

CHARACTERIZATION OF HERBAL TEA BAGS MADE FROM STARFRUIT LEAVES (*AVERRHOA BILIMBI*), GOTU KOLA LEAVES (*CENTELLA ASIATICA*) AND CINNAMON POWDER (*CINNAMOMUN BURMANII*) AS FUNCTIONAL DRINKS

Fachrur Rozi, Diana Silvy, Daimon Syukri*

Department of Agricultural Product Technology Andalas University

*Corresponding author: dsyukri@ae.unand.ac.id

ABSTRACT

This research aimed to study the characteristics of herbal tea bags from starfruit leaves, gotu kola leaves and cinnamon powder. This research used a completely randomized design with 5 treatments, namely differences in substitution of cinnamon powder 0%, 1%, 2%, 3% and 4% with 3 replications. The data obtained were analyzed statistically with ANOVA (Analysis of Variance) and if they were significantly different, then continued with the DNMRT (Duncan's News Multiple Range Test) test at a level of 5%. The results showed that the difference in the amount of cinnamon powder substitution had a significant effect on antioxidant activity, total water-soluble ingredients, total polyphenols, color, taste, and aroma. Differences in the concentration of cinnamon powder substitution did not significantly affect the water content and pH. The best treatment in this research was treatment E with substitution of cinnamon powder 4%. The results of organoleptic analysis were the average value of colour preference 3.95, taste 3.65, and aroma 4. The results of chemical analysis are water content 7.88%, total polyphenols 109,32 mg GAE/g, IC₅₀ 96.71 and total water-soluble ingredients 19,66%. The results of chemical analysis are water content 7.88%, total polyphenols 109,32 mg GAE/g, IC₅₀ 96.71, total water-soluble ingredients 19,66% and in steeping tea, pH 6.13 and antioxidant activity 36.93%.

Keywords : Herbal Tea, Starfruit Leaf, Gotu Kola Leaf, Cinnamon Powder, Antioxidant

INTRODUCTION

Starfruit is a plant that grows in tropical climates. This plant can be found in lowland areas such as the Pariaman area. People in Pariaman use wuluh starfruit as an additional ingredient in making food such as curry because the sour taste gives a fresh effect on food. The part of the star fruit plant that can be used not only for the fruit but also for other parts that contain chemicals that can have a health impact on the body, namely the leaves. Starfruit leaves are known as a type of leaf that has a complete nutritional content and high antioxidants. According to Wijayanti (2018), flavonoids, saponins, tannins, formic acid, sulfur, calcium oxalate, and potassium citrate are the active compounds contained in star fruit leaves. In addition,

there is another plant that has many benefits and its content is rarely known by the public, namely the gotu kola plant.

Gotu kola is designated as a medicinal plant in various countries and has been used for generations to treat various diseases. Gotu kola can be consumed in various forms, people believe that consuming gotu kola in the form of extracts, fresh leaves or decoction can treat various diseases and one of them is memory loss. Muchtaromah and Umami (2016) stated that the ability of gotu kola to stimulate memory is thought to be caused by the triterpenoid saponin compounds (asiaticoside) contained in it. This compound is known to repair damaged blood vessels so as to facilitate blood circulation to the brain and is able to regenerate cells and heal wounds. The combination of food products made from starfruit leaves and gotu kola leaves will be able to produce products that have good functional values.

One of the derivative products from starfruit leaves and gotu kola is herbal tea, including starfruit leaf tea (*Averrhoa bilimbi*, L.) (Afdila, 2019) and gotu kola leaf tea (*Centella asiatica*, L. Urban) (Anggraini et al., 2014). Previous research stated that these two leaves have the same character, namely they both have the same taste. One of the efforts to utilize these two leaves in the same product is to add other ingredients to provide aroma and taste and can add nutritional value while maintaining the expected properties of tea products. One of the ingredients that can be used to improve the taste of tea is cinnamon powder. Cinnamon powder functions as a natural flavor that has antioxidant activity. The main component of cinnamon is cinnamaldehyde. Cinnamaldehyde acts as a giver of aroma and color to drinks (Wismantara, 2017).

