



Effect of Drying Time on Antioxidant Activity and Nature Organoleptic steeping Tea Herbs From Leaf Gambir (*Uncaria gambir* (Hunters) Roxb)

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ABSTRACT

Influence long drying to activity antioxidants and nature organoleptic steeping tea herbs from leaf gambier (*Uncaria gambier* (Hunters) Roxb) has conducted. Destination study for analyze activity antioxidants and nature organoleptic from gambier leaf herbal tea steeping with drying time variations of 30, 60, 90, 120, and 150 minute. Measurement of antioxidant activity using spectrophotometry UV – Vis method DPPH (1,1 diphenyl - 2 – picrylhydrazyl) long wave 515.5 nm. Whereas test organoleptic with use method test scoring. Parameter organoleptic covers color, aroma and taste. The results of the study showed that the drying time treatment had an effect on the antioxidant activity of herbal tea steeping gambier leaves. Drying of leaves at temperature 50°C with time drying 150 minute give level activity antioxidants highest with score IC₅₀ 89.6744 %. Time drying also influence nature organoleptic from steeping herbal tea leaves gambier.

Say key : Antioxidants, gambier leaves, IC₅₀, tea herbs.

PRELIMINARY

Plant gambier (*Uncaria gambier* (Hunter) Roxb) is a natural substance that many used by Public Indonesia. This plant is native to Southeast Asia especially the island of Sumatra and cultivated especially in area Sumatra West (Body Supervisor Drug and Food, 2007). Gambier is often used by mothers and grandmother- grandmother for mixture beg which useful for strengthen tooth so that no easy kropos or broken. Traditionally, it is brewed from gambier leaves The fresh one is used as a medicine for diarrhea, dysentery, and as drug gargling for throat which stings (Arbaine *et al.*, 2014).

Gambier contains antioxidants very tall, catechins, flavonoids, alkaloids, and substance tanner (Sabarni, 2015). Content other found compound group chalcane-flavan dimer that is gambirin A1, gambirin A2, gambirin B1, and gambirin B2, epicatechin, and dimeric proanthocyanidins, procyanidin B3 and gambirin C (Arbaine *et al.*, 2014). The content of catechins in Gambier comes from compound polyphenols which could role as antioxidants and antimicrobials (Aditya & Ariyanti, 2016).

Antioxidant compounds can counteract or reduce the negative effects of internal oxidation body (Ramadan, 2015). So that distribution area and long shelf life then leaves Gambier is processed into herbal tea (Iskandar & ramdhan, 2020). However form tea herbs leaf gambier not yet many used by society.

Tea herbs no only originated from tea leaves namely *Camellia sinensis*. Herbal tea actually is a mix of several ingredient, and more appropriate called “tisanes” (Ravikumar, 2014). Tea herbs could formulated from flower herbs, seed, leaf,

root, and skin which obtained from various plant (Rahma & Syamira, 2020). Principle processing tea with drying method. Purpose drying for hinder growth microbe and prevent change biochemistry. On during drying with a different time interval same could cause change quality like scent and appearance as well as could reduce activity antioxidants (Hossain *et al.*, 2010).

Based on study previously regarding the effect of leaf drying time tea herbs to activity antioxidant, use sample leaf soursop which conducted drying leaf soursop on temperature of 50°C with variations in drying time 30, 60, 90, 120, and 150 minutes, yielding tea leaf soursop best with activity the highest antioxidant is 76.06% and value The lowest EC₅₀ is 82.16 µg/ml at temperature drying 150 minutes. But on condition operational the, tea leaf soursop have score organoleptic Lowest, specifically flavor (Adri & Hosoelisyorini, 2013).

Study about influence long drying leaf tea herbs other conducted with sample leaf ketapeng China. On study this show that the drying of Chinese ketapeng leaves is on temperature 50°C with variation long 110, 130, 150, 170, 190 minutes yield activity antioxidants strong with score IC₅₀ 60,18 µg/ml at a drying time of 130 minutes. As well as evaluation sensory have color steeping tea colored yellow, flavorful leaf ketapeng China, and taste septum (Yamin *et al.*, 2017).

