

Wedang Uwuh: Minuman Herbal Kaya Antioksidan Dari Yogyakarta

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Abstrak

Antioksidan alami sampai sekarang masih lebih digemari dibandingkan antioksidan sintetik karena khasiat dan juga keamanannya. Wedang uwuh adalah salah satu contoh minuman tradisional yang mengandung berbagai rempah (kayu manis, cengkeh, kapulaga, kayu secang, pala, dan jahe) yang dikenal kaya akan antioksidannya. Penelitian ini bertujuan untuk menentukan metode infusa pada wedang uwuh siap minum yang optimum untuk mencapai aktivitas antioksidan yang maksimal. Dua kelompok sampel wedang uwuh (dihaluskan dan kasar) dalam kantong teh celup diseduh air panas (90°C) selama waktu tertentu (1, 3, 5, 10, dan 15 menit). Setelah itu aktivitas antioksidan diukur menggunakan metode DPPH (2,2-difenil-1-pikrilhidrazil). Hasil penelitian menunjukkan nilai IC₅₀ tertinggi dengan nilai 7,97 µg/mL pada wedang uwuh yang dihaluskan yang diseduh selama 15 menit. Semakin kecil ukuran partikel dan lama waktu infusa akan menghasilkan nilai IC₅₀ yang lebih rendah, sehingga dapat dicapai aktivitas antioksidan yang lebih kuat.

Kata kunci: antioksidan, DPPH, rempah, wedang uwuh

Wedang Uwuh: An Antioxidant Rich Herbal Drink From Yogyakarta

Abstract

Natural antioxidants are still favoured due to their high benefits and safety compared to synthetic ones. Wedang uwuh is one example of a traditional drink consisting of various spices (cinnamon, cloves, cardamom, sappanwood, nutmeg, and ginger) rich in antioxidants. This study aimed to determine the optimum infusion method of ready-to-drink wedang uwuh to achieve its maximum antioxidant potential. Two groups of wedang uwuh samples (grounded and ungrounded) were infused in hot water (90°C) using tea bags at different timings (1, 3, 5, 10, and 15 minutes). Then their antioxidant activity was measured using the DPPH (2,2-diphenyl-1-picrylhydrazyl) scavenging assay method. The results showed the highest when we infused grounded wedang uwuh for 15 minutes with the IC₅₀ value of 7.97 µg/mL. The smaller the particle size and the longer the infusion time yields lower IC₅₀ value, thus achieving more potent antioxidant activity.

Keywords: antioxidants, DPPH, spices, wedang uwuh

Introduction radicals are the main culprit as they accumulate in the body and interfere with the Degenerative diseases are diseases in 1 physiological function of the cells. which the structure of the affected organs or Antioxidants

are recommended in fighting tissues changes for the worse over time, and these negative effects of free radicals. With the their high incidence has encouraged people to increasing development of health industries, take

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prevention. Studies reported that free we can easily find supplements and health products in the market. However, traditional remedies passed down from generation to generation, natural antioxidants, are safer and preferred more by people.²

The Indonesian archipelago has been known for its wealth of spices throughout history, which sparked colonial interference since the sixteenth century, and spices are a big part of our country's identity.³ Not only do they give flavours and preserve foods, but they also have plenty of other benefits, including being excellent sources of antioxidants and are often made into drinks. For instance, *wedang uwuh*, a traditional warm drink originating from Bantul, Yogyakarta. It is formulated from natural herbs and gives off a distinctive spice aroma, red colour, and spicy-sweet taste.

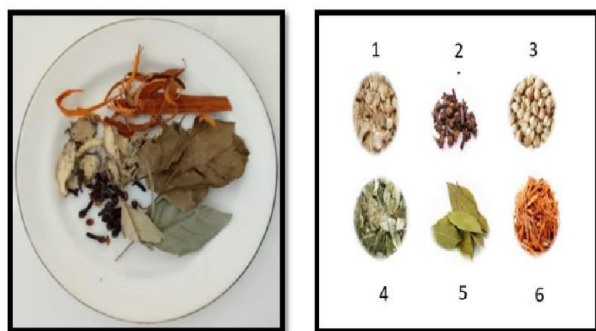


Figure 1. Wedang uwuh herbs. (1) Ginger (*Zingiber officinale*), (2) Cloves (*Syzygium aromaticum*), (3) Cardamom seeds (*Amomum compactum*), (4) Cinnamon leaves (*Cinnamomum burmannii*), (5) Nutmeg leaves (*Myristica fragrans*), (6) Sappanwood (*Caesalpinia sappan*)

