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The effect of the size of the red bajakah powder (*Uncaria acida* (Hunter) Roxb) on the quality of the tea produced

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Abstract
Several research results it is stated that the size of the tea powder affects the quality of the tea produced, so in this research the size of the red bajakah tea powder is divided into three sizes categories, namely: A1 (<10 mesh), A2 (10-16 mesh), A3 (>16 mesh). Furthermore, the treatment was compared with SNI Biack tea bags No. 3753:2014. Parameters observed were moisture content, total ash content, and organoleptic tests. Organoleptic testing using description and hedonic tests. The treatment was compared with SNI black tea bags No 3753:2014. Parameters observed were moisture content, total ash content, and organoIeptic tests. Organoleptic testing using description and hedonic tests. The result showed that the size of the red bajakah powder had a significant and very significant effect on all parameters except taste. However, the size of the bajakah powder still cannot produce tea that can meet the standards except for powder size >16 mesh. Therefore, it is recommended to make bajakah tea using a powder size >16 mesh.

Keywords: Red bajakah, herbal tea, powder size, tea bag quality

1. Introduction
Bajakah plants are vines that grow a lot in the forests of Kalimantan. Empirically, bajakah has been used as a medicinal plant by the Dayak ethnic for a long time, both for external and internal medicine. In Indonesia, there are about 200 species of bajakah, 55 of which are Uncaria species and eight of them are spreader in the forests of Kalimantan, one of which is the red bajakah (*Uncaria acida*) [1, 2].
Bajakah has erect stems, is brown in color, and propagates to surrounding trees [3] and its roots are at the bottom of peat waters and are endemic to Indonesia [4]. The genus Uncaria has the most extensive distribution compared to other bajakah. The red extract has the best cytotoxic activity compared to other bajakah [1]. The qualitative test of the red bajakah extract was positive for saponins, phenolics, flavonoids, tannins, terpenoids, glycosides and acaIoids [5]. The red Bajakah Kalalawit also contains functional compounds from the polyphenol group, antibacterial and catechins which are high antioxidant compounds and have anticancer activity [6]. In addition to the above compounds, red Bajakah kaialawit also quercetin compounds, tanning substances catechins, red catechins, mucus, and fat [7].
All parts of the red bajakah can be used, the parts that are most widely used are the stems and leaves [8, 2]. Various researches on bajakah are currently being carried out, as is the development of products from bajakah. One of the herbal products from bajakah that is currently being developed is herbal tea from bajakah. There are two groups of teas, namely herbal teas and non-herbal teas [9]. Herbal teas are teas made from the processing of flowers, bark, roots and leaves of various plants. However, until now there has been no specific research on the quality of bajakah tea, therefore it is necessary to conduct research on the quality of tea made from bajakah stems. Based on this, it is necessary to conduct research that aims to analyze the quality of bajakah herbal tea made from various sizes of powder. It is hoped that from the results of this study it can be recommended to choose the size of bajakah powder in order to produce herbal teas that can meet SNI standards, namely SNI black tea bags No 3753:2014 Currently, there is no SNI standard specifically for herbal teas, therefore as a first step the quality of herbal tea from pirated powder will be determined using black teabag standards because the bajakah tea made in this study is in the form of teabags [10].

2. Research Methods

The research was carried out at Laboratory of Forest Product Technology, Faculty of Forestry, Lambung Mangkurat University, Banjarbaru and the Herbal Tea Production Laboratory, Center for Technological Innovation, Commercialization, Management: Forests and Wetlands, Lambung Mangkurat University (PUI-ULM). The research was carried out for two months from June to July 2022 covering sample preparation, testing, data collection, data processing and data presentation. The experimental design used was a completely randomized design (CRD) with 3 treatments. The factor studied was the size of the bajakah powder. Each treatment was repeated 3 times, so there were 9 experimental units. To find out whether or not there was an effect of treatment, data analysis was carried out using 5% and 1% ANOVA. If the treatment has a significant or very significant effect, then it is continued with Duncan's Multitype Range Test (DMRT) to determine the difference between treatments.

