

**THE EFFECT COMPARISON OF BINAHONG LEAVES
(*Anredera cordifolia* (Ten.) Steenis) HERBAL TEA WITH TEA
LEAVES (*Camellia sinensis*) AND THE DRYING
TEMPERATURE OF HERBAL TEA CHARACTERISTICS**

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THE EFFECT COMPARISON OF BINAHONG LEAVES (*Anredera cordifolia* (Ten.) Steenis) HERBAL TEA WITH TEA LEAVES (*Camellia sinensis*) AND THE DRYING TEMPERATURE OF HERBAL TEA CHARACTERISTICS

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ABSTRACT

The purpose of this research to study a comparison binahong leaves with leaf tea and the temperatures of drying the characteristics of binahong leaf herbal tea. The benefits of this research is to provide information to the public regarding the manufacture of binahong leaf herbal tea leaves and enrich beverage products are beneficial for health.

This research was divided into two stages, names preliminary and primary research. The preliminary research conducted to determine the time of drying was an effective herbal tea with a level of 5 hours, 6 hours and 7 hours. In the main research was used Randomized Block Design (RBD) consists of 2 factors and each factor covered 3 levels with 3 times replicated and 27 units of experimental combination was obtained. First factor was used the comparison binahong leaves with tea leaves, namely: p1 (2: 1), p2 (1: 1) and P3 (1: 2) and the drying temperature, namely: s1 (50 °C), s2 (55 °C) and s3 (60 °C). The chemical response was on water content, ash content, antioxidant activity, saponin and organoleptic tests include color, aroma, taste and after-taste of herbal tea steeping leaves binahong using the hedonic test.

The results of preliminary research shows that times drying for 5 hours was selected for the primary research. The treatment chosen is p₁s₃ (comparison binahong leaves with leaf tea 2 : 1 and drying temperature 60 °C) have a water content 5,57%, ash content 3,09%, have antioxidant activity 360,5 ppm and positive contain saponin.

PRELIMINARY

Indonesia is rich in traditional medicinal plants that have historically been used as a traditional medicine. Traditional treatment with medicinal plants expected to be utilized in the development of public health. The advancement of

knowledge and modern technologies are not able to shift the role of traditional medicine, even when the government is encouraging the treatment of back to nature. (Apriani, 2015

Tea is one of the non-alcoholic beverages are very popular and mainstream society. Aside from being a refreshing drink, tea has long been believed to have many benefits for health. Tea is not only consumed as a beverage, tea extracts also were added in a variety of food products and cosmetics (Hartayo, 2003).

Herbal tea or herbal tea is one product of a mixed drink teas and herbs have efficacy in helping the treatment of a disease or as a pick-me-up body (Hambali, et al 2005).

Background made drink tea in this study are based on the benefits of tea as an antioxidant and modify drink tea with the addition of other materials which also has health benefits. Ingredients are added is binahong leaves. Binahong contains antioxidant compounds, alkaloids, polyphenols, flavonoids, saponins, and ascorbic acid sufficiently high so useful and the potential to treat several types of ailments.

Based on the lack of utilization of the leaves binahong and their elements in tea as givers taste, color and aroma it is Necessary to Investigate the comparison leaves binahong with tea leaves and a drying temperature of the right to Obtain herbal tea leaf Binahong has good characteristics and preferred by paneilst.

METHOD

The main raw material used for this study is the tip (p + 2 and p + 3) leaf tea (*Camellia sinensis*) obtained from Ciwidey and old leaves binahong (*Anredera cordifolia* (Ten.) Steenis) obtained from Antapani, Bandung , The materials used for the analysis is DPPH powder, methanol, distilled water, schools luff solution, 6 N H₂SO₄, KI, raw Na₂S₂O₃ 0.1 N, starch indicator, chloroform, Na₂SO₄ anhydrous, anhydrous acetate and 2N HCl.

