**INFLUENCE OF MALTODEKSTRINE ADDITION TO PHYSICAL CHEMISTRY CHARACTERISTICS EXTRACT ANTOSIANIN PIGMEN THROUGH THE BUTTERFLY PEA FLOWER (Clitoria Ternatea L) AS A NATURAL DYES POWDER**

**PENGARUH PENAMBAHAN MALTODEKSTRIN TERHADAP KARAKTERISTIK FISIK KIMIA EKSTRAK PIGMEN ANTOSIANIN MELALUI BUNGA TELANG (Clitoria Ternatea L) SEBAGAI POWDER PEWARNA ALAMI**

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 ***ABSTRACT***

*The purpose of this study was to obtain maltodextrin with proper concentration in anthocyanin extract of flower of the telang to produce natural dye powder with the best physical and chemical characteristics. The method used was Experimental Method using Randomized Block Design ). The experiments consisted of four treatments and each was repeated three times. The anthocyanin pigment powder of the flower bed with various additional treatments of the maltodextrin concentration had an effect on the water content, and yield, and had no significant effect on the total anthocyanin, solubility, and pH. The addition of maltodextrin concentration of 10% yielded the best characteristic with total antosianin 46,49 mg / L, water content 2,1, pH 3.01, and rendemen 50.71%. The results of the research on various parameters show. The anthocyanine pigment of the flower of the egg with the addition of maltodextrin concentration is processed as a natural dye powder for food and beverage.*

***Keywords****: Butterfly pea flower, maltodextrin, anthocyanin*

***ABSTRAK***

*Tujuan dari penelitian ini adalah untuk mendapatkan maltodekstrin dengan konsentrasi yang tepat dalam ekstrak antosianin bunga telang untuk menghasilkan serbuk pewarna alami dengan karakteristik fisik dan kimia terbaik. Metode yang digunakan adalah Metode Eksperimen dengan Rancangan Acak Kelompok (RAK). Percobaan terdiri dari empat perlakuan dan masing-masing diulang sebanyak tiga kali. Serbuk pigmen antosianin bunga Telang dengan berbagai perlakuan tambahan konsentrasi maltodekstrin berpengaruh terhadap kadar air, dan rendemen, serta tidak berpengaruh nyata terhadap total antosianin, kelarutan, dan pH. Penabahan konsentrasi maltodekstrin 10% menghasilkan karakteristik terbaik dengan total antosianin 46,49 mg/L, kadar air 2,13%, dan rendemen 50,71%. Hasil penelitian menunjukkan berbagai parameter. Pigmen antosianin bunga telor dengan penambahan konsentrasi maltodekstrin diolah menjadi bubuk pewarna alami makanan dan minuman.*

*Kata kunci: Bunga telang, maltodekstrin, antosianin*

**PENDAHULUAN**

Butterfly Pea flower (*Clitoria ternatea L.)* is a plant originating from central South America and has spread throughout the tropics, especially Southeast Asia including Indonesia. The cultivated butterfly pea flower of a nest originating from aceh, and harvested after 3 months of age Native flowering plants can grow in open places such as forests, shrubs, rivers, grows in trees and fences and include the most important and largest legume trees (leguminous) so widely cultivated (Dalimartha, 2008).

The easy-to-grow and safe-to-eat nature butterfly pea flowermakes it potentially huge to be utilized. The result of flower extraction can be used as an alternative to natural dye preparation for food and beverage. The blue color in the flower of the telang signifies the existence of plant pigments, namely anthocyanin. According to Winarno and Lakshmi (1986), the colors of anthocyanin pigments are red, blue, and violet which are usually found in flowers, fruits, and vegetables. Antosianin is a class of flavonoid compounds and the largest natural pigment group in plants. According to Vankar and Srivastava (2010), the anthocyanin content in fresh-flowered flowers is 227.42 mg / kg of flower. In addition to giving color to plants, other benefits of anthocyanin are as a source of antioxidants..

