

# **Analysis Of Acceptance, Protein Contents, And Calcium In Jelly Candy With The Addition Of Moringa Leaf Powder**

Nur Fajriyyah, Kurnia Yusuf, Andi Rahmani MB, Musdalifah, dan St. Masithah  
*Department of Nutrition, STIKes Salewangang Maros, Maros, Indonesia*  
[nur.fajriyyah17@gmail.com](mailto:nur.fajriyyah17@gmail.com)

**Keywords:** Moringa leaf, acceptability, jelly candy, protein, calcium.

**Abstract:** Jelly candy is one form of food that is liked by all people but conventional jelly candy has high sugar and low nutrients, therefore modifications are made Jelly candy uses Moringa leaf powder which is rich in nutrients. This study aims to determine the acceptability, protein content, and calcium in jelly candy that has been added with Moringa leaf powder, using a Completely Randomized Design (CRD) 3 repetitions and 4 formulas (1 control formula and 3 formulas modified tested on 60 untrained panelists (30 students and 30 grade 4 elementary school students). The analysis was carried out using the Kruskal Wallis test and continued using the Mann-Whitney test to determine the difference in formula pairs. Based on the results of the organoleptic test of acceptability, the acceptance of jelly candy with the addition of Moringa leaf powder can be accepted by the public with the most preferred formula, namely F0 (with the addition of 0 grams of Moringa leaf powder), while the modified formula that has the highest value is F1 (with the addition of 2 grams of Moringa leaf powder) with the results of the Kruskal Wallis test showing a P value <0.05. Analysis of protein content per 100gram of F0 and F1 respectively had an average of 19.31gr and 21.47gr. While the results of the analysis of calcium content per 100 grams of F0 as much as 35.03mg and F1 as much as 187.89mg.

## **1 INTRODUCTION**

Candy is a snack that is much liked by the public, especially children because it has a variety of interesting flavors and colors. There are various forms of candy, some are hard and some are soft. Hard candy is candy with a hard texture, clear color and slightly shiny, while jelly candy is one of the soft candy types, namely candy that has a soft texture that is processed by adding gelling ingredients. Materials commonly used as gelling agents include gelatin, carrageenan and agar (Bactiar, Ali, & Rossi, 2017). Jelly candy quality requirements are regulated in SNI 3547-2-2008.

Conventional jelly candy contains high sugar and low nutritional value such as vitamins and minerals. The results of the study (Latif, Aziz, & Deen, 2022) show that the use of natural plant extracts can be a substitute for dyes and flavors synthesis in jelly candy and can also increase the nutritional value of jelly candy. In this study, Moringa leaves were selected as an additional ingredient to increase the

nutritional value of jelly candy. Moringa leaves have a variety of nutritional content that is very beneficial for health. The results of the protein content study using a quantitative test using the Kjeldahl method obtained protein levels in young Moringa leaves 1.31% and old Moringa leaves 11.35% (Saputri, Tutik, & Permatasari, 2019). To facilitate its use as a functional food ingredient, Moringa leaves can be converted into Moringa leaf powder

Moringa leaves that are dried into powder contain more nutrients than when this plant is in the form of raw leaves (Darna, Timbuleng, Nushoibah, Khasanah, Arofah, & Kartikasari, 2019). This is because 100 grams of fresh Moringa leaves only produce 15-18 grams of Moringa leaf powder, so to produce 100 grams of Moringa leaf powder, more fresh Moringa leaves are needed.

The recommended serving size in a previous study by (Rahmawati & Adi, 2016) as much as 25 grams or  $\pm$  5 pieces of Moringa leaf jelly candy can meet

10-15% of the need for vitamin A (beta-carotene) for children, which is 0.05 mcg. Because if consuming excessive sugar can affect health such as tooth decay in children and can cause obesity, according to (Gupita, 2017) it is better to consume jelly no more than 10 grams.

Based on some of the data that has been presented, the researcher wants to conduct research on the analysis of acceptability, protein content, and calcium in jelly candy with the addition of Moringa leaf powder which is carried out in certain proportions.

