yellow) and treatment

A3 (25% milk) cows and 75% lotus seed milk) of 95.86⁰ (yellow). The results of the hue kefir color test for lotus seed milk can be seen in Figure 3.

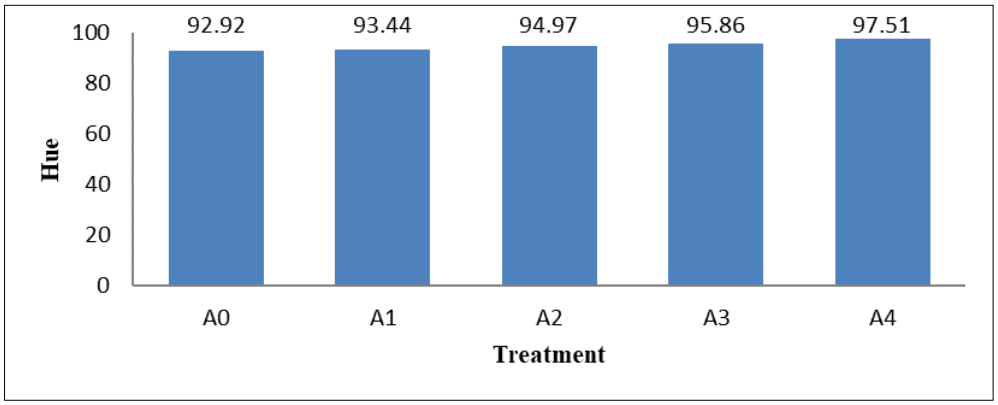


Figure 3 Average Hue Color Value of Kefir Milk with the Addition of Lotus Seed Milk

The hue value found in kefir milk with the addition of lotus milk showed the highest value among other treatments. The smaller the hue value indicates that the color contained in kefir milk with the addition of lotus milk is getting more yellow. This can be seen in the color comparison of the hue values in Table 1. The colors caused by the changes in the tannin compounds are yellow, brown, and reddish (Adina, 2012). The results of the ANOVA (Analysis of Varian) test at the 5% level showed that the treatment with different concentrations of lotus seed milk and cow's milk had no significant effect on the hue color of kefir milk. This shows that the higher the ratio of lotus seeds that are added, the higher the ratio of lotus seeds that are added, the color of the resulting hue value will increase.

3.4. Viscosity

According to Safitri and Swarastuti (2013), viscosity occurs because the protein in milk reaches the isoelectric point due to the acidic atmosphere during the fermentation process so that the protein can coagulate. Based on the results of the study showed that the viscosity of lotus seed milk kefir ranged from 2.81 m.Pa.s-1.11 m.Pa.s. The highest viscosity of lotus seed milk kefir is found in treatment A4 (0% cow's milk and 100% lotus seed milk) which is 2.81, while the lowest viscosity is found in treatment A0 (100% cow's milk and 0% lotus seed milk) which is 1.11 m.Pa.s. Treatment A1 (75% cow's milk and 25% lotus seed milk) had a viscosity of 1.44 m.Pa.s, treatment A2 (50% cow's milk, 50% lotus seed milk) was 1.82 m.Pa.s and A3 treatment (25% cow's milk and 75%, lotus seed milk) was 1.94 m.Pa.s.