The process of dye extraction must use a method appropriate to the nature of the material (pigment source) to produce high yield and pigment stability. The method used to extract the anthocyanin pigment from the flower of the shaft is the extraction by the maceration method. Extraction butterfly pea flowercan be done by using a solvent which corresponds to the polarity of the substance to be extracted. The flower anthocyanin pigment is extracted using aquadest solvent and tartaric acid. The solvent serves to dissolve the pigment and determine the quality of the anthocyanin extraction results (Moulana et al., 2012).

The dye preparation resulting from the liquid concentrate extraction process has the disadvantage of short shelf life of extract (Tama et al., 2014). Natural pigments such as anthocyanins have some disadvantages that are unstable when left too long and are influenced by external factors such as temperature, pH, and light. Based on the above, it is necessary to do research on the preparation of powder dye from antosianin extract of flower of telang. Excess dyes in powder form include low water content, longer shelf life, practical use, and easy handling, transportation, and storage (Gonnissen et al., 2008).

The process of preparation of an anthocyanin dye powder can be carried out by using the encapsulation method of a suitable combination of coating and dryers. Drying of materials containing useful components such as anthocyanins requires coating materials. The coating material is used to provide protection to the core material and maintain the color pigment of physical and chemical factors (Ernawati, 2010). The coating process of a material with a coating material is called encapsulation.

Maltodextrin is one of the starch derivatives produced from partial hydrolysis process by an α-amylase enzyme having Dextrose Equivalent (DE) value less than 20. Maltodextrin is effectively used as an anthocyanin pigment coating agent because it has higher solubility, lower hygroscopicity, strong binding strength , capable of forming films, assisting the dispersion process, and inhibiting crystallization. According to Sadeghi et al. (2008), maltodextrin is cheaper than other major edible hydrocolloids.

**RESEARCH METHODS**

**Materials and Research Tools**

 The ingredients used in the preparation of dye powder are the flower petal (Clitoria ternatea L.) obtained from Genus.O Bekasi. Additional ingredients used were aquadest, 5% tartaric acid, and maltodextrin DE 10-12, while the materials used for analysis were potassium chloride (KCl), hydrochloric acid (HCl), sodium acetate, sodium chloride, methanol, buffer solutions pH 4, and buffer solution pH 7.

The tools used in this research are rotary evaporator, vacuum oven, CM-5 spectrophotometer, pH meter, UV-Vis spectrophotometer, vacuum filter, aluminum plate, porcelain cup, measuring cup, chemical glass, analytical balance, grinder, silicon , test tube, measuring teapot, magnetic stirrer bar, spatula spoon, measuring flask, cup, cuvette, desiccator, plastic packaging, filter paper, volume pipette and ballet.

**Research methods**

The research method used is Experimental Method (Experimental Method) by using Randomized Block Design (RAK). The experiment consisted of four treatments and each was repeated three times.

The research consisted of two stages, namely Preliminary Research and Main Research.

**Preliminary Research**

A preliminary trial was conducted to establish treatments to be used in the main study. A preliminary experiment was conducted to determine the type of flower material (fresh or dried) used by measuring the absorbance of the extracted anthocyanin using a spectrophotometerUV-Vis.

**Main Research**

The main implementation of the preparation of anthocyanin dye powder with the treatment has been determined based on the implementation of preliminary experiments, namely the addition of maltodextrin as much as 10%, 20%, 30%, and 40% (w / v). The process of preparation of powder dye of telang flower using Budiarti method (2013) which modified.

Modifications are made to raw materials and drying process. Research Budiarti (2013) using rosella flowers as the main raw material, while in this study the raw material used is the flower of the telang. The process of drying the original product using a spray dryer is then modified using a vacuum oven. Stages of preparation of dye preparations are detailed are presented as follows:

1. Material Preparation

The raw materials used are dried flower petals. Dry dried flowers are obtained by drying fresh flowered telang using an electric oven at 60ºC for 5 hours. After that, weighing on the sample used.

1. Extraction (Maseration Method)

The extraction was performed using a liquid-solid method of maseration for 24 hours at ± 25 ° C in a dark room. After weighing, the flower of the tele is soaked in acidified aquades using 5% tartaric acid to pH to 2. Comparison of the material and solvent is 1: 8 (w / v).