## 2 METHODS

This study is a quantitative study with a completely randomized design (CRD) with 3 repetitions and 4 treatments. Where the treatment is the addition of different Moringa leaf powder to the jelly F0, F1, F2, and F3. The panelists used were untrained panelists consisting of 30 students and 30 elementary school grade 4. Panelists were selected based on their education level, children were selected as panelists because usually food products such as candy, ice cream and so on were more preferred and consumed by children.

Processing and analyzing data using the Kruskal Wallis test, this test was conducted to determine the average difference in acceptability of the 4 samples. If the results are significant, then proceed with the Mann-Whitney test to determine the differences between each sample. As for the processing and analysis of nutritional data on jelly candy with the addition of Moringa leaf powder using the ANOVA test.

### Making Moringa Leaf Powder

To make Moringa leaf powder, Moringa leaves are needed, Moringa leaves are selected that are still fresh with dark green criteria, then Moringa leaves are washed thoroughly to remove dirt. Then the moringa leaves are separated from the stalks and sorted, followed by the blanching stage for 1-2 minutes at 80° C Moringa leaves are then continued with the drying stage. After drying, the Moringa leaves are crushed and ground by using a blender to a powder, and sieved with a size of 80 mesh to separate small sticks that cannot be crushed. The ground moringa leaf powder is packaged and stored in an airtight polyethylene bag until ready to use.

### Making Jelly Candy

To make jelly candy, several ingredients are needed as in table 1, namely :

Table 1. Jelly Candy Making Ingredients

No	Name of Material	Weight (gr)			
		F0	F1	F2	F3
1	Gelatin	10	10	10	10
2	Sugar	50	50	50	50
3	Glucose Syrup	25	25	25	25
4	Water	40	40	40	40
5	Citric Acid	1	1	1	1
6	Food Coloring	0.3	0.3	0.3	0.3
7	Tapioca Flour	0.5	0.5	0.5	0.5
8	Moringa Leaf Powder	0	2	5	10

How to make jelly candy, first gelatin dissolved in water then Mix the gelatin solution into the sugar and glucose syrup, then heat it until it boils while stirring slowly. After boiling, add the Moringa leaf powder. then citric acid then pour it into a container and mix the food coloring then stir evenly. After that the jelly candy was poured into the mold and stored at room temperature (27°C). Finally, the candy is removed from the mold and coated with tapioca flour and sugar flour that has been roasted in a 1:1 ratio.

### Acceptance Test

To assess food products, an organoleptic test is carried out, namely an assessment that involves the human senses as a tool to measure acceptability. One type of acceptance test is the hedonic test, where the hedonic test is an activity to determine the level of consumer likes or dislikes for a particular product which is usually carried out by several panelists (Soekarto, 2020). For organoleptic assessment requires a group of people called panelists to assess a product. The panelists used were students and elementary school children in grade 4.

### Analysis of Nutrients

The formulas analyzed were control formulas and modified formulas which had the highest value from

the organoleptic test. To determine the levels of protein and calcium, laboratory analysis was carried out. Protein analysis in jelly candy used the Kjeldahl method while the calcium content analysis used the complexometric method.

### 3 RESULTS

#### Acceptance Test

In this study using a hedonic scale of 5 scales, score 1 = very dislike, score 2 = dislike, score 3 = average, score 4 = like, score 5 = very like. The acceptability test in this study used a hedonic scale which was assessed based on 4 aspects, namely aspects of color, taste, aroma, and texture. The results of the study can be seen in tables 2 and 3. To obtain these values after obtaining the organoleptic test scores for each formula, then they are averaged (can be seen in appendix 4) and then the average is multiplied by the panelist's preference score (Rahmawati, Wahyuni, & Hariati, 2018). The results of the research can be seen in tables 2 and 3.

Table 1. Results of Student Organoleptic Assessment on Jelly Candy with the Addition of Moringa Leaf Powder

		Parameters				
		Co- lor	Tas- te	Aro- ma	Tex- ture	Total
Average		3.33	3.13	3.23	3.54	
Hedonic Scale	F0	4.17	4.07	3.97	4.13	
	F1	3.23	3.30	3.03	3.70	
	F2	2.97	2.40	2.87	3.10	
	F3	2.93	2.73	3.07	3.23	
(X)× (Y)	F0	13.8	12.7	12.8 2	14.62	54.07
	F1	10.7	10.3	9.79	13.10	43.97
	F2	9.89	7.51	9.27	10.97	37.65
	F3	9.76	8.54	9.92	11.43	39.65