2.1 Preparation and Testing of Sample

The preparation of the tiller includes the preparation of the simplicia of bajakah rods which is started by wet sorting, with the aim of removing the dirt that is still attached to the rods. The bark of the bajakah wood is peeled, then the bark that has been peeled is washed until clean, drained and air-dried for 3 days.

2.2 Sample Making

Bajakahstems were chopped using a wood chopper tool, then the chopped powder was sieved using a 10 and 16 mesh sieve with a position of 10 mesh above, and 16 mesh below, so that there were three sizes of powder, namely <10 mesh, 10-16 mesh, and > 16 mesh with the aim of knowing which powder size is in accordance with SNI 3753-1995 [11]. The powder is then dried using an oven at 50 °C for one hour with the aim that it does not become a medium for the growth of microorganisms such as fungi, bacteria, and other contaminants that can cause damage when heating tea. Drying is also intended so that the powder that will be put into the tea bag can meet the standards of SNI 3753:2014 (maximum 10%) [10] This drying temperature is the best drying temperature for herbs. The Indonesian Ministry of Health 1995 stated that a good drying temperature for herbs is 30-90%. After going through the drying process, the powder is then put into tea bags of 1 gram each, then the tea is packed using closed aluminum foil paper.

2.3 Sample Testing

The quality of tea is determined by laboratory tests and organo-eptic tests. Laboratory tests carried out in this study were: Water content and total ash content, while the organoIeptic tests included color, odor, taste and preference. The moisture content test used the oven method, the total ash content was the furnace method [12]. The organoIeptic test used the descriptive method (color, smell, and taste) and the hedonic method (overall preference).

3. Results and Discussion

3.1 Result

The results of the study on the effect of the size of the powder on the water content, total ash content and organo-eptic tests (color, odor, taste, and preference) can be seen in Table 1.

Table 1: Results of Test of Water Content (%), Total Ash Content (%) and Organoleptic Test of Red Bajakah Tea on Various Sizes of Powder made Testing of Bajakah Tea Powder Size on Water Content, Total Ash Content and Organo Ieptics

S. No	Parameter	A1 (<10 mesh)	A2 (10-16 mesh)	A3 (>16 mesh)	Result of Anova Test	SNI Indonesia Standart 3753:2014	Information
1.	Water Content (%)	16, 73$^{a)}$	14, 95$^{b)}$	12, 35$^{c)}$	**	Maksimal 10%	No one meet SNI (Indonesia Standart)
2.	Ash Content (%)	1, 00$^{c)}$	1, 53$^{b)}$	5, 40$^{a)}$	**	4-8%	Only A3 that meets stand art
3.	Color Panelist assessment (In numbers)	a bit red 2, 00$^{b)}$	Red 3, 67$^{ab)}$	dark red 4, 33$^{a)}$	*	brownness red	A2 and A3 that meet stand arts
4.	Smell Panelist Assessment (In numbers)	unsmell 2, 44$^{b)}$	unsmell 2, 67$^{b)}$	typical red bajakah 4, 33$^{a)}$	**	typical tea	Only A3 produces a characteristic smell red bajakah
5.	Flavor Panelist Assessment (In numbers)	unflavor 2, 22	a bit typical red bajakah 3, 22	typicalred bajakah 4, 33	ns	typical tea	Only A3 shows distinctive taste red bajakah
6.	Favorite Panelist Assessment (In numbers)	a bit favorite 3, 22$^{b)}$	favorite 4, 00$^{b)}$	really favorite 5, 00$^{a)}$	**		A3 really favorite

Information:
*: significant difference
**: very significant difference
Tn: no significant difference
Color: 1= clear, 2= a bit red, 3= red, 4= darkness red, 5= brownness red
Smell: 1= very odorless, 2=un smell, 3=a bit typical red bajakah smell, 4= typical red bajakah smell, 5= very typical redbajakah smell
Taste: 1= very tasteless, 2= un tasteless, 3= a bit typical red bajakah taste, 4= typical red bajakah taste, 5= very typical red bajakah taste
Favorite: 1= very unfovorite, 2= favorite, 3= a bit favorite, 4= favorite, 5= really favorite

Based on Table 1, it can be seen that powder size has a very significant effect on moisture content, total ash content, odor, and preference, and has a significant effect on color. Meanwhile, the flavor of the resulting tea is not affected by the size of the powder.