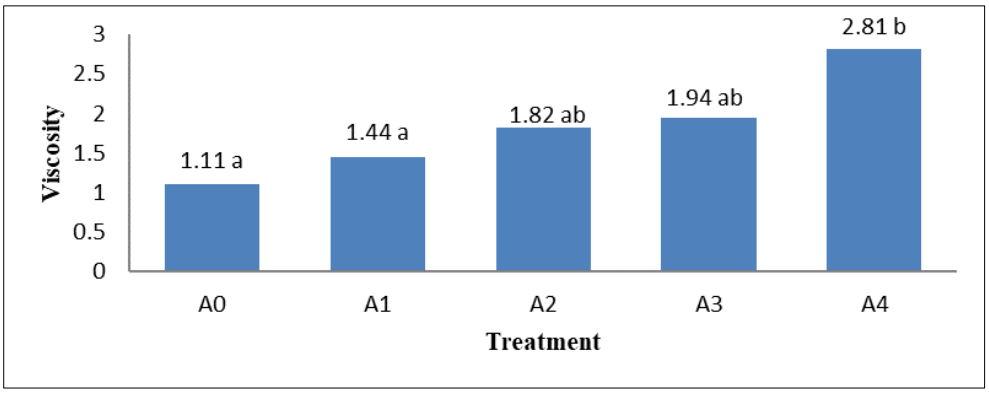


Figure 4 Average Viscosity Value of Kefir Milk with the Addition of Lotus Seed Milk

The results of the ANOVA (Analysis of Varian) test at the 5% level showed that the treatment with different concentrations of lotus seed milk and cow's milk had a significant effect on the viscosity of milk kefir. To see the difference in viscosity of lotus seed kefir with the difference in viscosity of lotus seed kefir and cow's milk, a further test of honest significant difference (BNJ) was carried out at the 5% level. The results of the BNJ further test can be seen in table 2.

Table 2 Further Test of BNJ Viscosity

No	Treatment	Average	BNJ (0.05)
1	A0	1.11	a
2	A1	1.44	a
3	A2	1.82	ab
4	A3	1.94	ab
5	A4	2.81	b

The results of the BNJ follow-up test at 5% level stated that the treatments A0 and A1 were not significantly different, but A0 and A1 were significantly different, but A0 and A1 were significantly different from A2, A3 and A4. Based on the results of the study, it was shown that the higher the treatment given to milk kefir with the concentration of lotus seeds, the viscosity will increase. This is said by Adrian and Aminah (2012), that lactic acid bacteria that form protein produce water binding capacity so that the viscosity becomes thick or semi-viscous. This shows that kefir milk with 100% lotus concentration the higher the viscosity value.

3.5. Water content

The water content in foodstuffs determines the freshness and durability of these foodstuffs, high water content makes it easy for bacteria, molds and yeasts to breed, so that the decay process will last longer (Winarno, 2007). Based on the results of the study showed that the water content of kefir of lotus seed milk ranged from 97.24% to 91.88%. The highest water content of lotus seed milk kefir is found in treatment A4 (0% cow's milk and 100% lotus seed milk) which is 97.24%, while the lowest water content is in treatment A0 (100% cow's milk and 0% lotus seed milk). that is equal to 91.88%. Treatment A1 (75% cow's milk and 25% lotus seed milk) had a moisture content of 93.66%, treatment A2 (50% cow's milk and 50% lotus seed milk) was 94.99% and treatment A3 (25% cow's milk and 75% lotus seed milk) which is 96.08%.

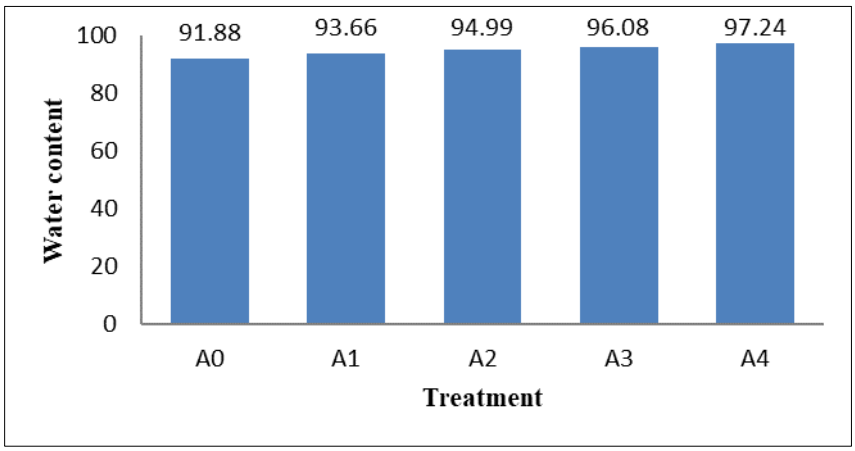


Figure 5 Average Water Content Value of Kefir Milk with the Addition of Lotus Seed Milk

The results of the ANOVA test (Analysis of Varian) at the 5% level showed that the treatment with different concentrations of lotus seed milk and cow's milk had no significant effect. This is in accordance with the statement (Oktafiani, 2019) that the more lotus treatments, the higher the water content of kefir milk. This milk is poor in minerals, especially iron, so the water content in milk is only 87.5% (Ide, 2008).