Wrong one test for determine antioxidant activity is by method DPPH (1,1- diphenyl- 2- picrylhydrazyl). Method DPPH has many applied for estimate activity antioxidants

in recent years (Molyneux, 2004). The DPPH method was found the most effective between the two antioxidant assay methods other which used that is method FIC (*Ferrous Ion Chelating*) and FRAP (*Ferric Reducing Antioxidant Power*) (Maesaroh *et al.*, 2018).

The DPPH method provides information reactivity of the compound being tested with a radical stable. DPPH give uptake strong at a wavelength of 515-517 nm with color violet dark (Sayuti & Yenrina, 2015). Antioxidant activity (IC_{50}) gambier in test with method DPPH and gallic acid was used as standard (Meliae *et al.*, 2015) and then observed with Spectrophotometer UV- visible (Satriari, 2017).

Based on description on, researcher interested for To do study about Antioxidant analysis in Gambier leaf tea to explore the potential of gambier leaves as functional drink including herbal drinks. Researcher interested in testing antioxidant activity with use method DPPH and Spectrophotometer UV- Vis.

METHOD STUDY

Tool

Tools used in research this Among other: Tool which used on this research is a UV- Vis *Double Beam* (Shimadzu UV-1800), *moisture balance* (Ohrus), oven (Memmert), *vibrations transducers Sieve Shakers* (VTSS 200-9) (B-One), scales analytic (Precisa), blender (Miyako), teapot electricity (Scarlett), glass Trophy (Pyrex), ball suck, funnel (Pyrex), erlemeyer (Pyrex), pumpkin measure (Pyrex), beaker glass (Pyrex), and pipette measuring (Pyrex).

Ingredient

Ingredient which used is leaf gambier (*Uncaria gambier* (Hunters) Roxb), powder *1,1 Diphenyl- 2- Picrilhydrazil* (DPPH) (Aldrich), methanol (CH_3OH) pa (CV. Vahana scientific), sour error ($C_7H_6O_5$) (PT. Bratachem), distilled water (H_2O), and pocket paper tea.

Taking Sample

Sample form shoots leaf gambier Fresh comes from Sialang Village, District Chalk IX, Regency Five tens City, Sumatra Province West.

Identification Plant

Identification plant conducted in Andalas University Herbarium (UNAND), Major Biology Faculty Mathematics and Knowledge Knowledge Natural (FMIPA) University Andalas (UNAND) field, West Sumatra. Identified sample is part leaf, flower, and seed plant.

Process Taking Sample Collection Ingredient raw

Ingredient raw which collected is leaf gambier, which taken from gambier plant. The leaves are taken young leaves. Leaves are picked moment morning day. Leaf gambier taken as much ± 1 kg.

Sorting Wet

Leaf gambier which already taken, followed by wet sorting. Sorting wet conducted for separate dirt – dirt or other foreign material from the leaves gambier. Leaf which already damaged, twig- twigs that are still attached to the leaves, as well other impurities that must be disposed of immediately, so that obtained leaf gambier which worthy used.

Washing

Washing conducted for remove soil and other impurities attached to Gambier leaves. Washing done with clean water and done in time short so that no remove substance nutritious on leaf gambier.

Making Tea Leaf Gambir

Gambir leaves after being washed clean and disort then conducted process withering During ± 18 o'clock on temperature room. Then conducted chopping ± 1 cm, next heat drying process $50^\circ C$ with a variation of drying time of 30, 60, 90, 120, and 150 minutes, then pollinated and sifted with sieve 60 mesh. Weigh 2 g of gambier leaf tea powder, then put in into the pocket tea paper. Do water content test.

Process Making steeping Tea Leaf Gambir

Brew tea with 100 ml of boiling water, then let stand for 5 minutes. Doon sample tea leaf gambier which has dried on long drying 30, 60, 90, 120, and 150 minutes.