The presence of nutritious ingredients in *wedang uwuh* such as cinnamon, nutmeg, cloves, sappanwood, cardamom, and ginger has proven to be beneficial for health in lowering cholesterol, preventing osteoporosis, as anti-diarrhoea, and anti-cancer. Combining several spices in formulating a drink can increase its antioxidant effects compared to when the spices are used individually, according to Herold (2007). The various ingredients in *wedang uwuh* are ascorbic acids, flavonoids, isoflavones, tannin, eugenol, and other phenolic compounds. These compounds play a significant part in the antioxidant activity, as revealed in studies by Bergendi et al. (1999).⁴



Figure 2. Wedang uwuh in tea bag

Commonly, brewing drinks in tea bags are more convenient than boiling the ingredients in a kettle. Also, boiling sometimes can cause the compounds contained in the ingredients to be evaporated or extracted too much, reducing its effectiveness.⁴ In this study, we infused two groups of *wedang uwuh* (ground into powder and coarsely chopped) using tea bags. The aim is to find out how different timings and molecule sizes affect the antioxidant activity of each sample.

Materials and Methods

Plant Materials

Wedang uwuh itself consists of various types of dried herbs, namely: cinnamon leaves (*Cinnamomum burmannii*), nutmeg leaves (*Myristica fragrans*), clove leaves and stalks (*Syzygium aromaticum*), sappanwood (*Caesalpinia sappan*), cardamom seeds (*Amomum compactum*), and ginger (*Zingiber officinale* Rosc.).

Preparation of Wedang Uwuh

Cinnamon leaves, nutmeg leaves, clove leaves and stalks, sappanwood, cardamom seeds, and ginger from the local market. The ingredients were dried and weighed (Table 1.), and then distributed evenly into 5 tea bags. The *wedang uwuh* is divided into two different groups. The first group was powdered ingredients. The second group was coarsely chopped ingredients. The content of tea bag is two grams.

Table 1. Weight of Each Sample Group

Ingredients	Quantity (g)
Cinnamon leaves	0.3
Nutmeg leaves	0.2
Clove leaves	0.5
Sappanwood	1.0
Cardamom seeds	1.0
Clove stalks	2.0
Ginger	5.0

Infusion of Wedang Uwuh

The wedang uwuh-tea bag was poured with 170 mL of hot water (90°C), for five different periods (1, 3, 5, 10, and 15 minutes).⁴ All infusates were then cooled and filtered using filter paper and later diluted with aquadest with the ratio of 1:5 (20 mL of sample in a 100 mL solution).

Determination of Antioxidant Activity

To prepare the DPPH solution, we diluted 5.9 mg of powdered DPPH with methanol in a 100 mL volumetric flask. The preparation of the sample for antioxidant activity measurement was done by pipetting the diluted infused sample into different concentrations (0%, 1%, 2%, 4%, 8%, 16%, 25%) in test tubes, with 0% being the control of the group. In the control group (0%), 500 µL of aquadest was added to 1500 µL of DPPH solution.^{5, 6} For a concentration of 1%, we diluted 20 µL of the sample with 480 µL of aquadest and so on. After adding the DPPH solution, we stored the samples in a dark place for 30 minutes. This absorbance was measured using the spectrophotometer at 517 nm, and we calculated the IC₅₀.^{5, 6}

The radical scavenging activity was calculated as a percentage of DPPH discoloration from its purple colour using the equation Eq. (1), where A₀ is the absorbance of the control and A₁ is the absorbance of the sample.⁷

$$\text{Scavenging activity (\%)} = \frac{A_0 - A_1}{A_0} \times 100\%$$

We plotted a graph of sample concentration against the scavenging activity (%), and we obtained the IC₅₀ value by

calculating the x value when y is equal to 50. The IC₅₀ value is the amount of substance concentration needed to cause a 50% loss in the DPPH activity. The IC₅₀ value is classified into different categories ranging from very strong (<50 µg/mL), strong (50-100 µg/mL), moderate (100-150 µg/mL), weak (150-200 µg/mL) to very weak (>200 µg/mL).⁷

