

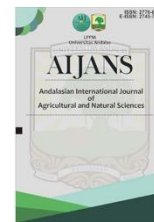


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### Article

## ADDITION EFFECT OF RED DRAGON FRUIT PEEL POWDER (HYLOCEREUSPOLYRHIZUS) ON THE CHARACTERISTICS OF YOUNG COCONUT JAM (COCOS NUCIFERA)

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### Abstract

The aim of this study to determine the addition effect of red dragon fruit peel powder on the physical and chemical quality characteristics of young coconut jam and get out the right concentration of making young coconut jam on sensory analysis. This study used a completely randomized design with 5 treatments and 3 replications. The research data were analyzed statistically using ANOVA and continued with the Duncan' New Multiple Range Test (DNMRT) at the 5% level. The treatment in this study was the addition of red dragon fruit peel powder with a concentration of 4% (treatment A), 12% (treatment B), 20% (treatment C), 28% (treatment D) and 36% (treatment E). The results showed that the addition of red dragon fruit peel powder had a significant effect on water content, ash content, pH, total dissolved solids, total sugar, Vitamin C, antioxidant activity and betacyanin

## INTRODUCTION

Coconut (*Cocos nucifera*) is one of the plantation commodities that are widely grown in Indonesia. The availability of coconut fruit can be utilized by making a business if managed properly. Young coconut meat can be consumed directly and the fruit water can be drunk directly without processing (Aristya, Prajitno, Supriyanta, and Taryono, 2008).

Young coconut is used by some people to make various processed food products such as pudding and cakes. To add economic value to coconuts, young coconuts can be processed into jam. Jam is a semi-solid ingredient made from 45 parts of the constituent substances of cider and 55 parts of sugar weight. The mixture is thickened to a level of soluted solids not less than 65%. The process of making jam involves boiling the fruit. This boiling aims to extract the taste of the fruit, obtain a lot of cider and extract pectin. When the addition of sugar, cider is stirred and heated until a gel is formed (Desrosier, 2008)

In the manufacture of jams, sugar is not only used as a sweetener but also as a structure-forming in jams. The addition of large amounts of sugar (at least 40% dissolved solids) will serve as a preservative and lower aw thus reducing microbial growth (Buckle et al, 1987).

Coconut meat jam is white, and color members need to be sought alternative color substances from natural and environmentally friendly ingredients. One of them is to use the

skin of dragon fruit (*Hylocereus polyrhizus*). Dragon fruit skin is rarely used, just thrown away. Dragon fruit skin can be used as a natural dye. The color produced from the skin of dragon fruit is interesting and can add nutritional value to the food. Dragon fruit skin is rich in fiber, and antioxidants and contains betacyanin. Betacyanin is used as a natural dye (Diah et al, 2019).

According to Prasetya (2013), dragon fruit skin has a high water content of 94.05% so it is easily damaged and susceptible to microorganisms. To overcome this, the skin of dragon fruit is made into powder with a drying process and then added to the jam. Based on this, the author has conducted research on the addition of red dragon fruit skin powder to young coconut jam with the title "Addition Effect Of Red Dragon Fruit Peel Powder (*Hylocereus Polyrhizus*) On The Characteristics Of Young Coconut Jam (*Cocos nucifera*)

## EXPERIMENTAL SECTION

### Materials

The ingredients used in this study were young and fresh coconut meat, dragon fruit peel, sucrose, citric acid, equates, buffer solution, phenol solution, H<sub>2</sub>SO<sub>4</sub> 0.3 N, alcohol 95%, iodine solution 1%, methanol solution, DPPH.

### Instrumentation

The instrumentation used in the study were scales, stainless steel spoons, stainless steel knives, ovens, thermometers, 100 mesh sieves, blenders, plastic basins, pans, stirrers, baking sheets, cauldrons, and stoves. The tools used for analysis are hot plate, colorimeter, cup glass, refractometer prism, aluminum cup, oven, desiccator, pH meter, stirring cup, furnace, Erlenmeyer 300 ml, filter paper, 250 ml cup glass, spectrophotometric.

### Procedure

#### Preparation of Raw Materials

The raw material used was a young coconut that is green, and the fruit is still diluted and not hard, the dragon fruit taken is a dragon fruit that is still fresh and taken its skin that has no injuries obtained from Bukittinggi Market.

