THE IMPACT OF DRYING TIME AND TEMPERATURE ON THE QUALITY OF HERBAL DRINKS MADE FROM COCOA LEAVES (THEOBROMA CACAO L.)

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Abstract: Pruning is one method of controlling pests and diseases to increase cacao plant output. Because cacao leaves include advantageous components that make them suited for processing into food products like herbal tea, the leaves that are obtained from pruning can be used. Finding the ideal drying temperature and time to create premium cacao leaf herbal tea is the goal of this study, along with evaluating any potential interactions between the two variables. Two parameters were used in a Randomized Block Design (RBD): drying length (W) at three levels — W1 (100 minutes), W2 (150 minutes), and W3 (200 minutes) — and drying temperature (T) at three levels — T1 (70°C), T2 (80°C), and T3 (90°C). A 5% significance level analysis of variance (ANOVA) was used to examine the data, and if significant differences were discovered, the Least Significant Difference (LSD) test was used. According to organoleptic evaluation, the best aroma was obtained at a drying temperature of 70°C, and the best color was obtained after 100 minutes of drying. Regarding the quality of the herbal tea made from cacao leaves, no discernible relationship between drying time and temperature was found.

Keywords: Drying Temperature, Herbal tea, Long drying time

Abbreviations (if any): All important abbreviations must be defined at their first mention there. Ensure consistency of abbreviations throughout the article.

Running title: a short title with five words

INTRODUCTION

In 2020, Indonesia was chosen as the largest cocoa producer and exporter in the Asian continent. The area of cocoa plantations on large plantations reached 26,000 Ha, while the area of smallholder plantations was 1,574,300 Ha in 2019, while cocoa production on plantations reached 15,300 tons and smallholder plantations 768,800 tons (Badan Standarisasi Nasional, 2020).

So far, much of the cocoa leaf waste obtained from pruning has been thrown away as waste and has not been utilized optimally; only a small portion has been used as animal feed and compost. In addition, cocoa processing so far has only focused on the fruit and its skin. Usually during the harvest season, farmers will only take cocoa fruit that is already yellow and leave the leaves as waste. In fact, based on their nutritional content, these cocoa leaves have the potential to be processed into more useful products, namely for food purposes, such as herbal tea products (Putri, 2022).

Cocoa leaves contain bioactive compounds in the form of phenolic compounds, which have a role as high antioxidants. Cocoa leaves also contain polyphenol compounds that function as antioxidants consisting of gallic acid (GA), epigallocatechin gallate (EGCG), epicatechin gallate (ECG), and epicatechin. In addition to containing polyphenol compounds, cocoa leaves also contain theine of 2.24% in young cocoa leaves and 1.33% in old cocoa leaves (Ratnaningrum et al., 2018). With the nutritional content of cocoa leaves, in this study, the manufacture of herbal cocoa leaf drinks used young leaves as the main ingredient.

Along with the development of science and technology, the variety of drinks currently continues to grow, such as herbal tea drinks made from cocoa leaf waste. Herbal tea that has undergone many changes that are not only made from tea leaves, but can also use ingredients that are easy to obtain, for example from the processing of flowers, leaves, seeds, and roots from various plants other than tea plants (Camellia sinensis). According to Amanto et al., (2020) in Indonesia, tea products are currently growing apart from tea plant commodities, here are examples of tea products other than the Camellia sinensis tea plant, such as tea from cocoa leaves, tea from gambir leaves, tea from guava leaves, tea from soursop leaves, tea from basil leaves, and celery tea. Herbal tea is a product that is currently widely consumed because it has a distinctive aroma and taste and herbal tea is also preferred by the public because the raw materials are easier to obtain and have properties as natural medicines to treat various diseases that vary depending on the raw materials used (Kusuma et

al., 2019). In herbal tea processing, there is a drying process, temperature and drying time used are thought to affect the quality of the tea that will be produced, if the drying temperature used is too high on leaves in wet conditions, it can cause the leaves to dry only on the outside. While drying time that is too long can cause tea to become brittle and smelly quickly and can reduce the quality of the tea produced, conversely if the drying time used is too fast, it will cause the dried tea to not dry enough or not dry enough so that the tea is not durable for storage for too long. And drying temperatures that are too high will cause a decrease in nutritional value and can change the color of the dried tea product (Sari et al., 2020). Based on this, research is needed to determine the effect of the best temperature and drying time in the process of making cocoa leaf tea on the quality of cocoa leaf herbal tea.