Source: Primary Data, 2022

Based on Table 2 shows that jelly candy with the addition of Moringa leaf powder has the highest value from the organoleptic test with student panelists, namely F0 or control formula (with the addition of 0 grams of Moringa leaf powder) of 54.07, then F1 (with the addition of 2 grams of Moringa leaf powder) of 43.97, F3 (with the addition of 10 grams of Moringa leaf powder) of 39.65 and the last is F2 of 37.65 (with the addition of 5 grams of Moringa leaf powder)

Table 2. Results of 4th Grade Elementary School Organoleptic Assessment on Jelly Candy with the Addition of Moringa Leaf Powder

		Parameters				
		Co- lor	Tas- te	Aro- -ma	Tex- ture	Total
Average		3.82	3.10	3.05	3.91	
Hedonic Scale	F0	4.60	4.80	4.17	4.80	
	F1	4.30	4.17	4.07	4.40	
	F2	3.37	2.07	2.13	3.70	
	F3	3.00	1.37	1.83	2.73	
(X)× (Y)	F0	17.5	14.8	12.7	18.77	63.94
	F1	16.4	12.9	12.4	17.20	58.97
	F2	12.8	6.42	6.50	14.47	40.25
	F3	11.4	4.25	5.58	10.67	31.96

Source: Primary Data, 2022

Based on Table 2 shows that jelly candy with the addition of Moringa leaf powder which has the highest from the organoleptic test with panelists of 4th grade elementary school children is F0 or control formula (with the addition of 0 grams of Moringa leaf powder) of 63.94 then F1 (with the addition of 2 grams of Moringa leaf powder) of 58.97, F2 (with the addition of 5 grams of Moringa leaf powder) of 40.25 and the last one is F3 (with the addition of 10 grams of Moringa leaf powder) of 31.96.

#### Analysis of Protein Content

The following are the result of protein analysis from jelly candy with the addition of Moringa leaf powder in the control formula (F0) and the modified formula that has the highest organoleptic test value (F1) using the Kjeldahl method.

Table 3. The results of Analysis of Jelly Candy Protein Content with the Addition of Moringa Leaf Powder Per 100 Gram

No	Sam- -ple	Content (%)			Ave- -rage
		Replica- -tion 1	Replica- -tion 2	Replic- -ation 3	
1	F0	19.47	19.66	18.79	19.31
2	F1	21.9	21.02	21.49	21.47

Source: Primary Data Laboratory Test, 2022

Based on table 4, the results of the analysis of the protein content of jelly per 100 grams in F1 (with the addition of 2 grams of Moringa leaf powder) were higher than the protein content found in F0. (with the addition of 0 grams of Moringa leaf powder) Where F1 has an average protein content of 21.47% while F0 is 19.31%.

### Analysis of Calcium Content

The following is the result of calcium analysis from jelly candy with the addition of Moringa leaf powder in the control formula (F0) and the modified formula that has the highest organoleptic test value (F1) using the complexometric method.

Table 4. The results of Analysis of the Calcium Content of Jelly Candy with the Addition of Moringa Leaf Powder Per 100 Gram

No	Sample	Content (mg)			Average
		Replication 1	Replication 2	Replication 3	
1	F0	35.79	35.48	33.83	35.03
2	F1	188.83	187.13	187.72	187.89

Source: Primary Data Laboratory Test , 2022

Based on table 5, the results of the analysis of the calcium content of jelly per 100 grams in F1 (with the addition of 2 grams of Moringa leaf powder) were higher than the calcium content found in F0 (with the addition of 0 grams of Moringa leaf powder). Where F1 has an average calcium content of 35.03mg while F0 is 187.79mg.

## 4 DISCUSSIONS

### Acceptance Test

To assess food products, an organoleptic test is carried out, namely an assessment that involves the human senses as a tool to measure acceptability. One type of acceptance test is the hedonic test, where the hedonic test is an activity to determine the level of consumer likes or dislikes for a particular product which is usually carried out by several panelists (Soekarto, 2020). The selection of the best candy formula was seen from the average overall acceptability in terms of color, aroma, texture and taste.

