



Physicochemical Characteristics of White Tea Product of PT. Perkebunan Nusantara IX (Kaligua Gardens)

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Abstract. White tea is a type of tea that still sounds foreign, the high price makes white tea sometimes used as a symbol of one's social status. Due to the high price, not many people consume it, so it is less popular. PT. Perkebunan Nusantara IX (PTPN-IX) which is located at the west foot of Mount Slamet, precisely in Pandansari Paguyangan Village, Brebes Regency, Central Java, with an altitude of 1,500-2,050 meters above sea level and a temperature between 8-280 Celsius. One type of tea product PTPN-IX that has not been studied physically, chemically and its characteristics is white tea. This study aims to examine the characteristics of white tea produced by PTPN-IX in Brebes. This research was carried out at the request of the PTPN-IX, the methodology used was to test some of the core components contained in white tea, some tests were carried out 3 times and the average value was taken. The components tested included: ash content, crude fiber, Pb/Cu/Zn/Hg content, total plate count, coliform, water content, carbohydrates, protein, pectin, tannins and caffeine. The results showed that white tea produced by PTPN-IX were: ash content of 5.70%; Crude fiber 13.40%; Pb 2.35 mg/Kg; Cu 12.94 mg/Kg; Zn 22.30 mg/Kg; Hg (negative); Total plate number 1.3×10^3 cfu/g; Coliform (negative). For chemical components, the results are: water 5.65%; carbohydrates 3.9%; 18% protein; pectin 5.85%; tannins 5.25%; caffeine 2.4 – 4.5.

Keywords: caffeine, pectin, tannin, white tea

(Received 2022-04-21, Accepted 2022-05-27, Available Online by 2022-05-29)

1. Introduction

Recently, the international community has begun to show an interest in white tea (Figure 1). The unique taste that comes from the umami (fifth taste) of white tea and the abundance of tea polyphenols which are very beneficial for the health and fitness of white tea drinkers are the main attractions of this special tea. Although in limited quantities, Indonesia has been able to produce silver needle quality white tea (the highest grade for white tea). White tea looks white because the tops of the leaves are still covered with white fine hairs. White tea is the finest and rarest tea in the world, because it is only produced in Fujian, China. It was only picked from *Cammellia sinensis* Shui hsien varieties and dai bai varieties, in

certain seasons. White tea contains nutritious substances that are very beneficial for health and fitness, making white tea the most superior health drink compared to health drinks from other types of tea [1].



Figure 1. White Tea

The picking process is a very important process, so it must be picked carefully. Picking only the two youngest shoots that have not yet opened are still covered with fine silver hairs. Picked when the shoots have not opened, and done before the sun has risen to keep the moisture from the tea shoots. Good quality white tea is usually picked in early spring, harvesting time is usually only 2 days to 2 weeks. The withering process plays a very important role in determining the final quality. The tea leaves that have been picked are spread evenly on a container made of woven bamboo, then dried in a place where the sun is not too hot or stored in a room that has good air circulation. The container for withering should not be placed directly on the floor.

White tea is naturally dried with the help of the wind and the sun's rays, without going through a fermentation or grinding process so as not to damage the actual shape of white tea. Drying in white tea aims to reduce the moisture content of the shoots to 3-4%. The sorting process aims to obtain uniform shape and size of white tea so that it meets the standards for being marketed abroad with guaranteed quality. Storage and packaging after sorting is done to maintain the fragrant aroma of white tea, white tea is usually packaged in paper bags or plastic bags. The components contained in white tea are: polyphenols (antioxidants), catechins (lowers cholesterol), flavanols (stimulates blood vessels), caffeine (stimulates the nervous system), tannins (source of umami taste), essential oils (source of aroma), fluoride (prevents odor, tooth decay), vitamins A-B-C, monocitrate, chlorophyll (prevents bad breath), theophylline (prevents asthma), hydroxy coumarin (prevents blood clots), zinc, calcium (essential minerals) and amino acids (regenerates cells) [2].