#### Making of Young Coconut Porridge (Arsyad Modification, 2018)

Young coconut fruits were peeled and separated between the flesh of the fruit and the water. The ratio of fruit and meat to water is 2:1. Young coconut meat is crushed until smooth to form a porridge.

#### Dragon Fruit Skin Powder Making (Agung Modification, 2019)

The dragon fruit was separated from its skin. Then remove the green scales on the skin of the dragon fruit. Next, it is melted for 3-5 minutes at a temperature of 80-90 °C, then do a size reduction of about ±1 cm. After that, drying was carried out at a temperature of 60 °C for 10 hours. After drying crushed with a blender and sifted with a sieve of 100 mesh. Obtained dragon fruit skin powder.

#### Jam Making Process ( Marisa, 2015)

Young coconut porridge weighs as much as 90 g. The coconut pulp is heated in a container at a temperature of 40°C and stirred until homogenous for 1 minute. Add 110 grams of granulated sugar and citric acid and 1 g and mix thoroughly. Insert dragon fruit skin powder according to the treatment given. Jam cooking was continued at a temperature of 50-60°C for 10-20 minutes while stirring. After that do a spoon test to see the maturity of the jam. Cooked jam is packaged in sterilized jar packaging.

## RESULT AND DISCUSSION

### Raw Material Analysis

The analysis conducted on the raw materials of young coconut porridge and red dragon fruit skin powder is pH, moisture content, antioxidant activity, and betacyanin levels. The following results of the analysis that has been done can be seen in Table 1.

Observation	Young Coconut Porridge (Average $\pm$ SD)	Red Dragon Fruit Skin Powder (Average $\pm$ SD)
pH	4.55 $\pm$ 0.04	5.31 $\pm$ 0.12
Water Content (%)	92.66 $\pm$ 0.58	9.33 $\pm$ 0.58
Activity Antioxidant (%)	35.65 $\pm$ 1.93	61.24 $\pm$ 1.14
Betacyanin Levels ( $\text{mgL}^{-1}$ )	-	0.81 $\pm$ 0.01

Description : (-) not tested

Based on the analysis of acidity in young coconut porridge and red dragon fruit skin powder, a pH value of young coconut porridge was obtained of 4.55. The pH value of the red dragon fruit skin powder obtained is 5.31. According to Fachruddin (1997) pH measurement is very important because it can affect the process of gel formation.

The moisture content in young coconut porridge is obtained by 92.66%. The moisture content of the red dragon fruit skin powder was obtained by 9.33%. The moisture content obtained from this study is not much different from the results of Raudhatul 's research (2017), which stated that the water content of dragon fruit skin is 9.22%. In the manufacture of dragon fruit skin, powder is done drying so that the moisture content of the dragon fruit skin is reduced.

The value of antioxidant activity obtained in young coconut porridge is 35.65%, while the value of antioxidant activity in red dragon fruit skin powder is 61.24%. This is because the drying process can reduce the antioxidant activity of the skin of red dragon fruit (Febrian, A 2015).

The level of betacyanin in the skin powder of red dragon fruit is 0.81 mg / g. Factors that affect the level of its concentration and temperature because the compounds of betacyanin are very unstable to temperature and susceptible to heat treatment so it will reduce and even eliminate the compound (Wulandari et., al, 2013).

### Physical Analysis of Young Coconut Jam

#### *Color Test*

Color is an important role to express its acceptance of a food product for consumers. The purpose of the color test is to find out the effect of the addition of red dragon fruit skin powder to young coconut jam. Color testing on young coconut jam with the addition of red dragon fruit skin powder was measured using hunter lab color flex Ez spectrophotometer.

Table 2. Average Value of Light Coconut Jam Color with the Addition of Red Dragon Fruit Skin Powder

Treatment	°Hue (Average ± SD)	
E (Addition of Dragon Fruit Skin Powder 36%)	14.61 ± 1.12	a
D (Addition of Dragon Fruit Skin Powder 28%)	16.46 ± 1.08	b
C (Addition of Dragon Fruit Skin Powder 20%)	19.76 ± 0.73	c
B (Addition of Dragon Fruit Skin Powder 12%)	21.46 ± 0.34	d
A (Addition of Dragon Fruit Skin Powder 4%)	22.09 ± 0.35	d
CV = 0.85 %		

The research that has been done on the color of young coconut jam with the treatment of the addition of red dragon fruit skin powder obtained a value of °hue ranging from 14.61 to 22.09. The value indicates that the color of the young coconut jam produced belongs to red-purple with a range of °hue values of 342-18. The higher the concentration of red dragon fruit skin powder added, the higher the °hue value (Ekawati, et al. 2015).

