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DEVELOPMENT OF FAST DISINTERGRATING TABLET (FDT) LEAF EXTRACT *Graptophyllum pictum* L. Griff WITH VARIATION OF *Ac-Di-Sol* CONCENTRATION AND SWEET TYPE

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ABSTRACT

Graptophyllum pictum L. Griff have traditionally been used for generations and a lot of research has been done to develop these plants. This plant contains nutritious chemical compounds such as alkaloids, flavonoids, saponins, tannins, triterpenoids, steroids, and glycosides. Fast Disintegrating Tablet (FDT) is a tablet that is easy to use without the need to use drinking water. FDT is designed to be destroyed quickly without chewing and without the aid of water for no more than 3 minutes (Bhowmik et al., 2009). This study aims to determine the type of sweetener favored by panelists with a concentration of Ac-Di-Sol 3%. Sweeteners for Formula 1 (sucralose) and formula 2 (aspartame). Tablet quality parameters include organoleptic, uniformity of weight, uniformity of size, hardness, friability, time of in vitro dispersion, hedonic test, and determination of flavonoid levels of *Graptophyllum pictum* extract and the best formulation of tablet formulas. The results of tablet quality testing on each formula showed a grayish black tablet, flat round shape with a flat bottom surface and top surface had a diameter, aromatic distinctive odor, had a sweet taste at the beginning of contact with saliva but in a long time gave bitter taste on the tongue. Tablet quality evaluations for all formulas meet the requirements of Pharmacopoeia III and IV. The results of this study indicate that formula 1 is the best formula for extracting *Graptophyllum pictum* extract with sweetener sucralose.

KEYWORDS: Purple plants, FDT, sucralose, aspartame.

INTRODUCTION

Analgesics are the body's positive response to stimuli that have the potential to damage tissue (Madya S, 2009). Ethanol extract of *Graptophyllum pictum* is effective as an analgesic through thermic pain induction with a dose of 100 mg / kg body weight and 200 mg / kg body weight (Madya S, 2009). According to research Mustikawati (2002) *Graptophyllum pictum* extract has the ability as an anti-inflammatory and also as an analgesic in mice. Based on Dwiputri's research (2019), *Graptophyllum pictum* extract extracted by maceration method using 96% ethanol solvent results in a dose that gives an analgesic effect of 4 mg / 20g BW of mice.

Fast Disintegrating Tablet (FDT) is a tablet that is easy to use without the need to use drinking water. FDT is designed to be destroyed quickly without chewing and without the aid of water for no more than 3 minutes (Bhowmik et al., 2009).

Superdisintegran that will be used in this study is Accelerate Disolution (Ac-Di-Sol). Ac-Di-Sol is often used in oral dosage formulations that function as superdisintegrants for capsules, tablets and granules. The addition of superdisintegran concentration will affect the physical properties of tablets, ie the higher superdisintegran concentration will increase the disintegration time and wettest time of the tablet (R. Martin and Hidayat W.U, 2017).

Sweeteners that are often used in FDT preparations are sucralose and aspartame. Sucralose is a crystal-shaped compound, white, odorless, easily soluble in water and alcohol. Sucralose has a relative sweetness level of 600 times the sweetness level of sucrose with no caloric value. Aspartame is a sweetener that has 200 times the sweetness level of sucrose which is a methyl ester from L-aspartyl-L-phenylalanine produced from amino acids, aspartic acid, and essential amino acids phenylalanine which is widely used as a non-nutritive sweetener (Fitriana, 2013).

METHODS

The tools used in this study include digital scales (AND®), analytical scales, glass beakers, mortars, mortars, sieves (Retsch GmbH & Co., Germany), calipers (Vernier Caliper, China), bulk- 245-2E tapped density tester (Pharmeq, Indonesia), AR400 tablet

printing machine (Erweka, Germany), TBH 28 Hardness Tester (Erweka, Germany), Friability Tester 28 (Erweka, Germany), and other glassware.