Based on tables 2 and 3, shows that the results of the acceptance of the control formula (F0) are still preferable to the modified formula (F1, F2, and F3) both from the aspect of color, taste, aroma, and texture. This is because F0 attracts the attention of panelists more than F1, F2, and F3. However, the jelly candy modified formula with the addition of

Moringa leaf powder has the highest value, namely F1.

Research (Rahmawati, Wahyuni, & Hariati, 2018) shows that the results of Kruskal Wallis on aspects of color, aroma and texture value  $P > 0.05$  which means there is no effect of adding Moringa leaf powder to jelly candy, the results of Kruskal Wallis' test on all organoleptic aspects in this study have a value  $P < 0.05$  which indicates a significant difference which means that there is an effect on the addition leaf to jelly candy.

### Aspects of Color

Color has an important role in food because it can make the appearance of food more attractive and form perceptions of taste in food (Rastiati, 2017) Based on the results of the organoleptic assessment in Tables 2 and 3, it can be seen that the color of the jelly candy with the addition of Moringa leaf powder F0 has the highest level of preference compared to F1, F2, and F3 because F0 is more attractive. In contrast to the results of research (Rahmawati & Adi, 2016) which showed that there was no effect of adding Moringa leaf powder to jelly candy ( $p = 0.16$ ), the results of the Kruskal Wallis test with student panelists and 4th grade elementary school students both showed that the addition of leaf powder Moringa has an effect ( $p = 0.00$ ) on the color aspect of the jelly candy.

Control formula jelly candy (F0) which has a bright green color because it is only given the addition of light green food coloring, in contrast to jelly candy the addition of Moringa leaf powder which has a dark green to black color because in addition to the addition of food coloring to the jelly candy, it is also given the addition of leaf powder. Moringa, where the Moringa leaves used in the process of making Moringa leaf powder are dark green Moringa leaves that have been blanched to maintain the color of the Moringa leaves.

Moringa leaves contain chlorophyll (green leaf dye) which is high to affects the green color of jelly candy where Moringa leaves contain chlorophyll of 6,890 mg/kg dry matter, while Moringa leaves in powder contain chlorophyll of 162 mg/8 grams of powder (Sinaga, Purba, & Nurminah, 2019). So that the more addition of Moringa leaf powder, the color produced on the jelly candy will be darker. This causes a decrease in the acceptance of sweets to panelists because attractive food colors will attract more people than foods that do not have attractive colors (Rastiati, 2017).

In line with research (Nurjannah, Hidayati, Kiranawati, Fatimah, & Susanto, 2020) on supplementation of Moringa leaf puree in jelly candy shows the more addition of Moringa leaf puree causes the color to darken and makes it less attractive. As well as research (Amini, 2022) on the fortification of Moringa leaves on hard candy which shows that the color produced by hard candy varies from dark green to dark brown, where the more addition of Moringa leaf powder and the higher the heating, the more brown the color of the hard candy becomes.

### **Aspects of Taste**

Taste is the result of a combination of various kinds of food ingredients that can be felt by the five senses (Usman, Umar, & Ruslang, 2022). Based on the results of the organoleptic assessment in table 2 and table 3, it can be seen that the taste of jelly with the addition of Moringa leaf powder F0 has the highest hedonic scale value compared to F1, F2, and F3. The results of the Kruskal Wallis test with student panelists and 4th grade elementary school students both showed that there was an effect of adding Moringa leaf powder ( $p=0.00$ ) to the taste aspect of jelly candy.

In contrast to research (Rahmawati & Adi, 2016) which used flavoring in jelly candy, this study did not use flavoring so that the taste of Moringa was still stronger than previous studies. The more addition of Moringa leaf powder to the jelly candy, the lower the panelist's preference for the jelly candy. This is because there is no addition of Moringa leaf powder which causes astringent taste in the jelly candy. Moringa leaves have a distinctive taste because they contain tannins which can cause astringent taste (Iskandar, Ningtyias, & Rohmawati, 2019).

In jelly candy F1 can still be covered by the taste of citric acid, which in the manufacture of soft jelly candy is used to help regulate the acidity of the jelly candy and will also affect the taste of the jelly candy (Delina & Warriyah, 2021). As for F2 and F3 with the addition of more Moringa leaf powder than F1 so that the sour taste of citric acid is covered by the taste of Moringa leaf powder. So this can cause the level of liking for jelly candy with the addition of Moringa leaf powder to be more preferred than F2 and F3.