Antioxidant Activity Test Making Solution DPPH 30 $\mu g/ml$

Weighed 10 mg DPPH (BM394,33), dissolved with methanol pa until 100 mL, then placed in pumpkin measuring which coated with *aluminum foil*. Obtained solution DPPH with a concentration of 100 $\mu g/mL$. Then diluted with method pipette 15 mL solution DPPH concentration 100 $\mu g/mL$ put in a 50 mL volumetric flask the solvent until sign limit then shake until homogeneous and obtained solution DPPH with concentration 30 $\mu g/mL$.

Making Solution Blank Optimization Long Wave Maximum DPPH

Pipette 3,8 mL solution DPPH 30 ($\mu g/mL$) into the vials. Then added methanol pa as much 0.2 mL and homogenized and vials closed with *aluminum foil*. Then incubated inside room dark During 30 minute. Define spectrum absorption use UV-Visible spectrophotometer at length wave 400-800 nm and specify long wave maximum.

Making Solution Comparison Sour Error

Test Organoleptic

Parameter testing organoleptic covers color, flavor, and scent. Panelists give evaluation form score on organoleptic test blank for steeping herbal tea leaf gambier (Adri & Hersoelistyorini, 2013). Color includes color types and properties life water steeping. Aroma covers scent typical tea and satisfaction panelist against tea scent. And taste includes the power of taste and satisfaction panelist to flavor tea herbs leaf gambier. Weighed sour error pure as much 10 mg, entered in pumpkin measuring 100 mL, then added methanol until 100 mL (100 µg/mL) and homogenize.

maker Calibration Curve Sour Error

A series of concentrations of 2 µg/mL, 4 µg/mL, 8 µg/mL, and 10 µg/mL, with method pipette solution parent (100 µg/mL) as much as 0.2 mL, 0.4 mL, 0.6 mL, 0.8 mL and 1 mL then enough with methanol until sign limit pumpkin measuring 10 mL. Then pipette 0.2 mL each concentration put in in vials and add 3.8 mL solution DPPH (30 µg/mL) then the vial was covered with *aluminum foil*. Incubated in room dark During 30 minute. absorbance from various concentration be measured with use UV-Visible spectrophotometer at length wave maximum DPPH.

Test Activity Antioxidant Tea Herbs Gambier leaves

Making Solution Parent sample

Each - each steeping herbal tea leaf gambier with variation long drying 30, 60, 90, 120, and 150 minutes Pipette 5 mL into a volumetric flask 100 mL. Then add methanol until sign limit.

Making curve calibration steeping Tea Gambir Leaves Herbal

Furthermore, respectively – respectively steeping tea herbs leaf gambier with drying variations 30, 60, 90, 120, and 150 minute a concentration series of 120 µg/mL was made, 140 µg/mL, 160 µg/mL, 180 µg/mL and 200 µg/mL, with method pipette solution parent (1000 µg/mL) 1.2 mL, 1.4 mL, 1.6 mL, 1.8 mL and 2.0 mL then enough with methanol until sign limit 10 mL volumetric flask. Then pipette 0.2 mL respectively – respectively concentration put in in the vial and add 3.8 mL of the solution DPPH (30 µg/mL) then the vial was closed with *aluminum foil*. Incubated in room dark During 30 minute. absorbance from various concentration be measured with using a UV-Visible spectrophotometer on long wave maximum DPPH.

Determination Score

Results calculation from activity antioxidants entered to inequality line $y = a + bx$ with concentration (µg/mL) as abscissa (axis x) and the % value of antioxidant activity is equal to 50% will obtained from the equation line.

Measurement Activity Antioxidant

Activity antioxidants sample determined by the magnitude of the absorption barrier radical DPPH through calculation percentage inhibition uptake DPPH with using the formula Andayani *et al* (2008) as following:

Analysis data Results Study

Obtained research data will processed in a manner statistics use device soft SPSS 20 with use test analysis One Way ANOVA if which tested distributed normal will proceed with the Turkey test and if data organoleptic which obtained no distributed normal so analyzed using a non-parametric test Friedman.

