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	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2023 **Issue:** 06 **Volume:** 122

Published: 12.06.2023 **http://T-Science.org**

Issue Article

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ANTIOXIDANT ACTIVITY AND ORGANOLEPTIC LEAF TEA Litsea cubeba PERS

Abstract: *Litsea cubeba leaf has been used traditionally to treat a variety of diseases, because Litsea cubeba leaf contains antioxidant compounds. The research objective to be achieved is to measure and analyze the activity of antioxidants and organoleptic properties of Litsea cubeba leaf tea by variations in drying time 30; 60; 90; 120 and 150 minutes. Measurement of antioxidant activity using US-VIS spectrophotometry method (λ 518 nm), while the organoleptic: taste; color, scent and appearance. The result of studies that a treatment time of drying effect on antioxidant activity of Litsea cubeba leaf tea. Litsea cubeba leaf drying conditions at 50°C with a temperature of 150 minutes gives the highest level of antioxidant activity and the lowest EC50, value, but it has the lowest organoleptic flavour.*

Key words: *Litsea cubeba leaf tea; antioxidants; drying; organoleptic.*

Language: *English*

Citation: Hamzah, F., & Hamzah, N. (2023). Antioxidant activity and organoleptic leaf tea Litsea cubeba pers. *ISJ Theoretical & Applied Science, 06 (122),* 108-116.

Soi: http://s-o-i.org/1.1/TAS-06-122-19 ***Doi***: https://dx.doi.org/10.15863/TAS.2023.06.122.19

Scopus ASCC: *1106.*

Introduction

The Litsea cubeba plant comes from the Latin word Litsea Papandayan which means spicy sweet and sour bag. Litsea leaves are widely used as anti-microbial drugs including herbal medicines and can also be added to food and drinks, especially in the form of anti-oxidant ingredients.

The content of class compounds in Litsea cubeba leaves include steroids, terpenoids, flavonoids, alkaloids and tannins. All classes of flavonoid compounds mostly function as antioxidants for antimicrobial diseases, one of which is anti-viral diseases including cancer, photosynthetic regulators and body regulators.

In Riau Province, Litsea cubeba leaves are commonly used as herbal medicine to treat viral diseases, namely cancer by drinking boiled water from Litsea cubeba leaves. The boiled water of Litsea cubeba leaves can cause heat in the body as well as the function of chemotherapy, but the boiled water of Litsea cubeba leaves is limited to killing abnormal cells (cancer) and releasing normal cells to live/grow. The effects of chemotherapy are slightly different where this chemotherapy treatment not only kills abnormal cells (cancer) but normal cells also die.

Boiled water from fresh Litsea cubeba leaves has long been made and can also be used as an herbal medicine for cancer, but this form of leaf tea has not been widely used by the public because so far Litsea cubeba leaf extract has been included in mixed tea products in green tea powder. Because of that, it is necessary to analyze the antioxidants in Litsea cubeba tea.

The basic drying time in the process of making this herbal tea refers to or is guided by other herbal teas including mangosteen peel, soursop and celery

leaves which have proven superiority with a drying time of 150 minutes at most, 30 minutes at the fastest, for that it is taken 30 minutes to 150 minutes.

This drying time also determines the quantity and quality of herbal teas from all observation tests on the quality of tea being made into drinks that are efficacious for our bodies in addition to hard-to-find class compounds from the results of research on the presence of secondary metabolic group compounds (steroids/terpenoids, alkaloids, flavonoids and tannins). Furthermore, to recognize the potential of Litsea cubeba leaves in the presence of active compounds attached to the body of the leaves, they are efficacious as functional drinks that can be used as herbal medicines for viral diseases (cancer).

MATERIALS AND METHODS

Material

Litsea cubeba leaves were taken starting from the fifth leaf to the third leaf from the base of the stem in an industrial Litsea cubeba tree, these leaves were taken in gardens in the Papandayan mountain forest, West Java as samples that grew a lot in that location, while in Kampar, Riau they did not get too much type/species cubeba, but indica species (Litsea indica) is also made as herbal medicine, Mg powder, concentrated HCI, amyl alcohol, 0.07 mM diphenyl pycril-hydrazyl (DPPH) solution and methanol pa

Tool

Baking sheet, oven, UV-VIS spectrophotometer, mortar, stamper, filter paper, funnel, drupple plate separator, small glass, small spoon and questionnaire paper.

