JPBIO (Jurnal Pendidikan Biologi)
Vol. 8, No. 2, November 2023, 293 – 301 //e-ISSN 2540-802X
http://jurnal.stkippersada.ac.id/jurnal/index.php/JBIO/index

The Potential of the zingiberaceae family as spice plants medicinal effectiveness

Florentina Rahayu Esti Wahyuni*, Benediktus Ege, Yakobus Bustami

Biology Education Study Program, STKIP Persada Khatulistiwa Sintang, Indonesia

*Corresponding author: estipandi84@gmail.com

Article Info

Article History:
Received 07 September 2023
Revised 20 October 2023
Accepted 28 November 2023
Published 30 November 2023

Keywords:
Zingiberaceae
Spice
Medicine
Dayak Linoh

ABSTRACT

This research was motivated by the absence of previous research that examined the potential of the Zingiberaceae family as a spice plant's medicinal effectiveness in the Dayak Linoh tribe in Belonsat Village. This can result in a loss of knowledge regarding that, so it is necessary to have a device that is used to document in writing the potential of the Zingiberaceae family as spice plants' medicinal effectiveness in the Dayak Linoh tribe at Belonsat Village. This research aims to 1) identify types of medicinal spice plants from the Zingiberaceae family in the Dayak Linoh tribe, 2) identify parts of medicinal spice plants from the Zingiberaceae family in the Linoh Dayak tribe, 3) identify how to use medicinal spice plants from the Zingiberaceae family in the Dayak Linoh tribe. This research uses a qualitative approach, the research methods used include surveys and interviews. The results of the research found 8 types of medicinal spice plants from the Zingiberacea family. The part of the plant that is most widely used is the rhizome, then there is 1 type of plant that uses flowers and young stems. Then, there are 11 methods used to use spice plants as medicinal ingredients, then there are 12 types of diseases that are believed to be able to be treated using types of spice plants from the Zingiberaceae family.

Citation: Wahyuni, F. R. E., Ege, B., & Bustami, Y. (2023). The potential of the zingiberaceae family as a spice plant medicinal effectiveness. *JPBIO (Jurnal Pendidikan Biologi), 8*(2), 293-301. DOI: https://doi.org/10.31932/jpbio.v8i2.2790

INTRODUCTION

Spices are plant parts originating from stems, leaves, bark, tubers, rhizomes, roots, seeds, flowers, or other parts of plant bodies that are aromatic and used in food with the main function of providing flavor. (Hakim, 2015). In its development, spice plants have been used as kitchen spices, flavor enhancers, fragrances, and food preservatives which are used on a limited basis (Robi, Siti, and Muflihati, 2019). According to Winarto & Karyasari, besides being useful as a cooking spice,

spices are also used in treatment, both for minor and chronic illnesses (Raburega, 2022). Spices contain phytochemical compounds including phytosterols, saponins, polyphenols, glycosinolates, phytesterogens, curcumin, sulfides, phytic acid, tannins, and essential oils, these phytochemical compounds apart from adding taste, also provide medicinal effects (Ningsih, 2021).

Every ethnic/tribe has traditional knowledge of using plants as medicine. This traditional knowledge is a cultural element that arises from individual experiences due to interactions with the environment and is inherited from generation to generation to sustain life, because whether we realize it or not, in maintaining the continuity of life, humans will always depend on their environment (Ani, Rohyani, and Ustadz, 2018). Traditional knowledge about the use of plants is obtained by the community through experience or trial and error, through dreams, through parents or ancestors which is inherited from generation to generation and orally from generation to generation, resulting in the creation of various high-quality medicinal concoctions (Julung et al, 2018). The management or use of spice plants as medicinal ingredients in various regions is also different, for example in the tourist area of Rancabuaya Beach, *Kaempferia galanga* L. is used as a reliever for urination and sprains (Mutaqin et al, 2017), then along the coast of Jember Regency it is used to treat colds (Puspitasari, Asyiah, and Astuti, 2019).