The tools used for the manufacture of herbal tea binahong leaf is tray, analytical balance and tunnel dryer. The tools used for the analysis was an oven, porcelain dish, desiccators, refraktrometer, analytical balance, test tubes, pipettes volumetric, pipette, spray bottle, flask, beaker, flask, cuvette and spectrophotometer.

The method used consisted of preliminary research and primary research. Preliminary research conducted aims to establish the best drying time will be applied to the main study, the drying time herbal tea that will be used is 5 hours, 6 hours to 7 hours with the dam 55°C and conduct analysis for organoleptic attributes of color, aroma, flavor and after-taste. Testing was conducted by 30 panelists somewhat trained.

Based on the results of the preliminary study organoleptic, selected samples will be used in the main study.

The main research is to determine the effect of comparison binahong leaves with leaf tea and herbal tea drying temperature against. The main study was conducted using Random Design (RBD), which consists of two factors. The first factor is the ratio binahong leaf and tea leaf (P) consists of three levels, namely:
p1 binahong leaf: leaf tea = 2: 1
p2 binahong leaf: leaf tea = 1: 1
p3 binahong leaf: leaf tea = 1: 2

The second factor is the herbal tea leaf drying temperature binahong (S) consists of three levels: s1 (50 °C), s2 (55 °C), s3 (60 °C). each treatment was done 3 times restating.

Description of the experiment is as follows:

1. Preparation of materials The tea leaves and leaves of fresh binahong prepared to do further processing.
2. Sorting Sorting of raw materials is an early stage that needs to be done by selecting and separating the leaves that are still intact and not damaged, this can be done by hand.
3. Mixing Binahong old leaves and the tea leaves are mixed with a ratio of 2: 1 (p1), 1: 1 (p2) and 1: 2 (p3).
4. Laundering Materials are washed using flowing water to clean dirt or

dust on the surface of the leaves and clean the skin of microorganisms attached.

5. Drying Leaves Binahong already dicu-ci, then drying using a tunnel dryer with a temperature of 50 °C (s1), 55 °C (s2), 60 °C (s3) with a drying time selected.

6. Test Response Appearance Response organoleptic dila-kukan against herbal tea products based on color, aroma, flavor and after-taste. This organoleptic test using a hedonic scale.

7. Chemical Analysis Chemical responses that do is to determine the content of the water content by gravimetric method, the ash content by gravimetric method, antioxidant activity with DPPH and saponin foam test method.

RESULTS AND DISCUSSION

Preliminary Research

The preliminary research is to determine the long drying time binahong leaf herbal teas, the selected time will be used in the main study. Time used is 5 hours, 6 hours and 7 hours at 55°C. Response to choose the best drying time is done using hedonic test against binahong leaf herbal teas which include color, aroma, flavor and after-taste. Testing was conducted by 30 panelists with test results as follows:

Table 1 Test Results Appearance Determining Drying Time

Time (hour)	Average Value			
	Color	Aroma	Taste	After Taste
5	4,10 a	4,13 a	3,77 a	3,80 b
6	4,10 a	3,93 a	3,73 a	3,97 b
7	4,63 b	3,93 a	3,40 a	3,37 a

Description: The average treatment followed by the same letter do not show significant differences according to Duncan test at 5%

Color

The results of further test analysis on binahong leaf herbal teas with different drying time of the color of the leaf herbal tea steeping binahong in Table 1 shows the drying treatment for 7 hours differ by drying for 5 and 6 hours. This is due to the color of steeping the tea is dried for 7 hours has a brown color and resembles the color of tea in general compared to drying for 5 and 6 hours that have the color of steeping tea yellow transparent, allowing panelists preferred the color brewed herbal tea leaf binahong for 7 h with an average value of 4.36.

Aroma

Results of analysis of variance showed that the drying time does not affect the aroma of herbal tea steeping leaves binahong. This is due to the resulting aroma of herbal tea leaves is not significant binahong of each treatment. Aroma is defined as one that can be observed with the sense of smell. Assessment of the aroma influenced by psychological and physiological factors that lead to different opinions (Winarno, 1997).