3.1.1 Water content

The water content of Bajakah teabags is strongly influenced by the size of the powder. The results of the different test showed that the three sizes of tea powder produced significantly different water content. The size of the powder can affect the moisture content [13]. The results also showed that the thinner the powder size of the bajakah stem or the larger the mesh size, the lower the water content of the teabags produced. Conversely, the smaller the mesh size or the larger the powder size, the greater the moisture content. This is because the smaller the powder size, the easier the drying process. Bajakah powder is a hygroscopic material, so it is easy to absorb and remove the water contained in it. Wood is a hygroscopic material, so it can lose or increase its

moisture due to changes in humidity and air temperature around it [14]. The smaller the powder size, the more surface area [15]. The larger the surface area of the powder, the more effective the contact with the filter material [46].

3.1.2 Total ash content

The results showed that the average total ash content of the three sizes of bajakah powder ranged from 1.00%; 1.53%; up to 5.40% is also in line with the opinion of states that the ash content of wood biomass ranges from 2.6-18.3% depending on the wood species and the duration of burning [17]. The range of ash content of bajakah powder made at various sizes is also in line with the results of research which stated that the ash content of powder from other types of herbs, namely ginger and Gambier leaves also produced a total ash content of <8% [18].

The total ash content can be interpreted as the inorganic component remaining after the combustion process is carried out [19]. Ash refers to the inorganic residue remaining after ignition or complete oxidation of organic matter in a food sample. Determining the ash content of a food is part of a proximate analysis for nutritional evaluation and is an important quality attribute for some foodstuffs [20]. The ash content can show the total minerals in a food ingredient. Organic materials in the combustion process will burn but the inorganic components will not, because that is called the ash content. Determination of total ash content aims to determine whether or not a processing is good, knowing the type of material used, and as a parameter determining the nutritional value of a food ingredient. Determination of ash content is closely related to the mineral content contained in a material, the purity and cleanliness of the resulting material, the ash content can show the total minerals in a food ingredient [21].

3.1.3 Color

Determination of the quality of food ingredients in general is very dependent on several factors, including color, taste, texture and nutritional value [22]. An ingredient that is considered nutritious, has a very good texture will not be liked by consumers if it has an unattractive color or gives the impression that it has deviated from the color it should have [23]. Based on the different tests, it can be seen that the size of the powder produces significantly different tea steeping colors, this is in line with the results of state that the color parameter greatly affects the perception of the panelists [24]. Steeping from 10-16 mesh and >16 mesh of bajakah powder produces a red steeping color, according to SNI standards. The results of the steeping also showed that the smaller the size of the powder, the red color was more intense. This is because the smaller the powder size, the larger the extract that comes out [25, 26]. Furthermore, the size of the powder affects the dissolution in the material, the smaller the size of the material, the greater the contact between the surfaces of the material with water so that the solvent will easily break down the walls of the material so that the color will come out [27]. The particle size affects color, where coarse-sized materials cause highly saturated colors [45].

3.1.4 Smell

Smell or aroma is one of the properties of foodstuffs that gives an impression on the respiratory system and is felt by the sense of smell (Praseptiangga *et al*. 2018). Aroma is also a determinant of the delicacy of the product [23]. Based on the different tests, it can be seen that the size of the powder differs greatly in the smell of the tea produced. The smaller the size of the powder, the more pronounced the distinctive odor of bajakah. This can be seen from the results of the study which showed that the characteristic odor of bajakah only appeared in tea made from the smallest powder size (> 16 mesh), while in larger sizes (10-16 mesh and <10 mesh) the characteristic odor of bajakah did not appear on brewing tea. The characteristic odor of bajakah that can be smelled in tea made from the smallest powder has something to do with the ease with which the extract comes out of the powder at a smaller powder size.