1. Vacuum Filtration

 The obtained solution is then filtered with a filter vacuum that has been dialed using a filter cloth to avoid any dregs or solids in the anthocyanin extract of the flower of the telang.

1. Approach

The flower extract concentration of the teles was carried out with a vacuum rotary evaporator at 40 ° C and 25 inHg for 2 hours.

1. The addition of Maltodextrin

The anthocyanin flower extract was added by maltodextrin according to the treatment of 10%, 20%, 30% and 40% (w / v) of the concentrating extract and then stirred until completely mixed using a magnetic stirrer.

1. Drying

Drying of anthocyanin flower extract is done by using a vacuum oven at 40 ° C ± 2 ° C, vacuum pressure of 25 inHg, for ± 16 hours until all the ingredients are completely dry.

1. Size Measurement

Size reduction is done by using the grinder.

1. Sifting

The powder is sieved with an 80 mesh sieve so it has a uniform size.

1. Packaging and Sample Storage before Characteristic Testing

Dye powder flower preparations packed in metalize plastic with the addition of food grade absorber into the packaging which is then carried out the closing of the packaging with the sealer. The package is stored in a sealed container with storage in a dry place and room temperature.

**RESULTS AND DISCUSSION**

**Determination of the type of flower materials used telang. Types of materials used are fresh dried flowers and dried dried flowers.**

Objective: Determine the type of material that has the most anthocyanin pigment.

Implementation: The flower of the nest is extracted by addition of aquadest solvent and 5% tartaric acid for maceration (immersion) for 24 hours. The crude extracts obtained were then filtered using vacuum filtration to obtain the flower extract of the telang. Furthermore, the flower flower extract was concentrated by using a rotatory evaporator until a 50% extract of the original volume was obtained. The concentration process is carried out at 40oC. The extract of concentrated pigment obtained then calculated total anthocyanin extracted from the material by measuring the absorbance using spectrophotometer.

Result: Quantitatively, the type of flower of the fresh and dried eagle which each has been extracted has total anthocyanin as described in the following Table.

Table Observation Results Observation Absorbansi Type of Material of butterfly pea

 Total Anthocyanins

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sample** | **λ 510 nm** | **λ 700 nm** | **Absorbansi** | **Total Antocyanin****(mg/L)** | **Average** |
| **pH****1** | **pH****4,5** | **pH 1** | **pH****4,5** |
| Flower Fresh | 0.42 | 0.30 | 0.002 | 0.005 | 0.120 | 49.097 | 48,888 |
| 0.37 | 0.25 | 0.006 | 0.006 | 0.119 | 49.679 |
| Flower Dry | 0.34 | 0.18 | 0.003 | 0.001 | 0.156 | 53.126 | 52,567 |
| 0.33 | 0.21 | 0.001 | 0.004 | 0.115 | 52.009 |

Based on the results of the total anthocyanin test of dried flowers was chosen because it has a total antosian greater than fresh flowers.

**Total Anthocyanins**

Treatment of the addition of various concentrations of maltodextrin did not give a significant effect on the total anthocyanin powder of anthocyanine pigment produced by the resulting flower. The results of the total anthocyanin analysis of the anthocyanine pigment powder of the telang flower can be seen in Table 6.

Table 6. Influence of Addition of Maltodextrin Concentration to Total Anthocyanin (mg / L) Powder Pigment Antosianin Butterfly pea flower.

|  |  |
| --- | --- |
| **Treatment** | **Total Antocyanin (mg/L)** |
| A : Maltodextrin 10% (b/v) |  46.49 a |
| B : Maltodextrin 20% (b/v) | 42.93 a |
| C : Maltodextrin 30% (b/v) | 38.75 a |
| D : Maltodextrin 40% (b/v) | 34.91 a |

Description: Mean treatment marked with the same letter is not significantly different according to Duncan Test at 5% level

Graphic 1. Anthocyanin Total

Based on the results of statistical analysis in the appendix it shows that there is no real effect on the antosianin powder parameters of anthocyanine pigment powder. This suggests that the addition of 10% -40% maltodextrin does not affect the total anthocyanin obtained from the anthocyanine pigment powder of the flower of the telang. The total anthocyanin powder of anthocyanine pigment of the resulting flower ranged from 34.91% - 46.49%.