MATERIALS AND METHODS

This study was conducted using the factorial Randomized Block Design (RAK) method consisting of 2 factors, namely the first factor is temperature treatment (T) consisting of 3 levels, namely T1 (70˚C), T2 (80˚C), T3 (90˚C) and the second factor is drying time treatment (W) consisting of 3 levels, namely W1 (100 minutes), W2 (150 minutes), and W3 (200 minutes). Treatment in the form of drying temperature with the description T1 = treatment with a drying temperature of 70˚C, T2 = treatment with a drying temperature of 80˚C, T3 = treatment with a drying temperature of 90˚C. Treatment in the form of drying time with the description W1 = treatment with a drying time of 100 minutes, W2 = treatment with a drying time of 150 minutes, and W3 = treatment with a drying time of 200 minutes. Each treatment was repeated 3 times so that 27 experimental units were obtained. This research used an oven with a design factor T= Drying temperature and factor W= Drying time, so that the treatment combination obtained was as follows:

T1 W1 = Temperature 70˚C, with a drying time of 100 minutes
T1 W2 = Temperature 70˚C, with a drying time of 150 minutes
T1 W3 = Temperature 70˚C, with a drying time of 200 minutes
T2 W1 = Temperature 80˚C, with a drying time of 100 minutes
T2 W2 = Temperature 80˚C, with a drying time of 150 minutes
T2 W3 = Temperature 80˚C, with a drying time of 200 minutes
T3 W1 = Temperature 90˚C, with a drying time of 100 minutes
T3 W2 = Temperature 90˚C, with a drying time of 150 minutes
T3 W3 = Temperature 90˚C, with a drying time of 200 minutes

The data obtained were analyzed statistically using analysis of variance (ANOVA). If the calculated F is greater than or equal to the F table, then it is continued with the smallest real difference test (LSD) with a level of 5%.

RESULTS AND DISCUSSION

Water Content

Water content greatly affects the quality of tea, because dry tea will affect the quality and shelf life of tea, if the water content is too high it will cause the tea to become damp and will spoil more quickly. Based on the results of the ANOVA analysis of variance (Table 15 appendix), it shows that temperature treatment, drying time, and the interaction between temperature and drying time do not have a significant effect on the water content test. The results of the water content test on cocoa leaf herbal drinks can be seen in the following table:

Table 1. Water Content

Treatment	Average water content (%)
Temperature (T)	
Temperature (70°C)	6,40 a
Temperature (80°C)	5,31 a
Temperature (90°C)	4,61 a
	tn
Time (W)	
Time (100 menit)	5,83 a
Time (150 menit)	5,63 a
Time (200 menit)	4,86 a
	tn

Description: tn (not real)

Table 1 shows that temperature treatment, drying time and interaction between temperature and time did not have a significant effect on water content parameters. The highest average was at a temperature of 70°C, which was 6.40%, while

the lowest water content was at a temperature of 90°C, which was 4.61%. In a study (Kusuma et al., 2019) it was stated that in herbal tea from cocoa skin, the drying temperature of 65°C had the highest water content of 11.07% and the lowest water content was at a temperature of 95°C, which was 6.52%. The high water content in this herbal drink from cocoa leaves is thought to be because the higher the drying temperature used, the lower the water content. This is in line with research (Rusnayanti et al., 2018) which states that during the drying process, water evaporation will occur from the material to the air which can reduce the water content in the material. Evaporation occurs due to the difference in vapor pressure between the water in the material and the water vapor in the air. The vapor pressure of the material is generally greater than the vapor pressure of the air so that there is a mass transfer of water from the material to the air. This is related to the higher the temperature during the drying process, the greater the heat energy under the air so that the greater the amount of liquid mass evaporated from the surface of the dried material.

The highest water content was found at a drying time of 100 minutes at 5.83% and the lowest water content was found at a drying time of 200 minutes at 4.86%. In a study (Yamin, et al., 2017) stated that a drying time of 110 minutes had the highest water content of 12.00% and a drying time of 190 minutes had the lowest water content of 3.58%. It is suspected that the water content in cocoa leaf herbal tea is influenced by water evaporation due to the long drying process, so the heat received by the material will be greater so that the amount of water evaporated in the food material increases and the measured water content becomes low. This is supported by the statement (Wijanarko, 2021) the evaporation rate is influenced by the humidity level and is also influenced by the temperature around the dried material. The increase in temperature on the surface of the material is caused by the supply of heat energy from combustion. Slicing the dried material will expand the surface of the material and a large surface can make it easier for water in the material to come out. The water content of cocoa leaf herbal tea decreases as the drying process takes longer.

