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Submission date: 28-Jun-2019 01:24PM (UTC+0700)

Submission ID: 1147656955

File name: An_analysis_of_antioxidants_organoleptics_and_hedo.pdf (212.99K)

Word count: 2348

Character count: 12461

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To cite this article: Fahmi Arifan *et al* 2018 *J. Phys.: Conf. Ser.* **1025** 012066

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An analysis of antioxidants, organoleptics and hedonics with variations of boiling time in Jasmine tea and Jasmine root tea a study on Kaliprau, Pemalang

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Abstract. There are so many jasmine plantations without any preservation and post production in Kaliprau, Pemalang. The aims of this research are analyzing the amount of antioxidant and organoleptic-hedonic test. The measurement of antioxidant used in this research is using DPPH. The organoleptic and hedonic test on 25 respondents. Jasmynes that been used on this research are the flower and the root part.

Through the test, some results have been found from the jasmine tea's sampling with the boiling time of 15 minutes and it contain antioxidant for about 55.0% and 74.84% for the jasmine root tea. Whereas for the boiling time of 30 minutes, it contained 54.00% of antioxidant for the jasmine tea and 84.00% of antioxidant in jasmine root tea. Jasmine tea and jasmine root tea contains flavonoids. Despite the large amount of antioxidant were found in jasmine tea and jasmine root tea (50-100%). There's a decreasing of antioxidant amount found in the samples, along with the prolonged boiling time. 84% of tresponden like the scent, flavor, color and the texture of jasmine tea and jasmine root tea. These products are finally accepted by the people and have its large amount of antioxidant contain for the jasmine tea.

Keywords: tea, jasmine flowers, jasmine roots, flavonoid, organoleptic, hedonic

1. Introduction

Tea has been being the most favorable beverage among the world. Tea plantation that comes from *Theaceae* family, and the species of *Camelia*, is majorly found in China, India, Japan and Sri Lanka. Tea tree has own shiny dark green leaf, with pinnate bone leaf and round shape. It has large flower in white, pink or red. The fruit is small and brown. There are two kinds of tea plant varieties, namely Chinese tea plant (*Camelia sinesis*) and Indian tea plant (*Camelia assamica*) [1]. Through the

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production process, tea is divided into 3 kinds: green tea (unfermented), oolong tea (partial fermented) and black tea (total fermented) [1].

Various flavors are also added to the tea itself, such as fruit and jasmine. Giving the flavor of jasmine to the tea has been a great decision, beside own special scent, it has many advantages that affect our health. Plants that included in the family *Oleaceae* are commonly found in tropical forests of Asia or warm temperate regions in Europe and Africa. Flowers from ordinary jasmine plants used as a traditional medicine to cure diarrhea, fever, asthma, dermatitis and so forth [2].

Apart from being an anticancer, tea is known as one of the high sources of antioxidants [3]. Antioxidants are known to prevent free radicals. Antioxidants are compounds that bias delay, inhibit, and prevent oxidation of lipids or other molecules by inhibiting the initiation or propagation of oxidative chain reactions [4].

Some examples of natural antioxidants include flavonoids, oxochromatic acids, vitamins C and E, carotene and other components [5]. Some examples of antioxidants in tea, among others, catechins, teaflavin, thearubigin, oxochromic acid, and flavonol. Of the three types of tea that is green tea (without fermentation), oolong tea (partial fermentation) and black tea (total fermentation), then green tea has antioxidant content, the highest catechins. While theaflavin content in oolong tea and black tea is as effective as the catechin content in green tea. The content of flavonoids in tea, especially epigallocatechin gallate, catechins is a major functional component of green tea. The weight of the element is > 10% of the dry weight of the green [6-8]. Tea in this study is a mixture of black tea with flowers and jasmine root. Jasmine and jasmine roots increase the aroma of tea. Jasmine and jasmine root itself contain antioxidants.

2. Method

Producing the jasmine tea in this study is using the method of jasmine scent-trapping on tea. By arranging the jasmine scent by sprinkling jasmine half blooms as much as 20 buds into 50 grams of black tea. Black tea and jasmine flowers are kept in a closed can for 4 hours. The wilted Jasmine flowers were replaced with new jasmine seven times. The scent of jasmine will be caught by tea after the turn of seven times and can be served into tea. Jasmine flowers and jasmine tree roots are taken from the jasmine gardens around Kaliprau beach. The jasmine root is washed with fresh and cool water and then aerated in the air on a tray. The material is dried over direct sunlight for 3 hours. In order for the roots of jasmine plants easily mixed and packed, then the roots of jasmine cut with a length of 1 cm. After a small size, jasmine root mixed with black tea with a ratio of 1: 3 or a teaspoon of tea with 3 tablespoons of root jasmine that has been cut into small pieces. The obtained samples were collected, packed in bags and stored at 4 °C. Jasmine tea and jasmine root tea boiled in hot water with 2 treatments for 15 minutes and 30 minutes [9].