In this study, the L\* value ranged from 28.65 to 17.75. This suggests that the addition of dragon fruit skin powder has an influence on the brightness of young coconut jam. Coconut jam with treatment E, has a lower brightness of 17.75. The highest brightness value is found in coconut jam with treatment A which is 28.65. The color of coconut jam comes from the pigment betacyanin found in the skin of dragon fruit. This pigment is red to purplish-red which belongs to the betalain group that can dissolve in water. Betasianin also serves as an antioxidant and as a natural dye in food products (Febrian, A. 2015).

### Chemical Analysis of Young Coconut Meat Jam

#### Moisture Content

The data of the results of the water content test of young coconut jam with the treatment of the addition of red dragon fruit skin powder (*Hylocereus Polyrhizus*) can be seen in Table 3.

Table. 3 Average Value of Young Coconut Jam Water Content with the Addition of Red Dragon Fruit Skin Powder.

Treatment	Water Content (%) (Average ± SD)	
E (Addition of Dragon Fruit Skin Powder 36%)	20.67 ± 2.08	a
D (Addition of Dragon Fruit Skin Powder 28%)	21.67 ± 3.06	a
C (Addition of Dragon Fruit Skin Powder 20%)	22.83 ± 2.36	a b
B (Addition of Dragon Fruit Skin Powder 12%)	26.08 ± 0.14	b c
A (Addition of Dragon Fruit Skin Powder 4%)	27.42 ± 1.70	c
CV = 1.77%		

Description :the numbers on the same column and followed by unequal lowercase letters differ markedly at the level of 5% according to the DNMRT

Based on the statistical test of young coconut jam with the treatment of the addition of red dragon fruit skin powder showed a noticeable different influence on the level of 5% on the moisture

content of jam. The highest water content in treatment A is 27.42% and the lowest in treatment E, is 20.67%. Based on the table above, it can be known that the higher the concentration of the addition of dragon fruit skin powder, the lower the moisture content contained in the jam. This is because the pectin properties found in the skin of dragon fruit are able to form a gel with water, sugar, and acid. In addition, the added red dragon fruit skin has low water content and can bind water so that the moisture content in the jam is reduced (Kusnandar, F. 2010).

According to Winarno (2002), semi-wet foods such as jam are foods that have a water content that is not too low and also not too high, which is 15-50%. Based on SNI. No. 3746: 2008 that the maximum water content of fruit jam is 35%, so the jam produced in this study is good because it does not exceed the established standards.

### **Ash Content**

Here is the data of the test results of the ash content of young coconut jam with the treatment of the addition of red dragon fruit skin powder (*Hylocereus Polyrhizus*) can be seen in Table 4.

Table 4. Average Value of Young Coconut Jam Ash Content with the Addition of Red Dragon Fruit Skin Powder

Treatment	Ash Content (%) (Average $\pm$ SD)	
A (Addition of Dragon Fruit Skin Powder 4%)	0.33 $\pm$ 0.01	a
B (Addition of Dragon Fruit Skin Powder 12%)	0.35 $\pm$ 0.01	a
C (Addition of Dragon Fruit Skin Powder 20%)	0.67 $\pm$ 0.04	b
D (Addition of Dragon Fruit Skin Powder 28 %)	0.92 $\pm$ 0.07	c
E (Addition of Dragon Fruit Skin Powder 36%)	1.00 $\pm$ 0.01	d

CV = 1.24%

Description :the numbers on the same column and followed by small letters that are not equal differ at the level of 5% according to the DNMRT

Based on the analysis of various fingerprints, it can be known that the addition of red dragon fruit skin powder differs statistically markedly at a level of 5% to the ash content of the young coconut jam produced. The value of the highest ash content is obtained in treatment E, with an ash content value of 1%. While the lowest ash level in treatment A, at 0.33%. Based on the table above, it can be known that the more addition of red dragon fruit skin powder, the minerals contained in the ingredients are increasing. This is due to the mineral content of the raw materials used differently.