In previous studies, the addition of cinnamon powder resulted in a non-bitter taste, fragrant aroma and brown color in binahong leaf tea (Yasir et al. 2019). The cinnamon used is AA quality cinnamon, which is the standard quality of cinnamon obtained from the bark. All the ingredients used are mixed and packaged in the form of tea bags so that they can increase the added value of herbal teas and make it easier for the public to serve them. According to Handayani (2010) teabags are processed products that are packaged in bags made of filter paper and can be served quickly and instantly. The purpose of this research is to find out and study the effect of the level of substitution of cinnamon powder on the chemical and organoleptic characteristics and to determine the best level of substitution on the chemical and organoleptic characteristics of herbal tea bags.

METHODOLOGY

2.1 Place and Time

This research has been carried out at the Agricultural Product Technology and Process Engineering Laboratory, Agricultural Biochemical Chemistry Laboratory and Food Nutrition, Instrument Laboratory and Total Quality Control Laboratory of Agricultural Product Technology Study Program, Faculty of Agricultural Technology, Andalas University, Padang, from May to July 2021.

2.2 Materials and Apparatus

2.2.1 Material

The material used in this study was starfruit leaves obtained from the area around Pariaman City, West Sumatra. The leaves taken are young leaves or pekoe + 3 leaves. The gotu kola leaves used were also obtained from the area around Pariaman City, West Sumatra and cinnamon powder from AA quality cinnamon bark obtained from the area around Padang City, West Sumatra.

The chemicals used in this study were distilled water, buffer solution, methanol, follin's reagent and ciocalteu's phenol, 5% sodium carbonate (Na_2CO_3), gallic acid, and DPPH reagent (2,2-Diphenyl-1-Picrylhydrazil).

2.2.2 Apparatus

The apparatus used in this study were pH meter, 1 ml pipette, analytical balance, aluminum cup, desiccator, oven, gegep, measuring cup, test tube, measuring flask, aluminum foil, filter paper, beaker, dropper, erlenmeyer, static, spectrophotometer (Shimadzu) and ultrasonic bath (Elma).

2.3 Research Design

This study was designed using a completely randomized design (CRD) with 5 treatment levels and 3 replications. The observed data were analyzed for variance (Anova) if they were significantly different, followed by Duncan's New Multiple Range Test (DNMRT) at a 5% significance level. Then the treatment given to each group consisted of:

A = No cinnamon powder substitute

B = Cinnamon powder concentration substitution rate 1%

C = Cinnamon powder concentration substitution rate 2%

D = 3% cinnamon powder concentration substitution rate

E = Cinnamon powder concentration substitution rate 4%

Table 1. Composition of herbal teabags

Treatments	Starfish leaves (g)	gotu kola (g)	Cinnamon Powder (g)
A	50	50	0
B	49.5	49.5	1
C	49	49	2
D	48.5	48.5	3
E	48	48	4

2.4 Observations

2.4.1 Observation of Functional Drinks for Tea Bags with Belimbing Wuluh Leaves and Gotu Kola Leaves with Cinnamon Powder Substitution Level

a. pH

Measurement of pH Measurement of the pH of the tea sample is done by taking about 100 mL of functional tea bag solution and then putting it into a glass beaker then measuring the pH of the tea solution using a pH meter.

b. DPPH method antioxidant test

1 mL of the sample was pipetted and then 10 mL of methanol was added, then vortexed and placed in an ultrasonic bath for 15 minutes. Then diluted until clear. Then 2 ml was taken and then 1 ml of DPPH solution was added and then left in a dark room for 15-20 minutes. Then the absorbance was measured at a wavelength of 517 nm.

The antioxidant activity of the sample is determined by the magnitude of the DPPH radical absorption inhibition by calculating the percentage of DPPH absorption inhibition using the formula:

$$\% \text{ inhibition} = (A \text{ control} - A \text{ sample}) / A \text{ Control} \times 100 \%$$

c. Organoleptic

The organoleptic test carried out in this study was a hedonic test (preferred test) by 20 semi-trained panelists. The organoleptic test carried out was an acceptance test, that is, each panelist was required to express a response about the product presented. The purpose of this test is to find out which product is preferred.

The hedonic test is also called the preference test and is carried out on several products that experience different treatments. In this test, panelists are asked to express their personal responses to the color, aroma and taste of the sample. The response can be in the form of a like or dislike response. The hedonic scale used is by using 5 numerical scales, namely very much like (5), like (4), normal (3), dislike (2), and really don't like (1).