Flavor

Results of variance analysis showed that the longer the drying effect on the taste of herbal tea steeping leaves binahong. This is due to the bitter taste of tea that is produced does not differ significant. A taste of herbal tea steeping influenced by a bitter taste originating from the active substance content which can cope with various health problems that alkaloids.

After Taste

Results of analysis of variance showed that the effect on the drying time after taste binahong leaf herbal tea steeping. Further test the effect of drying time of the after-taste of herbal tea steeping leaves binahong in Table 1 shows the drying process for 5 and 6 hours differ by drying for 7 hours. This is due to a sense of steeping the tea is dried for 5 and 6 hours is not too bitter when compared to drying for 7 hours, as it has been known that after taste is the taste that is still tetinggal in the mouth after after eating or drinking something so bitter taste will more durable in the after taste.

Results of a preliminary study based on the criteria of the organoleptic most preferred by the panelists can be concluded that the drying of herbal tea leaf binahong for 5 hours, 6 hours and 7 hours the same result but drying more efficient is the treatment of drying for 5 hours, so that the drying time for 5 hours be selected and further parameters to be used in the manufacture of herbal tea leaves binahong on primary research.

Main research

The main research is a continuation of the preliminary study. The main research was conducted to determine the effect of the tea leaves and leaf ratio binahong and drying temperature on the characteristics of binahong leaf herbal tea. Based on preliminary research results obtained results are used drying time is 5 hours.

Chemical response includes the analysis of water content, ash content, antioxidant activity analysis and qualitative analysis of saponin.

Water content

Based on the ANOVA calculation, comparison binahong leaves and leaf tea, the drying temperature and their interaction effect on water levels binahong leaf herbal tea. This is due to the moisture content of tea leaves which is lower than the leaf binahong and high drying temperature can pick up moisture from the more material, so that the high temperature treatment and comparison drying tea leaves that many results will be lower water content. Effect of interaction comparison binahong leaves with leaf tea and drying temperature on water content binahong leaf herbal teas can be seen in Table 2.

Table 2 Effect of Interaction Comparison with Leaf Tea Leaf Binahong and Drying Temperature Of Herbal Tea Leaf Water Content Binahong

Comparison of Leaf Binahong and Tea Leaf (p)	Water Content (%)		
	The Drying Temperature 50°C (s ₁)	The Drying Temperature 55°C (s ₂)	The Drying Temperature 60°C (s ₃)
2 : 1 (p ₁)	6,89 B c	6,22 A b	5,57 A a
1 : 1 (p ₂)	7,18 B c	6,53 A b	5,22 A a
1 : 2 (p ₃)	6,16 A b	6,16 A b	5,19 A a

Description: The average treatment followed by the same letter do not show significant differences according to Duncan test at 5% level. Notation capital letters read vertically, whereas lowercase notation is read horizontally.

The results of the analysis of water content of the leaf herbal teas p2s1 binahong indicate that treatment has an average value of the highest of 7.18% while the p3s3 treatment had the lowest average value that is equal to 5.19%. In the results table above shows the higher the drying temperature and the more the tea leaves, the lower the average value of the water content of herbal tea leaf binahong, this is due to the water content in the leaves binahong higher than the moisture content of the tea leaves, so the more the tea leaves the lower the water content measured. As it is known that the more the heat

received by the material resulting in the amount of water evaporated in the growing number of food and water content were measured to be low.

Ash Content

Based on the ANOVA calculation, comparison binahong leaves and leaf tea, the drying temperature and their interaction effect on ash content binahong leaf herbal tea. Effect of interaction comparison binahong leaves with leaf tea and the drying temperature of the ash content binahong leaf herbal teas can be seen in Table 3.

