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ANTIOXIDANT ACTIVITIES OF SOURSOP LEAVES AND MENIRAN PLANT EXTRACTS COMBINATION

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ABSTRACT

Antioxidants can prevent free radicals which from the metabolism of the body, air pollution and contamination of food. Soursop leaves has a good potential as an antioxidant because it contains alkaloids, tannins, flavonoids and saponins. Meniran has a good potential as an antioxidant because it contains alkaloids, tannins, flavonoids and steroids. The combination of soursop leaves extract and meniran extract can provide very strong antioxidant activity than its singular forms. The aim of this study is to determine the antioxidant activity of the combination of soursop leaves extract and meniran extract compared to the singular forms. This research was done at the BPTO Tawangmangu Central Java, Indonesian and Chemical Laboratory, STIKES Nasional from October to December 2016. This type of research was experimental with *quota sampling* technique. The results showed that IC_{50} value of singular forms of soursop leaves extract was 116,5376 ppm. IC_{50} value of singular forms of meniran extract was 30,6893 ppm. IC_{50} value of combination forms of soursop leaves extract and meniran extract with ratio of 1:1 was 41,4710 ppm. IC_{50} value of combination forms of soursop leaves extract and meniran extract with ratio of 1:2 was 23,8590 ppm. IC_{50} value of combination forms of soursop leaves extract and meniran extract with ratio of 2:1 was 56,5174 ppm. The combination of soursop leaves extract and meniran extract had very strong antioxidant activity compared to its singular forms. The combination soursop leaves extract and meniran with ratio of 1:2 had the strongest antioxidant activity.

Keywords: antioxidant; meniran; IC50; soursop leaves

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INTRODUCTION

Indonesia as a developing country has limitations in dealing with health problems, where the prevalence of degenerative diseases is increasing Cancer is one of the major degenerative diseases that cause death worldwide. According to the 2012 GLOBOCAN (IARC) data quoted from the Indonesian Ministry of Health's Data and Information Center (2015) breast cancer is the highest percentage of cancer, which is 43.3% in the female population followed by lung cancer with a percentage of 34 , 2% of the male population. Oxidative stress plays an important role in the pathophysiology of degenerative diseases (Werdhasari, 2014). Oxidative stress is a condition that occurs due to an imbalance between the products of free radicals and antioxidants in the body (Puspitasari et al., 2015).

Antioxidants can fight free radicals contained in the body obtained from the body's metabolism, air pollution, and food contamination (Werdhasari, 2014). Soursop leaves were selected in this study because besides the easy way to obtain them, the benefits of soursop leaves in the health sector have been known for a long time. Bioactive compounds and antioxidants such as alkaloids, tannins, flavonoids and saponins are found in soursop leaves(Agu & Okolie, 2020). Meniran (*Phyllanthus niruri* L.) is a plant that grows wild in rocky and humid places such as on the banks of rivers, forests, fields and house yards. Meniran is known to have anti-inflammatory, diuretic, and immunostimulatory activities, but also no less important is meniran also has antioxidant activity (Nisar et al., 2018a).

The combination of several antioxidants can provide more powerful antioxidant activity than both forms of both, as previous studies on the Administration of Vitex doniana extracts and *Phyllanthus amarus* and their combination significantly decrease fasting blood glucose because of it's strong antioxidant activity. Based on the description in the background, the researchers will conduct research "Anti-oxidant Activity Test Combination of Soursop (*Annona muricata* L.) and Meniran (*Phyllanthus Niruri* L.) Leaves Extracts along with Both Forms Both with DPPH Method (1,1-diphenyl-2 -pikrilhidrazil) ".

METHOD

The research was carried out at the STIKES National Water, Food, Beverage Chemistry Laboratory and the Center for Development and Research of Medicinal Plants and Traditional Medicines in Tawangmangu, Karanganyar.