The materials used in this study include *Graptophyllum pictum*, 96% Ethanol (Brataco), Ac-Di-Sol (Meprofarm), Manitol (Meprofarm), Avicel, Aspartame, Aerosil, Sucralose, Talk and Magnesium stearate.

Simplisia Powder Manufacturing

Fresh *Graptophyllum pictum* (Graptophyllum pictum (L.) Griff) are cleaned from dirt and other foreign material that is still attached (wet sorting). Furthermore, washed with running water until clean, then drained to remove the remnants of washing water. Then dried using the oven with a temperature of 40oC - 50oC to dry. Furthermore, the leaves that have been dried brownish green are sorted dry and smoothed with a grinder to obtain a *Simplisia* powder.

The simplisia of Graptophyllum pictum powder is sifted using a sieve with mesh 40 then weighed to get the final weight of *Simplisia*, stored in a tightly closed container.

Testing the characteristics of *Graptophyllum pictum's* simplisia include organoleptic testing, water content, ash content, and yield calculation.

Extraction

The extract was made using maceration method. *Graptophyllum pictum's* simplisia powder was weighed as much as 3 kg for maceration using 96% ethanol with a ratio of 1:10. Simplisia powder is soaked for the first 6 hours while stirring occasionally, then allowed to stand for 18 hours. Then filtered and separated the filtrate and the residue. The first maceration residue was re-macerated with ethanol 96% with the same treatment. Then, the whole maceration filtrate is combined. The filtrate was vaccum dryer until a dry extract was obtained (DepKes RI, 2013).

Tablet Formulation and Manufacturing

A total of 4 formulas will be made with 225 mg *Graptophyllum pictum* extract and different concentrations of Ac-Di-Sol and sweetener types. Each formula is made as many as 350 tablets with a weight of 400 mg per tablet.

Table 1: FDT Formula of *Graptophyllum pictum* extract.

Substance	**Formula (mg)**			
	1	**2**	**3**	**4**
Graptophyllum pictum extract	225	225	225	225
Substance	Formula (%)			
	1	2	3	4
Avicel PH 102	25	25	25	25
Ac-Di-Sol	3	5	3	5
Sucralosa	2	2	-	-
Aspartame	-	-	2	2
Aerosil	1	1	1	1
Mg Stearat	1	1	1	1
Talk	2	2	2	2
Manitol 200 SD ad	100	100	100	100

The method of making tablets used is the direct pressing method with the composition of the formula listed in Table 2. All materials were sieved using mesh 30 and weighed using digital scales. Avicel added with dried extract of *Graptophyllum pictum* is stirred until evenly mixed, then added mannitol and Ac-Di-Sol is mixed until homogeneous. The mixture is sifted again with a mesh 30 sieve. Then magnesium stearate is added and the talk is mixed until it is homogeneous. Granules that have met the requirements are ready to be printed into tablets.

GRANULE EVALUATION

a. Water Content

Determination of water content is done by using the Moisture Balance tool by entering a 2 gram sample of granule in the punch. The granules are flattened to cover the surface of the punch and then closed and then set at a temperature of 105o C. Moisture content will appear on the screen automatically. The general water content requirements for granules are not more than 3% - 5% (Hadisoewigno and Fudholi, 2013).

b. Flowability

Tests are carried out using a Flowmeter by weighing the granules of each formula by 20 grams. Then the mass of the granule is placed in the funnel in a closed state. Opened the lid, allowed the granules to flow then recorded the flow time using a stopwatch (grams / sec). Testing is done duplo. Flow types based on flow power can be seen in Table 3. Calculation of granule flow power is carried out using the formula:

$$F = \frac{M}{T}$$

Note: F = Flow capacity of granules (g / sec)
M = mass of granule (g)
T = Time (seconds)

Table 2. Flow Types Based on Flow Power.