This is in line with research (Iskandar, Ningtyias, & Rohmawati, 2019) in the study of adding Moringa

leaf powder to ice cream which showed that the addition of Moringa leaf flour to ice cream caused a change in taste. The more addition of Moringa leaf powder, the more taste distinctive Moringa leaves. In research (Lesmayati, Qomariah, Awanis, & Anggreany, 2022). Orange jelly candy shows the taste of orange jelly candy is influenced by the interaction between sucrose, which gives a sweet taste, and the concentration of citric acid which gives sour taste.

While the manufacture of hard candy does not use citric acid in its processing so that the things that affect the taste of the candy are only sugar and additional modified ingredients, as in research (Hartini, 2018) which shows that the more used, the sweeter the hard candy. because in the manufacture of hard candy generally required as much as 50-70% sugar of the total weight.

### **Aspect of Aroma**

Aroma is one of the factors that can attract consumer interest in a food because it can describe or explain whether or not a food is delicious. A food that has a distinctive and attractive aroma will be preferred by the public (Usman, Umar, & Ruslang, 2022). Based on the results of the organoleptic assessment in table 2 and table 3, it can be seen that the aroma of jelly candy with the addition of Moringa leaf powder F0 has the highest hedonic scale value compared to F1, F2, and F3.

This is due to the absence of mixing of Moringa leaves which can cause unpleasant odors in jelly candy so that the aroma only comes from citric acid and coating materials, namely tapioca flour and powdered sugar. In Moringa leaves, the unpleasant aroma is caused by several substances present in Moringa leaves such as saponins, tannins and phytic acid (Indriasari, Basrin, & Salam, 2019).

In contrast to research (Rahmawati & Adi, 2016) which showed that the addition of Moringa leaf powder had no significant effect on the aroma of jelly candy, the results of the Kruskal Wallis test on student panellists and panelists of 4th grade elementary school students showed that ( $p = 0.00$ ) which means there was an effect of giving Moringa leaf powder on jelly candy.

The more addition of Moringa leaf powder to the jelly candy, the stronger the aroma of Moringa leaf powder is. This is because the jelly candy is not given food flavors that can cover the aroma of

Moringa leaves in the jelly candy can cause the smell of Moringa in jelly candy is very strong so that the aroma released does not attract the attention of consumers.

In line with research (Agustini, Priadi, Hidayati, Multri, & Rahman, 2021) on *Chroococcus Turdigus* in formula as an antioxidant agent showed that the aroma of jelly candy was influenced by the addition of flavoring, gelatin and microalgae. Meanwhile, research (Johannes, Tuju, & Mamujaja, 2022) states that hard candy produces a relatively similar and dominant aroma, namely the aroma of heated sugar so that the aroma of pineapple is less dominant.

### **Aspect of Texture**

Texture Food is one of the factors that play a role in determining taste because it can affect the speed of stimulation of the olfactory receptor cells and salivary glands (Usman, Umar, & Ruslang, 2022). Based on the results of the organoleptic assessment in Tables 2 and 3, it can be seen that the texture of the jelly candy with the addition of Moringa leaf powder F0 has the highest hedonic scale value compared to F1, F2, and F3. This is because the texture of F0 is more chewy and softer than the modified formula.

In contrast to the results of the study (Rahmawati & Adi, 2016) which did not show a significant ( $p = 0.758$ ), so it can be said that the addition of Moringa leaf powder did not affect the texture of the jelly candy. The results of the Kruskal Wallis test on student panelists showed that ( $p = 0.002$ ) while the panelists were 4th graders ( $p = 0.00$ ) which meant that there was an effect of giving Moringa leaf powder on jelly candy. The texture produced by jelly candy depends on the amount of Moringa leaf powder added to the jelly candy.

The more addition of Moringa leaf powder, the lower the elasticity of the jelly candy, causing the jelly candy to become harder. The water content decreases due to heating and decreases due to the mixing of several ingredients. The use of low water content can reduce the plasticity of the candy, resulting in a harder nature of the jelly candy (Rahmawati & Adi, 2016). In contrast to (Rahmawati & Adi, 2016) where the more addition of Moringa leaf powder, the softer the texture of the jelly candy because every addition of Moringa leaf powder into the jelly candy dough, the Moringa leaf powder must be dissolved first with water 1:5 of the weight (g) Moringa powder.

