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THE IDENTIFICATION OF CHEMICAL COMPOUNDS CONTAINED IN THE METHANOL EXTRACT GRAIN HALMAHERA (Setaria italica beauv.)

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ABSTRACT

Grain Halmahera (*Setaria italica beauv l.*) is one of the natural results of processing and utilization of Indonesia which is still very limited, in North Halmahera only utilized as food and has never done research on seyawa content contained in Wheat Seed of Halmahera. This research was conducted to identify the chemical compounds contained in the methanol extract Grain Halmahera (*setaria italica beauv.*). Design of experimental research is purely done on pharmaceutical laboratories STIKES Halmahera. The technique of its secession is maceration using methanol as the liquid Chromatography method and penyari Gass Mass Spektrometry used to identify compounds contained in methanol extracts of wheat Seed of Halmahera. The results showed that the methanol extract of wheat grains contain Linoleic acid compound Halmahera ethyl ester 3.48%, Methyl (9z, 12z)-9.12-octadecadienoate 72.86% and, 9.12-octadecanoic acid 23.11%.

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INTRODUCTION

Health is the welfare of every living being where the current level of health faces enormous challenges. One of the causes is the ever-increasing medical costs, this can worsen the quality of life and public health. As society's need for medicine increases, people generally prefer to achieve health status by

using traditional medicine or herbal medicine.

In developing countries, the majority of the population continues to use traditional medicines primarily for the fulfillment of their basic health needs. Similarly, the use of traditional medicine in Asia continues to increase despite the widely available and outstanding chemical entity drugs. Meanwhile, the WHO Regional Office of the United States (AMOR / PAHO) reported 71% of Chilean population and 40% of Colombian population using traditional medicine. Some sources mention the use of traditional medicine by residents in France reached 49%, Canada 70%, United Kingdom 40% and United States 42% .1

Traditional medicine has long been known and used to treat various diseases. already since ancient times, many types of plants either singular or herb, have been used to ward off and treat disease. Traditional medicine is now one of the most popular health therapy options in the midst of modern medical advancement.2 With the development of science and technology, it is possible that the world of medicine also undergoes various changes and progress. Traditional medicine that was originally regarded as an ancient way of treatment now began in the lyrics and conducted research on the content of natural ingredients.

One of the natural products of Indonesia that is utilized as food has health benefits is wheat halmahera (*Setaria italica* L. beauv). Wheat Halmahera (*Setaria italica* L. beauv) is a small seeded cereal that has nutritional value similar to other food crops such as rice, corn, wheat, and other grains.4 Wheat halmahera is a member of the Poaceae family and is a plant ancient in China. Wheat halmahera is an important crop and animal feed in arid regions due to its characteristics such as drought resistance and suppresses nutritional deficiencies.5 In Indonesia specifically in northern halmahera currently not many know the use of wheat grain halmahera and chemical content contained therein which can be used as traditional medicine materials, the utilization is still limited as rice is processed into rice. In other areas often made porridge and dodol as food.

In previous studies it was reported that the wheat germ oil of Halmahera (*setaria italica* L. Beauv) at concentrations of 10% to 50% had the ability as an antibacterial active ingredient with the inhibited zone (DDH) produced (6.25-11.05) mm against growth of *S. aureus* representing gram positive and (8,25-13,15) mm for *E. coli* bacteria representing gram negative6 and the result of phytochemical screening of wheat halmahera using some method of solvent (petroleum ether, benzene, chloroform, methanol and water) containing compound alkaloids, flavonoids, terpenoids,

triterpenoids, tannins, and phenolics and it has been demonstrated that the wheat extract of methanol halmahera has higher antioxidant activity compared to ethanol and water extracts.7 Prevention and cure of disease using phytochemicals especially flavonoids are known. Various flavonoids found in nature have their own physical, chemical, and physiological properties. The efficacy of the drug from flavonoids as an antibacterial, hepatoprotective, anti-inflammatory, anticancer, and antiviral agent is well established. This substance is more widely used in developing countries. Therapeutic use of new compounds should be validated by using specific biochemical tests. With the use of genetic modification, it is now possible to produce flavonoids on a large scale. Further achievements will provide new insights and will surely produce new pharma-based flavonoid substances for the treatment of many infectious and degenerative diseases.8

Judging from the results of the above research and has never done research on wheat grain halmahera in kec. North Kao Tunuo village will be done identification of chemical compounds contained in the methanol extract of wheat grain halmahera (*setaria italica* L. beauv).