The use of spice plants which have medicinal effectiveness is not well documented because in general people living in rural areas often use oral traditions rather than written traditions to document the knowledge. Therefore, at this moment children or young people are not familiar with existing spices. Even among them, some do not know what the spices look like. Therefore, at this moment old people trust modern medicine more than using spices or traditional medicines, so the transfer of knowledge about spices and their efficacy is becoming more disconnected. Research on medicinal spice plants from the Zingiberaceae family in the Dayak Linoh tribe in Belmont Village has never been carried out, although health efforts through the use of traditional medicine from spice plants have been known to the community from the past until now. Belonsat Village has 3 community groups that live side by side, consisting of the Dayak people, especially the Dayak Linoh, Javanese people, and NTT people. Each group has different knowledge regarding the use of the Zingiberacea family. Based on these differences in knowledge, for this research, the focus is more on conducting research related to "The Potential of the Zingiberaceae family as spice plants medicinal effectiveness in the Dayak linoh tribe at Belonsat village". Research conducted by Nasution, Riyanto, & Chandra (2020) mentions that Zingiberaceae is used as a body warmer because the Batak ethnic group lives in the highlands which is synonymous with cold weather. Meanwhile, the Dayak Linoh tribe is a tribe that lives in the lowlands where the weather is hotter. This research aims to find out the types of spices, the parts used as medicine, and how to use the plants.

RESEARCH METHODS

Research Design

The research approach used is descriptive qualitative. This approach was used because the data obtained was descriptive in the form of written and spoken words from the Dayak Linoh tribe in Belonsat Village who understand the use of medicinal spice plants from the Zingiberaceae family. The method used in this research is a survey method. The survey method was used to collect field data relating to data on medicinal spice plants from the Zingiberaceae family in the Dayak Linoh tribe in Belonsat Village as can be seen in Figure 1.

Research Data Sources

The data in this research was obtained from informants, events or activities, places or locations, objects, images, and recordings, as well as written or unwritten documents. This research

consisted of three informants, consist of the main informant, the key informant, and the recommendation informant. The main informant was determined using a purposive sampling technique because the main informant was the easiest to find and was a mother from the Dayak Linoh tribe who understood spice plants from the Zingiberaceae family. Key informants and recommendations using snowball sampling. Snowball sampling is a technique for selecting informants from recommendations from previous informants. There is 1 person main informant and key informant, then there is also 1 person recommendation informant.

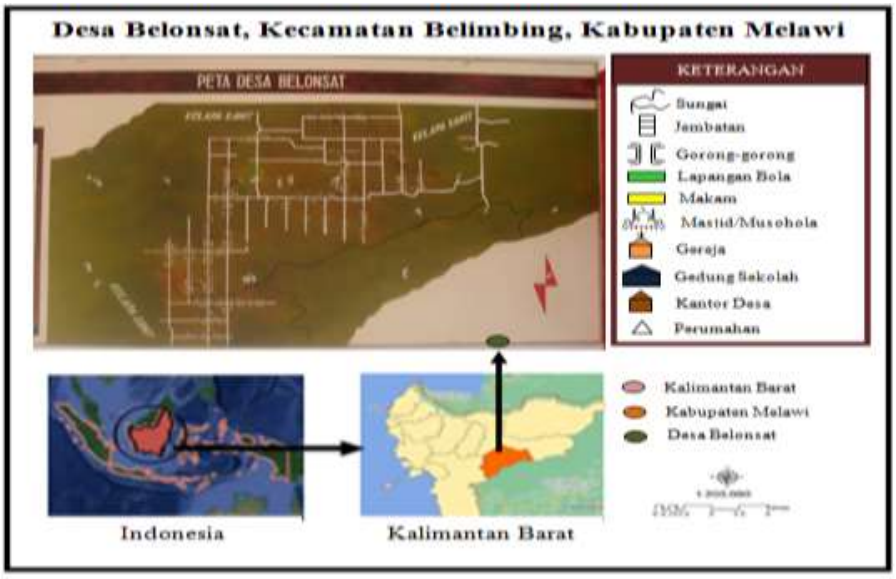

Figure 1. Places or locations in the Dayak Linoh tribe in Belonsat Village

Instruments

The instrument used in this research was an interview sheet according to the researcher's needs. When conducting interviews, researchers have prepared research instruments in the form of written questions that will be asked during interviews, where the questions relate to medicinal spice plants from the Zingiberaceae family which are used by the Dayak Linoh tribe in Belonsat Village.

Procedures

The research procedure carried out by the researcher consisted of several stages, specifically (1) compiling an interview sheet and carrying out validation, (2) coordinating with the head of Belonsat village as head of the PKK, (3) determining the respondents who would be interviewed, (4) collecting data one (1) time using the interview process, (5) documenting the Zingiberaceae family used by the Dayak Linoh tribe (6) analyzing research data, (7) making a research report

Data Analysis

The data analysis technique in this research is a qualitative descriptive analysis of the potential of the Zingiberaceae family as medicinal spice plants which includes: types of plants used, diseases that can be cured, parts of plants used, and how to use plants according to the informant's knowledge.