According to Daniel (2014), dragon fruit skin contains ash levels of 16-20% and mineral content in the form of calcium by 1.82%, phosphorus by 0.00208%, while the level of young coconut ash is 0.51%, and mineral content in the form of potassium 564.6%, calcium 7.0%, iron 1.0%, zinc 0.3% and phosphorus 30.0% (Barlina, 2004).

According to Deman (1989), sugaring is a method that is done to find out the presence of minerals in food. Such combustion will damage organic compounds and leave minerals. The ash

content of a material indicates the mineral content contained in the material. The greater the ash content of food, the higher the mineral content in the ingredients (Winarno, 2004).

### *pH value*

The results of the analysis of the pH value of young coconut jam with the addition of red dragon fruit skin powder can be seen in Table 5.

Table 5. Average pH value of young coconut meat jam with the addition of red dragon fruit skin powder.

Treatment	Ph (Average $\pm$ SD)	
A (Addition of Dragon Fruit Skin Powder 4%)	4.11 $\pm$ 0.01	a
B (Addition of Dragon Fruit Skin Powder 12%)	4.23 $\pm$ 0.01	b
C (Addition of Dragon Fruit Skin Powder 20%)	4.26 $\pm$ 0.01	c
D (Addition of Dragon Fruit Skin Powder 28%)	4.42 $\pm$ 0.01	d
E (Addition of Dragon Fruit Skin Powder 36%)	4.62 $\pm$ 0.02	e
CV = 0.06%		

Description :the numbers on the same column and followed by small letters that are not equal differ at the level of 5% according to the DNMRT

From the results of the variety of fingerprint analyses carried out the addition of red dragon fruit skin powder to young coconut jam for pH value gives a statistically different influence at the level of 5%. Where the pH obtained is in the range of 4.11-4.62. The highest pH value is in treatment E, with a pH value of 4.62, while the lowest pH value is in treatment A, with a pH value of 4.11. The higher the concentration of red dragon fruit skin powder added, the pH value of young coconut meat jam will increase. This is due to the pH contained in the raw material of red dragon fruit skin being higher than the pH of young coconut porridge raw materials, namely red dragon fruit skin by 5.31 and young coconut porridge by 4.55. The acidic elements in the skin of red dragon fruit are oxalic acid, citric acid, malic acid, succinic acid, and fumaric acid with an acid content of 1.72% (Jamilah et al, 2011)

In making jam, the level of acidity is very important because if the acidity is too low then the gel in the jam will not form and if it is too high the jam will become diluted (Lestari, 2006). Foodstuffs are grouped into three groups: low-smoky food (pH above 5.3), medium-smoky food (pH 4.5-5.3) and high-smoky foodstuffs (pH less than 4.5) (Kusnandar, F. 2010).

### ***Total Dissolved Solids Content***

Analysis of the average test value of the total test of dissolved solids of young coconut jam with the addition of red dragon fruit skin powder can be seen in Table 6.

Table 6. Average Value of Total Solids Dissolved Young Coconut Jam with the Addition of Red Dragon Fruit Skin Powder.

Treatment	Total Dissolved Solids (%) (Average $\pm$ SD)	
A (Addition of Dragon Fruit Skin Powder 4%)	68.00 $\pm$ 1.00	a
B (Addition of Dragon Fruit Skin Powder 12%)	70.33 $\pm$ 0.58	b
C (Addition of Dragon Fruit Skin Powder 20%)	71.66 $\pm$ 0.58	b
D (Addition of Dragon Fruit Skin Powder 28%)	73.33 $\pm$ 1.15	c
E (Addition of Dragon Fruit Skin Powder 36%)	73.66 $\pm$ 0.58	c
CV= 0.23%		

Description :the numbers on the same column and followed by small letters that are not equal differ at the level of 5% according to the DNMRT

Based on table 6 on the analysis of total dissolved solids the addition of red dragon fruit skin powder gives statistically different results at a level of 5% to the total dissolved solids of young coconut jam. The highest total value of dissolved solids is in treatment E, with a value of 73.66%, and the lowest total value of dissolved solids, namely in treatment A, with a value of 68.00%.

The more mixing the skin of the red dragon fruit, the total dissolved solids produced will be higher. This is because the more red dragon fruit skin, the more pectin contained will be. According to Mahmud (2013), the total dissolved solids produced will be higher if the pectin content is high. This is because pectin is the total constituent component of dissolved solids.

