Journal of Applied Agricultural Science and Technology *E-ISSN: 2621-2528*
4 (2): 189-195 (2020) *ISSN: 2621-4709*

OPTIMATION AND SENSORY PROFILE OF FUNCTIONAL DRINK FROM CINNAMON AND CARDAMOM

Mardiana*[,1], Novriza Sativa[2], Hari Hariadi[1], Nanda Triandita[3], Nela Eska Putri[4]

[1]Department of Food Science and Technology, Garut University, Garut, Indonesia
[2]Department of Agrotechnology, University, Garut University, Garut, Indonesia
[3]Department of Agricultural Products Technology, Faculty of Agriculture, Teuku Umar University, Meulaboh, Indonesia
[4] Department of Food Technology, Politeknik Pertanian Negeri Payakumbuh, 50 Kota, Indonesia

*Corresponding author
Email: mahasurasigi@gmail.com

Abstract. *Functional drinks can be made from local herbal ingredients that are often used for spices such as cinnamon (Cinnamomum burmanni) and cardamom (Amomum compactum). The purpose of this study is to determine the best formulation of cinnamon and cardamon as a herbal drink based on moisture content, ash content , and sensory evaluation . Raw materials were dried at 50 °C until reached a maximum moisture content 10% and were reduced in size. The formulations were made of comparison between cinnamon and cardamom which were A (100: 0)%; B (80:20)%; C (60:40)%; D (50:50)%; E (40:60)%; F (20:80)%; and G (0: 100)%. The moisture content of all formulas is between 7.12-7.33% (<10%) and the ash content of all formulas is between 4.83-5.06%. The results of sensory analysis showed that formula B had the best acceptance for color (3.03) and aroma (3.17). This producthad moisture 7.23 % and ash content 4.83 %.*
Keywords: *cardamom; cinnamon; functional drinks; herbal drinks*

1. Introduction

Foods have provide complex nutrients for the body, but these nutrients do not necessarily needs for each person body if consumed in varying amounts. Functional food is known to increase the physiological maintenance of the body because it has macronutrient and micronutrient components, such as protein, fiber, vitamins, minerals, and antioxidants. According to BPOM (2011), functional food is processed food that contains one or more food components which, based on scientific studies, have certain physiological functions outside their basic functions and are proven to be harmless to the body and beneficial to health.

Functional food is often associated with the prevention and cure of degenerative diseases, such as diabetes mellitus. Functional food can be served in the form of food or drinks, one of which is herbal drinks. Herbal drinks can be made from local ingredients that are often used for spices and cooking spices, such as cinnamon (*Cinnamomum burmanni*) and cardamom (*Amomum compactum*).

Cinnamon has cinnamaldehyde, eugenol, cinnamic acid, catechin, and other phenolic compounds which are antioxidants. Cinnamaldehyde can increase insulin sensitivity and improve pancreatic beta islet in mice can significantly reduce fasting blood glucose (Guo *et al*., 2017).

Received 12 Maret 2020; Received in revised form 31 August 2020; Accepted 31 August 2020
https://doi.org/10.32530/jaast.v4i2.138

AccordingtoAnjani *et al.*, (2015) suggested that the addition of cinnamon filtrate could increase the total phenol content of herbal tea from salak fruit skin. Cinnamon has a total phenol of 63.78 ppm and antioxidant activity of 45.42% (Yulianto & Widyaningsih, 2013). According to Kondoy *et al.,* (2013), cinnamon leaf extract has flavonoid compounds that can stimulate the activation of insulin thereby reducing blood glucose levels in experimental rats. Emilda (2018) suggested that cinnamon has the potential as an antidiabetic food by reducing blood glucose, inhibiting the activity of α-glucosidase enzymes, and controlling the blood glucose metabolism of non-diabetic respondents during postprandial.