In line with research (Charoen, 2016) on jelly candy with the addition of guava leaf extract which showed that the addition of extract Guava leaf, this is not in line with research (Amini, 2022) which states that the addition of Moringa leaf powder has no significant effect ( $p > 0.05$ ) on texture parameters. However, the texture of hard candy is affected by the temperature in the candy processing process, where the higher the temperature, the harder the candy texture. This is because the high temperature causes the water content in the candy material to evaporate so that it only produces solids.

### **Analysis of Protein Content**

Protein is the largest part of the body after water, where one-fifth of the body is protein. Based on the results of the laboratory after testing the protein analysis using the Kjeldahl method for three treatments, the results obtained protein per 100 grams with an average value of 19.31% in F0 and an increase in F1 as much as 21.47%. This is because the protein content in the jelly candy is influenced by the high protein content in the Moringa leaf powder, so that the more addition of Moringa leaf powder can increase the protein content contained in the jelly candy. In line with (Iskandar, Ningtyias, & Rohmawati, 2019) research on ice cream showed that protein content increased with increasing weight of Moringa leaf flour in ice cream. Where the protein content contained in ice cream with the addition of 20 grams of Moringa leaves is 6.25%terdapat pada es krim dengan penambahan 20 gram daun kelor sebesar 6.25%.

Based on table 4, the results of protein analysis in F0 and F1 increased and decreased protein levels in each repetition. This is because the jelly candy processing is carried out in 2 stages of boiling on Moringa leaves. The first step when processing Moringa leaves into Moringa powder is blanching at a temperature of 80°C. Then the second stage is boiling at the time of processing jelly candy. The decrease in protein levels in food can be caused by boiling, this is because at high temperatures the protein will be denatured so that coagulation occurs and decreases its solubility or solubility (Azhar, 2016)

Based on the results of the analysis of protein content, consuming 100 grams of F1 jelly candy can meet 21.47% of protein needs based on PMK No. 28 of 2019 (Kementerian Kesehatan RI, 2019). However, excessive sugar consumption can cause dental caries in children and obesity, according to

(Gupita, 2017) it is better to consume no more than 2 jelly candies (10 grams) where in this study 10 grams is equivalent to 5 pieces of candy. The protein content in 5 candies can meet 2.14% or 1.07 grams of protein needs in children aged 7-9 years and as much as 1.39 grams in men and women aged 19-29 years.

### **Analysis of Calcium Content**

Calcium is the most abundant mineral found in the human body, representing about 1.5% to 2% of the total body weight or between 1,000 and 1,400 grams in 70 kg of humans (Wahyuni, 2019). Based on the results of the laboratory after testing the calcium analysis using the complexometric method for three treatments, the results obtained protein per 100gram with an average value of 35.03mg in F0 and in F1 it increased to 187.89mg. In line with research (Pramono, Ningtyas, Rohmawati, & Aryatika, 2021) that along with the addition of Moringa leaf flour, lemuru nuggets increase calcium levels, where with the addition of 20 grams of Moringa leaf flour has a calcium content of 410.00 mg per 100 grams of nuggets.

The increase in calcium levels in jelly candy is due to the addition of Moringa leaf powder to jelly candy where based on the analysis of the nutritional content of Moringa leaf powder by (Rani, Ekajayani, Darmasetiawan, & Dewi, 2019) per 100 grams of Moringa leaf powder contains 2003 mg of calcium. However, the content per 100 grams of calcium in F1 is not as much as the level of calcium content per 100 grams of Moringa leaf powder. This is because the process of processing jelly candy with the addition of Moringa leaf powder involves boiling. Boiling can reduce calcium levels in food, this is because the boiling process involves temperature and water media, where water can cause calcium content in food to dissolve in water and the higher the temperature used, the lower the calcium content produced (A. Fajaria, Rohmayanti, & Kusumaningrum, 2019).

