Indonesian Journal of Biological Pharmacy
Journal homepage: https://jurnal.unpad.ac.id/ijbp

Volume 2 No. 1
April 2022
Pages 37-43

Health Benefits of Three Wild Leafy Vegetables in "Lalapan" as Sundanese Traditional and Ethnic Foods

Reza A. Kodir[1] and Moelyono Moektiwardoyo[2*]

[1]Departement of Pharmacy, Faculty of Mathematic and Natural Science, Universitas Islam Bandung, Bandung Indonesia

[2]Faculty of Pharmacy,Universitas Padjadjaran, Bandung Indonesia

Submitted 16 February 2022; Revised 07 April 2022; Accepted 8 April 2022; Published 15 April 2022

*Corresponding author: moelyono@unpad.ac.id

Abstract

Various ethnicities of the world have a long history of using their surrounding as the source of foods. Foods which are act as products of traditional ethnic knowledge known as traditional and ethnic foods (TEF). Vegetables are one of the main ingredients of TEF. As sources of many combinations of phytonutrients, vegetables offer various health benefits. As a country with a long history of agricultural practice, Indonesia also has abundant knowledge of how Indonesian ethnics process and consume vegetables. Vegetables, in Sundanese tradition, are usually consumed as "lalap" or "lalapan". Some lalapan are cultivated vegetables and some others have come from wild sources. This article discusses the health benefits of wild source *lalapan*, which can be found in its natural habitat.

Keywords: Traditional and Ethnic Foods, Sundanese tradition, lalapan, health benefits

Manfaat Kesehatan Tiga Sayuran Daun Liar di "Lalapan" Sebagai Makanan Tradisional dan Etnik Sunda

Abstrak

Berbagai etnik di dunia memiliki sejarah panjang penggunaan lingkungan sekitar sebagai sumber makanan. Makanan merupakan produk dari pengetahuan etnik tradisional, dikenal sebagai *traditional ethnic foods* (TEF). Sayur-sayuran adalah bahan utama dari TEF. Sebagai sumber dari berbagai kombinasi fitonutrien, sayur-sayuran juga dapat memberikan manfaat bagi Kesehatan. Sebagai negara dengan sejarah praktik agrikultur yang panjang, Indonesia memiliki pengetahuan yang luas tentang bagaimana etnik-etnik di negara Indonesia memproses dan mengonsumsi sayur-sayuran. Dalam tradisi Sunda, sayur-sayuran biasa dikonsumsi sebagai "lalap" atau "lalapan". Beberapa lalapan merupakan sayur-sayuran yang dibudidayakan dan sebagian merupakan tumbuhan liar. Artikel ini membahas manfaat Kesehatan dari sumber tumbuhan liar dari *lalapan*, yang dapat ditemukan pada habitat alaminya.

Kata Kunci: Lalapan, makanan tradisional & etnik, manfaat kesehatan, tradisi sunda

1. Introduction

1.1. Traditional and Ethnic Food

Various ethnicities of the world have a long history of using their surrounding as the source to fulfill their needs. They use their surroundings to fulfill their needs in shelters, clothes, food, medicines, etc. Foods that are used by traditional or ethnic people can be described as traditional or ethnic food interchangeably. Traditional foods are defined as a portion of food in which broad-sense knowledge (ingredients, way of preparation, role, etc.) is transmitted from generation to generation meanwhile ethnic foods are defined as foods originating from the heritage and culture of an ethnic group who use their knowledge of local ingredients of plants and/or animal sources.[1,2] In broader senses, ethnic food can be defined as an ethnic group's or a country's cuisine that is culturally and socially accepted by consumers outside of the respective ethnic group.[2] Foods eaten by people of different religions are also considered ethnic foods.[2] By these definitions, there are some similarities attached to both traditional and ethnic foods, which are (i) both are products from cultural knowledge; (ii) both contented with local ingredients, and also way of preparation, etc. For the rest of this article, traditional and ethnic foods will be abbreviated with "TEF"

The beginning of intense food development focused on increasing food production for the mass supply chain. Today, the focus of food development is now shifting from gaining more calories to promoting health, quality of life, tradition, and culture.[3] One of those focuses will lead food industries to develop a portion of food that has health functions. The development of ethnic foods will be held in countries that have long agricultural histories like countries of Asia, Europe, and Africa.[3] Within this trend of food development, once again TEF will play a great role forward. TEF fills the necessity of food development. One of TEFs ' roles is the fact that various TEF of the world's ethnic is the main reason for a healthy life for ethnic people. Therefore, the conservation and development of TEF will fulfill the future needs of foods.