The quality requirement of fruit jam based on SNI is a minimum of 65%. This shows that coconut meat jam has met SNI standards. Total dissolved solids are affected by soluble pectin, while the addition of granulated sugar is one of the factors affecting total dissolved solids (Winarno, 2004). Sugar has hygroscopic properties, namely the ability of sugar to bind water due to the presence of polyhydroxy groups that are able to form hydrogen cyclists with water (Kusnandar, 2010).

### **Total Sugar Content**

Total sugar analysis can be seen in table 7.

Table 7. Average Value of Total Sugar Of Young Coconut Jam with The Addition of Red Dragon Fruit Skin Powder

Treatment	Total Sugar (Average $\pm$ SD)	
A (Addition of Dragon Fruit Skin Powder 4%)	25.83 $\pm$ 0.91	a
B (Addition of Dragon Fruit Skin Powder 12%)	26.17 $\pm$ 1.15	a
C (Addition of Dragon Fruit Skin Powder 20%)	28.63 $\pm$ 1.60	b
D (Addition of Dragon Fruit Skin Powder 28%)	29.30 $\pm$ 1.41	b
E (Addition of Dragon Fruit Skin Powder 36%)	30.67 $\pm$ 0.90	b
CV= 0.87%		

Description :the numbers on the same column and followed by small letters that are not equal differ at the level of 5% according to the DNMRT

Based on statistical analysis at a level of 5% addition of red dragon fruit skin powder gives a noticeable different result at a level of 5%. The average value of total sugar in young coconut meat

jam is highest in treatment E with a total sugar value of 30.67%. While the lowest average total sugar value is in treatment A with a total sugar value of 25.83%. The amount of sugar added is the same in each treatment while the water content decreases with the addition of red dragon fruit skin powder, so the more the addition of red dragon fruit skin powder, the greater the amount of sugar in the jam. Therefore the total sugar is increasing with the increasing amount of red dragon fruit skin powder added.

Sugar has hygroscopic properties, namely the ability of sugar to bind water so that hydrogen bonds are formed (Kusnandar, 2010). The sugar used in the manufacture of jam is sucrose which is known as everyday granulated sugar. The addition of sugar aims to obtain texture, flavor, and appearance and serve as a preservative. In jam, the sugar content is good for the properties and the durability of jam should range from 65-to 75% (Muchtadi and Sugiono, 2008).

**Coarse Fiber Content**

The results of the rough fiber analysis of young coconut jam with the addition of red dragon fruit skin powder are between 2.47-5.31%. The results of further test analysis with DNMRT against coarse fiber levels can be seen in Table 8.

Table 8 Average Value of Crude Fiber Content of Young Coconut Jam with the Addition of Red Dragon Fruit Skin Powder.

Treatment	Coarse Fiber (%) (Average ± SD)	
A (Addition of Dragon Fruit Skin Powder 4%)	2.47 ± 0.16	a
B (Addition of Dragon Fruit Skin Powder 12%)	3.16 ± 0.80	a
C (Addition of Dragon Fruit Skin Powder 20%)	4.53 ± 0.28	b
D (Addition of Dragon Fruit Skin Powder 28%)	4.94 ± 0.12	b c
E (Addition of Dragon Fruit Skin Powder 36%)	5.31 ± 0.21	c

CV= 1.96%

Description :the numbers on the same column and followed by small letters that are not equal differ at the level of 5% according to the DNMRT

Based on the statistical test of young coconut jam with the addition of red dragon fruit skin powder obtained real different results at a level of 5% to the content of jam fiber. The highest coarse fiber is found in the E treatment which is 5.31%. While the lowest coarse fiber is found in treatment A which is 2.47%. The higher the addition of red dragon fruit skin powder, the rough fiber value on the jam will increase. This is due to the rough fiber content contained in the skin of red dragon fruit being greater than the rough fiber content in young coconuts. The fiber content of young coconut fruit is 22.44% (Barlina, 2007) and the fiber content of red dragon fruit skin is 25.56% (Diah. 2019).

Fiber consists of two groups, namely water-soluble fiber, and water-soluble fiber. Water-soluble fibers are pectin, gum, glucan, and mucilage. While water-soluble fibers are cellulose,



hemicellulose, and lignin (Almatsier, 2009). The fiber content of young coconut jam in this study has met the quality standards of jam, namely fiber content of positive value.