The water content of tea is also affected by wilting, because during the wilting process the tea leaves will lose 47-50% of their water content (Thanoza et al., 2016). Water content will affect the quality of tea, especially the shelf life, because if the water content is too high in a product it will cause the product to be damp and will spoil quickly. In the study (Rusnayanti et al., 2018) showed that water content has a significant effect on water content, but from the study of cocoa leaf herbal tea, it did not have a significant effect on water content parameters. This is thought to be because when baking at a temperature of 70 ° C the water content in the cocoa leaves experienced excessive evaporation, this caused the water content produced to be higher so that when using an oven temperature of 80° C and 90° C the water content produced tended to be the same which caused all treatments to have no significant effect on the water content test. The best average treatment according to SNI is at a temperature of 90°C of 4.61% and the best drying time of 200 minutes of 4.86% because it produces the lowest water content in herbal cocoa leaf drinks. The test results show that the water content of herbal cocoa leaf tea has met the quality standards of dry tea in packaging SNI 01-3836-2013 (BSN, 2013) which has a water content requirement for tea products with a maximum value of 8%.

Ash Content

Ash content is a parameter to indicate the value of inorganic content (minerals) in a material or product. The higher the ash content, the more inorganic content in the product. Ash content aims to determine whether the processing process is good or not, the type of material used, as a parameter of nutritional value in food ingredients and to estimate the content and authenticity of the materials used. Based on the results of the ANOVA analysis of variance (Table 17 appendix) shows that temperature treatment, duration and interaction between temperature and drying time do not have a significant effect on the ash content test.

Table 2. Ash content test results

Treatment	Average ash content (%)
Temperature (T)	
Temperature (70°C)	8,63 a
Temperature (80°C)	8,85 a
Temperature (90°C)	9,07 a
	tn
Time (W)	
Time (100 menit)	8,61 a
Time (150 menit)	8,84 a
Time (200 menit)	9,05 a
	tn

Description: tn (not real)

Table 2 shows that the average results of the highest ash content were at a drying temperature of 90°C of 9.07%, while the lowest ash content was at a drying temperature of 70°C of 8.63%. In the study (Dewi et al., 2017) stated that a temperature of 55°C had the highest ash content of 1.27% and ash content at a temperature of 40°C had the lowest ash content of 1.23%. It is suspected that the higher the drying temperature, the higher the ash content value, because the

higher the temperature, the more water evaporates and the ash content in the material increases because the water that comes out of the material is greater (Nurjadidah et al., 2023). The drying time of 200 minutes had the highest average ash content of 9.05% and the lowest ash content was at a drying time of 150 minutes, namely 8.61%. It is suspected that the longer the drying process, the higher the ash content in the resulting material, the increase in ash content occurs because the longer the time and the higher the drying temperature.

The results of the study showed that the temperature treatment, duration, and interaction between temperature and duration of drying did not have a significant effect on the ash content test of cocoa leaves. This is because during the ovening process using a temperature of 70°C the mineral content in cocoa leaves decreases more, so that if using a higher temperature, namely 80°C and 90°C, the mineral content in cocoa leaves is depleted when the oven uses a temperature of 70°C, resulting in ash content that tends to be the same which causes the ash content with all treatments to have no significant effect. During the burning or ashing process carried out, organic substances in cocoa leaf herbal tea evaporate, while inorganic substances or mineral elements such as calcium, phosphorus, and iron contained in cocoa leaf herbal tea do not evaporate. According to Yamin, et al., (2017) stated that ash content depends on the type of material, ashing method, time and temperature used during drying. The best average treatment was at a temperature of 70°C of 8.63% and the best drying time of 100 minutes of 8.61% because it produced the lowest ash content of cocoa leaf herbal tea. The test results showed that the ash content of cocoa leaf herbal tea was not in accordance with SNI 3836-2013 which has a requirement for ash content of tea products with a maximum value of 8%. The higher the ash content, the more inorganic content in the product. High ash content indicates that the product is not good for consumption.