1.2. Vegetables as Main Ingredients of TEF

Vegetables are of the widest main ingredients of TEF used by many cultures. In agricultural countries, the development of vegetables such as TEF has reached high advancement, but also still keep their traditional uses. Many ethnics develop many ways to consume their vegetables. Some ethnics consume raw vegetables like "salad" we know nowadays. Various soups, stews, and fermented vegetables can also be found in many ethnic cuisines of the world.

Vegetables are functioning as rich sources of beneficial nutrients, vitamins, and phytochemicals. Each vegetable contains a unique combination of phytonutrients. It is suggested to consume various vegetables on a daily diet to obtain various-unique phytonutrient combinations.[4,5] Antioxidant activity is the main benefit of vegetable phytonutrients. This antioxidative capacity helped us on combating many chronic diseases such as cancer, diabetes, obesity, cardiovascular disease, stroke, and many others.[4-8] With vegetables as one of the main ingredients in TEF, people who regularly consume these foods will obtain their health benefits for a better well living

2. Sundanese TEF

2.1. Lalapan as Sundanese TEF

As a country with a long history of agricultural practice, Indonesia also has abundant knowledge of how Indonesian ethnics process and consume vegetables. InMalays culture vegetables are usually known as "ulam".[9] Knowledge of "ulam" was shared amongst countries with Malay inhabitants like Indonesia, Malaysia, and Thailand.

One of the largest and most widely distributed ethnic in Indonesia is the Sundanese, which also has their special knowledge of processing and consuming vegetables. It is told by generations in Sundanese culture about the legend of Sangkuriang who want to marry his-unaged mother, Dayang Sumbi. The key to unaged Dayang Sumbi is her regular diet of young leaves of plants surrounding her living place. From this story, we can conclude that plants or plant parts act as Dayang Sumbi's

anti-aging agents. It is also widely accepted for the next generation of Sundanese that Sunda people consume various plants on their daily menu as a salad. From this viewpoint, the interconnection between Sundanese and plants is bound traditionally.

Vegetables, in Sundanese tradition, are usually consumed as "lalap" or "lalapan". Lalapan is an assorted plant served as a side dish in Sundanese culinary tradition. Lalapan is a traditional way to consume vegetables, which is usually eaten raw or simply boiled/ steamed, with dressings known as "sambal". Lalapan can easily be found in the traditional or semi-modern market. Food stalls and Sundanese food restaurants also provide lalapan as their companion to their main menu.

There are so many vegetable species consumed as lalapan. We can classify these vegetables by their part used in lalapan. Some vegetables are comes from leaf parts of plant like selada (*Lactuca sativa*), kemangi (*Ocimum americanum*), kanikir (*Cosmos caudatus*), sampeu (*Manihot utilissima*), etc. Lalapan which is the fruit part of plants is green terong (*Solanum melongena*), kacipir (*Psophocarpus tetragonolobus*), bonteng (*Cucumis sativus*), etc. Other plant parts such as a flower or flower bud are also can be found as lalapan, like flower of gedang (*Carica papaya*).

2.2. Wild Leafy Vegetable consumed as *Lalapan*

There are so many plants that can be categorized as wild leafy vegetables to be consumed as lalapan. Considering that Sundanese is heavily exploring their surroundings for food, even small weeds can be used as vegetables. Table 1 enlists wild leafy plants used in lalapan.