According to Anglemier and Montgomery (1976), the longer the immersion, the softer the structure of the lotus seed and makes it easier for water to enter the cell structure, so that in the manufacture of kefir milk, the concentration of lotus milk is higher.

3.6. Ash Content

Soeharsono (1996), stated that the ash content consisted of several mineral elements including calcium (25%), magnesium (20%) and phosphorus (44%). These minerals are insoluble, present in the form of caseinate, phosphorus and citrate, the mineral content can be calculated from the ash content, if some milk is dried and then burned, the remaining ash content consists of inorganic substances known as milk minerals. Based on the results of the study showed that the ash content of lotus seed milk kefir ranged from 0.52% to 0.28%. The highest ash content of lotus seed milk kefir is found in treatment A0 (100% cow's milk and 0% lotus seed milk) which is 0.52%, while the lowest ash content is in treatment A4 (0% cow's milk and 100% lotus seed milk). that is equal to 0.28%. Treatment A1 (75% cow's milk and 25% lotus seed milk) had an ash content of 0.39%, Treatment A2 (50% cow's milk and 50% lotus seed milk) was 0.34% and treatment A3 (25% cow's milk and 75% lotus seed milk) was 0.32%. The results of testing the ash content of lotus seed milk kefir can be seen in Figure 6.

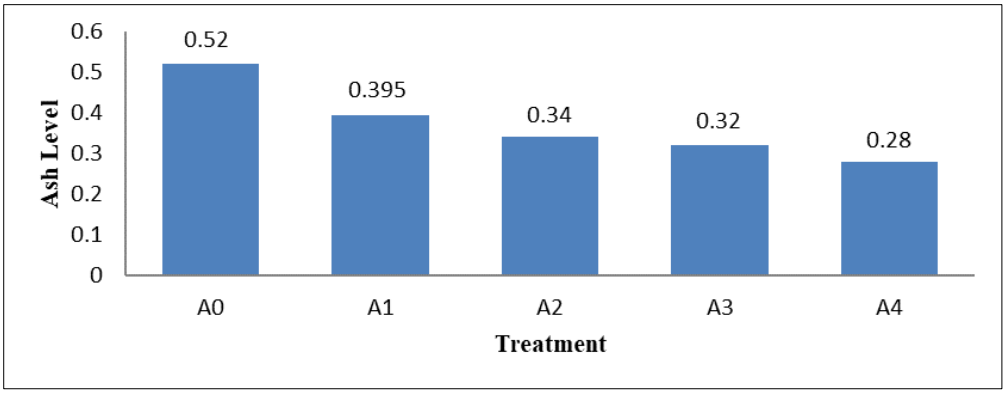


Figure 6 Average ash content of kefir milk with the addition of lotus seed milk

In this study, the ash content of milk kefir, the concentration of cow's milk and lotus milk, can be seen in Figure 6. It shows that the ash content value ranges from 0.52% to 0.28%. The highest ash content was in treatment A0 (100% cow's milk and 0% lotus seed milk) which was 0.52%. While the lowest was in the A4 treatment (0% cow's milk and 100% lotus seed milk) which was 0.28%. When compared with cow's milk in general which has an ash content of 0.65%-0.76% (Rahman et al. 1992), this average value is smaller.

The results of the ANOVA test (Analysis of Varian) at the 5% level showed that the treatment with different concentrations of lotus seed milk and cow's milk had no significant effect. Milk kefir with cow's milk has a higher mineral content than milk kefir from lotus seed milk. It can be seen in Figure 6. That milk kefir from lotus seed milk has a lower ash content than milk kefir with cow's milk.