***Vitamin C Content***

The results of the fingerprint analysis of various vitamin C levels in young coconut jam with the addition of red dragon fruit skin powder obtained ranged from 34.48%-73.89%. The results of further test analysis with DNMRT on vitamin C levels can be seen in table 9.

Table 9. Average Value of Vitamin C Young Coconut Jam with the Addition of Red Dragon Fruit Skin Powder

Treatment	Vitamin C (mg/100g) (Average ± SD)	
A (Addition of Dragon Fruit Skin Powder 4%)	0.35 ± 0.07	a
B (Addition of Dragon Fruit Skin Powder 12%)	0.52 ± 0.11	a b
C (Addition of Dragon Fruit Skin Powder 20%)	0.68 ± 0.04	b
D (Addition of Dragon Fruit Skin Powder 28%)	0.89 ± 0.16	c
E (Addition of Dragon Fruit Skin Powder 36%)	1.06 ± 0.07	c

CV = 2.85%

Description :the numbers on the same column and followed by small letters that are not equal, differ at the level of 5% according to the DNMRT

Based on statistical analysis conducted on young coconut jam with the addition of red dragon fruit skin powder obtained a noticeable different result at a level of 5% to the level of vitamin C jam. The lowest vitamin C levels are found in treatment A which is 0.35mg / 100g. While the highest is found in the E treatment which is 1.06mg / 100g. From the results above it is known that the more concentration of the addition of red dragon fruit skin powder, the higher the level of vitamin C obtained in jam. Vitamin C is a type of vitamin that is easily damaged during processing. Besides being easily soluble in water vitamin C is also easily oxidized and it will be accelerated by the presence of heat, rays, alkalis and other oxidizers (Winarno, 2002).

***Antioxidant Activity***

The average value of the test of the antioxidant activity of young coconut jam with the addition of red dragon fruit skin powder can be seen in table 10.

Table 10. Average Value of Young Coconut Jam Antioxidant Activity with the Addition of Red Dragon Fruit Skin Powder

Treatment	Antioxidant Activity (%) (Average ± SD)	
A (Addition of Dragon Fruit Skin Powder 4%)	10.13 ± 0.66	a
B (Addition of Dragon Fruit Skin Powder 12%)	18.80 ± 1.75	b
C (Addition of Dragon Fruit Skin Powder 20%)	29.33 ± 0.99	c
D (Addition of Dragon Fruit Skin Powder 28%)	39.42 ± 0.67	d
E (Addition of Dragon Fruit Skin Powder 36%)	42.11 ± 0.43	e
CV= 0.72%		

Description: the numbers on the same column and followed by small letters that are not equal differ at the level of 5% according to the DNMRT

Based on the table above, you can see the antioxidant activity in young coconut jam with the addition of red dragon fruit skin powder gives a statistically different influence at the level of 5% on antioxidant activity. The value of antioxidant activity at a concentration of 1000 ppm in coconut jam has increased. The highest result was in treatment E, with an antioxidant activity value of 42.11%. For the lowest value, namely in treatment A with an antioxidant activity value of 10.13%. The higher the concentration of red dragon fruit skin powder added, the higher the value of antioxidant activity obtained. This is because the skin of red dragon fruit contains flavonoid compounds such as betacyanin which has a fairly high antioxidant activity value (Febrian.A. 2015).

Antioxidants are compounds that can counteract or reduce the impact of free radicals. Antioxidants are needed by the body to protect the body from free radical attacks. According to Marxen, Vanselow, Lippermeier, Hintze (2007), DPPH is a stable free superpower in methanol solutions. So methanol is used as a solvent in the analysis of antioxidant activity. Antioxidant compounds in red dragon fruit skin powder are polar compounds that can dissolve in methanol.

**Betacyanin Level**

The results of the analysis of the levels of young coconut jam betacyanin with the addition of red dragon fruit skin powder can be seen in table 11.