RESULTS

The results of this research were obtained through interviews and field observations with respondents from the Dayak Linoh tribe in Belonsat Village, namely that there are 8 types of medicinal spice plants from the Zingiberacea family. These plants include lempuin/lempuyang

(*Zingiber zerumbet* (L.) Sm.), liak padi/jahe padi (*Zingiber officinale* var. Amarum), liak jeronang/jahe merah (*Zingiber officinale* var. Rubrum), sumpak asam/kecombrang (*Etlingera elatior* Jack.), cokur/kencur (*Kaempferia galanga* L.), kunyit (*Curcuma domestica* Valeton), lengkuas (*Alpinia galanga* (L.) Sw.), entomu/temulawak (*Curcuma xanthorrhiza* Roxb.). Data on spice plants from the Zingiberaceae family, names of diseases, parts used, and how to use them can be seen in Table 1.

Table 1. Zingiberaceae family as medicinal spice plants in the Linoh Dayak tribe

No	Name	Disease Name	Used part	Processing Method	
1	Lempuin/Lempuyang (*Zingber zerumbet* (L.) Sm.)	Bodyache/Stiff	Rhizome	Chewed Sprayed	Rhizomes are chewed. Then spray it on the sick/stiff part of the body.
		Nousea	Rhizome	Crushed/cut boiled drunk	The rhizomes are crushed/cut. Then boil, leaving the water to be half the volume of the previous water. Drink until the nausea disappears
2	Liak Padi/Jahe Padi (*Zingiber officinale* var. Amarum)	Recovery after giving birth	Rhizome	Beated, boiled and drunk	Clean the ginger then crush it, then brew it with hot water. Ginger water can be filtered and drunk 2x a day.
3	Liak Jeronang/Jahe Merah (*Zingiber officinale* var. Rubrum)	Empty Nousea	Rhizome	Pounded, filtered, and drunk	The rhizomes are finely ground, and then filtered. The filtered juice is drunk directly.
		Rheumatism	Rhizome	Pounded and smeared	The dregs from the remaining filter or finely ground new rhizomes are applied to parts of the body suffering from rheumatism.
4	Sumpak Masam/Kecombrang	Hemorrhoids	Flower	Pounded and smeared	Finely ground and smeared on the

	(*Etlingera elatior* Jack.)				lower abdomen.
		Hemorrhoids	Young Stem	Pounded and smeared	Finely ground and smeared on the lower abdomen.
5	Cokur/Kencur (*Kaempferia galanga* L.)	Stomachache	Rhizome	Pounded, smeared, chewed, sprayed	The rhizome is crushed, then smeared/sprayed on the sick part of the stomach.
6	Kunyit (*Curcuma domestica* Valeton.)	Vomit and diarrhea	Rhizome	Pounded, filtered, and drunk	The rhizomes are finely ground, and then filtered. The filtered juice is drunk directly.
7	Lengkuas (*Alpinia galanga* (L.) Sw.)	Backache	Rhizome	Burned and taped	Burn I galangal rhizome, then crush it, then stick the galangal on the sore part of your back.
		Tinea versicolor	Rhizome	Peeled and smeared	Peel I young galangal rhizome, then apply it directly to the part of the body affected by tinea versicolor.
		Flavor Enhancer	Rhizome	Grate drunk	Grate I galangal rhizome, then squeeze until the water comes out. The grated water is mixed with I glass of water then boiled. Boiled water can be drunk by mixing a little honey.
8	Entomu/Temulawak (*Curcuma xanthorrhiza* Roxb.)	Flavor Enhancer	Rhizome	Boiled and drunk	Boil some ginger rhizomes, tamarind, and brown sugar together. Once this concoction has

				cooled, you can drink it straight away.
	Flatulency	Rhizome	Boiled and drunk	Boil some rhizomes. Once this concoction has cooled, you can drink it straight away

DISCUSSION

Based on the results of interviews with 2 women from the Dayak Linoh tribe in Belonsat Village, 8 types of plants from the Zingiberaceae family were found, which cured 11 types of diseases. Spice plants with medicinal effectiveness from the Zingiberaceae family consist of 8 types of plants, namely lempuyang, rice ginger, red ginger, kecombrang, galangal, turmeric, galangal, and ginger. According to Kurniati, the Zingiberaceae family grows more easily in various types of soil and has been cultivated by people in gardens and fields. The Zingiberaceae family is a plant that is often found in tropical forest areas. The Zingiberaceae family is generally known by the Indonesian people as ginger plants which are used in traditional medicine (Takoy, Rizal, dan Irwan, 2013).