Cardamom has antioxidants and anti-inflammatory compound such as phenolic and flavonoids as well as volatile oils. Research Afrina *et al.* (2016) showed that cardamom extract contains alkaloids, saponins, tannins, polyphenols, flavonoids, quinones, steroids, and triterpenoids. Fachriyah and Sumardi (2007) stated that the components of cardamom seed essential oils are α-pinene, β-pinena, p-simene, 1.8 sineol, and α-terpineol. Flavonoid and phenolic compounds found in cardamom are also potential as antioxidants and antidiabetic. Cardamom stem extract can increase SOD activity and decrease rat lipid peroxidation during 14 days administration (Rahmawati *et al.*, 2014). Cardamom leaf extract also can control blood glucose levels and body weight in diabetic rats (Winarsi *et al.,* 2013). Consumption of cardamom extract at least 0.5 g/100 g diet or 40 mg/day might exert a favorable effect on improving the gastrointestinal milieu, and also provide a clue to substantiate its traditional therapeutic uses and dosage for intestinal health improvement (Huang *et.al.,* 2007).

Cinnamon is often used as an additional beverage, while cardamom is rarely used as a beverage ingredient. Cinnamon and cardamom have volatile compounds that can produce flavors and aromas. This study aims to determine the best formulation of herbal drinks based on sensory reception, antioxidant capacity, and total plate figures made from cinnamon and cardamom. This herbal drink is made by drying and reducing the size and then pack it like tea using a tea bag.

2. Methods

2.1. Materials

The raw materials in this study are cinnamon and cardamom obtained from Garut Regency, West Java Province. The formulations comparison between cinnamon and cardamom which were A (100: 0)%; B (80:20)%; C (60:40)%; D (50:50)%; E (40:60)%; F (20:80)%; and G (0: 100)%.

The production equipment used are ovens, analytical scales, food processors, and 80 mesh filters. The analytical equipment used included electric ovens, mufflefurnace, measuring cups, measuring flasks, pipettes, and micropipets.

2.2. Procedures

Cardamom and cinnamon is sorted to separate the good products from the bad ones and wash thoroughly. Then cardamom is dried until the water content reaches a maximum of 10% using an oven at 50 °C. After obtaining a moisture content of ± 10%, each material is mashed using a food processor and filtered using a 80 mesh size sieve. The filter results are then packed in 5 gram tea bags each. Furthermore, characterization of sensory reception, moisture content, and ashcontent was performed

2.3. Moisture Content Analysis (According to AOAC, 1995)

The empty aluminum cup was dried in the oven at 105 °C for 15 minutes. The cup cooled in a desiccator for 5 minutes. The cup is weighed and recorded as initial weight (a). The sample was weighed as much as 5 g (b) and put in the cup. The sample is then dried in an oven at 105 ° C until it reaches a constant weight (no change in weight of more than 0.003 g). After that the cup containing the sample is cooled in a desiccator, then weighed the final weight (c). Material moisture content (%) is determined by the following formula:

$$\text{Moisture } (\%\, w/w) = \frac{b-(c-a)}{b} x\ 100\% \quad (1)$$

2.4. Ash Content Analysis (According to AOAC, 1995)

The empty porcelain cup was clean and dried in the oven at 105 °C for 30 minutes. The cup cooled in a desiccator for 5 minutes. The cup is weighed and recorded as initial weight (a). The sampleabout 2-5 grams, accuratelyweighted, taken in toporcelain cup (b) andburned in the electric stove. When there was no longer smoke come out from the cup, the sample was keep in muffle furnace allow the temperature to each 600 °C and constant for 7 hours. The cup was cooled in a desiccator for 15 minutes and then was weighed (c). Ash content (%) is determined by the following formula:

$$\text{Ash content } (\%\, w/w) = \frac{c-a}{b} x\ 100\% \quad (2)$$

2.5. Sensory Analysis

Sensory analysis conducted was a hedonic rating test (preferability) on a scale of 1-5 against 30 untrained panelists drink up 50-70 ml herbal drink from brewed 10 packs herbal drink with 500ml water. The scale of the product color, aroma and taste show in Table 1.

Tabel 1. The hedonic scale of cinnamon and cardamom drink

Scale	Explanation
1	Very dislike
2	Dislike
3	Netral
4	Like
5	Very like

2.6. Statistic Analysis

This research used a completely randomized design with 7 of treatments and 3 of repetitions. Water content, ash content and sensory data processed statistically using SPSS statistics 22 application with one-way analysis of variance (ANOVA) at 95% confidence level. Analysis included Duncan's follow-up test. The data interpreted based on the results of the statistical tests.