Results and Discussions

The IC₅₀ values for the both groups were 7-19 µg/mL. They can be classified as very strong antioxidants. However, there was no significant different between groups, the powdered and chopped ingredients. The IC₅₀ values of the powdered ingredients were 7-14 µg/mL. And the OIC50 of the chopped ingredients were 10 to 19 µg/mL (Table 2). The wedang uwuh made from the ingredient powder was better than choops in their antioxidative activities. The size of the particles is important. –The smaller the size of the particle, the larger the specific surface area; water, as the solvent, will then penetrate more easily into the particles, thus increasing the extraction efficacy. The particle size is a crucial parameter in chemical composition, affecting biological activities.^{8, 9, 10}

Table 2. IC₅₀ Value of Wedang Uwuh

Time (mins)	IC ₅₀ value (µg/mL)	
	Powder	Coarse
1	14.88	18.43
3	13.89	17.12
5	13.38	15.03
10	10.10	11.51
15	7.97	10.84

Supplementary to particle size, time period of infusion also plays a big role in affecting antioxidant activity. As seen in Figure 3., the IC₅₀ value decreases with the infusion time, reaching its lowest (strongest) when infused for 15 minutes, for both powdered (IC₅₀ = 7.97 µg/mL) and chopped (IC₅₀ = 10.84 µg/mL) preparations. Thus, the best infusion time in this study for *wedang uwuh* was 15 minutes.^{11, 12} There are different methods in extracting

bioactive compounds, but among these extraction methods, infusion is the simplest, fastest and most effective way to obtain plant extracts. According to Adouni et al. (2018) for very short extraction times, it can present the most important extraction yields correlated with the bioactive compounds' content. Moreover, most people are more convenient with instant ready to drink beverages.^{12, 15, 16}

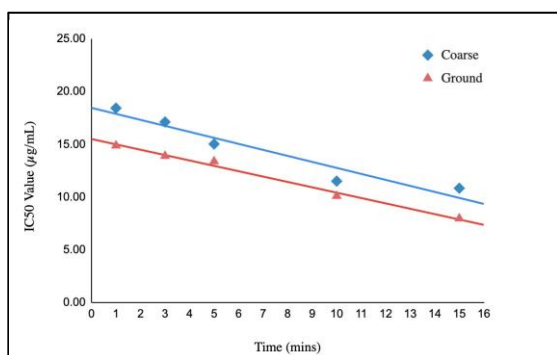


Figure 3. The IC₅₀ value of *wedang uwuh*

Wedang uwuh is rich in antioxidants. Ginger and cloves dominated the *wedang uwuh*. The gingerol found in ginger and eugenol in cloves is the main phenolic compound with the highest antioxidant activity as stated by Suryatno et al. (2012).^{15,17} The ascorbic acid or vitamin C in cardamom (19.22 mg/g extract) is a strong antioxidant. Vitamin C itself is used as a standard for determining antioxidant activities.^{18,19} Limonene, eugenol, and myristicin were the active compounds found in nutmeg's essential oil and is also excellent antioxidant.^{20,21} As reported by Wasia et al., cinnamon contains eugenol, flavonoid, tannin, but sinamaldehyd is the primary active compound (52-76%) of its essential oil which is a powerful antioxidant and can also act as an anti-diabetes.²² The combination of these ingredients surely boosts the antioxidant effect of this beverage and is highly beneficial to fight off the adverse effects of free radicals.

Conclusions

The mains objectives of this study were to investigate two factors that influence the antioxidant capacity of wedang uwuh. the first factor was the different between the use of powdered and chopped ingredients. The second factor was the hot water-infusion period. The

powdered ingredient and the longest infusion period gave the best antioxidant capacity of wedang uwuh.