Our interest in a discussion focused on examples from wild edible leafy plants used as lalapan. The next discussion will emphasize wild edible plants that can be found in the wetland area, mountainous areas, and rural areas. For this purpose, three species were selected, which are tespong (*Oenanthe javanica* DC. syn. *Oenanthe stolonifera* Wall ex DC. syn. *Oenanthe laciniata* Zoll.) from wetland area,poh-pohan (*Pilea melastomoides* (Poir.) Wedd. syn. *Pilea trinervia* (Roxb.) Wight) from mountainous area, and sintrong (*Crassocephalum crepidioides* (Benth.) S. Moore) from a rural area.

3. Health Benefits of Several Vegetables in "Lalapan"

3.1. Tespong (*Oenanthe javanica* DC. syn. *Oenanthe stolonifera* Wall ex DC. syn. *Oenanthe laciniata* Zoll.)

Tespong is a wetland herb from *Apiaceae*. Tespong is also called water celery due to its relation with celery (*Apium graveolens*). Aerial part of tespong used in lalapan. Tespong is usually consumed uncooked, with sambal dressing to enhance its flavor. Tespong have several traditional medicinal properties such as treating stomach ache and fever.[11,12]

Figure 1. Lalap plater with sambal dressing[10]

Tabel 1. Wild edible leafy plants used as lalapan

Local name	Scientific name	Family
Tespong	*Oenanthe javanica* DC.	Apiaceae
Poh-pohan	*Pilea melastomoides* (Poir.) Wedd.	Urticaceae
Sintrong	*Crassocephalum crepidioides* (Benth.) S. Moore.	Asteraceae
Jalantir	*Erigeron sumatrensis* Retz.	Asteraceae
Antanan	*Centella asiatica* (L).) Urban	Apiaceae
Dulang sontak	*Hydrocotyle sibthorpioides* Lam.	Apiaceae
Beunghar ku cicing/lokatmala	*Artemisia vulgaris* L.	Asteraceae
Putat	*Planchonia valida* (Blume) Blume	Lecythidaceae
Bungbrun	*Polygonum chinense* L.	Polygonaceae
Krokot/gelang	*Portulaca oleraceae* L.	Portulacaceae

Tespong is an aromatic herb which contains β-carotene, luteolin, an essential oil such as α-Copaene (18.3%), Z-Caryophyllene (0.34%) α-Cuprenene (0.40%) and Cembrene-type diterpenes such as Incensole (26.4%) and Cembrenol (0.45%).[13,14] Copaene has been shown to exhibit antioxidant and anti-carcinogenic features.[15] Incensole and its acetylated form incensole acetate, exhibits anti-inflammatory effects as well as several CNS-associated activities.[15] Tespong leaves shows anti-HSV activity at 0.005-0.01 mg/ml concentration.[16] Tespong extract shows ACE inhibitory activity.[17]

One of the most intensive studies on testing is its antioxidant activity. IC_{50} value at 87.42 ± 0.64 µg/ml of tespong extract was observed by Lee et al. (2011).[18] Water extracts of tespong show antioxidative activity at 19.96 mg (TAE/100 g fw).[19] Meng et al. (2010) found that herbal tea made from tespong leaves with a non-fermented method brings out the best antioxidative activity rather than other methods of making herbal teas (semi-fermented and fermented).[20] Antioxidative activity of tespong also correlated with melanogenesis to protect skin from further oxidation).[21] For parasitic disease, tespong shows anti-trypanosomal activity.[22] Tespong investigated for its modulatory effect on blood glucose level and shown that flavone is its phytochemical responsible in combating diabetes.[9,23]

3.2. Poh-pohan (*Pilea melastomoides* (Poir.) Wedd. syn. *Pilea trinervia* (Roxb.) Wight)

Poh-pohan is a wild shrub that can be found in West Javan Mountains. Sundanese use poh-pohan as freshly eatensalad.[24] Young leaves of poh-pohan served as side dishes and eaten raw with sambal. Poh-pohan can also be found in the traditional or semi-modern market. There is no traditional medicinal record for poh-pohan.