Table 11. Average Value of Young Coconut Jam Betacyanin Levels with the Addition of Red Dragon Fruit Skin Powder

Treatment	Betacyanin Levels (mg/100 g) (Average ± SD)	
A (Addition of Dragon Fruit Skin Powder 4%)	0.13 ± 0.004	a
B (Addition of Dragon Fruit Skin Powder 12%)	0.29 ± 0.001	b
C (Addition of Dragon Fruit Skin Powder 20%)	0.34 ± 0.024	c
D (Addition of Dragon Fruit Skin Powder 28%)	0.57 ± 0.002	d
E (Addition of Dragon Fruit Skin Powder 36%)	0.59 ± 0.002	e
CV = 0.56%		

Based on the results of the betacyanin test on young coconut jam with the addition of red dragon fruit skin powder, the highest value in treatment E is 0.59 mg / 100 g and the lowest in treatment A is 0.13 mg / 100 g. The content of betacyanin obtained in young coconut jam is lower than that obtained in red dragon fruit skin powder. This is due to the breakdown of the color pigment during the processing process. The factors that affect the stability of betacyanin compounds are temperature, pH, oxygen, light, and metal ions (Yuliza, 2012).

According to Azeredo (2009), dragon fruit skin betalain group that has water-soluble properties and contains nitrogen synthesized from the amino acid tyrosine consisting of two groups, namely Red-violet Betasianin and yellow-orange Betaxantin

## CONCLUSION

Based on the results of research that has been done can be drawn the following conclusions, the addition of red dragon fruit skin powder to young coconut jam has a real effect on color, moisture content, ash content, total dissolved solids, vitamin C, antioxidant activity, and levels of paralyanine. The highest Vitamin C value is 1.06 mg / 100g, the highest antioxidant activity is 42.11%, the highest level is 0.59 mg / 100g and all criteria meet SNI. Therefore the best treatment was E (Addition of Dragon Fruit Skin Powder 36%)

## REFERENCES

- Agung, W. 2018. Pengaruh Suhu Pengeringan Terhadap Karakteristik Kimia Dan Aktivitas Antioksidan Bubuk Kulit Buah Naga Merah. Politeknik Negeri Jember. Jember.
- Almatsier, S. 2009. *Prinsip Dasar Ilmu Gizi*. PT Gramedia Pustaka Utama. Jakarta.
- Aristya, V.E, Prajitno, D., Supriyanto, Taryono, 2008. Kajian Aspek Budidaya Dan Identifikasi Keragaman Morfologi Tanaman Kelapa (*Cocos Nucifera, L.*) Di Kabupaten Kabumen. Fakultas Pertanian . UGM. Yogyakarta.
- Arsyad, M. 2018. Pengaruh Konsentrasi Gula Terhadap Pembuatan Selai Kelapa Muda (*Coconus Muvifera L*) *Gorontalo Agriculture Technology Journal*. Vol 1. No 2.
- Azeredo, H.C.M. , Ana C.P., Arthur, C.R.S., Sandro, T.G, Dan Kenya. C.B. M. 2009. Study On Efeciency Of Betacyanin Ekstraktion From Red Beetroots. *International Journal Of Foos Science & Technology*. Vol 44. No 12.
- Barlina, 2007. Pengaruh Perbandingan Air Kelapa dan Penambahan Daging Kelapa Muda serta Lama Penyimpanan Terhadap Serbuk Minuman kelapa, *Jurnal Litri, Balai Penelitian Tanaman Kelapa dan Palma Lain (Balitka)*. Vo. 13, No. 2
- Buckle, K.A.,1987. *Ilmu Pangan*. Universitas Indonesia Press.Jakarta.
- Daniel R. S. 2014. Kajian KandunganZatMakanan dan Pigmen AntosianinTiga Jenis KulitBuah Naga (*Hylocereus sp.*) Sebagai Bahan Pakan Ternak. [Skripsi]. FakultasPeternakan. UniversitasBrawijaya Malang. Malang.
- Demam, J. M. 1989. *Principles of Food Chemistry*. Padmawinata, K. (penerjemah). 1997. Kimia Makanan. Penerbit ITB. Bandung.
- Desrosier, N. W. 1998. *Food PresevationTechnologi*. Milijohardjo, M. TeknologiPengawetan Pangan. EdisiKetiga. UI-Press. Jakarta.
- Desrosier, N. W. 2008. *The Technology of Food Preservation, Third Edition (TeknologiPengawetanPangan, EdisiKetiga)*. Terjemahan: M. Muljohardjo. PenerbitUniversitas Indonesia. Jakarta.
- Diah, A.W., Robby. C.P., Meia. Y.S. 2019. Uji Aktivitas Antioksidan Pada Ekstrak Kulit Buah Naga Merah Dengan Metode DPPH. *Jurnal Analis Farmasi* Vol 4. No 2
- Ekawati.F., Restiati., Dan Syahraeni, 2015. Aplikasi Ektrak Kulit Buah Naga Sebagai Pewarna Alami Pada Susu Kedelai Dan Antan. *E-J. Agrotekbis* Vol 3. No 2.
- Fachruddin, L. 1997. *Membuat Aneka Selai*. Kanisius. Yogyakarta.