Value of Flow Power (F)	Note
>10	Free to Flow
4-10	Easy to Flow
1,6-4	Cohesive
<1,6	Very Cohesive

c. Compression Index and Hausner Ratio

Granule compressibility index is performed to determine the compressibility of granules in tablets by looking at the decrease in the number of granules due to pounding and vibration on the volumenometer. Tests carried out using a bulk tapped density tester. Weighed 20 grams of granule, put in a measuring cup and then measured in volume (V1). Bulk Specific Gravity = m / V1. Measuring cups containing granules are placed on a bulk tapped density tester. The tool is installed with a knock 20 times. The experiment was repeated duplo for 20 beats to ensure that the sample volume did not decrease, the volume was measured (V2). Compressible Specific Gravity = m / V2. Calculated% compressibility with the equation below with the% compressibility requirements in Table 4.

$$\% \text{ Compressibility} = \frac{\text{Bj Compressed} - \text{Bj Bulk}}{\text{Bj Compressed}} \text{ x } 100\%$$

$$\text{Hausner Ratio} = \frac{\text{Bj Compresssed}}{Bj\ Bulk}$$

The Hausner ratio with a value <1.25 is a good category while the hausner ratio with a value> 1.25 is included in the bad category (Bhowmik, et al., 2009).

QUALITY EVALUATION OF FAST DISINTEGRATING PURPLE LEAF TABLETS

a. Uniformity Test Weight

Tablets as many as 20 tablets are weighed the average weight of each tablet. According to the Pharmacopoeia the weight requirement of tablets is not more than 2 tablets that deviate is greater than column A and none of the tablets deviate from column B (Depkes RI, 1979).

Table 3. Terms of Deviation of the Weight of the Tablet.

Average Weight	Weights the average weight of tablets in %	
	A	B
25 mg or less	15%	30%
26 mg to 150 mg	10%	20%
151 mg to 300 mg	7,5%	15%
More than 500 mg	5%	10%

b. Size Uniformity Test

Tablets of 20 tablets were measured by thickness and diameter using calipers. In Pharmacopoeia Indonesia 3 stipulates that the size uniformity requirement is except if the diameter of the tablet is not more than 3 times and not less than 1 1/3 times the thickness of the tablet (DepKes RI, 1979).

c. Hardness Test

Hardness test is carried out by taking as many as 20 tablets, measured hardness using Hardness Tester. The results of pressure applied by the device when the tablet starts to break, are recorded. Terms of hardness of the tablet to break quickly 3-5 kg / cm2 or 3-5 kp.

d. Friability Test (Fragility Test)

The friability check is carried out on 20 tablets, then weighed (W1) and put into the friabilator tool. The parameter tested is the fragility of the tablet against friction or slamming for a certain time. The test was carried out at a speed of 25 rpm for 4 minutes. Next, the tablets are removed and cleaned from the loose fine powder that is released, then weighed again (W2) (Lachman, et al., 1986). The tablet's fragility requirements are less than 1%. Calculation of friability test:

$$f = \frac{W1 - W2}{W1}\ x\ 100\%$$

Note: F = Friability

W1 = Total weight of the tablet before the test

W2 = Total weight of the tablet after the test

e. Dispersion Time Test *in vitro*

A total of 10 ml of phosphate buffer 6.8 was put into the beaker glass. Then put the tablet into a petri dish carefully. Duplo done. Disintegration time of tablets is calculated using a stopwatch (Rawas-Qalaji, et al., 2016).

HEDONIC TEST

The hedonic test was carried out on 30 panelists. Panelists were asked to taste to assess the aroma, taste, and color of *Graptophyllum pictum* FDT tablet sample. The scale used is 1 to 5, that is very dislike (1), dislike (2), rather like (3), like (4), and very like (5). The panelists are expected to fill in the questionnaire papers that have been provided. The results of this hedonic test were analyzed using SPSS 22.