References

1. Winarsi H, Nuraeni I, Roselina A, Andreas A. Sensory and antioxidant evaluation of functional drinks based on cardamom rhizomes (*Amomum cardamomum* willd.). *Food Res.* 2020;4(6):2169–75.
2. The dirty dozen: BHA and BHT. Disitasi dari <https://davidsuzuki.org/queen-of-green/dirty-dozen-bha-bht/>, pada tanggal 23 Desember 2021. A journey through time and spices. Disitasi dari <https://www.thejakartapost.com/life/2020/09/03/a-journey-through-time-andspices.html>, pada tanggal 23 Desember 2021.
3. Widanti YA, Nuraini V, Ariyanto SD. Sensory properties and antioxidant activity of wedang uwuh *Moringa* with various brewing methods. *Res Fair Unisri.* 2019;3(1):290–7.
4. Ikhlas N. Antioxidant activity test of basil herb extract (*Ocimum ladanum* Linn) with DPPH method (2,2-Diphenyl-1-Picrylhydrazil). 2013.
5. Salim R, Maiza R. Antioxidant activity of red leaf infusion using the DPPH method (1,1-diphenil-2-picrylhydrazyl). *J Akad Farm Pray.* 2016;1(1):13–8.
6. Morabbi Najafabad A, Jamei R. Free radical scavenging capacity and antioxidant activity of methanolic and ethanolic extracts of plum (*Prunus domestica* L.) in both fresh and dried samples. *Avicenna J phytomedicine.* 2014;4(5):343–53.
7. Ben Hassine D, Kammoun El Euch S, Rahmani R, Ghazouani N, Kane R, Abderrabba M, et al. Clove buds essential oil: the impact of grinding on the chemical composition and its biological activities involved in consumer's health security. *Hindawi Biomed Res Int.* 2021.
8. Selles SMA, Kouidri M, Belhamiti BT, Ait Amrane A. Chemical composition, in vitro antibacterial and antioxidant activities of *Syzygium aromaticum*

- essential oil. *Journal of Food Measurement and Characterization*. 2020;14(4):2352–2358.
9. Gülçin I, Elmastaş M, Aboul-Enein HY. Antioxidant activity of clove oil: a powerful antioxidant source. *Arabian Journal of Chemistry*. 2012;5(4): 489–499.
 10. Eyenga M, Brostaux Y, Ngondi JL, Sindic M. Optimisation of phenolic compounds and antioxidant activity extraction conditions of a roasted mix of *Tetrapleura tetraptera* (Schumach & Thonn.) and *Aframomum citratum* (C. Pereira) fruits using response surface methodology (RSM). *Saudi J Biol Sci*. 2020;27(8):2054–64.
 11. Siah WM, Azman MA, Jeeven K, Noor Hayazan MD, Tahir SM. Effect of infusion conditions on total phenolic content and antioxidant activity in *Centella asiatica* tea. *J Trop Agric Food Sci*. 2011;39(2):149–156.
 12. Bahriul P, Rahman N. Antioxidant activity test of bay leaf (*Syzygium polyanthum*) ethanol extract using the DPPH method. *J Akad Kim*. 2014;3(3):368–74.
 13. Oter S, Jin S, Cucullo L, Dorman HJD. Oxidants and antioxidants: friends or foes? *Oxid Antioxid Med Sci*. 2012;1(1):1-4.
 14. Herdiana D, Utami R, Anandito RBK. Kinetics of thermal degradation of antioxidant activity in ready to drink traditional beverage, wedang uwuh. *Food Technoscience Journal*. 2014;3(3):44–53.
 15. Adouni K, Mekhelfi T, Daouadji MZD, Achour L. Decoction, infusion and ethanolic extract of *Juncus acutus* rhizome: phytochemical content and antioxidant properties. *Int J Pharm Rev Res*. 2018;48:148-152.
 16. Suryatno H, Basito, Widowati E. Study of organoleptic, antioxidant activity, total phenol on ripening time variations of making salted eggs with added ginger extract (*Zingiber officinale* Roscoe). *Food Technoscience Journal*. 2012;1(1):118-125.
 17. Mu'nisa A, Wresdiyanti T, Kusumorini N, Manalu W. Antioxidant activity of clove leaf extract. *J Vet*. 2013;13(3):272-277.
 18. Winarsi H, Sasongko ND, Purwanto A, Nuraenii I. Cardamom leaves extract decreased atherogenic indexes and blood glucose level of diabetic rats alloxans-induced. Yogyakarta: Faculty of Agricultural Tech UGM. 2013;33(3):273–80.
 19. Rahardjo E. Optimization of temperature, time, and material ratio in ultrasound-assisted extraction of nutmeg seed oleoresin (*Myristica fragrans*) using ethanol solvent. Semarang: Soegijapranata Catholic University; 2019.
 20. Wang D, Dong Y, Wang Q, Wang X, Fan W. Limonene, the compound in essential oil of nutmeg displayed antioxidant effect in sunflower oil during the deep-frying of Chinese Maye. *Food Sci Nutr*. 2020;8(1):511–20.
 21. Nurminabari IS. The effect of comparison of cinnamon powder (*Cinnamomum burmannii*) with cloves (*Syzygium aromaticum* L.) and stevia sugar concentration (*Stevia rebaudiana* B.) on the characteristics of noni leaf tea bags (*Morinda citrifolia* L.). *Pas Food Technol J*. 2019;6(1):18.