Research procedure

First of all, this research procedure included sample preparation, preparation of Litsea cubeba leaf tea, preparation of Litsea cubeba tea solution, water content test, qualitative test of phenolic compounds from the flavonoid group, quantitative test of antioxidant activity (DPPH and EC50 methods) and test of organoleptic properties (scoring method).

1. Sample Preparation

Litsea leaves were obtained from the West Java area of Mount Papandayan (tourist forest) taken in the morning at 06.00 WIB, then the Litsea cubeba leaves were separated from the branches.

2. The process of making Litsea cubeba leaf tea

Litsea cubeba leaves are washed and sorted. Litsea cubeba leaves are carried out through a withering process at 70 °C for 4 minutes, cooled for 5 minutes and then rolled. After being rolled, the drying process is carried out at 50 °C with a drying time of 30; 60; 90; 120 and 150 minutes, finally tested for water content.

3. The process of making Litsea cubeba leaf tea solution

Litsea cubeba leaf powder, weighed 100 mg and added 10 ml of hot water. Hot water, then put in a water bath and brought to a boil.

4. Antioxidant Activity Test

a. Qualitative Test of Phenolic Compounds

Take 5 ml of Litsea cubeba leaf tea drink, put it in a test tube, then add 5 drops of 5% FeCl3 solution and shake until smooth. The formation of blackish blue color after the addition of 5% FeCl3 indicated the presence of phenolic group compounds.

b. Qualitative Test of Compounds of the Flavonoid Group

Take 5 ml of Litsea cubeba leaf tea and put it in a test tube. Then added Mg powder. 1 ml concentrated HCI and 5 ml amyl alcohol and shaken until smooth. The formation of orange color in the solution indicates the presence of flavonoids.

c. Qualitative Antioxidant Activity Test (test the antioxidant activity of the DPPH method, Yhunkun, 2018)

Antioxidant activity was carried out by taking 4 ml of 0.07 mM DPPH solution, then putting it into a test tube and adding 50 µl of Litsea cubeba leaf tea solution and homogenizing with a vortex, DPPH solution was used as a control without the addition of the test solution. Then the solution was measured with a UV-VIS spectrophotometer at a wavelength of 517 nm and operating time of 40 minutes.

d. Antioxidant Activity Test with Effective Concentration (EC50) according to Yhunkun (2018)

Antioxidant activity is the value of efficient concentration 50 (EC50), namely the concentration of an antioxidant substance can cause 50% of DPPH to lose its free radical character or the concentration of an antioxidant substance that provides % free radical inhibition 50% Substances that have high antioxidant activity will have a value of EC50 low (Momerinux, 2018).

5. Test the Organoleptic Properties with the Scoring Method

Organoleptic testing included taste, color, aroma and appearance. The panelists gave an assessment in the form of scores on the organoleptic test blocks for Litsea cubeba tea and Litsea cubeba tea drinks.

RESEARCH DESIGN

The research design was a completely randomized design (CRD) with a single factor, because one level of treatment was carried out. The independent variable was the drying time of Litsea cubeba tea leaves and the dependent variable was the antioxidant activity and organoleptic properties of Litsea cubeba leaf tea. The number of treatments was determined by 5 treatments (P) and each treatment was repeated 4 times (U). Determination of replicates using the error formula (P-1) x (U-1)-(5-1) x (4-1) 4x3 12. If in this study there were 5 treatments and 4 repetitions, the total error = 12.

The data obtained from the measurement of antioxidant activity were analyzed using the ANOVA (Analysis of Variant) test for effect, while the data from the organoleptic tests were tabulated and analyzed using the Friedman test.

RESULTS AND DISCUSSION

The manufacture of Litsea cubeba leaf tea is based on Rangga's research (2018). The tea leaves were withered at 70°C for 4 minutes. The withering operating conditions were guided as the optimum conditions for withering Litsea cubeba leaves in this study. The process of drying Litsea cubeba leaves, drying 30, 60, 90, 120 and 150 minutes. Tests carried out by the resulting Litsea cubeba leaf tea products included testing for water content, testing for antioxidant activity, and organoleptic properties.