RESULTS

Material collection is the first stage carried out in this study. Soursop and meniran leaves were determined to determine their Latin name, *Annona muricata* L. for the Latin name Soursop and *Phyllanthus niruri* L. for the Latin name Meniran. The extraction method used in this study is maceration. The extraction results obtained ethanol extract of soursop leaves and meniran, then the extract was calculated% yield with the results as presented in Table 1.

Table 1.
The results of the calculation of the yield of simplicia soursop and meniran leaves

Ingredients	Weight extract	% Yield
Soursop leaves	40 gram	16,00 % b/b
Meniran	29 gram	11,60 % b/b

Phytochemical compound qualitative test aims to ensure the presence of compounds suspected to be antioxidants. The results of the phytochemical analysis of each ingredient are presented in Table 2.

Table 2.
The results of phytochemical analysis of soursop leaves and meniran extracts

Test	Soursop leaves	Meniran
Alkaloid:		
Dragendorf	positif	positif
Mayer	positif	positif
Wagner	positif	positif
Flavonoid	positif	positif
Saponin	positif	negatif
Tanin	positif	positif
Steroid	negatif	positif

Absorbance data and vitamin C concentration were calculated using free radical immersion so that the curve as shown in Figure 1 was obtained.

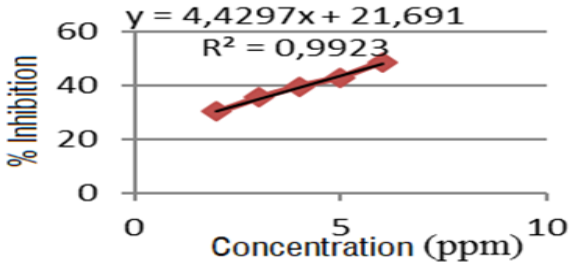

Figure 1. Corelation between concentration and% inhibition of vitamin C

DISCUSSION

The graph presented in Figure 1 shows that the higher the concentration, the higher the% inhibition, the% inhibition is the ability of compounds to reduce free radicals, the linear regression equation with x concentration (ppm) results in% inhibition y = 4.4297x + 21.691. known IC50 value of 6.3907 ppm and included in the category of very strong. Vitamin C was used as a positive control because vitamin C is a secondary antioxidant originates from nature.Vitamin C or L-ascorbic acid is a water-soluble antioxidants. As an antioxidants, vitamin C works as a donor electrons by transferring one electron to Cu metal compounds and in biochemical reactions intracellular and extracellular. Vitamin C is able to react with free radicals, then converts them to ascorbyl radicals. This last radical compound is about to change into ascorbate and dehydroascorbate. Ascorbate can directly capture oxygen free radicals either with or without an enzyme catalyst. While dehydroascorbate is not stable at pH above 6 because the compound will split to tartaric and oxalate. This can prevented by reducing dehydroascorbate converted to ascorbate by dehydroascorbate reductase involving glutathione (Wimpy & Harningsih, 2017).

The calculation of the yield of soursop leaves ethanol extract in this study was 16.00% w / w, greater than the results of the study of the yield of soursop leaves ethanol extract (Gyesi et al., 2019) amounting to 12.41% w / w, while the yield of meniran ethanol extract in this study was 11.60% w /w. The results of phytochemical analysis of soursop leaves extract showed positive alkaloids, tannins, saponins, and flavonoids, the same result as the study by (Harningsih & Wimpy, 2018)**.** Meniran phytochemical analysis results showed showed presence of flavonoids compounds and steroidal sapogenins (Nakweti et al., 2013)The maximum wavelength of DPPH obtained in this study was 535 nm and the Operating time

(OT) obtained in this study was 44 minutes. The absorbance value of both the control solution and the sample meets the Lambert-Beer law, which is between 0.2-0.8.