The results showed that the range of different 10% maltodextrin concentration did not affect the total anthocyanin yield of anthocyanine pigment powder of the telang flower. This is because the filler added to the anthocyanin extract serves to accelerate the drying process and does not affect anthocyanin levels (Haryanto, 2016). According to Yuliana et al. (2014), the addition of maltodextrin to the anthocyanin extract of the flower of the shell may increase the total of the dried solids thus possibly reducing the anthocyanin content in the material.

The heat from the drying process also affects the total anthocyanins contained in the pigment powder. According to Ernawati (2010), maltodextrin has a lower heat resistance so that in a small amount can not protect the pigment antosianin with a maximum. This causes the anthocyanin pigment to degrade. In addition to heat, the pH value can affect the anthocyanin levels contained in the pigment powder. According to Sholikin et al. (2012) in the manufacture of red dadap flower extract showed the results of research where low levels of anthocyanin caused by high pH value. This statement is supported by Jackman and Smith (1996) who stated that factors affecting anthocyanin stability include anthocyanin structure, pH, temperature, light, and ascorbic acid.

**Water content**

The treatment of the addition of maltodextrin concentration gave a significantly different effect on water content of anthocyanine pigment powder of the resulting flower of telang. The results of the analysis of water content of anthocyanine pigment powder of flower can be seen in Table 10.

Table 10. Effect of Addition of Maltodextrin Concentration to Water Content (%) Powder Pigment Antosianin Butterfly pea flower.

|  |  |
| --- | --- |
| **Treatment** | **Water content (%b.k)** |
| A : Maltodextrin 10% (b/v) | 2.24 c |
| B : Maltodextrin 20% (b/v) | 2.13 bc |
| C : Maltodextrin 30% (b/v) | 2.02 b |
| D : Maltodextrin 40% (b/v) | 1.49 a |

Description: Mean treatment marked with the same letter is not significantly different according to Duncan Test at 5% level.

 Graphic 2. Water Content

The result of statistical test with Duncan test at 5% indicated that the powder pigment antosianin flower of the telang with various treatment of addition of maltodextrin concentration give a real influence to water content. Water content of anthocyanine pigment powder flower with treatment of addition of maltodextrin concentration of 40% gave a significant different effect on treatment of addition of maltodekstrin other concentration.

Average results indicate that treatment of 40% addition of maltodextrin resulted in lower moisture content compared with treatment of maltodextrin addition of 30%, 20%, and 10%. It shows that the addition of maltodextrin concentration can decrease the water content of anthocyanine pigment powder of telang flower. This result is consistent with the research of Fiana et al. (2016) on the manufacture of instant drinks from kombucha tea where the resulting water content ranged from 6.21% -6.60% in addition of 5% -20% maltodextrin concentration.

The results showed that water content of anthocyanine pigment powder flower ranged between 1.49% - 2.24%. Properties of anthocyanin powder flower of the expected flower of the native dye is a powder of anthocyanin pigment of flower of the egg with low moisture content. The percentage of water content of the research results with the addition of 10% -40% concentration of maltodextrin is in accordance with the standard powder beverage product which has a maximum water content limit of 3% based on SNI 01-4320-1996.

 Water content is one of the important parameters for powder-shaped products because it will affect the stability and storage of products. The dye anthocyanin dye preparations in powder form are hygroscopic (so easy to absorb water) that the storage should be in a container that has low permeability and in tight packaging. The absorption of water vapor by the powder product may increase the water content and cause the agglomeration of the product. According to Buckle et al. (1987), the product in the form of its moisture content should be reduced to below 5%.

This is because if the powder product has a high water content will be more susceptible to damage due to the growth of bacteria and fungi. Water content of anthocyanine pigment powder flower ranges between 1.49% -2.24% so it can be said that the encapsulation process with 10% -40% maltodextrin coating can extend the shelf life of the product compared to the anthocyanine pigment of flower in the form of an extract.