Tests of flavonoid levels in jasmine tea and jasmine root by using the DPPH method. This method is commonly used to test compounds that act as radical scavengers or hydrogen donors and evaluate antioxidants. This method can be used to examine both solid and liquid samples. Tea antioxidant activity was measured using the free radical method of DPPH (2,2-diphenyl-1-picrylhydrazyl). The principle of this method is the antioxidant in the material under study catching free radical hydrogen. DPPH is a free radical that will be reacted with a sample containing antioxidants [10]. DPPH electrons have strong absorption capability at 517 nm wavelength (UV-vis spectrophotometer) with purple. Antioxidants cause purple to yellow color changes due to DPPH changes to DPPH-H [11]. DPPH binding activity is indicated by percentage decrease in purple color intensity from DPPH [10]. Organoleptic and hedonic tests used questionnaires that were distributed to 25 surrounding communities in Kaliprau, Pematang. The results obtained in the form of test data of consumer acceptance of flower mixed tea and dried jasmine root with 9 points hedonic scale.

3. Result

Jasmine tea and jasmine root are measured antioxidant content with radical DPPH method and flavonoid content test. The results showed in table 1

Table 1. Description of flavonoid and antioxidant content of jasmine tea and jasmine root tea with variation of boiled with periods of 15 and 30 minutes

No	Sample	boiling time (minute)	flavonoid test	antioxidant content ($\mu\text{g/ml}$)			average ($\mu\text{g/ml}$)
1	jasmine tea 1	15	+	58.00	55.00	52.00	55.00
2	jasmine root tea 1	15	+	74.90	76.20	73.42	74.84
3	jasmine tea 2	30	+	56.00	53.00	53.00	54.00
4	jasmine root tea 2	30	+	83.08	87.21	81.76	84.02

Both samples have been tested in the UPT (Integrated Service Unit) laboratory of Diponegoro University. Parameters tested were flavonoid levels. Both tested positive tea samples contain flavonoids. Flavonoids are one of the antioxidant compounds that can prevent free radicals. These compounds act to protect the cell structure, as anti-inflammatory, preventing bone loss. Flavonoids also play an important role to determine the taste, color, smell and quality of tea. In addition, there were also antioxidant activity tests. Each sample was tested with time of 15 minutes and 30 minutes. Jasmine tea and jasmine root tea contains flavonoids. The longer boiling in jasmine tea does not cause a decrease in antioxidant levels. The longer boiling in jasmine root tea caused a decrease in antioxidant power.

4. Discussion

Samples of jasmine root A with boiling time 15 minutes contain antioxidant average 74,84% and boiling 30 minutes containing antioxidant 84,02%. With the value obtained, which is between 50 - 100%, it indicates the strength of antioxidant activity in the tested tea sample. Boiling time can turn out to affect the levels of antioxidants in the tea. The longer tea boiling time decreases the antioxidant levels in the tea. That's because high temperatures can damage the content of beneficial substances in tea. Antioxidant activity in black tea is best if done hot water extraction and in a short time. Long immersion in the black will decrease the strength of antioxidant activity [12].

In addition to the flavonoid test, two other tests performed were organoleptic and hedonic test. Questionnaires were distributed to respondents around Kaliprau Village. Before filling out the questionnaires, respondents sampled the prepared tea. After tasting the tea, the respondents then fill out the questionnaire with several parameters assessment of tea, including color, aroma, taste and texture. Respondents are entitled to give a value of 1 - 4 for these parameters. From the results that have been obtained, as many as 21 of the 25 respondents who participated, said like in tea jasmine. They said, if the jasmine tea being mass produced, they will buy the tea.

For organoleptic and hedonic test, 21 respondents from 25 respondents (84%) liked aroma, taste, color and texture of jasmine tea. They love the floral and tea flavor preferences between the jasmine and the jasmine root with the green. Jasmine tea can be accepted by the community.

5. Conclusion

After testing the jasmine and jasmine tea, it was found that the jasmine tea did contain one of the antioxidant substances, namely flavonoids. Both samples of black tea mixed with jasmine and jasmine root have strong antioxidant activity, because the value of antioxidant activity is in the range 50 - 100. The length of boiling time can affect the levels of antioxidants contained in jasmine tea. The longer tea boiling time decreases the antioxidant levels in it. That's because high temperatures can damage the content of beneficial substances in tea. Jasmine tea and jasmine root tea contains flavonoids. The longer boiling in jasmine tea does not cause a decrease in antioxidant levels. The longer boiling in jasmine root tea caused a decrease in antioxidant power.

Jasmine tea has many devotees. 84% of respondents stated like to jasmine tea (organoleptic test and hedonic test). They love the color, scent, taste and texture of the jasmine tea they taste. Jasmine tea can be accepted by the community if one day it will be mass produced.

6. Recommendation

Recommendations for next research is to analyze the content of microbiology and water content in powder jasmine tea and jasmine root tea.

Acknowledgement

Upon the completion of this research, we would like to thank to Ministry of Research, Technology and High Education (project number: 007/SP2H/PPM/DRPM/V/2017)

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