3. Results and Discussion

3.1. Moisture Content of Cinnamon and Cardamom Drinks

The maximum expected moisture content for dry herbal drinks is 10%. Dry packaged tea has a maximum moisture content of 8.0% according to SNI 3636: 2013 (BSN, 2013). The moisture content of each functional drinks from cinnamon and cardamom show in Table 2.

Tabel 2. The moisture & Ash content of cinnamon and cardamom drink

Formulation	Cinnamon : cardamom (%)	Moisturecontent (%)	Ash content (%)
A	100:0	7.20^{b}	4.90^{a}
B	80:20	7.23^{b}	4.83^{a}
C	60:40	7.25^{b}	5.06^{a}
D	50:50	7.33^{a}	4.96^{a}
E	40:60	7.12^{b}	4.90^{a}
F	20:80	7.31^{b}	5.04^{a}
G	0:100	7.22^{a}	4.92^{a}

Notes: Data on the same column with different letter superscripts are significantly different ($p<0.05$) as assessed byDuncan'stestat $p<0.05$

Rusli & Liasambu (2018) suggested that herbal tea bag from bay leaves combined with soursop leaves had a moisture content of 9.46-11.94% and had fulfilled SNI requirements. Requirements for maximum moisture content of tea bags based on SNI No. 01-4324-1996 is 12%. According to the Table 2, all drink formulas made from cinnamon and cardamom packaged like tea bags was show standards of tea.

Functional drinks from cinnamon and cardamom with various treatments have relatively the same water content. Products D and G have significantly different moisture content from other products because cardamom has a fairly high moisture content. In addition, this is influenced by the level of surfaceporosity of the material which is small eror smoother will evaporate the water better.

3.2. Ash Content of Cinnamon and Cardamom Drinks

Food minerals is depend ash content from it. The ash content of each functional drinks from cinnamon and cardamom show in Table 2. Cinnamon has 3.67% of minerals (Anto & Rato, 2018). Processing can separation or partitioning of food minerals. The extent of processing can impact minerals stability in food. Functional drinks from cinnamon and cardamom with various treatments have not significantly different of ash content. Requirements for maximum ash content of tea bags based on SNI No. 3836:2013 is 8% (BSN, 2013). All of the product were SNI requirements for herbal drink dyes.

3.3. Sensory Properties of Cinnamon and Cardamom Drinks

The results of the sensory analysis functional beverage products from cinnamon and cardamom show in Table 3. The variation of the addition of cinnamon or cardamom was significantly different to the color, aroma, and taste from panelists.

According to the Table 3., Formula A was the most preferred in taste by panelists but statistically it has significantly different (p<0.05) only with formula C.The product taste with cinnamon dominant is preferred by panelists compared to without the addition of cardamom. The cinnamaldehydeh as a spicy perceptionand then increase consumer acceptance to the product higher than without cardamom addition product. Cardamom flavor mostly unfamiliar for herbal drinks. In contrast to cinnamon, it is used in various foods and beverages.

Tabel3. Level of panelists acceptance of cinnamon and cardamom drink

Formulation	Sensories Attribute		
	Color	Aroma	Taste
A	2.90^{abc}	3.00^{ab}	4.37^{b}
B	3.03^{bc}	3.17^{b}	2.87^{bc}
C	2.77^{ab}	3.17^{b}	2.67^{c}
D	2.60^{a}	2.77^{a}	2.77^{bc}
E	3.17^{c}	2.73^{a}	3.13^{b}
F	3.13^{bc}	2.87^{ab}	2.90^{bc}
G	3.23^{c}	2.70^{a}	2.73^{bc}

Notes: Data on the same column with different letter superscripts are significantly different (p<0.05) as assessed by Duncan'stest atp<0.05

Formula B and C were the most preferred in aroma by panelists and statistically it has no significantly different (p<0.05) with formula A and F. Cinnamon is often used to enhance flavor and aroma in various dishes. Cardamom contains α-pinene, β-pinene, p-simene, 1,8 sineol, and α-terpineol which are volatile compounds and produce a distinctive aroma. According to Naik *et al.* (2004), 1,8-Cineole is present considerably lower level in the pericarp oil of cardamom. According to Gurudutt *et al.* (1996), the major constituents of cardamon are l,8-cineole (61.3%), α-terpineol, α - and β-pinene and allo-aromadendrene. Menon *et al.* (1999) research showed the major free volatiles of cardamom were, 1,8-cineole and α-terpinyl acetate, while other monoterpenes levels such as β-pinene and γ-terpinene are present in less than 2%.