METHODS

The type of research used in this study is a type of pure experimental research.

RESULTS

Grain Halmahera (*setaria italica* beauv l.) is a type of cereal seed-bearing small ever made staple food by the people of East and Southeast Asia before they farm other cereal plants. This annual plant can grow to a height of 2 m and type of small grains. Utilization and processing of grain on Halmahera by communities of North Halmahera are still limited and simple only in the foodstuffs as a sport in the same way as rice becomes rice.

Based on the results of the identification of compounds that are performed using GC-MS method (Gass Chromatography Mass Spektrometry), Halmahera Grain contains Linoleic Acid ethyl ester, Methyl (12z-9z)-9.12-octadecadienoate, and 9.12- Octadecadienoate acid. Of these three compounds that contained methyl compounds, (9z, 12z)-9.12-octadecadienoate is compound with the highest levels detected in test results using GC-MS method i.e. 72.86%. Methyl (9z, 12z)-9.12-octadecadienoate (linoleic acid) is not saturated

fatty acid chain length and is of an essential fatty acid that cannot be produced by the body but can be obtained from the food consumed. Linoleic acid plays a role in the prevention of coronary heart disease and healthy blood vessels. One source of linoleic acid is the usual soy beans are consumed by the community in a variety of preparations such as soy sauce, tofu, tempeh, soy milk and others. 23 linoleic acid is very important for the body, a deficiency of linoleic acid may cause dermatitis, reproductive ability declined, impaired growth, degeneration of the liver, and prone to infection.

In addition on soybeans, linoleic acid (methyl (9z, 12z)-9,12-octadecadienoate is also found in the seeds of Basil (*ocimum basilicum*) seed essential oil, cardamom (*amomum cardamomum* willd) identified using Gass Cromatography Mass. Spectrometry .24 Pecan seed oil, fish oil tilapia (*oreochromis niloticus*) and Castor oil fence (*jatropha curcas* L).

DISCUSSION

Preparation of methanol extract of wheat grain halmahera done by maceration method. The maceration method was chosen as the method of sifting in this research because the way of workmanship and the equipment used is simple and easy to obtain besides the maseration method also can avoid destruction of chemical compounds that are thermolable. The solvent used in the process of escape is methanol.

Before extracting the wheat germ of halmahera must be made into powder first. The purpose of extraction is so that the content of phytochemicals contained in wheat grain halmahera more easily extracted because the surface area of powder in contact with the greater solvent. 300 gram Halmahera wheat powder is added to the maceration mixer and 300 ml (1: 1) of methanol added, the maseration vessel is then closed and left for 5 days in a cool and sheltered place from the light while stirring every day. Stirring in the maceration process is done to ensure the balance of the extracted material faster in the liquid of the dancer. After 5 days filtrate filtration was taken and the residue re-macerated with methanol while stirring then the maceration vessel was closed and left for 2 days. After 2 days the residue filtering is discarded, collect the filtrate and evaporate by using a rotary evaporator until the viscous extract is obtained.

The extract of ethanol obtained gives the organoleptic characteristics as follows:

Form: Thickened extract

Color : Yellow

Odor: Typical

CONCLUSION

From the result of identification of chemical compound by using GC-MS method (Gass Cromatography Mass Spectrometry) can be concluded that Halmahera Wheat (*Setaria italica* L. beauv) contains Methyl compound (9z, 12z) -9,12-Octadecadienoate 72,86% , 9.12-Octadecadienoic acid 23.11% and, Linoleic acid ethyl ester 3.48%.

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REFERENCES

1. Sampurno. Obat herbal dalam prespektif medik dan bisnis. Universitas Gadja Mada. 2007; [10 p.].
2. Wikanda S. P. Kitab herbal nusantara. Yogyakarta. Kata Hati: 2015, 10,12.
3. Mapanawang A. L. Riset di bidang kesehatan. Tobelo: Yayasan Medika Mandiri, 2016.
4. Trinitasari S. Pengaruh ekstrak tepung jewawut terhadap proliferasi sel limfosit manusia secara *in vitro*. [Skripsi]. Bogor: Institut Pertanian, 2011.
5. Li W, M. Chen, E. Wang, L. Hu, M. J. Hawkesford, L. Zhong, et al. Genome-wide analysis of autophagyassociated genes in foxtail millet (*setaria italica* L.) and characterization of the function of *SiATG8a* in conferring tolerance to nitrogen starvation in rice. BMC Genomics. 2016; 17: 1-16, DOI: 10.1186.
6. Soetjipto H., Y. Martono dan N.T. Pujiastuti. Identifikasi senyawa dan efek antibakteri minyak jewawut (*setaria italica*). Prosiding Seminar Nasional Sains dan Pendidikan Sains VII. Universitas Kristen Satya Wacana, 2012; 3(1): 105-108.
7. Suma P.F. dan A. Urooj. Antioxidant activity of extracts from foxtail millet (*Setaria italica*). J Food Sci Technol. 2012; 49(4): 502-504, DOI: 10.1007.
8. Kumar S. dan A. K. Pandey. Chemistry and biological activities of flavonoid: an overview.