3.7. Protein Content

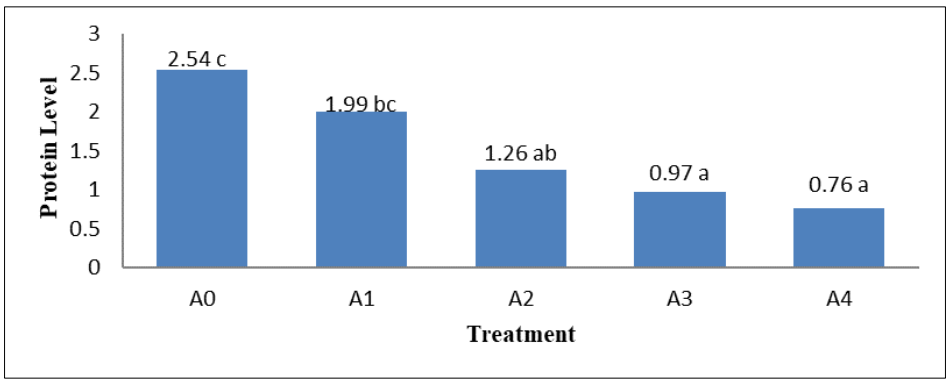


Figure 7 Average Protein Content Value of Kefir Milk with the Addition of Lotus Seed Milk

Protein is the second component attacked by bacteria after carbohydrates (lactose) and then fat. These components will be degraded into simpler components. The lactose component will be broken down into glucose and galactose, protein into amino acids, and fat into fatty acids. The greater the number of active bacteria in fermented milk, the faster the

breakdown of protein and fat as a supply of energy and carbon for the growth of these bacteria (Buckle et al. 1985). Based on the results of the study showed that the protein content of lotus seed milk kefir ranged from 2.54% to 0.76%. The highest protein content of lotus seed milk kefir was found in treatment A0 (100% cow's milk and 0% lotus seed milk) which was 2.54%, while the lowest protein content was found in the A4 treatment (0% cow's milk and 100% lotus seed milk) which was 0.76%. Treatment A1 (75% cow's milk and 25% lotus seed milk) had a protein content of 1.99%, treatment A2 (50% cow's milk and 50% lotus seed milk) was 1.26% and treatment A3 (25% cow's milk and 75% lotus seed milk) which is 0.97%. The results of testing the ash content of lotus seed milk kefir can be seen in Figure 7.

The results of the ANOVA (Analysis of Varian) test at 5% level showed that the different concentrations of lotus seed milk and cow's milk had a significant effect on the protein content of kefir milk. To see the difference in the protein content of lotus seed kefir and cow's milk, a further test of honest significant difference (BNJ) was carried out at the 5% level. The results of the further BNJ test can be seen in table 3.

Table 3 BNJ Follow-up Test for Protein Levels

No	Treatment	Average	BNJ (0.05)
1	A0	2.54	c
2	A1	1.99	bc
3	A2	1.26	ab
4	A3	0.97	a
5	A4	0.76	a

The results of the BNJ follow-up test at 5% level stated that the treatments A3 and A4 were not significantly different, but A2, A3 and A4 were significantly different from A0. This shows that, according to Anjasari (2010), cow's milk has 3.2% protein, while Lestari et al. (2017), said that the protein content of pure lotus ranged from 17-18%. So it can be concluded that the manufacture of milk kefir from the concentration of cow's milk has a high protein content.