Formula G were the most preferred in colour by panelists and statistically it has no significantly different (p<0.05) with formula A, B, E and F. Color acceptance for each product are significantly different. Formula G is the best preferred product color is on beverage powder made from cardamom. Water can affect the appearance, texture and flavor of food (Ilmi *et al.,* 2017).

Dry cardamom has a brighter color than dried cinnamon. The treatments such as drying can reduce the sensory acceptance of the product becausethe color after brewing becomes dark brown and the taste more spicy. The research of Jahangir *et al.,* cinnamaldehyde enrichment is beneficial for both the functional as well as oxidative stability of chocolates.

4. Conclusions

Functional drinks made from 80% cinnamon and 20% cardamon have the most preferred color and aroma ratings from panelists, while 100% cinnamon (without the addition of cardamom) are preferred by panelists in the aspect of taste. Formula B has a moisture content of 7.23% and ash content of 4.83%.

Acknowledgement

We gratefully acknowledge the financial suppport of the Ministry of Research and Technology/ National Research and Innovation Agency (Indonesia) for research grant of Hibah Penelitian Dosen Pemula with Research Contract Number: 110 / SP2H / LT / DPRM / 2019; 2682 / L4 / PP / 2019; 170 / LEMLIT / UNIGA / III / 2019.

References

Afrina, Chismirina, S., &Aulia, C. R. P. (2016). Konsentrasi hambat dan bunuh minimum ekstrak buah kapulaga (*Amomum compactum*) terhadap *aggregatibacter Actinomycetemcomitans*. *Journal of Syiah Kuala Dentistry Society*, 1(2), 192-200. http://jurnal.unsyiah.ac.id/JDS/.

Anjani, P.P, Adrianty, S., &Widyaningsih, T.D. (2015). Pengaruh penambahan pandan wangi dan kayu manis pada teh herbal kulit salak bagi penderita diabetes. *Jurnal Pangandan Agroindustri*, 3(1), 203-214.http://jpa.ub.ac.id/index.php/jpa

Anto& Rato, R. (2018). Pengaruh Penambahan Bubuk Kayu Manis (*Cinnamomum burmanni*) terhadap sifat kimia dan total mikroba pada nugget ayam. (Effect of the addition cinnamon (*Cinnamomum burmannii*) powder on chemical and total microbial properties in chicken nugget). *Agropolitan*, 5(1), 1-11.

[AOAC] Association of Analitycal Communities. (1995). Official Methods of Analysis of the AOAC International. 16th Ed.Washington, USA: AOAC International.

[BPOM] Badan Pengawas Obat dan Makanan. (2011). Ketentuan Pokok Pengawasan Pangan Fungsional. Jakarta: Badan Pengawas

[BSN] Badan Standardisasi Nasional. (2013). Standar Nasional Indonesia tentang teh kering dalam kemasan. 3836:2013. Jakarta: BSN

Emilda. (2018). Efek senyawa bioaktif kayu manis (*Cinnamomum burmanii* Nees Ex. BL) terhadap diabetes melitus: kajian pustaka. *Jurnal Fitofarmaka Indonesia*, 5(1), 246-252. http://doi.org/10.33096/jffi.v5i1.316.

Fachriyah, E. & Sumardi. (2007). Identifikasi minyak atsiri biji kapulaga (*Amomum cardomomum*). *Jurnal Sains & Matematika (JSM)*, 15(2), 83-87. http://ejournal.undip.ac.id/index.