Fiber Content

The crude fiber content aims for proximate analysis of food ingredients, namely the part of food ingredients that cannot be hydrolyzed by sulfuric acid and sodium hydroxide. Based on the results of the ANOVA analysis (Table 19 appendix), it shows that the temperature treatment, duration and interaction between temperature and duration of drying do not significantly affect the fiber content test. The results of the fiber content test in cocoa leaf herbal drinks can be seen in the following table:

Table 3. Fiber Content

Treatment	Average fiber content (%)
Temperature (T)	
Temperature (70°C)	16,24 a
Temperature (80°C)	17,32 a
Temperature (90°C)	17,41 a
	tn
Time (W)	
Time (100 menit)	16,77 a
Time (150 menit)	16,90 a
Time (200 menit)	17,30 a
	tn

Description: tn (not real)

Table 3 shows that temperature, drying time, and the interaction between temperature and drying time do not have a significant effect on the fiber content of cocoa leaf herbal tea drinks. This is suspected that when the oven uses a temperature of 70°C, the water in the cocoa leaves decreases more so that if using a higher temperature, namely 80°C 90°C, the fiber content tends to be the same, which causes the fiber content with all treatments to have no effect. The average highest fiber content at a temperature of 90°C is 17.41% and the lowest fiber content at a temperature of 70°C is 16.24%. In the study (Kusuma, et al., 2019) the highest cocoa skin fiber content at a temperature of 95°C is 28.67% and the lowest fiber content at a temperature of 65°C is 23.89%. The results of the study showed that the high fiber content is in line with the increasing drying temperature. This is thought to be due to the high drying temperature producing low water content which causes the tea powder carbohydrates to increase. This is in line with Simanjuntak's research, 2014 that the reduction of water in food ingredients, the content of other compounds such as fat, protein and carbohydrates will increase. With the increase in carbohydrates, the level of crude fiber in the ingredients will increase.

The drying time of 200 minutes has the highest fiber content of 17.30% and the drying time of 100 minutes has the lowest fiber content of 16.77%. In the study (Lestari, et al., 2018) produced the highest fiber content of Chinese ketepeng leaf herbal tea with a time of 110 minutes of 17.24% and the lowest crude fiber content with a time of 190 minutes of 13.00%. This shows that the longer the drying process, the higher the value of the crude fiber produced. It is suspected that the reduction in water in the material makes the value of the crude fiber produced in the material increase so that the value obtained tends to increase.

Phytochemical Test

Phytochemical tests are chemical compounds contained in plants. Phytochemical tests are carried out to determine the group of compounds in the form of flavonoids and tannins. Flavonoids are natural chemical compounds in the form of

secondary metabolites of plants that are beneficial to human health because they are natural antioxidants. While tannins are compounds derived from polyphenols that affect the taste and color of food ingredients. With a change in color to orange for flavonoid compounds and blue or blackish green for tannin compounds. The content of flavonoid and tannin compounds in cocoa leaves can be seen in the following table:

Table 4. Cocoa leaf flavonoid compound test

Treatment	Observation	Results		
		U1	U2	U3
Temperature 70°C duration 100 minute	Blue	+	+	+
Temperature 70°C duration 150 minute	Blue	+	+	+
Temperature 70°C duration 200 minute	Blue	+	+	+
Temperature 80°C duration 100 minute	Blue	+	+	+
Temperature 80°C duration 150 minute	Blue	+	+	+
Temperature 80°C duration 200 minute	Blue	+	+	+
Temperature 90°C duration 100 minute	Blue	+	+	+
Temperature 90°C duration 150 minute	Blue	+	+	+
Temperature 90°C duration 200 minute	Blue	+	+	+

Description: (+) = Positive

Table 4 shows the positive results of the tannin compound test on cocoa leaf herbal drinks, namely the color change that occurs when the $FeCl_3$ solution is added to blue or blackish green. The emergence of blue or blackish green is thought to be due to the reaction of the addition of $FeCl_3$ solution; it is estimated that the solution reacts with one of the hydroxyl groups in the tannin compound (Manongko et al., 2020). The higher the drying temperature, the more the tannin compound will be damaged. The damage to the tannin compound causes the low levels of tannin obtained. According to Wahyuni et al., 2018) tannin compounds will decompose or be damaged at a temperature of 99°C-102°C. In this cocoa leaf herbal tea study, a lower temperature, namely 70°C, 80°C, and 90°C, was used so that all treatments in cocoa leaf herbal tea had a tannin compound content, which is shown by positive results. In addition to drying, the decreasing tannin levels are also caused by the age of the leaves. Older leaves will have lower tannin values compared to young leaves because the older the leaves, the less tannin is contained in the leaves. Cocoa plants have the potential as antioxidants because they are one of the plants that produce metabolite compounds in the form of flavonoids and tannins. Tannin is the most important component in tea that can provide color and taste strength (bitter, astringent, and bitter). Tea containing tannin has properties as an antidiarrheal, astringent, and mouth ulcer treatment; it stops bleeding, helps neutralize fat in food, lowers blood cholesterol, freshens breathing, and stimulates the brain stem (Hutosoit et al., 2021). The tannin content in tea can be used as a quality guideline because tannin also provides a stable taste.