3.8. Fat Content

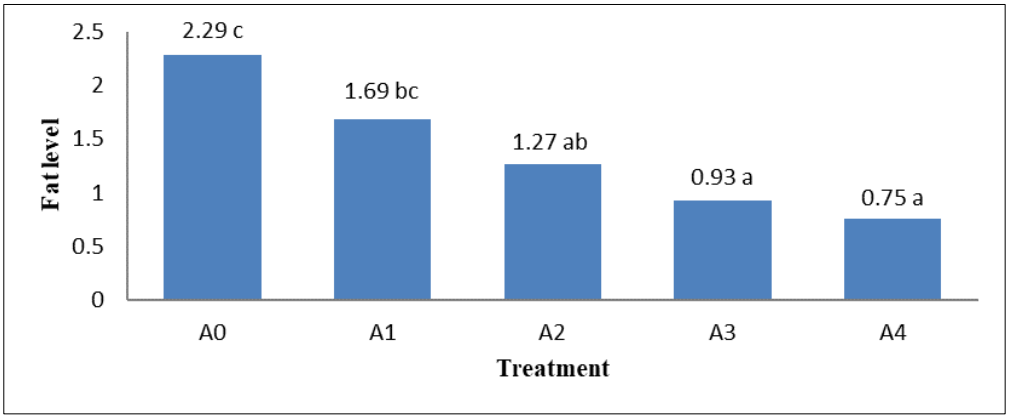


Figure 8 Average Fat Content Value of Kefir Milk with the Addition of Lotus Seed Milk

Fat content is one of the parameters for determining the quality of food, one of which is kefir. Suhendra et al., (2017), stated that milk fat is composed of saturated and unsaturated fatty acids. Fat has a function to improve the shape and physical structure of foodstuffs, add nutritional and caloric value, and provide a savory taste to foodstuffs (Winarno, 1984). Based on the results of the study showed that the fat content of kefir of lotus seed milk ranged from 2.29% to 0.75%. The highest fat content of lotus seed milk kefir is found in treatment A0 (100% cow's milk and 0% lotus seed milk) which is 2.29%, while the lowest fat content is found in treatment A4 (0% cow's milk and 100% lotus seed milk). that is equal to 0.75%. Treatment A1 (75% cow's milk and 25% lotus seed milk) had a fat content of 1.69%, Treatment A2 (50% cow's milk and 50% lotus seed milk) was 1.27% and treatment A3 (25% cow's milk and 75% lotus seed milk) was 0.93%. The results of testing the ash content of lotus seed milk kefir can be seen in Figure 8.

The results of the ANOVA (Analysis of Varian) test at the 5% level showed that the treatment with different concentrations of lotus seed milk and cow's milk had a significant effect on the fat content of kefir milk. To see the difference in fat content of lotus seed kefir with the difference in fat content of lotus seed kefir and cow's milk, a further test of honest significant difference (BNJ) was carried out at the 5% level. The results of the BNJ further test can be seen in Table 4.

Table 4 Further Test of BNJ Fat Content

No	Treatment	Average	BNJ (0.05)
1	A0	2.29	c
2	A1	1.69	bc
3	A2	1.27	ab
4	A3	0.93	a
5	A4	0.75	a

The results of the BNJ follow-up test at 5% level stated that treatment A0 was significantly different from A2, A3 and A4, but A0 and A1 were not significantly different. In the research of Lestari et al. (2017) raw lotus seeds are known to contain 1.86 fat, while milk according to the National Standardization Agency (2011) states it has a fat content of 3.00%.

According to Rahayu et al. (1992), that when the water content decreases, the fat content increases. In kefir milk with different treatment concentrations of cow's milk and lotus milk, the lotus concentration has more water content than the cow's milk concentration so that the fat content in kefir milk with lotus concentration has a low fat content. Therefore, kefir milk with a concentration of cow's milk has the highest fat content. This is in accordance with the opinion of Kurniawan (2008), who said that fat content has a negative relationship with water content, meaning that if the water content decreases, other components such as fat components will increase.

3.9. Carbohydrate Content

Carbohydrates are the main source of energy in the body, which is useful in preventing the onset of ketosis, the breakdown of excessive body protein, loss of minerals and helping the metabolism of fat and protein (Winarno, 1997). Sources of carbohydrates are rice, corn, bread, sweet potatoes, flour, and the results are noodles, macaroni, and others (Soenardi, 2002). Carbohydrate content is the amount of carbohydrates contained in the material expressed in percent.