3.1.5 Taste

Taste is the most important parameter in determining the sensory quality of a product [28]. Based on the results of the study, the difference in the size of the pirated powder does not or has not affected the taste of the tea it produces. This result is different from the opinion of state that taste perception in the mouth is influenced by one of the particle sizes [29]. This difference of opinion may be due to differences in the sizes used and the types of materials or herbs studied. Although statistically the difference in powder size has not shown the difference in the taste of the tea it produces, the taste test results show that Bajakah tea made from the smallest powder size, which is >16 mesh, has produced a distinctive Bajakah taste that can be detected by the tongue, namely the typical astringent taste of bajakah. The steeping of red kaIaIawit bajakah shows the typical chelattaste of bajakah [30].

3.1.6 Favorite

Consumer likes and acceptance of a product is not only influenced by one factor, but is also influenced by various factors, giving rise to different acceptances [22]. Overall preference parameters are used to determine the level of panelists' preference for quality attributes (color, smell, and taste) contained in the product as a whole. Based on the results of the different tests, it can be seen that the powder sizes of the three samples showed very significantly different results.

4. Discussion

The manufacture of powders will affect the condition of the cells, where the smaller the size of the powder, the cells will be more open because there are some parts where the cell walls are broken [31]. Both of these conditions cause the powder with a smaller size to more easily experience a decrease in water content, or an easier drying process than a powder with a larger size. This causes if powders of different sizes are dried at the same time, the smaller powders will dry out more easily or experience a greater reduction in water content than large powders, so that in the final condition, the moisture content of the small powders will decrease has a lower moisture content than powders with a larger size.

The results of the study show that the smaller the size of the powder, the lower the water content, but overall the bajakah tea made from various sizes of the powder has not met the SNI standard, because the water content is still above 10%. This needs attention, considering that before the packaging process the powder has been dried with a moisture content of less than 10%. The increase in water content after the packaging process is caused before and after the packaging the powder is not stored in an airtight container, so that the surrounding moist air can enter it. Bajakah powder is hygroscopic so it easily absorbs water during storage. The product that easily absorbs water when during storage is in contact with outside air which generally for tropical

environments has an RH of 75%-80%, it will experience water vapor absorption which in turn will change its physical properties.

Tea as a dry food ingredient will absorb water from the air during storage. So that tea is called a hygroscopic material that is easy to absorb water. The absorption of water from the air will cause the water content and water activity of foodstuffs to increase [32]. Therefore, it is necessary to pay attention to the use of airtight containers to maintain the moisture content of the powder. Based on the results of this study, another factor that can affect the water content is material handling. Water content can also be affected by improper handling, packaging, and storage methods [33]. This water content becomes important and as one of the quality requirements, especially for food products. Therefore, it is very important to pay attention to the drying process. The food drying aims to extend shelf life by reducing the water content of food to prevent the growth of spoilage microorganisms [34, 35]. The water content greatly determines the shelf life of food products [36].

The total ash content as a range of allowable external and internal mineral content exists, this is related to the purity and contamination of the material [37]. Determination of ash content aims to determine the quality of processing, determine the type of material used and as a parameter determining nutritional value in food and beverages. This is what makes ash content one of the important parameters in maintaining the quality of food and beverage products, in accordance with the Indonesian National Standard (SNI) 01-2891-1992 [12, 38].

As one of the determinants of the quality of food and beverage products, including this tea bag product, there are many factors that can affect the total ash content. The effect of biomass powder size on its thermal properties stated that smaller powder particle size resulted in higher ash content [39]. This is because at a smaller size the powder will be more compact and denser so that the amount of pore space is less as a result of more complete combustion, so that the ash content is higher than in the larger powder size. The results of this study are in line with the results of this study, which showed that the size of the powder had a very significant effect on the total ash content. The three sizes of powder, only the smallest powder size (>16 mesh) whose ash content (5.40%) can meet the SNI standard (4-8%). The smaller size of the piracy powder (>16 mesh) resulted in higher ash content, compared to the larger powder size (10-16 mesh) and (<10 mesh). The results of this study are in line with the opinion of the smaller the powder size, the higher the ash content [40].