- Febrian, A. 2015. Pengaruh Suhu Pengeringan Terhadap Komponen Kimia Teh Daun Kedondong. [Skripsi]. Fakultas Teknologi Pertanian. Universitas Andalas. Padang
- Jamilah, B., C. E. Shao, M. Kharidah, M. A. Dzulkifly, and A. Noranizam. 2011. Physico-Chemical Characteristics Of Red Pitaya (*Hylocereus Polyrhizus*) Pell. *International Food Research Journal* 18: 279-286.
- Kusnandar, F. 2010. *Kimia Pangan Komponen Makro*. Dian Rakyat. Jakarta.
- Kusnandar, F. 2010. *Kimia Pangan Komponen Makro*. Dian Rakyat. Jakarta.
- Lestari, .O.A. dan Dewi, Y.S.K. 2016. Aplikasi Penggorengan Vakum Untuk Buah Etnik Artocarpus Integer Sebagai Upaya Peningkatan Citra Pangan Lokal, *Prosiding Seminar Nasional Penerapan Ilmu Pengetahuan Dan Teknologi (Pipt) Ii*. Pontianak.
- Mahmud, M. 2013. Peran Pektin Dan Sukrosa Pada Selai Ubi Jalar Ungu. Fakultas Teknologi Industri. Universitas Pembangunan Nasional. Jawa Timur.
- Marisa. M. 2015. Pengaruh Penambahan Ekstrak Buah Senduduk (*Melastomamalabathricumx L.*) terhadap Karakteristik Mutu Selai Jerami Nangka (*Artocarpusheteropyllus. L.*). Padang: Fakultas Teknologi Pertanian. Unand. Padang.
- Marxen K, Vanseelow KH, Luppemeier S, Hintza R. 2007. *Determination of DPPH Radical Oxidation Caused by Methanolic Extraxts of Some Microalgal Species by Linear Regression Analysis of Spectrophotometric Measuremens Sensors*. 7(10) : 2080-2095.
- Muchtadi, D. 2008 . *PetunjukLaboratoriumEvaluasi Nilai Gizi Pangan*. DepdikbudPAU Pangan dan Gizi. InstitutPertanian Bogor.
- Prasetya, E.G. 2013. RasioJumlahDaging dan KulitBuah pada Pembuatan Selai BuahNaga Merah (*Hylocereuspolyrhizus*) Ditambah Rosela (*Hibiscus sabdariffa L.*) dan Kayu Manis (*Cinnamomum Sp.*).Teknologi Hasil Pertanian. Universitas Jember, Jember.
- Raudhatul A. Heru P.W., Syarifah R. (2017). PemanfaatanLimbahKulitBuah Naga (*Hylocereuscostaricensis*) dalamPembuatanTeh Herbal denganPenambahan Jahe. *JurnalIlmiahMahasiswaPertanianUnsyiah*.
- Standar Nasional Indonesia. 2008. SNI 3746 : 2008. Syarat Mutu Selai Buah. Badan Standarisasi Nasional. Jakarta.
- Winarno, F.G. 2004. *Kimia Pangan dan Gizi*. PT Gramedia Pustaka Utama. Jakarta.
- Winarsi, H. 2002. *Antioksidan Alami dan Radikal Bebas*. Kanisius. B. Yogyakarta.
- Wulandari, W.Y. 2013. Pengaruh Suhu Pemanasan dan Ukuran Mesh dalam Ekstraksi Senyawa Antosianin Kelopak Bunga Rosella (*Hibiscus sabdariffa L.*).. Surakarta: Jurusan Teknologi Pengolahan Hasil Pertanian. Solo.
- Yuliza, F. Y., 2012. Identifikasi Betasianin Dan Uji Antioksidan Dari Ekstrak Daun Bayam Merah (*Amaranthus Tricolor, L*) Serta Aplikasinya Sebagai Zat Warna. Teknologi Pertanian. Universitas Andalas. Padang.