RESULTS AND DISCUSSION

Study this use sample Gambir leaves are processed into herbal tea. The sample used in this study is leaf gambier. Leaf gambier which taken are leaves young located in shoots the plants. Process taking sample this conducted on o'clock 09:00 WIB. Taking the leaves in the morning when process photosynthesis going on maximum. Gambir leaf shoots are picked as much as ± 1 kg leaf. Gambir leaf shoots are taken from Village Beehive, Subdistrict Chalk IX, Regency Five tens City, Sumatra West.

The simplicia was withered for ± 18 hours on temperature room. Process withering this conducted with 2 time reversal, so that process withering equally Among surface upper and lower surfaces of leaves. Do chopping on simplicity ± 1 cm for zoom out size simplicity the. Process chopping this conducted for make it easy process drying and refinement leaf gambier. Then dried in oven on temperature 50°C with variation time drying 30, 60, 90, 120, and 150 minutes. The gambier leaves already dry mashed with blender for 1 minute, then the powder is sifted with sieve 60 mesh so that size powder uniform. Then conducted packaging into the pocket tea dip. Pocket tea used are paper tea bags. So that formed product form tea herbs leaf gambier. Tea herbs leaf Gambier must be stored in a container that is closed meeting and keep away from ray sun.

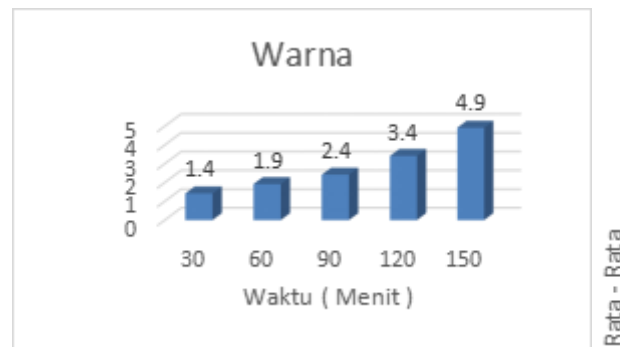
Then do the level test water from powder tea herbs leaf gambier. Principle from measurement rate water is Secrete water in ingredient with help energy hot based on weight lost during heating in the oven. This test has an important role in determine the characteristics of herbal tea preparations leaf gambier. Rate water must determined because water which remaining in simplicity is a growth medium for mold and body tiny. Testing rate water this conducted with use tool *moisture balance*. Based on Body Standardization National (2013) about Tea Packaged dry, dry tea water content a maximum

of 8.0%. Results of water content analysis on tea herbs leaf gambier based on variations in drying time are shown in Table I shows that the highest water content obtained on treatment long drying 30 minute, as big 13.56 %. It means on powder tea leaf gambier drying 30 minute could Becomes media growth mold and micro-organisms. While the water content Lowest there is on treatment long drying 150 minute, as big 6.35 %. This means that Gambir leaf tea powder is safe from the growth of molds and microorganisms. Water content that meets the standard provisions rate water preparations tea <8% is powder tea herbs leaf gambier drying 120 and 150 minute. Can be seen on Table 1.

Table 1. Results assay water

| Sample | Drying | Rate Water |
|----------|-------------|------------|
| Sample 1 | 30 minutes | 13.56 % |
| Sample 2 | 60 minutes | 13.30 % |
| Sample 3 | 90 minutes | 12.94 % |
| Sample 4 | 120 minutes | 7.39 % |
| Sample 5 | 150 minutes | 6.35 % |

Subtraction rate water powder tea affected by mass transfer convection at the surface of the material. Decline levels as the temperature increases consequence from the more many molecule water in ingredient evaporate. According to Winarno (1997), that the more tall temperature drying so the more fast occur evaporation so that the water content inside ingredient Getting lower.