Based on the statistical analysis, it shows that there is no significant effect on the hygroscopicity level of anthocyanine pigment powder of telang flower. This suggests that the addition of maltodextrin does not affect the degree of hygroscopicity obtained from the anthocyanine pigment powder of the flower of the telang. Hygroscopicity rate of anthocyanine pigment powder of flower of the telang is ranged between 5.56% -7.42%.

The results showed that the range of different 10% maltodextrin concentration did not affect the hygroscopicity level of anthocyanin pigment powder of the telang flower. According to Costa et al. (2014), this is because maltodextrin has a low hygroscopicity that affects the affinity between water and other compounds in the product. The statement is also supported by Hui (1992) in which the properties of maltodextrin, among others, can be dispersed quickly, have high solubility, and have low hygroscopic properties.

The degree of hygroscopicity is the ability of the material to absorb water vapor from the surrounding environment until the material is no longer able to absorb water. According to the classification issued by the GEA Niro Research Laboratory (2005), materials with a hygroscopic <10% hygroscopic degree, 10.1% -15% are slightly hygroscopic, 15.1% -20% hygroscopic, 20.1% - 25% are highly hygroscopic, and> 25% are highly hygroscopic. The hygroscopicity rate of anthocyanin pigment powder is included in non hygroscopic products because it has hygroscopic values ​​<10% ranging from 7.20% to 8.50%.

**Solubility**

The addition of maltodextrin concentration did not significantly affect the solubility of anthocyanine pigment powder. The results of the solubility analysis of anthocyanine pigment powder of telang flower can be seen in Table 12.

Table 12. Effect of Addition of Maltodextrin Concentration to Solubility (%) Powder Pigment Antosianin Butterfly pea flower.

|  |  |
| --- | --- |
| **Treatment** | **Solulibility (%)** |
| A : Maltodekstrin 10% (b/v) | 86.78 a |
| B : Maltodekstrin 20% (b/v) | 89.26 a |
| C : Maltodekstrin 30% (b/v) | 90.56 a |
| D : Maltodekstrin 40% (b/v) | 91.23 a |

Description: Mean treatment marked with the same letter is not significantly different according to Duncan Test at 5% level.

 Graphic 3. Solulibility

The result of statistical test with Duncan test at 5% indicated that various treatment of maltodextrin concentration did not give significant effect to solubility of antocyanine pigment powder. This suggests that the addition of maltodextrin does not affect the solubility resulting from the anthocyanine pigment powder of the flower of the telang. The solubility value of powder of anthocyanin pigment of flower of telang is about 98,83% -99,30%.

The results showed that the range of 5% difference of maltodextrin concentration did not affect the solubility of anthocyanin pigment powder of telang flower. According to Retnaningsih and Dance (2014), maltodextrin is an oligosaccharide composed of several glucose molecules attached to hydrogen bonds that are highly soluble in water and rapidly dispersed. The hydroxyl group on maltodextrin causes a high degree of solubility of a powder product.

The solubility value of the anthocyanin pigment powder butterfly pea floweris also influenced by its water content. According to Retnaningsih and Dance (2014), a high-moisture powder product will readily form clumps that cause the breakdown of bonds between particles to last longer so that the solubility of the product will be lower.

Solubility is the maximum ability of a solute to be soluble in a particular solvent to form a homogeneous solution. A high degree of solubility is a desirable feature of a powdered product. According to Chen (2008) cited Cindy (2015), good powder solubility value of 92-99%.

The powder pigment antosianin flower of the telang can be said to have a good solubility value ranges from 98.83% to 99.30%. The higher solubility value indicates that the quality of powdered product is better because it will facilitate its use.

**Solubility Time**

The treatment of addition of maltodextrin concentration had significant effect on the solubility time of anthocyanine pigment powder of the resulting flower of telang. The results of the analysis of the soluble time of anthocyanine pigment powder of flower can be seen in Table 13.