DPPH radical capture method is based on the interaction of antioxidants with DPPH, either electron transfer or hydrogen radicals on antioxidants will neutralize the free radical character of DPPH. If all the electrons in the DPPH free radical become pairs, then the color of the solution changes from dark purple to pale yellow. This color change will be observed in the form of decreasing the absorbance of DPPH (Harningsih & Wimpy, 2018). Percentage value of inhibition increases with increasing sample concentration which inhibits DPPH free radicals(Kumaran & others, 2006).

The research data obtained were compared to the IC50 value, IC50, the concentration of the test solution that provides DPPH reduction of 50%. The less IC50 value is the stronger in reducing the impact of free radicals, and vice versa. IC50 values of a combination of soursop and meniran leaves extract and a single form are both presented in Table 3.

Table 3.
IC50 values for each combination of soursop leaves extract: meniran

Combination	IC50 Value (ppm)	Antioxidant category
1:0	116,5376	Medium
0:1	30,6893	Very strong
1:1	41,4710	Very strong
1:2	23,8590	Very strong
2:1	56,5174	Strong

Based on the table above, the IC50 value of the single form of soursop leaves extract is 116.5376 ppm and the single form of meniran extract is 30.66893 ppm, thus indicating that the single form of meniran extract has very strong antioxidant activity compared to the antioxidant activity of soursop leaves extract. The combination form of soursop and meniran 2: 1 leaves extract has an IC50 value of 56.5174 ppm and for the combination form of soursop and meniran 1: 1 leaves extract has an IC50 value of 41.4710 ppm. This shows the combination of soursop leaves extract and meniran ratio of 1: 1 and 2: 1 has a very strong antioxidant activity when compared to the anti-sidan activity of the soursop single form, but not very strong when compared to the single form of meniran, whereas in a combination of extracts soursop leaves and meniran 1: 2 have IC50 values of 23.8590 ppm. This shows the combination of soursop leaves extract and meniran ratio of 1: 2 has a very strong ability to reduce the impact of free radicals than the combination of soursop leaves extract and meniran ratio of 1: 1; 2: 1 and both singular. The antioxidant compounds of ex-meniran extract dominate more than the antioxidant compounds in soursop leaves extract which is supported by IC50 value of meniran extract greater than IC50 value of soursop leaves extract.

CONCLUSION

The antioxidant activity of the combination of soursop (*Annona muricata* L.) and meniran (*Phyllanthus niruri* L.) leaves compared to 1: 2 is very strong compared to the singular both with IC50 values of 23.8590 ppm.

REFERENCES

Agu, K. C., & Okolie, N. P. (2020). Comparative Influences of Extracts of Various Parts of Annona muricata (Soursop) on Basal Lipid Profile and Plasma Fatty Acid Synthase in Wistar Rats. *NISEB Journal*, *19*(3).

Aslam, I., & Afridi, M. S. K. (2018). Pharmacognostic characterization of Beaumontia grandiflora (Roxb.) Wall. Leaf for taxonomic identification for quality control of a drug. *Journal of Applied Research on Medicinal and Aromatic Plants*, *8*, 53–59.

Gyesi, J. N., Opoku, R., & Borquaye, L. S. (2019). Chemical composition, total phenolic content, and antioxidant activities of the essential oils of the leaves and fruit pulp of Annona muricata L.(Soursop) from Ghana. *Biochemistry Research International*, *2019*.

Harningsih, T., & Wimpy, W. (2018). Uji Aktivitas Antioksidan Kombinasi Ekstrak Daun Kersen (Muntingia calabura Linn.) dan Daun Sirsak (Anonna muricata Linn.) Metode DPPH (2, 2-diphenyl-1-picrilhidrazyl). *Biomedika*, *11*(2), 70–75.

Kardinasari, E., & Devriany, A. (2020). Phytochemical identification of bangka origin virgin green coconut oil: Anti-inflammatory and anti-bacterial potential. *Enfermería Clínica*, *30*, 171–174.

Keey, R. B. (2013). *Drying: Principles and practice* (Vol. 13). Elsevier.