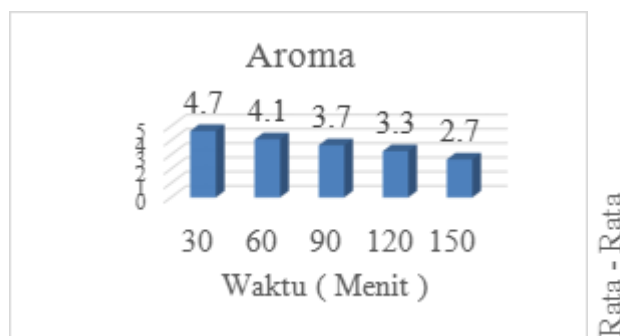
Picture 1. Average Graph – Test Average Color

Testing organoleptic steeping tea herbs leaf gambier on study this covers color, scent, and flavor. Color is wrong one parameter important in determine reception by consumer because color is reject the first measure of someone in assessing something product. Color have meaning and role important for food commodities. Score results the average of the panelists on the color of the brew tea herbs leaf gambier displayed on Picture 1.

Score score color drink highest there is on sample with long drying 150 minutes, amounting to 4.9. It means color on steeping tea herbs time drying 150 minute colored green yellowish to red brown and alive. While the lowest score is found in samples with a drying time of 30 minutes, of 1.4. This means the color of the brewed tea herbs time drying 30 minute colored green yellowish until red brown and very gloomy. Friedman's test results obtained p-values 0.00 where p-values

<0.05 which means there is influence very real long drying to color steeping tea herbs leaf gambier. According to Adri and Hersoelistyorini (2013) process drying cause color green chlorophyll on leaf oxidized Becomes brown which is called browning event. Besides chlorophyll, tannins also experience oxidation to produce compounds theaflavins which produce a yellow color and thearubigin which produce color red (Towaha, 2013). In researchaYamin., *et all* (2017), the longer the leaves ketapeng China dried color the brew Becomes the more yellowbrown.

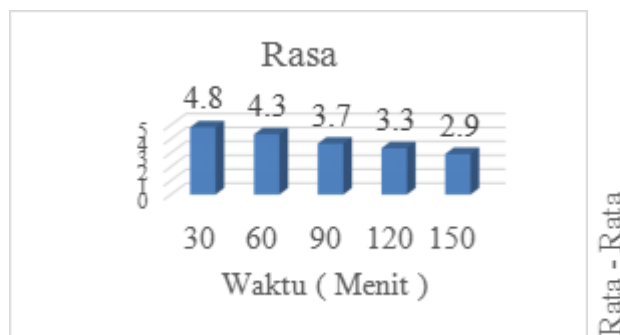
The role of aroma is also very important a product because it will determine the power accept consumer will product the. Aroma something product could determined with sense nose through smell or scent which generated exists compound folate. Aroma also is wrong one important factor for determining qualityfrom something ingredient food. Results test organoleptic aroma of steeping herbal tea leaves gambier can be seen on Picture 2.



Picture 2. Chart Flat – Flat Test Aroma

Assess the aroma of steeping herbal tea get score highest on sample with a drying time of 30 minutes, amounting to 4,7. It means scent typical tea satisfying. While the lowest score in the sample with a drying time of 150 minutes, amounting to 2,7. It means scent typical tea not enough satisfying. Friedman test results obtained p-value 0.00 where p-value <0.05 so could is known exists influence very real long drying to scent steeping tea herbs leaf gambier. According to Sari., et al (2019) the longer the drying can affect the color and aroma of tea. The drying process results in compounds catechins on tannins oxidized Becomes thearubigin which produce scent fragrant on tea.

Flavor from something ingredient food very depends on ingredient at first. kindly In general, consumers definitely like drinks which it feels like nice. However flavor nice characteristic negative, that is flavor nice according to someone is not necessarily the same as people other. Results test organoleptic flavor could seen on Picture 3.



Picture 3. Flat Graphics – Flat Test Flavor

Score flavor steeping tea herbs get score highest on sample with a drying time of 30 minutes, amounting to 4,8. This means that the typical taste of tea is very bitter, taste very satisfying until very satisfactory. the lowest score on the sample with a drying time of 150 minutes, sebsar 2,9. Arinya's distinctive taste of tea is tasteless, tasteless typical tea no satisfying until rather no satisfying. Results test Friedman obtained p-values 0.00 where p-values

<0.05 so that could is known there is influence very real long drying to flavor steeping tea herbs leaf gambier. According to Sari., et al (2019) flavor tea steeping with time variation treatment drying produce flavor which tend same that is taste bitter and septum. However, the more tall time drying intensity flavor the bitter drop. Catechins have a role important in determining aroma and taste tea. Catechins is compound no colored and soluble in waterbitter and astringent properties in tea brewing (Evizaet al., 2021).