DETERMINATION OF EXTRACT FLAVONOID LEVELS AND *Graptophyllum pictum* TABLETS

a. Determination of Maximum Quercetin Wavelength (10 ppm)

As much as 1 ml of a standard solution of quercetin in methanol concentration of 100 ppm was put into a 10 ml volumetric flask, added 1 ml of 10% AlCl3, 1 ml of 1 M Na Acetate and 3 ml of distilled water. The solution was shaken homogeneously and then left for 30 minutes, the absorbance measured at a wavelength of 400-450 nm using a UV-Vis spectrophotometer (Chang et al., 2002).

b. Determination of Optimum Incubation Time (10 ppm)

As much as 1 ml of a standard solution of quercetin in methanol concentration of 100 ppm is put into a 50 ml volumetric flask, about 3 ml of distilled water is added, then 1 ml of 10% AlCl3 is added, 1 ml of 1 M Na Acetate and diluted with distilled water to the limit. Then, homogenized and incubated at room temperature. Absorption is measured at a maximum wavelength of 5, 10, 15, 20, 25, and 30 minutes to obtain a stable optimum time (Chang et al., 2002).

c. Quercetin Standard Curve Making

Quercetin standard series is made with a concentration of 2, 4, 6, 8, and 10 ppm. Quercetin standard solution 100 ppm pipette as much as 0.2; 0.4; 0.6; 0.8; 1 ml each was put into a 50 ml volumetric flask, then a solution was added 3 ml of distilled water, 1 ml of 10% AlCl3, and 1 ml of Na Acetate 1 M. The solution was shaken homogeneously and then left for optimum time and its absorbance measured at maximum wavelength (Chang et al., 2002). Absorbance measurements above, made a curve between the concentration of quercetin standard solution with the absorbance value obtained which will produce a linear regression equation (y = bx + a). this regression equation to calculate extract concentration (ppm) by entering the absorbance of extract as the value of y into the equation (Chang et al., 2002).

d. Determination of *Graptophyllum pictum* extract Flavonoid Content

A total of 100 mg of extract was put into a 50 ml volumetric flask and then added to the boundary methanol flask. The 10 ml pipette extract solution was put into a 50 ml volumetric flask plus 10 ml distilled water, 1 ml 10% AlCl 3, 1 ml Na Acetate 1 M. Then, the mixture was shaken homogeneously and then left for 15 minutes, then absorption was measured at the maximum wavelength. The resulting absorbance is entered into the regression equation of the quercetin standard curve. Then, total flavonoid levels are calculated using the formula:

Kadar =

$$\frac{C\ sampel\ (ppm) x\ volume\ (ml) x\ fp\ x\ 10-6}{\text{extract weight (g)} - (\text{extract weight } x\ \%water\ content)}$$

x 100%

e. Determination of*Graptophyllum pictum* Flavonoid Tablets

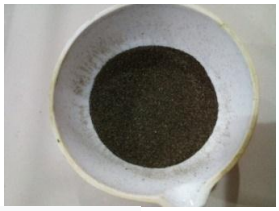
A total of 20 tablets were weighed on average and then crushed until smooth then the powder was weighed equivalent to 100 mg of extract. After that, it is put into a 50 ml volumetric flask and dissolved with methanol up to the flask boundary line. The 20 ml pipetted extract solution was added with 1 ml of 10% AlCl3, 1 ml of 1 M Na Acetate, and 28 ml of distilled water. Shaken homogeneously then left for 15 minutes, then absorption is measured at the maximum wavelength. The resulting absorbance is entered into the regression equation of the quercetin standard curve. Then, total flavonoids are calculated using the formula:

Kadar (% b/b) =

$$\frac{Csampel\ (ppm) x\ volume\ (ml) x\ fp10-6}{\text{extract weight (g)} - (\text{extract weight } x\ \%water\ content)}$$ x 100%

RESULTS AND DISCUSSION

Fresh *Graptophyllum pictum* used were 19 kg, after the drying and sifting process was obtained as much as 3 kg. The yield of Simplisia was obtained 15.32%. Calculation of powder yield can be seen in Appendix 5. The results of testing the water content using the gravimetric method were obtained at 6.49%, fulfilling the requirements for not more than 10% (MOH RI, 2000). Ash content was obtained at 5.27%, qualifying because no more than 12% (DepKes RI, 1979).