Kumar, A., Ilavarasan, R., Jayachandran, T., Decaraman, M., Aravindhan, P., Padmanabhan, N., Krishnan, M., & others. (2009). Phytochemicals investigation on a tropical plant, Syzygium cumini from Kattuppalayam, Erode district, Tamil Nadu, South India. *Pakistan Journal of Nutrition*, *8*(1), 83–85.

Kumaran, A. & others. (2006). Antioxidant and free radical scavenging activity of an aqueous extract of Coleus aromaticus. *Food Chemistry*, *97*(1), 109–114.

Molyneux, P. & others. (2004). The use of the stable free radical diphenylpicrylhydrazyl (DPPH) for estimating antioxidant activity. *Songklanakarin J. Sci. Technol*, *26*(2), 211–219.

Nakweti, R. K., Ndiku, S. L., Doumas, P., Nkung, H. S., Baissac, Y., Kanyanga, R. C., Ndofunsu, A. D., Otono, F. B., Jay-Allem, C., & others. (2013). Phytochemical analysis of Phyllanthus niruri L.(Phyllanthaceae) extracts collected in four geographical areas in the Democratic Republic of the Congo. *African Journal of Plant Science*, *7*(1), 9–20.

Nisar, M. F., He, J., Ahmed, A., Yang, Y., Li, M., & Wan, C. (2018a). Chemical components and biological activities of the genus Phyllanthus: A review of the recent literature. *Molecules*, *23*(10), 2567.

Nisar, M. F., He, J., Ahmed, A., Yang, Y., Li, M., & Wan, C. (2018b). Chemical components and biological activities of the genus phyllanthus: A review of the recent literature. *Molecules*, *23*(10), 2567.

Panchal, P., & Parvez, N. (2019). Phytochemical analysis of medicinal herb (Ocimum sanctum). *International Journal of Nanomaterials, Nanotechnology and Nanomedicine*, *5*(2), 008–011.

Puspitasari, M. L., Wulansari, T. V., Widyaningsih, T. D., Maligan, J. M., & Nugrahini, N. I. P. (2015). Aktivitas Antioksidan Suplemen Herbal Daun Sirsak (Annona muricata L.)

Dan Kulit Manggis (Garcinia mangostana L.): Kajian Pustaka [In Press Januari 2016]. *Jurnal Pangan Dan Agroindustri*, *4*(1).

Sawant, R. S., & Godghate, A. G. (2013). Preliminary phytochemical analysis of leaves of Tridax procumbens Linn. *International Journal of Science, Environment and Technology*, *2*(3), 388–394.

Vaiyapuri, M., Raju, K., & Karuppusamy, S. (2015). Preliminary phytochemical investigation on Secamone emetica (Retz.) R. Br.(Apocynaceae)–An endemic medicinal plant species of southern India. *Journal of Pharmacognosy and Phytochemistry*, *3*(6), 58–61.

Vimalkumar, C., Hosagaudar, V., Suja, S., Vilash, V., Krishnakumar, N., & Latha, P. (2014). Comparative preliminary phytochemical analysis of ethanolic extracts of leaves of Olea dioica Roxb., infected with the rust fungus Zaghouania oleae (EJ Butler) Cummins and non-infected plants. *Journal of Pharmacognosy and Phytochemistry*, *3*(4).

Werdhasari, A. (2014). Peran antioksidan bagi kesehatan. *Jurnal Biotek Medisiana Indonesia*, *3*(2), 59–68.

Wimpy, W., & Harningsih, T. (2017). Uji Aktivitas Antioksidan Kombinasi Ekstrak Sarangsemut (Myrmecodia pendans) dan Ekstrak Keladi Tikus (Typhonium flagelliforme Lodd.) dengan Metode DPPH (1, 1-Dipheyl-2-Picrilhidrazil). *Jurnal Kesehatan Kusuma Husada*.