Organoleptic Quality of Herbal Tea

Organoleptic test on herbal tea using the scoring, method: this test is conducted to determine the taste and level of panelists' preference for the characteristics of herbal tea. Assessed with 5-1 from the highest to the lowest as follows:

a. Herbal tea brewing water color score: 5 (yellowish green), 4 (yellow), 3 (reddish yellow), 2 (red), and 1 (brownish red).
b. Herbal tea brewing water taste score: 5 (very typical of tea products), 4 (typical of tea products), 3 (quite typical of tea products), 2 (less typical of tea products), and 1 (not typical of tea products).
c. Herbal tea brewing water aroma score: 5 (very typical of tea aroma), 4 (typical of tea aroma), 3 (quite typical of tea aroma), 2 (less typical of tea aroma), 1 (not typical of tea aroma).

Table 5. Organoleptic Quality of Herbal Tea

Sample	Color		Aroma		Flavor	
	Score	Indicator	Score	Indicator	Score	Indicator
TIW1	4,74*	Yellowish green	2,96*	Quite tea scented	3,15*	Quite typical tea
T1W2	4,76*	Yellowish green	3,07*	Quite tea scented	2,97*	Quite typical tea
T1W3	4,33*	Yellow	3,07*	Quite tea scented	2,99*	Quite typical tea
T2W1	4,49*	Yellow	2,93*	Quite tea scented	3,08*	Quite typical tea
T2W2	4,40*	Yellow	2,84*	Quite tea scented	2,97*	Quite typical tea
T2W3	4,21*	Yellow	2,91*	Quite tea scented	2,96*	Quite typical tea
T3W1	4,77*	Yellowish green	2,85*	Quite tea scented	2,84*	Quite typical tea
T3W2	3,95*	Yellow	2,69*	Quite tea scented	3,01*	Quite typical tea
T3W3	3,37*	Yellowish green	2,59*	Quite tea scented	2,92*	Quite typical tea

Note: (*) Complies with SNI 01-3836-2013

Color	Aroma	Flavor
Mark 4,50 – 5,00 : Yellowish green	Mark 4,50 – 5,00 : Very tea flavored	Mark 4,50 – 5,00: Very typical tea
Mark 3,50 – 4,49 : Yellow	Mark 3,50 – 4,49 : Tea scented	Mark 3,50 – 4,49: Special tea
Mark 2,50 – 3,49 : Reddish yellow	Mark 2,50 – 3,49 : Quite tea scented	Mark 2,50 – 3,49: Quite typical tea

Mark 1,50 – 2,49 : Red	Mark 1,50 – 2,49 : Less tea flavor	Mark 1,50 – 2,49: Less typical tea
Mark 1,00 - 1,49 : Brownish red	Mark 1,00 - 1,49 : No tea scent	Mark 1,00 - 1,49: Not typical tea

Color in beverages and food is one of the variables needed to determine the degree of consumer acceptance and can attract consumers. Color is also a parameter of preference that can be seen before consumption; color can only be seen through the sense of sight. The color of tea brewing according to SNI standards is yellowish green to red. Based on the results of the analysis of variance ANOVA, temperature treatment and interaction between temperature and drying time did not have a significant effect on the organoleptic color test, while the drying time had a significant effect on the color test. The results of the organoleptic test on the color parameter showed that the average level of panelists' preference for the color of cocoa leaf herbal tea was generally reddish yellow. The highest average was found at a temperature of 70°C of 4.61 with a drying time of 100 minutes of 4.67, producing a brewed cocoa leaf herbal tea color of yellowish green, and the lowest average was at a temperature of 90°C of 4.03 with a drying time of 200 minutes of 3.97, producing a brewed cocoa leaf herbal tea color of yellow. Based on the results of the study, the higher the drying temperature and the longer the drying time, the lower the brightness of the cocoa leaf tea. Drying temperatures that are too high will cause a decrease in nutritional value and color changes in the dried product (Sari et al., 2020). According to Lestari et al., (2024) stated that the longer the drying time can cause a decrease in the natural color of the resulting cocoa leaf herbal tea. This is caused by the drying process, which can damage coloring substances such as chlorophyll in cocoa leaves. This is in line with the research of Nurjadidah et al., (2023) One of the factors that can affect the color change of the resulting brew from fresh green to dark is because chlorophyll is converted into pheophytin, or brownish green, if the drying temperature used is higher. The best treatment was at a temperature of 70°C with a drying time of 100 minutes, resulting in the highest panelist assessment score, with the color of the cocoa leaf herbal drink brew being yellowish green.