- The Scientific World Jurnal. 2013; 1: 1-16, DOI: 10.1155.
9. Hildayanti. Studi pembuatan flakes jowar (*setaria italica*). [Skripsi]. Makassar: Universitas Hasanuddin, 2012.
 10. Kamatar M.Y., S.M. Brunda, S. Rajaput, H. H. Sowmya, G. Goudar, dan R. Hundekar. Nutritional composition of safety five elite germplasm of foxtail millet (*setaria italica*). International Journal of Engineering Research and Technology (IJERT). 2015; 4(04): 1-6.
 11. Tirajoh S, Achmanu, O. Sjojfan, dan E. Widodo. Evaluation of nutritive values of papua foxtail millet (*Setaria italica sp*) and its substitutive effect for yellow corn on broiler performances. International Journal of Agronomy and Agricultural Research (IJAAR). 2014; 4(5): 195-201.
 12. Zhang J., H. Lu, N. Wu, X. Yang dan X. Diao. Phytolith analysis for differentiating between foxtail millet (*Setaria italica*) and green foxtail (*Setaria viridis*). PLoS One. 2011; 6(5): 1-11, DOI: 10.1371.
 13. Suseno S. Proses pembuatan mi hotong instan dengan substitusi terigu dan pendugaan umur simpannya dengan metode akselerasi. [Skripsi]. Bogor: Institut pertanian Bogor, 2010.
 14. Yanuwar W. Aktivitas antioksidan dan imunomodulator sereal non-beras. [Tesis]. Bogor: Institut Pertanian Bogor, 2009.
 15. Sari M. Identifikasi protein menggunakan fourier transform infrared (FTIR). [Skripsi]. Depok: universitas Indonesia, 2011.
 16. Hutagalung H. Karbohidrat. Universitas Sumatera Utara. repository.USU.ic.id/gizihalomoan. 2004. (Accessed 2 Mey 2017).
 17. Saifudin A. Senyawa alam metabolit sekunder teori, konsep, dan teknik pemurnian. Ed. 1. Yogyakarta: Deepublish; 2014.
 18. Tukiran, Suyatno dan N. Hidayati. Skrining fitokimia pada beberapa ekstrak dari tumbuhan bugenvil (*bougainvillea glabra*), bunga sepatu (*hibiscus rosa-sinensis L.*), dan daun ungu (*graptophylum pictum griff*). Prosiding Seminar Nasional Kimia. Universitas Negeri Surabaya, 2014; 235-244.
 19. Mukhriani. Ekstraksi, pemisahan senyawa, dan identifikasi senyawa aktif. Jurnal Kesehatan. 2014; 7(2): 361-367.
 20. Hussain S. Z. dan K. Maqbool. GC-MS: priciple, technique and its application in food science. INT J CUUR SCI. 2014; [11p.].
 21. Bahti H. H. Kromatografi gas teori dan aplikasinya. Cetakan Kesatu. Bandung: ALFABETA. 2013; 74-80.
 22. Budiadji A. F., A. L. Mapanawang, D. Sedeng, Muh. Nasir, A. Tualeka, B. T. Fambrene, et al. Identification of hexadecanoic acid compound which in globe extract (*hornsedtia zingiberaceae*). International Journal of Health Medicine and Curent Research (IJHMCR), 2016;1(01): 48-52, DOI: 10.22301.
 23. Sudaryatiningsih C. dan Supyani. Analisis kandungan asam linoleat dan linolenat tahu kedelai dengan *rhizopus oryzae* dan *rhizopus oligosporus* sebagai koagulan. Nusantara Bioscience, 2009; [9]
 24. Tambunan L.R. Isolasi dan identifikasi komposisi kimia minyak atsiri dari biji tanaman kapulaga (*amomum cardamomum willd*). Jurnal Kimia Riset, 2017; 2(1): 57-60.