Picture 1. Simplisia of *Graptophyllum pictum*.

Dried *Graptophyllum pictum* extract was obtained by maceration method using ethanol 96% solvent soaked for 24 hours. A total of 3 kg of *Graptophyllum pictum's* simplisia powder was extracted with 96% ethanol as much as 30 L, then the filtrate obtained was dried with a Vaccum Dryer. Dry extract obtained as much as ¬420.97 g with extract yield of 14.45%. Organoleptic test results on 96% ethanol extract of *Graptophyllum pictum* that are green, distinctive odor, and have a bitter taste The test results of the extract water content of 5.55%, qualify for not more than 10% (MOH RI, 2000). The results showed that the extract ash content was 4.8848%, fulfilling the requirements because it was no more than 12% (DepKes RI, 1979).

Picture 2. Dried *Graptophyllum pictum* extract.

GRANUL EVALUATION

Table 4. Granule Evaluation Results.

Granul Evaluation	Formula				Syarat	Keterangan
	1	2	3	4		
Water Content (%)	4,65±0,05	4,4±0,1	4,45±0,15	4,25±0,05	3-5%	Good
Flowability (menit detik)	4,20±0,45	5,41±0,09	4,31±1,39	5,70±1,48	4-10	Easy to Flow
Compressibility Index (%)	14,61±1,63	11,65±3,20	16,64±0,23	12,85±3,4	5-12% 12-18%	Well
Hausner Ratio	1,17±0,02	1,13±0,04	1,11±0,005	1,14±0,05	<1,25	Good

Water content testing is useful to determine the water content in the granules. The results of testing the water content of all the granules meet the requirements of less than 5%. The moisture content of formula 4 is smaller than the other three formulas. The difference in the concentration of Ac-di-sol has an influence on the content of water content, the higher the concentration of Ac-di-sol the smaller the water content. Ac-di-sol has moisture withdrawal properties (Rowe et al., 2003).

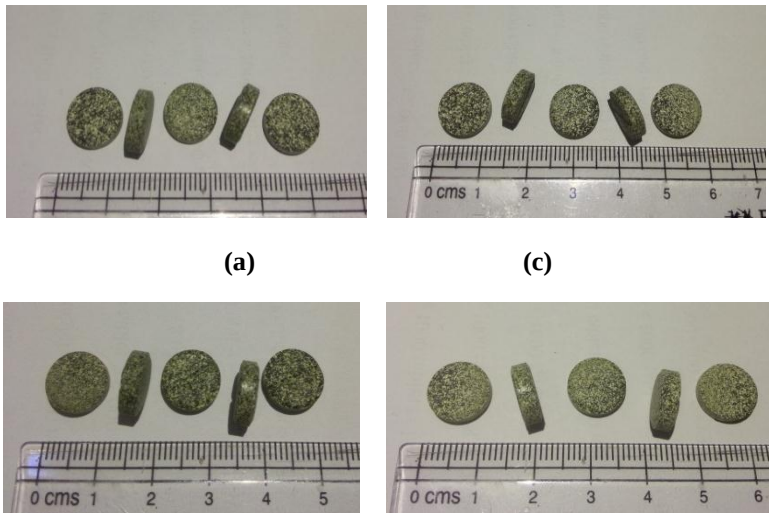
The flow rates of all formulas show good water rates. According to Aulton (1988), a good flow rate is 4-10. The good flow characteristic will make the filling die fulfilled evenly so that the uniformity of the weight of the tablet does not deviate (Lachman et al., 1986).

Compressibility index is the ability of granules to remain compact in the presence of pressure. Compressibility index results for all formulas show very good results. The smaller the compressibility value, the better the pressing ability of each tablet. Ac-di-sol has good compressibility and is able to absorb water vapor, which causes an increase in tablet moisture which will strengthen bonds between particles in the tablet (Setyawan D., et al., 2010). Hausner ratio is the powder density (porosity) expressed in percent, which is the ratio between volume and total volume of powder. The hausner ratio of all formulas is eligible because <1.25 so it has a good category (Bhowmik, et al., 2009).