RESULTS AND DISCUSSION

Herbal Tea Bag Observation

pH analysis

The pH value is one of the important indicators in determining the quality of herbal teas. According to Lagawa (2020) the measurement of pH in herbal teas aims to determine the level of acidity contained in herbal teas. According to Batubara et al. (2018), the pH value of a food product is one of the important factors that determine the level of resistance to the growth of spoilage microorganisms during processing, distribution and storage. The results of the analysis of the pH value of herbal tea products from star fruit leaves, gotu kola leaves and cinnamon powder can be seen in table 7 as follows:

Table 2. Analysis of pH levels

Treatments	pH value± SD
A	6,10±0,10
B	6,10±0,10
C	6,10±0,10
D	6,10±0,10
E	6,13±0,05

In table 2 it can be seen that the substitution of cinnamon powder on herbal teas with starfruit leaves and gotu kola leaves was not significantly different. The highest pH value was found in treatment E (4% cinnamon powder substitution) which was 6.13 while the lowest pH value was found in treatment A (0% cinnamon powder substitution) which was 6.10. It can be concluded that the greater the number of wood powder substitutions used in herbal teas of belimbing wuluh and gotu kola leaves, the higher the pH value obtained, in line with research conducted by Harianja et al., (2019), the more the addition of wood powder extract. sweet, the pH value of the resulting coffee drink will increase. The increase in the pH value was caused by the base of the cinnamon extract. Cinnamon is an alkaline group that is alkaline with a pH value of 8.5 (Hastuti, 2014).

DPPH Antioxidant Activity

According to Winarsi (2007) antioxidants are electron donating compounds or compounds that are able to counteract or reduce the negative effects of oxidants in the body. Antioxidants work by donating one electron to compounds that are oxidant so that the activity of these oxidant compounds can be inhibited. In this herbal tea, an analysis of antioxidant activity was carried out using the DPPH method. The working principle of the DPPH method is a reduction process which is characterized by a change or fading of the color of the solution, from purple to slightly yellowish. This fading results in a decrease in the absorbance of visible light from the spectrophotometer, so the lower the absorbance value of the sample, the higher the antioxidant activity. The results of the analysis can be seen in table 3 as follows:

Table 3. Analysis of DPPH . antioxidant activity

Treatments	Inhibition(%) ± SD
A	27,69± 2,63 a
B	30,30±3,23 b
C	32,65± 2,80 b c

D	35,15±2,49b	c
E	36,93±2,78	c

In table 3, it can be seen that the steeping water of herbal tea showed the level of addition of the total concentration of cinnamon powder substitution was significantly different to antioxidant activity. Infusion of herbal tea from belimbing wuluh leaves, gotu kola leaf substituted with cinnamon powder has antioxidant activity between 27.69%-36.93% at 80 ppm. The treatment with the highest antioxidant activity was treatment E (4% cinnamon powder substitution) while the treatment with the lowest antioxidant activity was A (0% cinnamon powder substitution).

Organoleptic test

The effect of the concentration level of cinnamon powder substitution on the color, taste, and aroma according to the panelists can be seen in Figure 1. Based on the radar graph in the image, which is calculated based on the average preference level, the panelists tend to choose herbal tea products with treatment E, namely with a substitute concentration of 4% cinnamon powder. With the average value of preference for color 3.95, taste 3.65, and aroma 4

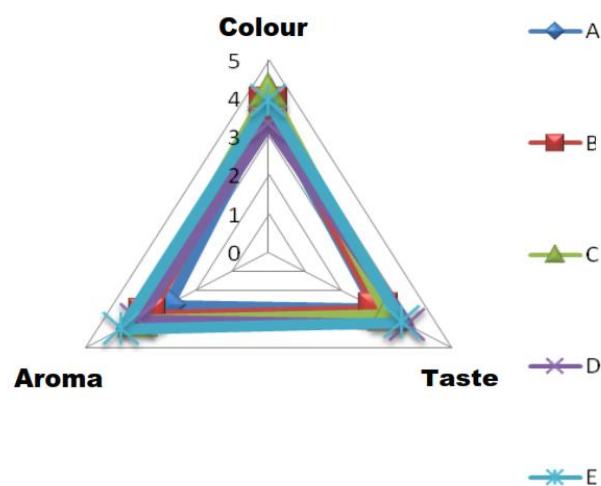


Figure 1. Herbal Tea Brewing Organoleptic Radar

CONCLUSION

Panelists acceptance of herbal tea starfruit leaves, gotu kola leaf and cinnamon powder organoleptically gave results on color, taste, and aroma with the best treatment in this study was treatment E with a substitution level of 4% cinnamon powder, the organoleptic results were the average value color preference is 3.95 (ordinary), 3.65 (ordinary), and aroma is 4 (like). The results of chemical analysis on

steeping tea have a pH value of 6.13, and antioxidant activity of 36.93%. Based on the research that has been done, testing the contamination contained in the herbal tea produced needs to be done