Table 13. Effect of Addition of Maltodextrin Concentration on Time Solution (s) Powder Pigment Antosianin Butterfly pea flower.

|  |  |
| --- | --- |
| **Treatment** | **Solubility time (s)** |
| A : Maltodextrin 10% (b/v) | 187 b |
| B : Maltodextrin 20% (b/v) | 156 b |
| C : Maltodextrin 30% (b/v) | 142 ab |
| D : Maltodextrin 40% (b/v) | 132 a |

Description: Mean treatment marked with the same letter is not significantly different according to Duncan Test at 5% level.

 Graphic 4. Solulibility Time

Duncan test results showed that the powder of anthocyanin pigment butterfly pea flower with various application of addition of maltodextrin concentration gave a real effect on the soluble time. The soluble time of anthocyanin pigment powder of the flower of the nest with treatment of maltodextrin concentration of 10%, 20%, and 30% did not give any significant effect. However, the addition of maltodextrin as much as 10% again in the treatment of 40% maltodextrin concentration gives a real different effect.

The statistical analysis showed that the addition of maltodextrin 40% showed faster soluble time compared with treatment of maltodextrin addition of 30%, 20%, and 10%. This shows that the addition of maltodextrin concentration can decrease the solubility time of anthocyanine pigment powder of telang flower. This is in line with A-sun et al's study. (2016) where the addition of 30% concentration of maltodextrin resulted in a lower soluble time of coconut sugar powder than the addition of maltodextrin concentration of 10%.

Matodextrin is a filler with a high solubility value. The increased solubility rate is due to the higher surface area in the powdered product so that the particles on the pigment powder that are in contact with water will be more. An increase in surface area of ​​pigmented powder causes the powder to wet more quickly and dissolve completely (Hui, 1992).

The results showed that the soluble time of anthocyanin pigment powder butterfly pea flower ranged between 132-187 seconds. Properties of anthocyanin pigment flower of expected flower that is that have fast dissolve time. Rapid soluble time indicates that the quality of the resulting powder product is better because it will facilitate the application in food.

**PH**

The addition of maltodextrin concentration did not significantly affect pH value of anthocyanine pigment powder. The result of pH analysis of anthocyanine pigment powder of butterfly pea flower can be seen in Table 14.

Table 14. Effect of Addition of Maltodextrin Concentration to pH Powder of Anthocyanin Pigment Flower of the Cross.

|  |  |
| --- | --- |
| **Treatment** |  **pH** |
| A : Maltodextrin 10% (b/v) | 3.01 a |
| B : Maltodextrin 20% (b/v) | 3.04 a |
| C : Maltodextrin 30% (b/v) | 3.08 a |
| D : Maltodextrin 40% (b/v) | 3.10 a |

Description: Mean treatment marked with the same letter is not significantly different according to Duncan Test at 5% level.

Based on the results of statistical analysis, showed that there is no significant effect on pH value parameter of anthocyanine pigment powder. This suggests that the addition of maltodextrin does not affect the pH value of the anthocyanine pigment powder of the flower of the telang. The pH value of the anthocyanine pigment powder of the resulting flower is ranged from 3.04-3.11.

 Graphic 5. PH

The results showed that the range of 5% difference of maltodextrin concentration did not affect pH value of anthocyanin pigment powder of telang flower. The use of raw materials with uniform characteristics and drying process with the same time cause the pH value of pine anthocyanin pigment of flower between treatments is not significantly different.

The pH value is influenced by the acid content contained in the anthocyanin pigment powder. The acid used during the maceration process of tomato flower extract is tartaric acid with concentration of 5%. According to Retnaningsih and Dance (2014), high pH values ​​are due to the presence of oligosaccharide compounds in maltodextrin capable of neutralizing the acid properties of pigmented pigments because they contain high hydroxyl (OH) groups.

According to Jackman and Smith (1996), the intensity of anthocyanin color will be stable at low pH ie 2-3. Antosianin has a form of flavilium cation which is the most stable and colored form at low pH. The pH value in this study ranged from 3.04-3.11, which means still in accordance with the pH range to maintain the stability of anthocyanin pigments. Stable anthocyanin pigments at low pH can be applied to acidic products, such as soft drinks, sweets, sauces, pikel, canned food or beverages (Fennema, 1996).