Water content

Moisture content has an important role in determining the characteristics and duration of food storage. The results of the analysis of the water content of Litsea cubeba leaf tea with the long drying treatment can be seen in Figure 1.

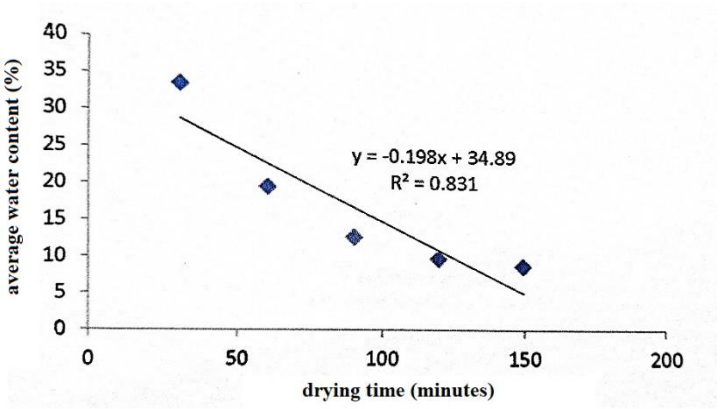

Figure 1. Water content of Litsea cubeba leaf tea

Figure 1 shows that the highest water content was in the 30-minute drying treatment, amounting to 34.15% and the lowest water content was found in the 150-minute drying treatment, amounting to 8.15%. The results of the ANOVA statistical test using 0.05 obtained data at a significant level of p-value: 0.00 where the p-value <0.01, it can be concluded that drying time has a very significant effect on moisture content.

The water composition of foodstuffs, such as free water and bound water, can affect the rate or duration of drying of food ingredients. Bound water is water contained in foodstuffs. Free water is water that is physically bound in a network of material matrices such as membranes, capillaries, fibers and others, essentially free from components in plant and animal cell materials, in other words outside of cell bonds (Warenok, 2018).

Antioxidant Activity Test

a. Qualitative Test of Phenolic Compounds

The results of the qualitative test of Litsea cubeba leaf tea phenolic compounds can be seen in Table 1 below.

Table 1. The results of the qualitative test of the phenolic group of Litsea cubeba leaf tea Pers.

Drying Time	Phenolic Compounds
30 minutes	+
60 minutes	+
90 minutes	+
120 minutes	+
150 minutes	+

Notes: + Litsea cubeba leaf tea samples were positive for phenolic group compounds

Table 1 states that the results obtained positively contain phenolic group compounds in the opinion of Rahman (2018) explaining that FeCl3 reacts with phenolic groups to form green, purple to black complexes, the presence of these colors is a sign of the presence of phenolic group compounds in the plant material.

b. Qualitative Test of Compounds of the Flavonoid Group.

The results of the qualitative test of compounds belonging to the flavonoid group can be seen in Table 2 below.

Table 2. The results of the qualitative test of compounds belonging to the class of flavonoids in tea leaf Litsea cubeba Pers.

Drying Time	Flavonoid Compounds
30 minutes	+
60 minutes	+
90 minutes	+
120 minutes	+
150 minutes	+

Note: + Litsea cubeba leaf tea samples were positive for flavonoid compounds

Table 2 can be seen that the results obtained were positive indicating that all the drying time treatments contained compounds of the flavonoid class. This is in accordance with the opinion of Robinson and Radiatum (2018), compounds belonging to the flavonoid group react with magnesium powder and the help of concentrated HCl to form complexes with green to orange flavonoid groups. The appearance of an orange color from the Mg flavonoid complex indicates the presence of this group of compounds.

c. Antioxidant Qualitative Test

1. Antioxidant qualitative test with the DPPH method

The results of the antioxidant analysis of Litsea cubeba leaf tea with the DPPH method can be seen in Figure 2.