As lalapan, poh-pohan valued for its total flavonoid and dietary fiber content. Poh-pohan has total flavonoid (TF) value at 2.27 ± 0.21 (mg/100g fw).[25] This TF value can significantly contribute to dietary flavonoid intake. Andarwulan et al. (2015) measured TDF (total dietary fiber), IDF (insoluble dietary fiber), SDF (soluble dietary fiber) for poh-pohan. TDF, IDF, and SDF values for poh-pohan were 67.03 ± 0.44, 57.04 ± 0.25, 9.99 ± 0.15 (g/100g dw) respectively.[26]

3.3. Sintrong (*Crassocephalum crepidioides*(Benth.) S. Moore)

Sintrong is a leafy weed known as "fireweed". Sintrong can be found around rural area to higher mountain area. This easily spread weed is usually used as lalapan and cattle's feed by local people.

Sintrong contains amino acids,protein,

crude fibre, ash, iron (Fe), manganese (Mn), sodium (Na), potassium (K), magnesium (Mg) and calcium (Ca).Sintrong is a good source of protein in the nutrition of both human and animal.[27] Secondary metabolites of sintrong are cathetic tannins, gallic tannins, coumarins, combined anthracene derivatives C-heterosides, flavonoids, mucilage, reducing compounds and steroids.[28] As a family member of Asteraceae, sintrong contains essential oils. Forty-seven essential oil compounds were identified from sintrong's root. The main constituents were (E)-β-farnesene (30.6%), α-humulene (10.3%), β-caryophyllene (7.2%), cis-β-guaiene (6.1%) and α-bulnesene (5.3%).[29] The essential oils of the leaves contained α-caryophyllene (10.29 %), β-cubebene (13.77 %) and α-farnesene (13.27 %) as major constituents while the dominant constituents of the stems oil were thymol (43.93 %), α-caryophyllene (15.16 %) and 4-cyclohexybutyramide (20.94 %).[30] The essential oils of flowers and aerial parts were dominated by monoterpene hydrocarbons (82.0%; 70.8%) with myrcene (45.3%; 46.1%), β-phellandrene (20.2%; 31.0%) as major constituents. The other constituents in flower oil were dauca-5,8-diene (6.9%), trans-β-farnesene (4.8%) and daucene 3.6%), while allo-aromadendrene (4.9%), α-muurolene (2.6%) and β-panasinsene (2.4%) were identified in the aerial parts oil.[31] With this phytoconstituent, sintrong has a great potential for human health benefits. Antimicrobial activity of sintrong was confirmed for Staphylococcus aureus, Klebsiella pneumonia, and Escherichia coli.[32]

4. Conclusion

According to our discussion, lalapan has great health benefits for human. Generally, antioxidative properties of tespong, poh-pohan, and sintrong were described and have a good potential for combating non-communicable and chronic disease such as cardiovascular disease, cancer, etc. Phytochemical of those three lalapan also has a good potential on cytotoxic effect, antimicrobial effect, antiparasitic effect, etc. Daily consumption on lalapan can provide us a better health conditions and disease prevention.

Wild edible leafy plants used in lalapan shows so many beneficials to human health. Intense research and developments needed to discover the total health benefit of wild edible leafy plants used in lalapan.

5. Acknowledgments

This article is under advisory and supervisory of Faculty of Pharmacy, Padjadjaran University and under facilitatory of Pharmacy Study Programme, Faculty of Mathematic and Natural Science, Universitas Islam Bandung.