REFERENCES:

- Afdila, Yusi Diki, 2019. *Pengaruh Penambahan Bubuk Jahe Merah (Zingiber Officinale, Rose) Terhadap Sifat Kimia Dan Uji Sensori Teh Daun Belimbing Wuluh (Averrhoa Bilimbi, L.)*. [Skripsi]. Fakultas Teknologi Hasil Pertanian. Universitas Andalas. Padang
- Anggraini, Tuty, Diana Silvy, Sahadi Didi Ismanto dan Firdaus Azhar. 2014. *Pengaruh Penambahan Peppermint (Mentha Piperita, L.) terhadap Kualitas Teh Daun Pegagan (Centella Asiatica, L. Urban)*. Jurnal Litbang Industri. 4(2)
- Batubara, Siti Chairiyah, Nindia Arum Pratiwi. *Pengembangan Minuman Berbasis Teh dan Rempah sebagai Minuman Fungsional*. Jurnal Industri Kreatif dan Kewirausahaan. Universitas Sahid. Jakarta Selatan. 1(2)
- Handayani, Yuli. 2010. *Kajian Pembuatan Teh Celup dengan Daun Pegagan Centella asiatica (L.) Urban*. [Skripsi]. Fakultas Teknologi Pertanian. Institut Pertanian Bogor. Bogor
- Harianja, Yosua J.R, Sentosa Ginting, Ismed Suhaidi. 2019. *Pengaruh Penambahan Ekstrak Kulit Kayu Manis (Cinnamomun burmanii Blume) sebagai Bahan Pengawet Alami Untuk Meningkatkan Umur Simpan Minuman Kopi*. J. Rekayasa Pangan dan Pert. 7(3)
- Hastuti, A. M. 2014. *Pengaruh Penambahan Kayu Manis terhadap Aktivitas Antioksidan dan Kadar Gula Total Minuman Fungsional Secang dan Daun Stevia Sebagai Alternatif Minuman bagi Penderita Diabetes Melitus Tipe 2*. Artikel Penelitian. UNDIP. Semarang.
- Lagawa, I Nyoman Cakra, Pande Ketut Diah Kencana, I Gusti Ngurah Apriadi Aviantara. 2020. *Pengaruh Waktu Pelayuan dan Suhu Pengeringan terhadap Karakteristik Teh Herbal Daun Bambu Tabah (Gigantochloa nigrociliata BUSE-KURZ)*. Jurnal BETA (Biosistem Dan Teknik Pertanian). Program Studi Teknik Pertanian, Fakultas Teknologi Pertanian Universitas Udayana. 8(2).
- Muchtaromah, Bayyinatul dan Leny Rusvita Umami. 2016. *Efek Farmatologi Pegagan (Centella asiatica (L.) Urban) sebagai Suplemen Pemacu Daya Ingat*. Jurusan Biologi. Fakultas Sains dan Teknologi UIN Alauddin Makassar. Makassar
- Wijayanti, Tut Rayani Aksohini dan Rani Safitri. 2018. *Uji Aktivitas Antibakteri Ekstrak Belimbing Wuluh (Averrhoa Bilimbi Linn.) terhadap Pertumbuhan Bakteri Staphylococcus Aureus Penyebab Infeksi Nifas*. Jurnal Ilmiah Ilmu Kesehatan. 6(3): 277-285
- Winarsi, H. 2007. *Antioksidan Alami dan Radikal Bebas*. Kasinus. Yogyakarta

- Wismantara, Hikmah Ramadhany, Moh. Amin dan Elly Purwanti. 2017. *Pengaruh Filtrat Azolla Micraphylla dan Penambahan Filtrat Kayu Manis terhadap Kualitas Produk Nata De Soya Serta Pengembangannya sebagai Modul Biologi Berbasis Riset untuk Siswa Kelas XII SMA/MA*. Pusat Studi Lingkungan dan Kependudukan (PSLK) Universitas Muhammadiyah Malang. Malang
- Yasir, Muhammad, Meittycorfrida Mailoha dan Priscillia Picauly. *Karakteristik Organoleptik Teh Daun Binahong dengan Penambahan Kayu Manis*. Jurnal Teknologi Pertanian. 8(2): 53-57