QUALITY EVALUATION OF FAST DISINTEGRATING PURPLE LEAF TABLETS

a. Organoleptic

Organoleptic tests performed on all formulas include shape, odor, color, and taste. The resulting tablet is flat round with a flat bottom surface while the upper surface has a midline, has a distinctive aromatic odor, a grayish black color, and a slightly sweet bitter taste on the tongue.



(a) **(c)**

(b) **(d)**

Picture 3. Fast Disintegrating *Graptophyllum pictum* extract Tablet

(a) Formula 1 (Ac-Di-Sol 3%, Sucralose 2%)
(b) Formula 2 (Ac-Di-Sol 5%, Sucralose 2%)
(c) Formula 3 (Ac-Di-Sol 3%, Aspartame 2%)
(d) Formula 4 (Ac-Di-Sol 5%, Aspartame 2%)

b. Uniformity Test Weight

Table 5. Uniformity Weight Test Results

Uniformity of Weights	Formula 1 (g)	Formula 2 (g)	Formula 3 (g)	Formula 4 (g)
Average	0,4191±0,0044	0,4107±0,0066	0,4143±0,0051	0,4157±0,0076
Deviation 5%	0,3982 - 0,440	0,3902 – 0,4312	0,3936 – 0,435	0,3949 – 0,4365
Deviation 10%	0,3772 - 0,4610	0,3696 – 0,4518	0,3729 - 0,4557	0,3741 – 0,4573

The weight of each formula has a weight that qualifies because there are no tablet weights that deviate from the average weight greater than the price of column A (5%) and no tablet deviates from the average weight greater than the price of column B (10%) (RI Ministry of Health, 1979). The use of Ac-di-sol affects the uniformity of the weight of the tablet because Ac-di-sol has good flow properties so that the filling of the die can be fulfilled evenly (Lachman, et. Al, 1986).

c. Size Uniformity Test

Table 6. Results of Size Uniformity Testing.

Formula	Average Measurement (mm)		Condition (mm)	
	Diameter	Thick	1 1/3	3
1	11,005±0,057	3,377±0,038	4,5027	10,131
2	11,000±0,038	3,320±0,068	4,4267	9,960
3	10,861±0,116	3,356±0,113	4,4747	10,068
4	10,907±0,115	3,3245±0,078	4,4327	9,9735

The results of testing the uniformity of size in each formula are eligible because there are no tablets whose size is no more than 3 times the diameter of the tablet and not less than 1 1/3 of the thickness of the tablet (DepKes RI, 1979).

d. Hardness Test

Table 7. Hard Disintegrating Tablet Hardness Test Results.

Formula	Average Hardness (Kp)	Range (Kp)
1	2,80±0,35	2,2 – 3,3
2	2,73±0,33	3,2 – 3,3
3	2,67±0,34	2,3 – 3,4
4	2,73±0,32	2,2 – 3,4

Requirements for good hardness of FDT tablets are in the range of 3-5 kg / cm2 (3-5 kp). FDT tablets are designed to break quickly so that the hardness is low enough so that the tablet can be destroyed in the oral cavity. (Panigrahi and Behera, 2010). Tablets that are too hard can prevent water penetration, so excipients need to act as filler binders that do not block water penetration. The use of Ac-di-sol affects the hardness of the tablet because the higher the concentration of Ac-di-sol, the hardness of the tablet will decrease (Bestari, 2016).

e. Friability Test (Fragility Test)

Table 8. Friability Test Results (Fragility Test).