Determination of the antioxidant activity of herbal tea from *Uncaria gambir leaves* (Hunter) Roxb with testing antioxidants use reactor DPPH (1,1 diphenyl-1-picrylhydrazil) determined by UV-Vis Double Beam spectrophotometry. Antioxidant activity test using this method is based on the loss of purple color due to reduction

DPPH by compound antioxidants in sample. Compound DPPH which have unpaired electrons in an atom hydrogen will be reduced by hydrogen atoms from antioxidants. Through reaction Among DPPH and compound antioxidant, will produce compound DPPH which more stable colored yellow.

Wavelength measurement results maximum absorption of DPPH solution is 30 µg/mL in solvent methanol produce maximum absorption at that wavelength 515.5 nm which obtained, including wrong one in range long long wave ray looked that is 400 – 800nm.

Testing comparison activity antioxidants namely gallic acid as it is known gallic acid as an antioxidant is very strong. Got percent activity antidote free radicals and IC₅₀ value of gallic acid on Table 2. Judging from the results of the absorbance can be It is known that the greater the concentration sample so will the more small score absorption which got, Thing this because the more tall compound antioxidants which capable muffle or ward off radical on DPPH and percentage the inhibition will the more big (Bahrul et al., 2014). Score IC₅₀ or activity antidote radical free as big 50

% obtained from comparison sour error standard on concentration 16.0527 µg/mL.

Score IC₅₀ obtained based on calculation of the regression equation in a way plot concentration solution test with percent immersion DPPH as Parameters of antioxidant activity, concentration sample (µg/mL) as abscissa (x-axis) and score absorbance as coordinate (axis y). Decline results got no significantly due to the DPPH compound which unstable and during operating time which passed before being measured.

Table 2. Score IC₅₀ Sour Error and steeping Tea Herbs Leaf Gambir Drying 30, 60, 90, 120, and 150 minutes.

| No | Solution Test | Concentration (µg/mL) | absorbent | | % Inhibition | IC ₅₀ (µg/mL) | Information |
|----|---------------|-----------------------|-----------|-------|--------------|--------------------------|-------------|
| | | | A1 | A2 | | | |
| 1 | SourError | 4 | 0.534 | 0.496 | 7.1161 | 16.0527 | VeryStrong |
| | | 8 | | 0.423 | 20.7865 | | |
| | | 12 | | 0.339 | 36.5168 | | |
| | | 16 | | 0.265 | 50.3745 | | |
| | | 20 | | 0.196 | 63.2958 | | |
| 2 | 30 Minute | 120 | 0.534 | 0.488 | 8.6142 | 427.2222 | Weak |
| | | 140 | | 0.474 | 11.2360 | | |
| | | 160 | | 0.459 | 14.0449 | | |
| | | 180 | | 0.446 | 16.4794 | | |
| | | 200 | | 0.430 | 19.4757 | | |
| 3 | 60 Minute | 120 | 0.534 | 0.465 | 13.2059 | 186.1745 | Currently |
| | | 140 | | 0.405 | 24.1573 | | |
| | | 160 | | 0.348 | 34.8315 | | |
| | | 180 | | 0.283 | 47.0037 | | |
| | | 200 | | 0.226 | 57.6779 | | |
| 4 | 90 Minute | 120 | 0.534 | 0.343 | 35.7678 | 158.5455 | Currently |
| | | 140 | | 0.300 | 43.8202 | | |
| | | 160 | | 0.265 | 50.3745 | | |
| | | 180 | | 0.225 | 57.8658 | | |
| | | 200 | | 0.188 | 64.7940 | | |
| 5 | 120 Minute | 120 | 0.534 | 0.331 | 41.7603 | 136.8511 | Currently |
| | | 140 | | 0.264 | 52.4345 | | |
| | | 160 | | 0.212 | 60.2996 | | |
| | | 180 | | 0.166 | 68.9139 | | |
| | | 200 | | 0.120 | 77.5281 | | |
| 6 | 150 Minute | 120 | 0.534 | 0.234 | 56.1798 | 89.6744 | Strong |
| | | 140 | | 0.213 | 60.1124 | | |
| | | 160 | | 0.192 | 64.0449 | | |
| | | 180 | | 0.170 | 68.1648 | | |
| | | 200 | | 0.148 | 72.2846 | | |