Some of the active chemical compounds in the powder of bajakah rods are easier to come out in small powders. This is because the smaller size allows easier contact with the solvent and the cells are more open. The smaller size can maximize the surface area which in turn can increase the transfer of active mass from the plant material to the solvent [15]. The smaller size of the tea powder will make it easier for chemical compounds to come out so as to produce a greater chemical content than the larger powder size [41, 42, 46]. The size of the powder has an influence on sensory perception, especially the sense of smell [43].

The taste of tea is strongly influenced by the chemical components contained in it [44]. This is why the size of the tea powder gets smaller, the flavor that comes out is stronger. This has something to do with the smaller the particle size, the easier the extraction process due to the easier the solvent in contact with the material.

5. Conclusion's and Suggestions

5.1 Conclusions

The size of the red powder has a very significant effect on the water content, total ash content, odor and panelist preference for the tea produced, and has a significant effect on the color of the tea produced. Meanwhile, the taste of tea is not affected by the size of the powder. When compared with SNI black tea bags No. 3753:2014, only powder size >16 mesh that meets SNI standards, especially when viewed from the total ash content parameter, this size is also the most preferred panel.

5.2 Suggestions

Based on the results and discussion of the research, it is recommended as follows:

1. To make bajakah tea, it is recommended to use a powder size of >16 mesh, and further research needs to be done on what powder size is the most optimal.
2. It is necessary to do further research whether the size of the powder also affects other parameters in addition to the parameters that have been tested in this study.
3. In this study, although the water content was <10%, the test results after being packaged in tea bags showed that the water content was more than >10% (doesn't meet SNI). It is therefore recommended that after the powder is dried from the oven, the powder should be placed immediately and stored in an airtight container.

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7. References

1. AIiviyanti RUY, Sudibyo RS, Murwanti R. Cytotoxic Effects of Several KaIimantanBajakah Roots against Breast Cancer SeI T47d. Journal of Scientific Research. 2021, 26(2).
2. Arifin YF, Hamidah S, Hatta GM. Comparison of the Flavonoid Contents of Bajakah Plants from Tropical Forest in Kalimantan, Indonesia. Journal of Hunan University（Natural Sciences). 2021;48(8):21-28. ISSN 1674-2974, http://jonuns.com/index.php/journal/article/view/684
3. Amrianti ASP. Identification of Compounds and Antioxidant Activities of n-Hexane Fraction and Ethyl Acetate Fraction of Kalalawit Bajakah Wood (*Uncaria gambir* Roxb) from Muara Teweh, Central Kalimantan). Pharmacy Thesis, FMIPA ULM; c2020.
4. Jaya IGNIP, IeIiqia NPE, Widjaja INK. Test of DPPH Radical Capture Activity of Extracts of Black Tea Products (*Camellia sinensis* (I) O.K) and Gambir (*Uncaria gambir* (Hunter) Roxb) and their ProfiI KIT-Densitometer). Journal of Udayana Pharmacy; c2012. JiI.1 No 1
5. Widya IN, Susanto FH. Toxicity Test of Bajakah Kalalawit (*Uncaria gambir* Roxb) Stem Extract on Liver Organs of Wistar Male White Rats. Journal of Science & Technology. 2020;1(1):363-392.
6. Rahmawati N, Bakhtiar A, Prima Putra D. Isolation of Catechins from Gambir (*Uncaria gambir* (Hunter) Roxb) for Pharmaceutical and Cosmetic Preparations. Journal of Indonesian Pharmaceutical Research. 2012;1:6-12.
7. Damanik DDP, Nurhayati S, RosdaneIIi Hasibuan. Extraction of Catechins from Gambir (*Uncaria gambir* Roxb) Leaves by Maceration Method. Journal of Chemical Engineering of USU. 3(2):10-14.
8. Anshari I. Isolation and Identification of Chemical Compound Ethyl Acetate Fraction of BatangBajakah Tampala (*Spatholobus littoralis* Hassk) from Central