From the research that has been done by researchers on green tea and black tea, with the aim of knowing the difference antioxidant activity between green tea and black tea and its correlation with polyphenol content in tea produced by PT. Tambi Wonosobo. The results showed that the phenol content and antioxidant activity of green tea is higher than the phenol content and antioxidant activity black tea. Phenol content affects antioxidant activity the higher the phenol content, the higher antioxidant capacity in tea.

2. Methods

Sample preparation was carried out by taking much as 1 Kg, fresh white tea leaves, dried. It is declared dry if it has reached a constant weight on two weighing. The sample used for the laboratory is 200 grams. This research was conducted in Basic Chemistry Laboratory Program Bachelor Degree in Chemical

Engineering, University of 17 August 1945, Semarang. Research begins by testing according to the parameters in SNI, some parameters are carried out manually and other parameters using instruments such as spectrophotometers UV-Vis, FTIR.

3. Results and Discussion

The results of the analysis of white tea from PT. Perkebunan Nusantara IX Brebes based on SNI tea is shown in Table 1 and 2. Green tea contains polyphenols of 588.58 mg/Kg – 750 mg/Kg which is known as a source of antioxidants and contributes to the sensation of bitter and sour taste [3-5]. In white tea the polyphenol content of 26% or 26 /100gr, this indicates that the polyphenol content of white tea is greater than that of green tea. The initial brewing temperature of 95oC and the brewing time of 15 minutes produced the best extract characteristics with the extract yield of $26.2 \pm 0.50\%$, total flavonoids 252.3 ± 1.71 mg QE/g dry weight of the material, and antioxidant activity of 173.5 ± 1.34 g/mL [6]. The flavonoid content in white tea is 1260 mg/100 gr (1.26%) greater than green and white tea. From the two chemical parameters above, it shows that the content of active substances in white tea is greater than black and green tea. Especially for the white tea produced by PT. Perkebunan Nusantara IX, the Kaligua garden has very good characteristics and meets standards. This can be seen from the physical test of the white tea which has a value below the maximum allowable limit in SNI. The antioxidant content (flavonoids and polyphenols) of white tea is quite high, 26% and 1.26%, respectively. Flavonoids as antioxidants, antimicrobials and also anticancer that can fight free radicals that damage body cells. While these polyphenols substances also act as antioxidants that can fight cancer cells and reduce the risk of inflammation in the body. The antioxidant content in tea is 100 times more than that in fruits and vegetables so that it can increase metabolism and body immunity. White tea produced by PT. Perkebunan Nusantara IX has good quality and is feasible to produce, in addition to having a high economic value, white tea has health benefits.

Table 1. Results of the physical analysis of white tea.

No	Parameters	Quality Standard (SNI)	Value
1	Water Content	Max. 8% b/b	5.65
2	Extract content in water	Max.32% b/b	41.08
3	Ash Content	Max. 8%	5.70
4	Water soluble ash alkalinity	1 – 3 %	2.35
5	Coarse Fiber	Max. 16%	13.40
6	Pb	Max.20 mg/kg	2.35
7	Cu	Max. 50 mg/kg	12.94
8	Zn	Max. 40 mg/kg	22.30
9	Hg	Max.0.03mg/kg	Negative
10	Total Plate Number	Max. 3×10^3 efu/g	1.3×10^3
11	Coliform	< 3 APM/g	Negative

Table 2. Results of the Analysis of the Chemical Content of White Tea (100 grams)

No	Parameters	Percent (%)
1	Polifenol	26
2	Karbohidrat	3.9
3	Pektin	5.8
4	Kafein	40.78
5	Protein	18
6	Tanin	4.26
7	Flavonoid	1.26

4. Conclusion

The complete characterization physicochemical of white tea from the Kaligua plantation of PT. Perkebunan Nusantara IX is presented in tables 1 and 2, if it refers to the SNI standard, then the white tea from the Kaligua plantation meets the standard.

Acknowledgements

Thank you to PT. Perkebunan Nusantara IX Kaligua Gardens for funding and entrusting the characterization test of white tea products to the Chemical Engineering Study Program UNTAG Semarang.

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