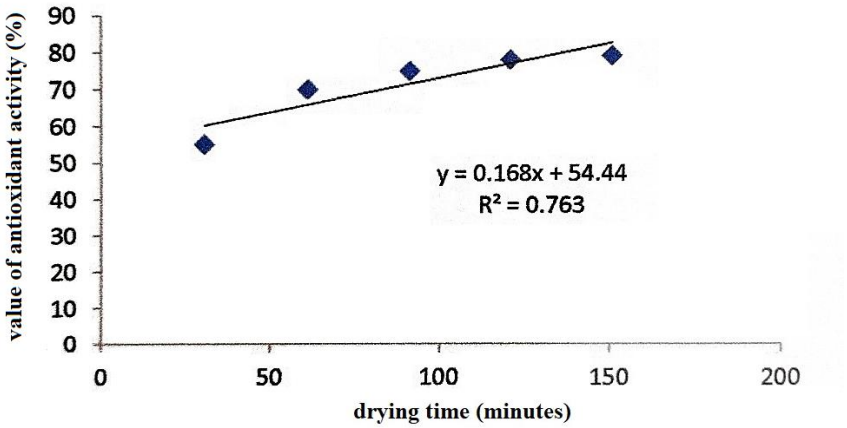

Figure 2. Antioxidant activity

From Figure 2 it is found that the longer the drying time the higher the antioxidant activity. The highest antioxidant activity was found in Litsea cubeba leaf tea samples with 150 minutes of drying time, which was 76.10% and the lowest was 53.5% in 30 minutes of drying. The results of the ANOVA test showed a p-value of 0.00 where a p-value <0.01 showed that drying time had a very significant effect on antioxidant activity. This condition is due to the drying process resulting in an increase in the active substances contained in the tea leaves (Weinght, 2018). This is also in the opinion of Winarno (2018) that the drying process has an effect and increases the active substances contained in the composition of tea leaves.

2. Antioxidant Activity Test with an Effective Concentration Value of 50 (EC50)

The results of the antioxidant analysis of Litsea cubeba leaf tea with the EC50 value can be seen in Figure 3.

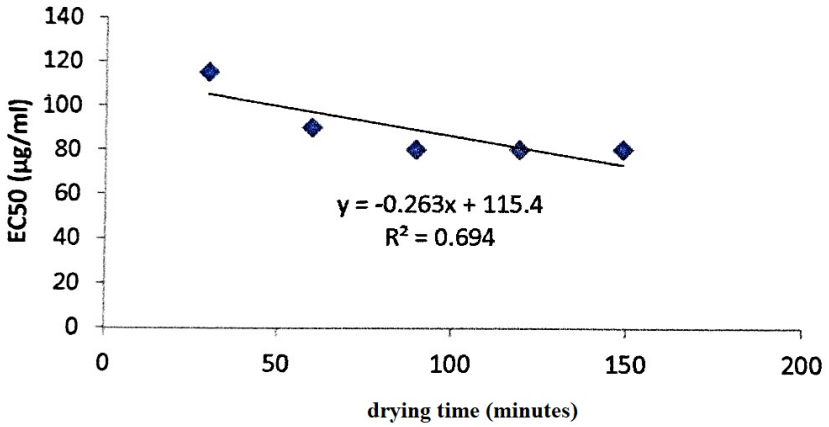

Figure 3. EC50 value of Litsea cubeba leaf tea

Figure 3 shows that the longer the drying time, the lower the EC50 value, so that the lowest value was 82.20 µg/ml for 150 minutes of drying and the highest was 117.90 µg/ml for 30 minutes of drying. The results of the ANOVA test yielded a p-value of 0.00 where the p-value <0.01 obtained that the drying time had a very significant effect on the EC50 value

The EC50 value is used to express the antioxidant activity of a test substance using the DPPH free radical immersion method. The EC50 value is inversely proportional to the ability of the compound to act as an antioxidant. The smaller the EC50 value, the stronger the antioxidant power (Molyneus, 2018).

Organoleptic Properties

a) Litsea cubeba leaf tea organoleptic

Texture

The texture of good tea is rough where the drying process of tea leaves can cause changes in pectic acid. Pectic acid will dry out and form a kind of varnish so that the surface of the tea becomes dry and rough. The results of the average panelist study on the texture of Litsea cubeba leaf tea can be seen in Figure 4.