Kalimantan. Thesis of Pharmacy Faculty ULM; c2012.
9. Winarsi H. Natural Antioxidants and Free Radicals. Yogyakarta: Kanisius; c2007.
10. Indonesia National Standart (SNI). Black Cup Tea. 3753-2014. Jakarta. National Standardization Insitution; c2014.
11. Indonesia National Standart (SNI). Black Tea bags. 01-3753-1995. Jakarta. Nati-onal Standardization Insitution; c1995.
12. AOAC. Assosiation of OfficiaI Chemist. Inc. Virginia; c2005.
13. Fitriani Eldha S, Suroto HS. Characteristics of Bajakah Root Plants (*Spatholobus littoralis* Hassk) From Loakulu, KutaiKartanegara Regency. Journal of Industrial Technology Research. 2020;14(2):376. Samarinda
14. Dumanauw JF. Getting to Know Wood. PT. Gramedia. Jakarta; c1982.
15. Handa SS, Khanuja SPS, Longo G, Rakesh DD. An Overview of Extraction Techniques for Medical and Aromatical Plants. Trieste: ICS-UNIDO; c2008. p. 21-54.
16. Jaiswal R, Masih D, Sonkar C, Handibag R, Verma P. The processing and health benefits of herbal tea. Int. J Adv. Chem. Res. 2022;4(2):232-234. DOI: 10.33545/26646781.2022.v4.i2d.103
17. Danielowska DS, Jabłońska M. Chemical and mineral composition of ashes from wood biomass combustion in domestic wood-fired furnaces**.** Environmental Science, Materials Science, International Journal of Environmental Science and Technology; c2021. DOI:10.1007/s13762-021-03506-9-Corpus ID: 235730177.
18. Bungsu IMP, Budaraga IK, Yessirita N. The Effect of Addition of Red Ginger Powder (*Zingiber Officinale* Var. Rubrum) to Tea Yield from BajakahGambir (*Uncaria gambir* Roxb). Journal of Agricultural Science and Research. 2021;(2):120-129.
19. Liu Keshun. Effect of Sample Size, Dry Ashing Temperature and Duration on Determination of Ash Content in Algae and Other Biomass. Alga 2019 Res. 2019;40:101486.
20. Harris SK, Marshall MR. Ash Analysis. Journal of Food Analysis. Springer, Cham; c2017. p. 287-297.
21. Zahro. Agricultural Quality and Yield Analysis. Universitas Jember. Jawa Timur; c2013.
22. Praseptiangga D, Nabila Y, Muhammad DR. A Study of Panelist Accep-tance Rate on Choclate Bar with Addition of Cinnamon Powder (*Cinnamomum burmanii*). Caraka Tani. Journal of Sustainable Agric. 2018;33:78-88.
23. Winarno FG. Food chemistry and nutrition. PT Gramedia Pustaka Utama. Jakarta; c2004.
24. Morrot G, Brochet F, Dubourdieu D. The Color of Odors. Brain and Language. 2001;79(2):309-320. doi:10.1006/brln.2001.2493
25. Sulaiman Arifin R, dan Yana S. *Camellia sinensis* on Caffeine Levels. Procee-dings of the 2015 HKI-Kaltim Chemical National Seminar; c2015.
26. Yunus MAC, Hasan M, Othman N, Mohd-Setapar SH, Salleh LM, Ahmad-Zaini MA, *et al*. Effect of Particle Size on The Oil Yield and Catechin Compound Using Accelerated Solvent Extraction. Journal of Technology. 2013;60(1):21a-25.
27. Novriantari NP, Lutfi S, Wartini NM. Effect of Powder Particle Size and Acetone Solvent Concentration on Characteristics of Sargassum Polycystum Extract Color. Journal of Agroindustry Engineering and Management 5(3):102-112.
28. Voltz M, Beckett ST. Sensory of Choclate. Presented at the ZDS Choclate Technology Conference at Anuga Food Technology. 1997, 49.