The aroma produced by certain foods or ingredients can be detected through the sense of smell. A distinctive and attractive aroma can make a food more preferred by consumers. If the aroma of tea does not have a distinctive aroma of tea or deviates from the SNI 3836-2013 quality standard criteria, then the tea can be said to have no distinctive aroma of tea products or a foreign aroma. Based on the results of the analysis of variance, the drying temperature treatment showed a significant effect on the organoleptic color test, while the length of drying time and the interaction between temperature and length of drying time did not have a significant effect on the organoleptic test of cocoa leaf herbal drinks. The results of the organoleptic test on the aroma parameter showed that the average level of panelists' preference for the aroma of cocoa leaf herbal tea had a fairly distinctive aroma of tea products. The organoleptic aroma test values from each treatment showed that the highest aroma with an average panelist value was found in the 70°C temperature treatment of 3.03 with a drying time of 100 minutes of 2.92, and the lowest average aroma was found at a temperature of 90°C of 2.71 with a drying time of 200 minutes of 2.86, which gave an assessment of a fairly distinctive aroma of tea products. This is suspected of being a temperature. The higher the temperature and the longer the drying time, the more it can damage the distinctive aroma of cocoa leaf herbal tea. Low oven temperatures and short oven times do not damage the aromatic compounds in cocoa leaf herbal tea, because during the drying process at low temperatures, the content in cocoa leaf herbal tea will be maintained so that several polyphenol oxidase enzymes are still actively working and oxidizing the polyphenol compounds in the material so that a browning reaction occurs and produces aroma components. The effect of this difference is also caused by the release of volatile compounds. As in the study conducted by Yamin et al., 2017) the decrease in the aroma of cocoa leaf herbal tea was caused by the activity of enzymes in whitening, which caused some volatile compounds to be released so that there was a decrease in the distinctive aroma of cocoa leaf herbal tea. The results of the panelist assessment scores on average showed the best treatment was at a temperature of 70°C with a drying time of 100 minutes, resulting in the highest panelist assessment score with the aroma of cocoa leaf herbal drink brewing, which was quite aromatic with a distinctive aroma of tea products, according to SNI 01-3836-2013.

Taste is a very important factor in someone's assessment of the quality of a food ingredient and can determine whether or not a product is accepted. Based on the results of the analysis of variance of temperature treatment, drying time and interaction between temperature and drying time did not significantly affect the organoleptic test of taste. The results of the organoleptic test on the taste parameters showed that the temperature treatment, drying time, and the interaction between temperature and drying time did not significantly affect the organoleptic test of the taste of cocoa leaf herbal tea drinks, with the highest average panelist assessment at a drying temperature of 70°C, which was 3.04, and the highest average at a drying time of 100 minutes, which was 3.02, which was on a fairly typical scale of tea products. The taste of this cocoa leaf herbal tea brew was quite liked by the panelists because it had almost the same taste as tea product brews in general. The organoleptic test on cocoa leaf herbal drinks had an astringent and slightly bitter taste because this plant is rich in tannin compounds, which provide an astringent taste when tasting. The bitter taste of coca leaf tea comes from the catechin compounds and alkaloid compounds found in coca leaves; the length of withering time also has an effective effect on the level of bitterness. It is suspected that during the wilting process, it can inhibit changes in phenol compounds so that the phenol components are maintained, which results in a bitter taste (Supriyanto et al., 2014). The best treatment is at a temperature of 70°C with a drying time of 100 minutes, resulting in the highest panelist assessment score with the taste of herbal cocoa leaf drinks, which is quite typical of tea products.

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