Table 3 Effect of Interaction Comparison with Leaf Tea Leaf Binahong and Drying Temperature Levels Ash Content Of Binahong leaves Herbal Tea

Comparison of Leaf Binahong and Tea Leaf (p)	Ash Content (%)		
	The Drying Temperature 50°C (s ₁)	The Drying Temperature 55°C (s ₂)	The Drying Temperature 60°C (s ₃)
2 : 1 (p ₁)	4,11 B b	4,07 A b	3,09 A a
1 : 1 (p ₂)	5,05 C b	4,07 A a	4,04 B a
1 : 2 (p ₃)	4,04 A b	4,05 A b	3,06 A a

Description: The average treatment followed by the same letter do not show significant differences according to Duncan test at 5% level. Notation capital letters read vertically, whereas lowercase notation is read horizontally.

The results of the analysis of the ash content of the herbal tea leaf p2s1 binahong indicate that treatment has an average value of the highest of 5.05% while the p3s3 treatment had the lowest average value that is equal to 3.06%. In the results table above

shows the higher the drying temperature the lower the average ash content of herbal tea leaf binahong, this is due to the heat received by the material the more so that the amount of inorganic materials contained in foodstuffs

more evaporative and ash measured to be low. The more the ash content of the tea leaf herbal teas binahong the lower leaves, this is due to solids at binahong leaves more than the tea leaves so that the ash content measured to be low. Judging from the value obtained regarding herbal tea leaf ash content binahong showed that all treatments have met the quality requirements of dried tea, when referring to the quality requirements of dried tea (dried tea SNI) for a maximum of 8%.

Antioxidant activity

Based on the ANOVA calculation, comparison binahong leaves and leaf tea, the drying temperature and their interaction effect on antioxidant activity binahong leaf herbal tea. Effect of interaction comparison binahong leaves with leaf tea and drying temperature on water content binahong leaf herbal teas can be seen in Table 4.

Table 4 Effect of Treatment Comparison of Leaf Binahong Interaction with Leaf Tea and Antioxidant Activity Against Drying temperature Herbal Tea Leaf Binahong

Comparison of Leaf Binahong and Tea Leaf (p)	Antioxidant Activity (ppm)		
	The Drying Temperature 50°C (s ₁)	The Drying Temperature 55°C (s ₂)	The Drying Temperature 60°C (s ₃)
2 : 1 (p₁)	390 B b	388 C b	360,5 B a
1 : 1 (p₂)	319 C b	304 B a	303 C a
1 : 2 (p₃)	279 A b	259,5 A c	250 A a

Description: The average treatment followed by the same letter do not show significant differences according to Duncan test at 5% level. Notation capital letters read vertically, whereas lowercase notation is read horizontally

In the table above shows that the processing with the higher temperature drying, the smaller the value of antioxidant activity showed that the activity is getting strong or active, this is due to the antioxidant compound is very easy to change one of various types of treatment may

result in the loss of antioxidant compounds found on the sample. Treatment comparisons and drying temperature gives a different response because the content of antioxidants in herbal tea such as polyphenols in tea through a drying process

are high can stop the enzymatic oxidation of polyphenol compounds in tea on the composition of substances supporting quality achieve optimal state, so that the antioxidant activity is getting stronger.

Based on Table 4 antioxidant activity present in the sample code binahong p3s3 ratio and leaf tea leaves 1: 2 and a drying temperature of 60 ° C with a value of 250 ppm, but according jun, et al (2003) IC50 values of 250-500 ppm relatively weak antioxidant activity.

Color

Result Analysis of Variance (ANOVA) in Annex 9 shows that the ratio of leaf binahong with tea leaves and interaction comparison with the drying temperature affects the color of the leaf herbal tea steeping binahong, while the drying temperature has no effect to color binahong leaf herbal tea steeping. This is due to the dried food turns brown, leaf tea and dry faster than the leaves binahong so steeping the resulting color will be darker and less preferred by the panelists. In the appendix shows that the lower the drying temperature and the more the tea leaves then the sample is more preferred by the panelists, this is due to the color of steeping the tea is dried with a high temperature color is brown and dense, while the tea is dried at a low temperature has a

yellow color clear as the water content in herbal tea by drying 50°C binahong still high, thus causing during the process of brewing herbal tea leaves steeping color binahong not come out optimally.