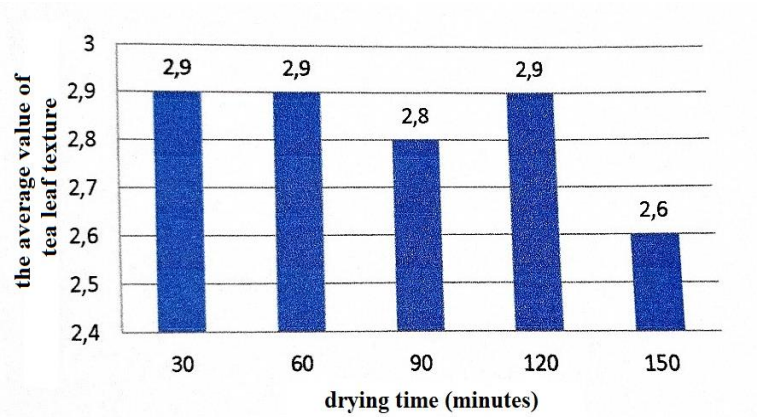

Figure 4. The results of the panelist's assessment of the color of Litsea cubeba leaf tea

The highest organoleptic value for tea texture was obtained by drying time of 30, 60 and 120 minutes, which was 2.9, while the lowest value was found for tea with a drying time of 150 minutes, which was 2.7. Friedman test results using P-0.05 obtained significant data level p-value 0.46 where p-value> 0.05 stated that there was no effect of drying time on the texture of Litsea cubeba leaf tea

Aroma

According to the SNI 03-3836-2012 standard, a good aroma for Litsea leaf tea is normal, namely the distinctive aroma of tea. According to Cahyudi (2018) states that the compounds that make up the aroma of tea mainly consist of volatile and reducing essential oils so that they can produce a fragrant aroma in tea.

The results of the panelists' average research on the aroma of Litsea cubeba leaf tea can be seen in Figure 5.

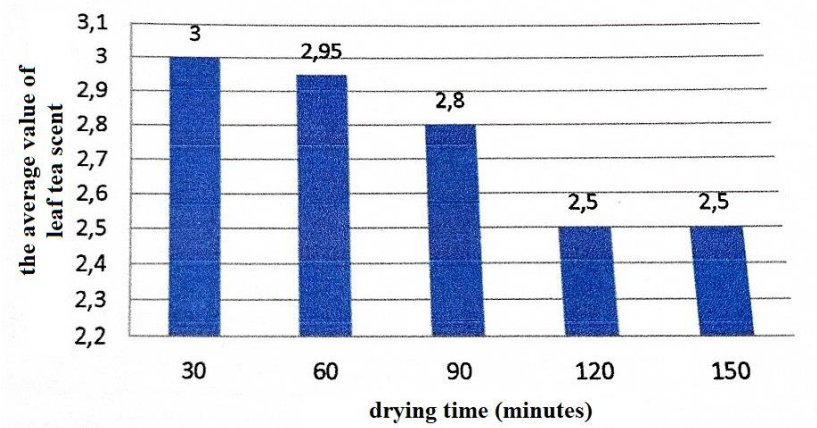

Figure 5. The results of the panelists' assessment of the aroma of Litsea cubeba leaf tea

The highest aroma value was found in the tea sample with 30 minutes of drying time, equal to 3, while the lowest aroma value was found in the tea sample with 150 minutes of drying time, amounting to 2.5. Friedman's test results obtained 0.00 (p-value <0.01) so that it can be obtained that there is a very significant effect of drying time on the aroma of Litsea cubeba leaf tea.

Color

According to the SNI 03-3836-2012 standard, the color of good tea is normal, namely brownish green. The drying process causes the green color of chlorophyll in the leaves to oxidize to brown. This is due to a browning event (Handani, 2018).

The results of the panelists' average assessment of the color of Litsea cubeba leaf tea can be seen in Figure 6.