Formula	F (%)
1	0%
2	0%
3	0%
4	0%

The results of the friability testing in each formula meet the requirements because the good friability requirements is <1%. The concentration of Ac-di-sol affects the fragility because the higher concentration of Ac-di-sol used can increase the hardness of the tablet so that the fragility is smaller. (Setyawan D., et al 2010).

f. Time of Dispersion *in vitro*

Table 9. Results of Dispersion Time *in vitro.*

Formula	Average of Dispersio Time in vitro (minute second)
1	7 minutes 39 seconds
2	2 minutes 17 seconds
3	8 minutes 23 seconds
4	2 minutes 19 seconds

In vitro dispersion time test results are needed for the tablet formula to be dispersed in liquid. Formula 2 and formula 4 with Ac-di-sol 5% have a faster in vitro experimental time compared to formula 1 and formula 3 with Ac-di-sol 3%. The higher the concentration of Ac-di-sol, the faster the time of dispersion of tablets because Ac-di-sol can break the tablet by capillary mechanism, causing water to seep into the tablet through the pores of the tablet, then Ac-di-sol expands and causes the tablet to rupture (Setyawan D., et al 2010).

Hedonic Test

This test is carried out to determine whether or not the FDT tablet is liked by panelists. The hedonic test was conducted by 30 male and female panelists by giving 2 samples of FDT tablets with different sweeteners to be sampled. This test is carried out on the parameters of aroma, taste, and color. To find out the hedonic test results from 30 panelists, a variety analysis was performed using SPSS 22. The test results were obtained in terms of aroma with a significant value (0.732)> 0.05 and color with a significant value (0.737)> 0.05. These results indicate the taste and color of the two formulas favored by panelists, while in terms of taste with a significant value (0.002) <0.05, the results show that formula 2 with sucralose sweetener is preferred by panelists compared to formula 4 which uses aspartame sweetener.

Maximum Wavelength Determination Results

Determination of the maximum wavelength of flavonoids in this study using a quercetin standard. Quercetin was chosen as a standard because it includes flavonol compounds, namely flavonoids that are most effective at capturing free radicals and inhibiting various oxidation reactions, because they can produce phenoxyl radicals that are stabilized by the resonant effect of the aromatic ring (Sri, 2008). The maximum wavelength at the determination of total flavonoid levels is obtained at a maximum absorption of 432 nm. The optimum incubation time is obtained at 20 minutes, which shows the time with the most stable absorbance value. The stability of the absorbance value of a compound is related to the stability of the color absorbed by monochromatic light. The results of determining the optimum incubation time are the same as Sukmawati's research (2018) at the 20th minute.

Quercetin standard curve is made to be able to produce a linear equation curve that will be used to determine the total flavonoid content. Quercetin is made in series with concentrations of 2, 4, 6, 8, 10 ppm. Determination of the standard curve obtained by the equation y = 0.0826x - 0.0089 with a value of R2 0.9987. The results of the equation have met the acceptance criteria that is ≥ 0.98 (Harmita, 2004). This value shows the closeness of linearity that is close to number 1, so it can be stated that absorbance is a function whose value is directly proportional to concentration and follows the linear regression equation.

Determination of Total Extracts and Tablet Flavonoid Levels

The results of determining the levels of flavonoids of *Graptophyllum pictum* extract were carried out in triplo with an average absorbance of 0.2798; 0.2806; and 0.2826. The percentage content obtained was 5.63%; 5.69%; and 5.73% with an average of 5.68%.

Determination of flavonoid tablet levels was carried out on all four formulas in which 20 tablets in each formula were crushed until smooth and weighed equivalent to 100 mg extract. The results of the determination of the content of all formulas are 5.21%; 4.99%; 5.24%; and 5.12%. Then, compared to the extract content, the results were 91.6%; 87.86%; 92.16% and 89.99%.

CONCLUSION

Fast Disintegrating Tablet (FDT) of the best *Graptophyllum pictum* extract with different types of aspartame sweetener is formula 1 sucralose sweetener with an average level of *Graptophyllum pictum* extract flavonoids of 5.69% and an average level of purple leaf FDT flavonoids of 5.14%.

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