**Powder Dyes Total**

Treatment of addition of maltodextrin concentration significantly affect the yield of anthocyanine pigment powder of butterfly pea flower. The results of the analysis of powder yield of anthocyanine pigment flower of telang can be seen in Table 15.

Table 15. Effect of Addition of Maltodextrin Concentration on Rendement (%) Powder Pigment Antosianin Butterfly pea flower.

|  |  |
| --- | --- |
| **Treatment** | **Powder dyes total (%)** |
| A : Maltodextrin 10% (b/v) |  49.51 c |
| B : Maltodxstrin 20% (b/v) |  51.52 b |
| C : Maltodextrin 30% (b/v) |  56.67 ab |
| D : Maltodextrin 40% (b/v) |  60.13 a |

Description: Mean treatment marked with the same letter is not significantly different according to Duncan Test at 5% level.

 Graphic 6. Powder dyes total

The result of statistical test with Duncan test at 5% indicated that the powder pigment antosianin butterfly pea with various treatment of addition of maltodextrin concentration gave a real effect to yield. The yield value of powdered anthocyanin pigment powder with treatment of addition of maltodextrin of 40% concentration did not give significant effect on treatment of addition of maltodextrin of 30% concentration and treatment of addition of maltodextrin 20% concentration did not give significant effect on treatment of addition of maltodextrin concentration of 30%.

The result of statistic analysis showed that the addition of maltodextrin concentration of 40% resulted in higher yield compared with treatment of 10%, 20%, and 30% maltodextrin concentration. This shows that the addition of maltodextrin treatment can increase the yield value. This is in line with the Muqoddas (2016) study where the addition of maltodextrin concentration of 30% to the banana python antokianin pigment powder produces a higher yield when compared with the addition of maltdoekstrin concentration of 10%.

The yield content of the anthocyanin pigment powder showed that the results tended to increase along with the increase of the addition of maltodextrin concentration. According to Masters (1979) quoted Warsiki (1993), the increase in the value of rendement due to the addition of maltodextrin can increase the total solids of the dried material. Maltodextrin is a sweet, white-shaped sugar with water-soluble properties, capable of protecting the capsules from oxidation, increasing the yield, has a relatively low viscosity, and has an affordable price (Sansone et al., 2011).

**Buttterfly Pea Flower + Aquades**

The results of analysis of anthocyanin values ​​on the powder pigment anthocyanin flower of the telang with the addition of maltodextrin 10% and 20% can be seen in Table 16.

Table 16. Buttterfly Pea Flower + Aquadest

|  |  |
| --- | --- |
| **Treatment** | **Antosianin (mg/L)** |
| A : Maltodekstrin 10% (b/v) | 26.42  |
| B : Maltodekstrin 20% (b/v) | 21.76  |



**Butterfly pea with acid Butterfly pea non acid**

**CONCLUSIONS AND SUGGESTION**

**Conclusion**

 The powder of anthocyanin pigment pigment with various treatment of addition of maltodextrin concentration give influence to water content, soluble time, and yield, but no significant effect to total anthocyanin, hygroscopicity, solubility, and pH value.

 The treatment of 10% addition of maltodextrin concentration yielded the best characteristic with total anthocyanin 50.49 mg / L, water content 2.33%, hygroscopicity 8.50%, 98.83% solubility, 228 seconds soluble time, pH 3.04, and 52.71%.

 The results of the various parameters showed that the powder of anthocyanin pigment powder with treatment of addition of maltodextrin concentration was potentially applied as a natural dye powder for food and beverage.

**Suggestion**

Suggestion for this research is necessary to determine the shelf life of anthocyanin pigment powder of butterfly pea flower with The application and stability of anthocyanin pigment powder of the flower of the egg to the foodstuffs to determine the dosage of proper dye powder applied to the foodstuff and the total threshold of anthocyanin and color that can still be accepted as food coloring. It is also necessary to do different methods of extraction and drying on anthocyanin characteristics powder produced.

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