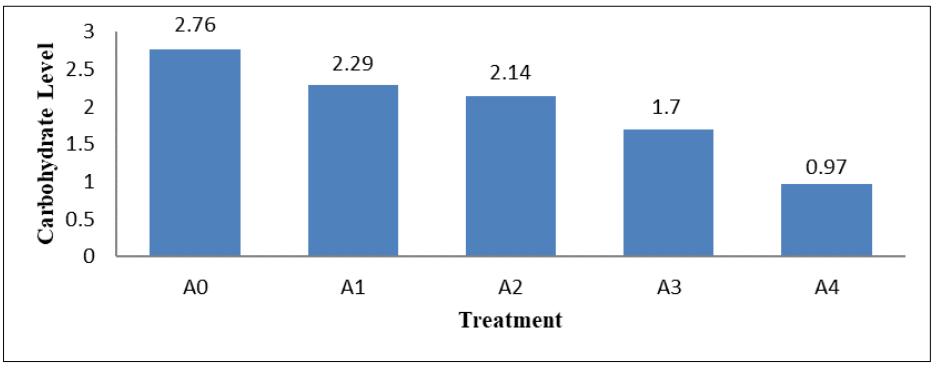


Figure 9 Average Value of Carbohydrate Content of Kefir Milk with the Addition of Lotus Seed Milk

Carbohydrate content was analyzed using the by different method, namely the carbohydrate value obtained from the reduction of the total nutrients contained in the food product, namely water, protein, fat, crude fiber and ash content. Based on the results of the study showed that the carbohydrate content of lotus seed milk kefir ranged from 2.76% to 0.97%. The highest carbohydrate content of lotus seed milk kefir is found in treatment A0 (100% cow's milk and 0% lotus seed milk) which is 2.76%, while the lowest carbohydrate content is in treatment A4 (0% cow's milk and 100% lotus seed milk). that is equal to 0.97%. Treatment A1 (75% cow's milk and 25% lotus seed milk) had a carbohydrate content of 2.29%, treatment A2 (50% cow's milk and 50% lotus seed milk) was 2.14% and treatment A3 (25% cow's milk and 75% lotus seed milk) which is 1.7%. The results of testing the carbohydrate content of lotus seed milk kefir

can be seen in Figure 8. 29%, treatment A2 (50% cow's milk and 50% lotus seed milk) was 2.14% and treatment A3 (25% cow's milk and 75% lotus seed milk) was 1.7%. The results of testing the carbohydrate content of lotus seed milk kefir can be seen in Figure 8. 29%, treatment A2 (50% cow's milk and 50% lotus seed milk) was 2.14% and treatment A3 (25% cow's milk and 75% lotus seed milk) was 1.7%. The results of testing the carbohydrate content of lotus seed milk kefir can be seen in Figure 8.

In this study, the carbohydrate content of milk kefir, the concentration of cow's milk and lotus milk, can be seen in Figure 8. It shows that the value of carbohydrate content is in the range of 2.76%-0.97%. The highest carbohydrate content was in treatment A0 (100% cow's milk, 0% lotus seed milk) which was 2,76%. While the lowest was in the A4 treatment (0% cow's milk and 100% lotus seed milk) which was 0.97%. The results of the ANOVA test (Analysis of variance) at the 5% level showed that the treatment with different concentrations of lotus seed milk and cow's milk had no significant effect. It can be concluded that the lotus seeds in the manufacture of milk kefir. So, the carbohydrate content will be lower. Because, according to Indrayan (2005), pure lotus has a carbohydrate content of 1.92%. In addition, according to Vinifera and Nurina (2016),

4. Conclusion

The results showed that the lightness and chroma color test of kefir milk with lotus seed milk concentration treatment decreased but the hue color and viscosity of kefir milk increased. The ash, fat, protein and carbohydrate content values of milk kefir with lotus seed milk concentration treatment decreased, but the water content value increased..

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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