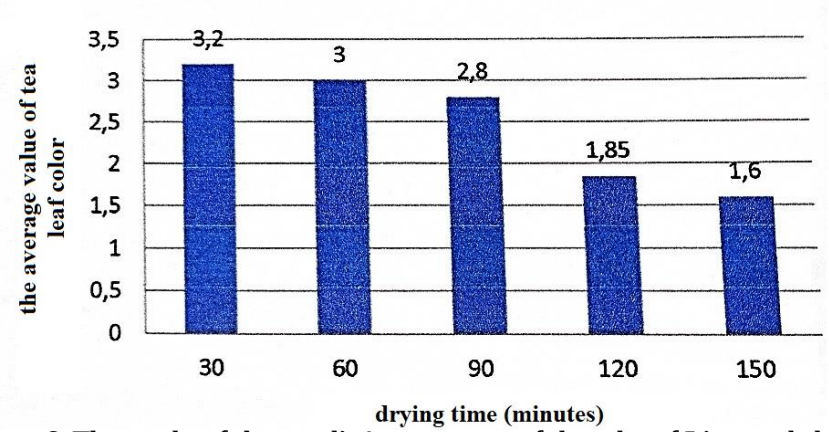

Figure 6. The results of the panelist's assessment of the color of Litsea cubeba leaf tea

The highest color value was found in the tea sample with 30 minutes of drying time, at 3.2. The lowest was found in the tea sample with a drying time of 150 minutes at 1.6.

The Friedman test results obtained a p-value of 0.00 where the p-value <0.01 so that it was obtained that there was a very significant effect of drying time on the color of Litsea cubeba leaf tea.

b) Litsea cubeba leaf tea organoleptic

Flavor

According to the SNI 01-3143-1992 standard, the good taste of Litsea cubeba leaf tea is normal, namely the astringent taste. Catechins are tannins which do not have tanning properties and collect proteins to produce an astringent taste.

The average results of the panelists' assessment of the Litsea cubeba leaf tea taste problem can be seen in Figure 7.

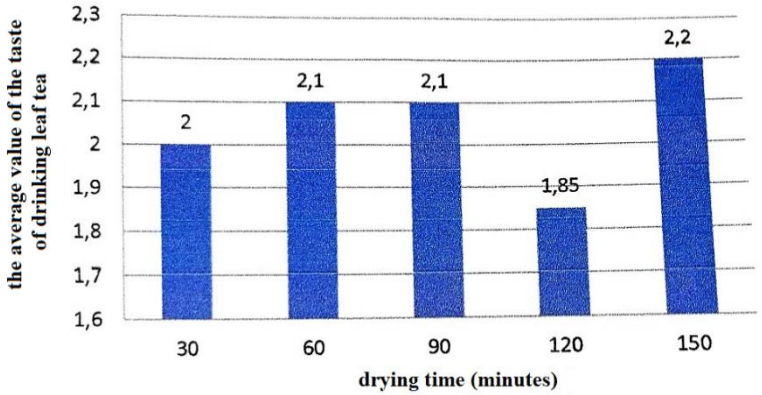

Figure 7. The results of the panelist's assessment of the taste of Litsea cubeba leaf tea

The highest taste value was found in the 150-minute drying sample, which was 2.5, while the lowest value was found in the 30-minute drying sample, which was 2. The Friedman test results used p. 0.05 data obtained a significant level of p-value 0.46 where p-value> 0.05 obtained no effect of drying time on the taste of Litsea cubeba leaf tea.

Aroma

According to the SNI 01-3143-1992 standard, the aroma of a good Litsea cubeba leaf tea drink is normal, namely fragrant. The drying process of gallic acid will be oxidized into thearubigin (TR) compound, this compound has an effect on fragrant aroma (Kim et al., 2018).

The results of the panelists' average assessment of the aroma of Litsea cubeba leaf tea can be seen in Figure 8.

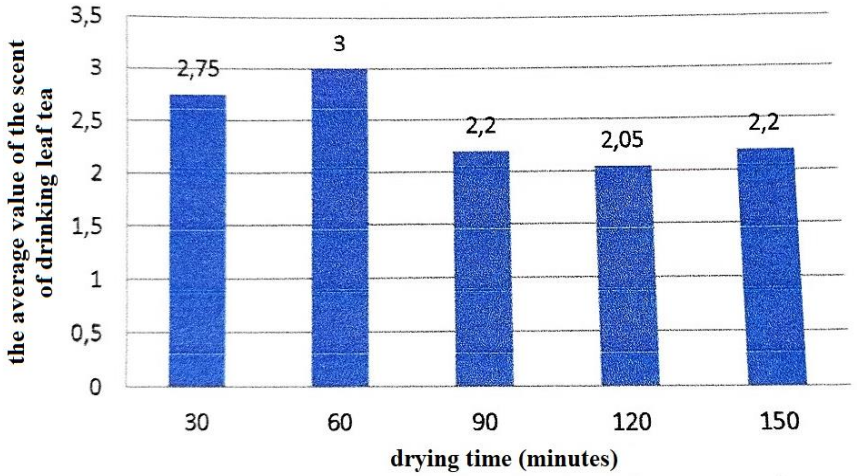

Figure 8. The results of the panelist's assessment of the aroma of Litsea cubeba leaf tea