References

1. D'Antuono, L.F. 2016. Traditional Food in Caballero, B., Finglas, P.M., and Toldra, F (editors). 2016. **Encyclopedia Of Food And Health**. Elsevier, Oxford
2. Kwon, D.Y. 2015a. What is Ethnic Food? **Journal of Ethnic Foods** 2 (2015) 1
3. Kwon, D.Y. 2015b. Why Ethnic Food? **J Ethn Foods** 2 (2015) 91
4. Dias, J.S. 2012. Nutritional Quality and Health Benefits of Vegetables: A Review. **Food and Nutrition Sciences**, 2012, 3, 1354-1374
5. Liu, R.H. 2003. Health benefits of fruit and vegetables are from additive and synergistic combinations of phytochemicals. **Am J Clin Nutr** 2003;78(suppl):517S–20S.
6. Boeing, H., Bechthold, A., Bub, A., Ellinger, S., Haller, D., Kroke, A., Leschik-Bonnet, E., Muller, M.J., Oberritter, H., Schulze, M., Stehle, P., and Watzl, B. 2012. Critical review: vegetables and fruit in the prevention of chronic diseases. **Eur J Nutr** (2012) 51:637–663
7. Slavin, J.L., and Lloyd, B. 2012. Health Benefits of Fruits and Vegetables. **Adv. Nutr.** 3: 506–516, 2012.
8. Wang, X., Ouyang, Y., Liu, J., Zhu, M., Zhao, G., Bao, W., and Hu, F.B. 2014. Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective

cohort studies. **BMJ** 2014;349:g4490
9. Bachok, M.F., Yusof, B-N.M., Ismail, A., and Hamid, A.A. 2014. Effectiveness of traditional Malaysian vegetables (ulam) in modulating blood glucose levels. **Asia Pac J Clin Nutr** 2014;23(3):369-376
10. en.wikipedia.org
11. Tilling, R., Bharali, P., Dutta, P., Gogoi, G., Paul, A., Das, A.K. 2015. Ethnomedicinal Plants Used By Apatani Tribe Of Ziro Valley Of Arunachal Pradesh. **Int J Conserv Sci** 6, 3, Jul-Sept 2015: 411-418
12. Alam, A. 2014. Ethno Medicinal Exploration of Wetland Plants of Champaran (E). **Research Journal of Agriculture and Forestry Sciences**. Vol. 2(10), 8-10, October (2014)
13. Zaifuddin, F.A.M., Hassan, N.M., and Othman, R. Quantification Of Pro-Vitamin A Activities And Content In 22 Selected 'Ulam' Species Or Malaysian Traditional Vegetables. **International Journal of Pharmacy and Pharmaceutical Sciences** Vol 6, Suppl 3, 2014
14. Pattiram, P. D., Lasekan, O., Tan, C.P., and Zaidul, I. S. M. 2011. Identification of the aroma-active constituents of the essential oils of Water Dropwort (Oenanthe javanica) and 'Kacip Fatimah' (Labisia pumila). **International Food Research Journal** 18(3): 1021-1026 (2011)
15. Lasekan, O., and Azeez, S. 2014. Chemo-preventive Activities of Common Vegetables' Volatile Organic Compounds (VOC's). **Pharm Anal Acta** 2014, 5:7
16. Manoharan, S., and Kaur, J. 2013. Anticancer, Antiviral, Antidiabetic, Antifungal and Phytochemical Constituents of Medicinal Plants. **Am. J. PharmTech Res.** 2013; 3(4)
17. Chuchote, C., Pathompak, P., and Charoonratana, T. 2015. Screening Of Angiotensin I-Converting Enzyme Inhibition Of Thai Indigenous Vegetables. **BHST**. 2015, 13 (1) : 38-42
18. Lee, K.H., Padzil, A. M., Syahida, A., Abdullah, N., Zuhainis, S. W., Maziah, M., Sulaiman, M. R., Israf, D. A., Shaari, K., and Lajis, N. H. 2011. Evaluation of anti-inflammatory, antioxidant and antinociceptive activities of six Malaysian medicinal plants. **Journal of Medicinal Plants Research** Vol. 5(23), pp. 5555-5563, 23 October, 2011
19. Huda-Faujan, N., Noriham, A., Norrakiah, A.S.n and Babji, A.S. 2007. Antioxidative Activities of Water Extracts of Some Malaysian Herbs. **ASEAN Food Journal** 14 (1): 61-68 (2007)
20. Meng, S.E., Saad, B., and, Sulaiman, S.F. 2010. Antioxidant Activities And Phenolic Contents Of Oenanthe Javanica (Blume) Dc. (Water Dropwort) In Different Tea Processing Methods. **Malay J Pharm Sci**, Suppl. 1 (2010)
21. Kwon, E-J., and Kim, M-M. 2013. Effect of Oenanthe javanica Ethanolic Extracts on Antioxidant Activity and Melanogenesis in Melanoma Cells. **Journal of Life Science** 2013 Vol. 23. No. 12. 1428~1435
22. Norhayati, I., Getha, K., Haffiz, J.M., Ilham, A.M., Sahira, H.L., Syarifah, M.M.S., and Syamil, A.M. 2013. In Vitro Antitrypanosomal Activity Of Malaysian Plants. **Journal of Tropical Forest Science** 25(1): 52–59 (2013)
23. Yang, X-B., Huang, Z-M., Cao, W-B., Zheng, M., Chen, H-Y., and Zhang, J-Z. 2000. Antidiabetic Effect of Oenanthe javanica Flavone. **Acta Pharmacol Sin** 2000 Mar; 21 (3): 239-242
24. Sugimura, K., Sahab, A., Yata, M., Kridalaksana, A., Agus, Zanuansyah, A., Ichwani, S.N., Nurika, S., Howard, T.E. 2015. Local people's use of non-timber forest products in the Gunung Halimun Salak National Park, West Java. **Journal of Environmental Studies**, Nagasaki Univ., Vol. 18, No. 1, pp. 16-27 (Oct. 2015)
25. Andarwulan, N., Batari, R., Sandrasari, D.A., Bolling, B., and Wijaya, H. 2010. Flavonoid content and antioxidant activity of vegetables from Indonesia. **Food Chemistry** 121 (2010) 1231–1235
26. Andarwulan, N., Faridah, D.N., Prabekti, Y.S., Fadhilatunnur, H., Mualim, L., Aziz, S.A., and Cisneros-Zevallos, L. 2015. Dietary Fiber Content of Waterleaf (Talinum