Table Score IC₅₀ on steeping tea gambier leaf herbal based on old variations drying 30, 60, 90, 120, and 150 minutes could seen on Table 2. From Table it was obtained that the brewing of herbal tea gambier leaves with a drying time of 30 minute obtain score IC₅₀ as big 427,3219 µg/mL have activity

antioxidants category weak. On steeping tea herbs leaf gambier with long drying 60 minutes to obtain an IC value of ₅₀ 186.1754 µg/mL has activity moderate antioxidant category. On the brew tea herbs leaf gambier with long drying 90 minutes to obtain an IC value of ₅₀ as big 158.5455 µg/mL have activity

moderate antioxidant category. On the brew tea herbs leaf gambier with long drying 120 minute obtain score IC₅₀ as big 138.1667 µg/mL have medium category of antioxidant activity. On steeping tea herbs leaf gambier with long drying 150 minute obtain IC₅₀ value of 89.6744 µg/mL has activity antioxidants strong category.

The results of the analysis of the antioxidant activity of tea herbs leaf gambier show that increase concentration sample test cause happening decline score absorbance. DPPH accepts electrons or Hydrogen radicals will form molecules diamagnetic which stable. Interaction antioxidants with DPPH good in a manner transfer of electrons or hydrogen radicals on DPPH, will neutralize free radicals from DPPH. The color of the solution changed from dark purple becomes bright yellow and the absorbance is on wavelength 515.5 nm will is lost if all electron on radical free DPPH Becomes in pairs (Molineux, 2004).

Plant gambier contain polyphenolic compounds that are quite high, the same such as compounds found in leaves tea (*Camellia sinensis*). Lots results study show that compound Polyphenols act as antioxidants beneficial in treat disease or catch radical free which formed in body. Compound polyphenols contained in Gambir leaves include tannins, catechins, and gambirin (Eviza *et all* ., 2021). According to Be patient (2015), that gambier have content catechins, flavonoids, alkaloids, and tannins. From results it is also obtained that drying tea herbs leaf gambier drying 150 minute have activity antioxidants highest. Thing this caused because drying resulted increasing substance active which contained in tea herbs leaf gambier. Sahin (2013) report that phenol and flavonoid compounds stand to the heating process at 100°, as well as supported by study Adri and Hersoelistyorini (2013) that the longer drying the more tall activity the antioxidant, caused on process drying resulted increasing active substances contained in tea leaves. Then drying tea herbs leaf gambier drying 30 minute have activity antioxidants Lowest. Thing this due to the drying time a moment not yet enable compoundphenolic ones function as antioxidants.

CONCLUSION

Based on the research conducted about the effect of drying time on antioxidant activity and organoleptic properties gambier leaf herbal tea (*Uncaria gambier* (Hunters) Roxb), so could concluded that :

1. There is influence long drying on antioxidant activity and properties organoleptic from steeping tea herbs leaf gambier which dried from range time 30 minute until 150 minute. That the more long drying so the more tall antioxidant activity of brewed tea herbs leaf gambier. As well as, variation time drying tea herbs leaf gambier influence nature organoleptic brewing of leaf herbal tea gambier that is color, scent, and flavor.
2. Gambir leaf herbal tea steeping have score activity antioxidants highest on range time drying 30 minute until 150 minute is on treatment drying herbal tea 150 minutes.

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