The highest aroma value of Litsea cubeba leaf tea was obtained at 60 minutes of drying time, at 3.0, while the lowest value was found at 120 minutes of drying time, at 2.05. The Friedman test results obtained a p-value of 0.00 where a p-value <0.01 obtained a very significant effect of drying time on the aroma of Litsea cubeba leaf tea.

Color

According to the SNI 01-3143-1992 standard, the color of a good Litsea cubeba leaf tea drink is normal, namely bright.

The results of the panelist average research on the color of the Litsea cubeba leaf tea drink can be seen in Figure 9.

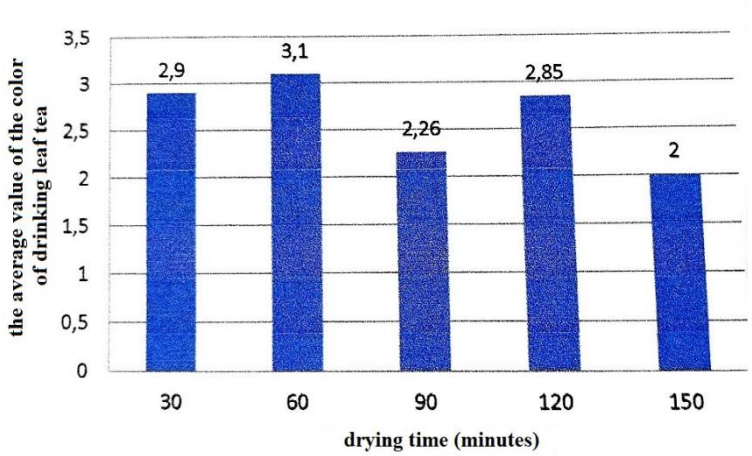

Figure 9. The results of the panelist's assessment of the color of the Litsea cubeba leaf tea drink

The highest drink color value was found in the 60 minute drying time sample of 3.1, while the lowest value was obtained for 120 minute drying time, amounting to 2.0. The Friedman test results obtained a p-value of 0.00 where a p-value <0.01 means that there is a very significant effect of drying time on Litsea cubeba leaf tea. In accordance with Arifan's opinion (2018) explaining the problem of the color of tea, the tea flavin compound gives a yellowish-red, bright color and affects the clarity of the brew.

Viscosity

According to the SNI 01-3143-1992 standard, the viscosity of a good Litsea cubeba leaf tea drink is normal, that is thick. Tea catechins are oxidized to orthoquinones which condense to form theaflavins (TF). This compound is responsible for the thickness of the tea (Hamsal et al., 2018).

The highest viscosity value of tea drink was 2.05 for 30 and 60 minutes of drying time, while the lowest value was 120 minutes of 120 minutes of drying time, 1.6. The results of the Friedman test using p-0.05 obtained data with a significant level of p-value 0.76 where the p-value> 0.05 so that the drying time can be obtained for the viscosity of Litsea cubeba leaf tea drink.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The results of the study can be concluded from the results obtained that there is an effect of drying time on the antioxidant activity of Litsea cubeba leaf tea. The operational conditions for drying tea leaves at 50°C with a drying time of 150 minutes produced Litsea cubeba leaf tea with the highest antioxidant activity, the lowest EC50 value, but under these operational conditions, Litsea cubeba leaf tea had the lowest organoleptic value, especially taste. Obtaining Litsea cubeba leaf tea which is good in terms of antioxidant and organoleptic activity, it is necessary to do research on the effect of adding essence to the manufacture of Litsea cubeba leaf tea

Suggestion

Further research is needed on sampling the young and old leaves of the Litsea cubeba industrial tree because the age of the leaves also affects the efficacy and amount of antioxidant content, as well as the financial analysis including the packaging used for herbal tea packaging for the Litsea cubeba leaf commodity.

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