Based on the results of the analysis of calcium content, by consuming 5 pieces of F1 jelly candy or 10 grams of jelly candy can meet 1.87% or 18.78 mg of calcium needs for children aged 7-9 and boys and girls aged 19-29 based on PMK No. 28 of 2019 (Kementerian Kesehatan RI, 2019).

## **5 CONCLUSIONS**

The acceptance of jelly candy with the addition of Moringa leaf powder can be accepted by the public with the most preferred formula, namely F0 (with the addition of 0 grams of Moringa leaf powder), while the modified formula with the highest value is F1 (with the addition of 2 grams of leaf powder). In contrast to previous studies which showed that there was no effect of giving Moringa leaf powder on candy jelly. The results of the Kruskal Wallis test in this study showed that there was an effect of Moringa leaf powder on jelly candy where the more addition of Moringa leaf powder, the lower the panelist's preference level.

There is an effect on the addition of Moringa leaf powder to jelly candy. The protein content of jelly candy with the addition of Moringa leaf powder in F1 was higher than F0, where the protein content per 100 grams in F1 was 21.47% while for F0 it was 19.31%.

Calcium levels in jelly candy with the addition of Moringa leaf powder F1 are higher than F0 which is the control formula, where the calcium level per 100 grams in F1 is 187.89mg while F0 is 35.03mg so it can be said that there is an effect of giving Moringa leaf powder on jelly candy.

Even though it is accepted by the community, further development is needed regarding the formula studied, especially on the taste and aroma aspects of jelly candy. In addition to protein and calcium, there are many useful nutrients in jelly with the addition of Moringa leaf powder, therefore further research is needed for other nutrients..

## **6 REFERENCES**

- A. Fajaria, T., Rohmayanti, I., & Kusumaningrum. 2019. Calcium Levels And Sensory Characteristics Of Crackers With The Addition Of Catfish Bone Flour And White Oyster Mushroom (Pleurotus Oestreatus). *Prosiding Seminar Nasional Teknologi Pangan* , Vol. 13 No. 2 , 130-142.
- Agustini, N. W., Priadi, D., Hidayati, N., Multri, H. D., & Rahman, D. Y. 2021. The Chroococcus Turgidus Supplements In Jelly Candy Formulation As Antioxidant Agent. *Journal Of Hunan University (Natural Sciences)* , Volume 48 No. 11, 10-17.
- Amini, N. I. 2022. Fortification Of Hard Candy Based On Morage Leaf Powder. Makassar: Universitas Hasanuddin.