triangulare (Jacq.) Willd) Cultivated with Organic and Conventional Fertilization in Different Seasons. **American Journal of Plant Sciences**, 2015, 6, 334-343

27. Dairo, F.A.S., and Adanlawo, I.G. 2007. Nutritional Quality of Crassocephalum crepidioides and Senecio biafrae. **Pakistan Journal of Nutrition** 6 (1): 35-39, 2007
28. Adjatin, A., Dansi, A., Badoussi, E., Loko, Y.L., Dansi, M., Gbaguidi, F., Azokpota, P., Ahissou, H., Akoègninou, A., Akpagana, K., and Sanni A. 2013. Phytochemical screening and toxicity studies of Crassocephalum rubens (Juss. ex Jacq.) S. Moore and Crassocephalum crepidioides (Benth.) S. Moore consumed as vegetable in Benin. **J. Chem. Pharm. Res.**, 2013, 5(6):160-167
29. Joshi, R.K. 2014. Study On Essential Oil Composition Of The Roots Of Crassocephalum Crepidioides (Benth.) S. Moore. **J. Chil. Chem. Soc.**, 59, N° 1 (2014)
30. Owokotomo, I. A., Ekundayo, O., Oladosu, I. A., and Aboaba, S. A. 2012. Analysis of the Essential Oils of Leaves and Stems of Crassocephalum crepidioides Growing in South Western Nigeria. **International Journal of Chemistry** Vol. 4, No. 2; April 2012
31. Joshi, R.K. 2011. Terpene composition of Crassocephalum crepidioids from Western Ghats region of India. **International Journal of Natural Products Research** 2011;1 (2):19-22
32. Omotayo, M.A., Avungbeto, O., Sokefun, O.O., and Eleyowo, O.O. 2015. Antibacterial Activity Of Crassocephalum Crepidioides (Fireweed) And Chromolaena Odorata (Siam Weed) Hot Aqueous Leaf Extract. **IJPBS** |Volume 5| Issue 2|APR-JUN|2015|114-122