29. Rahimah S, Arbaia R, Andoyo R, Lembong E, Setiawati TA. Effect of Particle Size on Sensory Attributes of Sapodilla Tea (Manilkara zapota) Using E-Tongue. In IOP Conference Series: Earth and Environmental Science IOP Publishing; c2020. p. 012101.
30. Chabib Lutfi, Tria A, Irianti RD. Tablet Formulation of Gambir (*Uncaria gambir* (Hunter) Roxb) Extract with Variations of Arabic Gum (Gummi acacia) binder. Traditional Medicine Magazine. 2010;15(2):75-79.
31. Ministry of Health of the Republic of Indonesia. Galenik Preparations, 5-17, Direc-torate General of Drug and Food Control Jakarta; c1986.
32. Rohdiana D. Analysis of Quality Parameters and Flavonoid Levels in Black Tea Bags. Doctoral dissertation, Faculty of Engineering Unpas; c2016.
33. Diniz PHGD, Pistonesi MF, Alvarez MB, Band BSF, De Araujo MC. Simplisied Tea Classfication Based On A Reduced Chemical Composition Profile Via Sucessive Projections Algorithm Linear Discriminant Analysis 9SPA-LDA. Journal of Food Composition and Analysis. 2015;39:103-110.
34. Mc.Cabe Warren L. Unit Operation of Chemical Engineering. Edition 4th. Mc. Grow Hill International Book Co Singapore; c2002.
35. Napitupulu Farel H, Tua Putra Mora. Design and Testing of Cocoa Dryer with Cabinet Dryer Type for Capacity 7.5 kg Per-Cycle. Journal of Dinamic. 2012, 2(10).
36. Luthfiyanti R, Iwansyah AC, Pamungkas NY, Triyono A. Decreasing The Quality of Atioxidant Compounds and Water Content to The Shelf-Life of Ciplukan; c2020.
37. Ministry of Health of the Republic of Indonesia. General Standard Parameters of Medicinal Plant Extracts. Directorate General of Drug and Food Control Jakarta; c2000.
38. Indonesia National Standart (SNI). How to Test Food and Drinks. 01-2891-1992. Jakarta. National Standardization Institution; c1992.
39. Tokan A, Sambo AS, Jatau JS, Kyauta EE. Effect Of Particle Size on the Thermal Properties of Sawdust, Corncobs and Prosopis Africana Charcoal Charcoal Briquettes. American Journal of Engineering Research (AJER). 2014;3(8):369-374.
40. Lori JA, Myina OM, Ekanem EJ, Lawal AO. Preliminary Evaluation of *Moringa Oleifera* Seed Shells As Precursor For Activated Carbon. Australian Journal of Basic and Applied Sciences. 2010;4(12):5856-5861.
41. Wang H, Helliwell K. Determination of Flavonolsin Green and Black Tea Leaves and Green Infusions By High-Performance Liquid Chromatography. Food Research International. 2001;34(2-3):223-227.
42. Vuong QV, Golding JB, Stathopoulus CE, Nguyen MH, Roach PD. Optimizing Conditions for The Extraction of Catechins from Green Tea Using Hot Water. Journal of Separation Scince. 2011;32(21):3099-3106.
43. Tarwendah IP. 2017. Comparative Study of Sensory Attributes and Brand Aware-ness of Food Products. Journal of food and agroindustry, 2017, 5(2).
44. Borse BB, Rao LJM, Nagalakshmi S, Krishnamurthy N. Fingerprint of Black Teas From India: Identification of The Regio-Specific Characteristic. Food Chemistry. 2002;79(4):419-424.
45. Anna M, Gueli AM, Bonfiglio G, Pasquale G. Effect of Particle Size on Pigments; c2016. https://doi.org/10.1002/col.22062
46. Makanjuola SA. Influence of Particle Size and Extraction Solvent on Antioxidant Properties of Extract of Tea, Ginger, & Tea-Ginger Blend. Food Sci Nutr. 2017;00:1-7.