Guo, X., Sun, W., Huang, L., Lili, W., Hou, Y., Qin, L., & Liu, T. (2017).Effect of Cinnamaldehyde on glucose metabolism and vessel function. *Medical Science Monitor*, 23, 3844-3853. http://doi.org/10.12659/MSM.906027.

Gurudutt, K. N., Naik, J. P., Srinivas, P. & Ravindranath, B. (1996). Volatile constituents of large cardamom (*Amomum subulatum* Roxb.). *Flavour and Fragrance Journal*, 11(1), 7-9. https://doi.org/10.1002/(SICI)1099-1026(199601)11:1<7::AID-FFJ542>3.0.CO;2-9

Huang. Y., Yen, G. , Sheu F , Lin, J., and Chau, C., Dose effects of the food spice cardamom on aspects of hamster gut physiology. *Mol. Nutr. Food Res (51) 602-608,* doi 10.1002/mnfr.200600249

Ilmi, A., Praseptiangga, D., & Muhammad, D. R. A. (2017). Sensory attributes and preliminary characterization of milk chocolate bar enriched with cinnamon essential oil. *International Conference On Food Science and Engineering 2016-IOP Conf. Series: Materials Science and Engineering*, 193, 1-6. http://doi:10.1088/1757-899X/193/1/012031.

Jahangir, M.A., Shehzad, A. , Butt, M. S., Shahid, M. Influence of Supercritical Fluid Extract of Cinnamomum zeylanicum Bark on Physical, Bioactive and Sensory Properties of Innovative cinnamaldehyde-Enriched Chocolates. *Czech J. Food Sci,* 36 (1), 28–36, https://doi.org/10.17221/237/2016-CJFS

Kondoy, S., Wullur, A. & Bodhi, W. (2013). Potensi ekstrak etanol daun kayu manis (*Cinnamomum burmanii*) terhadap penurunan kadar glukosa darah dari tikus putih jantan (*Rattus novergicus*) yang diinduksi sukrosa. *Pharmacon Jurnal Ilmiah Farmasi*, 2(3),96-99.http://ejournal.unsrat.ac.id/index.php/pharmacon.

Menon, A. N., Chacko, S., & Narayanan, C. S. (1999). Free and glycosidically bound volatiles of cardamom (*Eletteria cardamomum* Maton var. *miniscula* Burkill). *Flavour and Fragrance Journal*, 14(1), 65-68. https://doi.org/10.1002/(SICI)1099-1026(199901/02)14:1<65::AID-FFJ789>3.0.CO;2-A

Naik, J. P., Rao, L. J. M., Kumar, T. M. M., & Sampathu, S. R. (2004). Chemical composition of the volatile oil from the pericarp (husk) of large cardamom (*Amomum subulatum* Roxb.). *Flavour and Fragrance Journal*, 19(5), 441-444. http://doi 10.1002/ffj.1336.

Rahmawati, G., Rachmawati, F. N. & Winarsi, H. (2014). Aktivitas superoksida dismutase tikus diabetes yang diberi ekstrak batang kapulaga dan glibenklamid. *Scripta Biologica*, 1(3),197-201.https://doi.org/10.20884/1.sb.2014.1.3.42.

Rusli, N. & Liasambu, S. H. (2018). Formulation and sensory evaluation of herb tea from bay leaf (*Eugenia polyantha* Wight.) and soursop leaf (*Annona muricata*L.) as anti-hypertension. *Journal of Pharmaceutical and Medical Science*, 3(1), 6-9. http://dx.doi.org/10.32814/jpms.v3i1.62.

Winarsi, H., Sasongko, N. D., Purwanto, A. & Nuraeni, I. (2013). Ekstrak daun kapulaga menurunkan indeks atherogenik dan kadar gula darah tikus diabetes induksi alloxan. *Agritech*, 33(3), 273-280. https://doi.org/10.22146/agritech.9548.

Yulianto, R. R. & Widyaningsih, T. D. (2013). Formulasi produk minuman herbal berbasis cincau hitam (*Mesonapalustris*), jahe (*Zingiberofficinale*), dan kayu manis (*Cinnamomum burmanni*). *Jurnal Pangan dan Agroindustri*, 1(1), 65-77. http://jpa.ub.ac.id/index.php/jpa.