Aroma

Result Analysis of Variance (ANOVA) showed that the ratio of tea leaves and leaf binahong and interaction comparison with the drying temperature affects the aroma of herbal tea steeping leaves binahong, while the drying temperature does not affect the aroma of herbal tea steeping leaves binahong. This is due to the content of alkaloids in tea leaves can create a distinctive aroma to the brew herbal teas, so the aroma of herbal tea steeping the tea leaves plenty of comparison will be preferred by the panelists. Effect of interaction comparison with the drying temperature to brew herbal tea aroma leaf tea binahong show more and more the higher the average value that indicates more preferred by the panelists, this is due to the distinctive aroma of tea out more dominating than the aroma of leaves binahong. Aroma is defined as one that can be observed with the sense of smell. Assessment of the aroma influenced by psychological and physiological factors that cause different opinions. (Winarno, 1997).

Flavor

Result Analysis of Variance (ANOVA) in the appendix shows that the ratio of tea leaves and leaf binahong and drying temperature significantly affect the taste of herbal tea steeping leaves binahong. The more the tea leaves greater average value which indicates more preferred by the panelists, this is not too bitter taste of the tea, and the least bitterness issued by binahong leaves. As is known binahong leaf used was an old leaf and possibly a higher content of polyphenols resulting bitter taste that is less preferred by the panelists.

Reckon on leaf herbal tea steeping binahong panelists preferred samples are binahong with herbal tea leaf drying temperature 60 ° C, this is not too bitter tea taste than others. A taste of herbal tea steeping influenced by a bitter taste originating from the active substance content which can cope with various health problems that alkaloids.

After Taste

Organoleptic test results in the table above to the after-taste of herbal tea steeping leaves binahong show panelists preferred the after-taste in the process of drying at 60 ° C. This is due to a sense of steeping the tea is dried at a temperature of 60 ° C is not bitter than others, as it has been known that after taste is the taste that is still tetinggal in the

mouth after after eating or drinking something so bitter taste will be more durable in the after-taste , The bitter taste arising resulting from the active substance which is an alkaloid.

Analysis of Saponin

The results of the qualitative analysis of saponin in Table 4.10 shows on all of the positive samples containing saponins. Binahong leaves contain a compound known as saponins, saponin is a surface-active compounds and are like soap can be detected by the ability to form foam. Saponin is a compound in the form of glycosides which are widespread in higher plants. Saponins form a colloidal solution in water and form stable foam when shaken and did not disappear with the addition of acid. Some saponins work as an antimicrobial. (Robinson, 1995).

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

1. In a preliminary study, la-ma-drying time dipi cf. for use on primary research was the time of 5 hours.
2. Comparison of the leaves with leaf tea binahong significant effect on water content, ash content, antioxidant activity and organoleptic parameters of color, flavor and taste, but ti-dak significantly affect after-taste.
3. The drying temperature significant effect on water content, ash content,

the activity of antioxidants-and organoleptic parameters flavor and after-taste, but did not significantly affect the organoleptic parameters of color and aroma.

4. Interaction between the ratio of leaf and leaf tea binahong dengan drying temperature significantly affected the moisture content, ash content, antioxidant activity, organoleptic parameters of color and flavor, but does not significantly affect the organoleptic parameters aroma and after taste.

5. Based on the calculation Election-han selected products, the products chosen are the product code p1s3 ratio bina-hong leaves and tea leaves 2: 1 with a drying temperature of 60 ° C.

Suggestion

1. It is necessary to do further research to find out-ruh Oversight of storage and packaging conditions of the herbal tea.

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