- Azhar, M. 2016. Cell Biomolecules Carbohydrates, Proteins, And Enzymes. Padang: Unp Press Padang.
- Bactiar, A., Ali, A., & Rossi, E. 2017. Making Red Ginger Extract Jelly Candy With The Addition Of Carrageenan. *Jurnal Online Mahasiswa Fakultas Pertanian Universitas Riau* , Vol Ume 4 Nomor 1, 1-13.
- Charoen, R. 2016. Development Of Antioxidant Gummy Jelly Candy Supplemented With Psidium Guajava Leaf Extract. *Kmutnb Int J Appl Sci Technol* , Volume 8 No.2, 145-15.
- Darna, A. R., Timbuleng, E. M., Nushoibah, Khasanah, P. U., Arofah, G. E., & Kartikasari, M. D. 2019. Peri Dalor (Kelor Leaf Jelly Candy): An Antioxidant Rich Candy Innovation As A Health Solution. *Jurnal Semar* , Vol. 8 No. 1, 35-39.
- Delina, I. R., & Warriyah, C. 2021. Acid Sugar Balance, Physical Properties And Preference Level Of Guava (Psidium Guajava L.) Soft Candy With Variations In Concentration Of Sugar And Citric Acid. Yogyakarta: Universitas Mercu Buana Yogyakarta.
- Gupita, A. M. 2017. Analysis Of Sugar Content, Water Content, Protein Content, And Acceptability Of Jelly Candy With The Addition Of Moringa Leaves. Jember: Universitas Jember.
- Hartini, S. P. 2018. The Effect Of The Proportion Of Green Beans And Sugar On The Nutrition And Sensory Quality Of Hard Candy. Mataram: Universitas Mataram.
- Indriasari, Y., Basrin, F., & Salam, M. B. 2019. Consumer Acceptance Analysis Of Moringa Biscuit (Moringa Biscuit) Enriched Flour Of Moringa Leaf (Moringa Oleifera). *Agroland* , Volume 26 No.1, 221 - 22.
- Iskandar, A. B., Ningtyias, F. W., & Rohmawati, N. 2019. Analysis Of Protein, Calcium And Acceptance Level Of Ice Cream With The Addition Of Moringa Leaf Flour (Moringa Oleifera). *Penel Gizi Makan* , Volume 42 Nomor 2, 65-72.
- Johannes, A. C., Tuju, T. D., & Mamujaja, C. 2022. Chemical And Organoleptic Properties Of Carrot Juice (Daucus Carota L.) Hard Candy With The Addition Of Pineapple (Ananas Comosus L.) Fruit Juice. *Jurnal Teknologi Pertanian* , 8-14.
- Kementerian Kesehatan Ri. 2019. Peraturan Menteri Kesehatan Republik Indonesia Nomor 28 Tahun 2019 Tentang Angka Kecukupan Gizi Yang Dianjurkan Untuk Masyarakat Indonesia. Jakarta: Kementerian Kesehatan Indonesia.
- Latif, M. A., Aziz, H. A., & Deen, A. K. 2022. Utilization Of Some Natural Plants Sources In Producing New Product (Gummy Jelly Candy). *International Journal Of Family Studies, Food Science And Nutrition Health* , Volume 3 No.2, 40-63.
- Lesmayati, S., Qomariah, R., Awanis, & Anggreany, S. 2022. Effect Of Gelatin And Citric Acid Concentration On Chemical And Organoleptic Properties Of Jelly Citrus. *The 3rd International Conference On Agricultural Postharvest Handling And Processing* , 1-7.
- Nurjannah, N., Hidayati, L., Kiranawati, T. M., Fatimah, N., & Susanto, H. 2020. The Characteristic And Organoleptic Qualities Of Moringa Oleifera Jelly Candy Post Kelor Leave Puree Supplementation. *International Conference On Life Sciences And Technology* , 1-6.
- Pramono, M., Ningtyas, F. W., Rohmawati, N., & Aryatika, K. 2021. Effect Of Additional Moringale Flour [Moringaoleifera] On Protein, Calcium, And Acceptance Of Lemuru Fish Nugget [Sardinellalemuru]. *Penel Gizi Makan* , Volume 44 No.1, 1-10.
- Rahmawati, P. S., & Adi, A. C. 2016. Acceptance And Nutritional Substances Of Jelly Candy With The Addition Of Moringa Leaf (Moringa Oleifera) Powder. *Media Gizi Indonesia* , Vol. 11, No. 1 , 86–93.
- Rahmawati, Wahyuni, F., & Hariati, N. W. 2018. Effect Of Oyster Mushroom Flour Substitution On Acceptability And Nutritional Content Of Dried Noodles. *Jurnal Dunia Gizi* , Volume 1 No. 2, 119-127.
- Rani, K. C., Ekajayani, N. I., Darmasetiawan, N. K., & Dewi, A. D. 2019. Nutritional Content Training Module. Surabaya: Fakultas Farmasi Universitas Surabaya.
- Rastiati, N. P. 2017. *Applied Microbiology*. Depok: Pt Grafindo Persada.
- Saputri, G. R., Tutik, & Permatasari, A. I. 2019. Determination Of Protein Levels In Young And Old Moringa (Moringaoleifera L.) Leaves Using Kjeldahl Method. *Jurnal Analis Farmasi* , Volume 4, No.2, 108 - 116.
- Sinaga, H., Purba, R. A., & Nurminah, M. 2019. The Effect Of Adding Moringa Oleifera (Moringa Oleifera) Flour In The Making Of Laughter Onde-Onde Cake Using Mocaf Flour. *Jfls* , Volume 3 No. 1, 29 – 37.
- Soekarto, S. T. 2020. *Sensory Test Methods And Analysis*. Bogor: Pt. Penerbit Ipb Press.
- Usman, Umar, F., & Ruslang. 2022. *Nutrition And Local Food*. Padang: Pt Global Eksekutif Teknologi.
- Wahyuni, F. 2019. *Metabolism Of Nutrients*. Maros: Stikes Salewangan Maros.