The Dayak Linoh tribe in Belonsat Village mostly uses the rhizome for medicinal purposes, but there are also other parts that are used, such as the flowers and young stems. Plants from the Genus Zingiber (Family Zingiberaceae) are widely used throughout the world as food and medicinal plants. They represent a very popular herbal medicine in various traditional healing systems, especially the Zingiber rhizome. This plant has a long history of ethnobotanical use because a large number of rhizomes have antimicrobial characteristics derived from their essential oil content (Sharifi-Rad et al., 2017). Other research also states that Zingiberaceae has been used by people of various ethnicities as traditional medicinal ingredients. Most of the parts used are the rhizomes of the plant, while the treatment methods vary (Nrhazizah *et al.*, 2021).

According to Handa et al., the rhizomes of Zingiberaceae plants are a source of essential oils. Essential oils are widely used in soap, cosmetics, toilet products, medicines, perfumes, and food. Plant organs that contain natural essential oils are flowers, leaves, bark, roots, seeds, fruit, rhizomes, and sap or *oleoresin exudate* (Rukmana, Mukhtar, & Zulkarnain, 2022). Ginger is a common and widely used spice. Ginger is rich in various secondary metabolites, including phenolic compounds, terpenes, polysaccharides, lipids, organic acids, and crude fiber. The health benefits of ginger are mainly attributed to the presence of phenolic compounds, such as gingerol and shogaol. Accumulating investigations have shown that ginger has several biological activities, including antioxidant, anti-inflammatory, antimicrobial, anticancer, neuroprotective, cardiovascular protective, respiratory protective, antiobesity, antidiabetic, antinausea, and antiemetic activities. (Mao et al., 2019). Furthermore, there are also research that has revealed that ginger positively influences memory and exhibits anti-neuroinflammatory activity, which may contribute to preventing neurodegenerative diseases (Park *et al*, 2013; Huh *et al*, 2018).

Kaempferia galanga L., which belongs to the Zingiberaceae family, is an endangered medicinal plant with potential medicinal effectiveness. The leaves, rhizomes, and root tubers of the plant have several medicinal applications. This plant is economically important and is overexploited so there is always a shortage of propagating material (rhizomes) which are also the consumable part. *Kaempferia galanga* extract has anti-inflammatory, analgesic, antidiarrheal, antibacterial, sedative, cytotoxic, insecticidal, and anthelmintic (Shetu *et al.*, 2018). The rhizoma of *Kaempferia*

galanga L. contains primary metabolites such as protein, fiber, and minerals (potassium, phosphorus, magnesium, zinc, cobalt, iron, manganese, and nickel). Secondary compounds include essential oils and flavonoids. The essential oil content in the form of ethyl p-methoxycinnamate (EPMC) can cause anti-inflammatory activity. (Hashiguchi *et al.*, 2022).

Curcumin is the main constituent of turmeric (*Curcuma longa*). Turmeric has been widely used as a spice in food and for therapeutic applications such as anti-inflammatory, antihyperlipidemic, and antimicrobial activities. Turmeric and curcumin are nonmutagenic and nongenotoxic. Curcumin (CU) is a natural multipurpose plant compound with antioxidant, antiviral, antibacterial, antifungal, antiproliferative, anticancer, anti-inflammatory, neuroprotective, and cardioprotective activities (Soleimani *et al.*, 2018).

Alpinia galanga has been used for many years for its biological activity. Many species of the family Zingiberaceae have been studied for their potential biological activity. *Alpinia galanga* from the Zingiberaceae family was widely used several decades ago and is still used for traditional and medicinal purposes. Easy availability and low cost have enabled benefits for more people from this plant. The bioactive compound, 1,8-cineole is known as a metabolite providing strong biological activity. This active compound causes plants to have biological activities such as antibacterial, antifungal, antitumor, antiulcer, antiallergic, antioxidant, and insecticidal activity (Subramanian & Nishan, 2015).

The use of various types of plants in everyday life, including as food, medicine, or ritual processes. The discovery of medicinal plants based on ethnobotanical research is the importance of documenting this traditional knowledge. Therefore, some of these species can be targeted for phytochemical and pharmacological studies to identify the active ingredients contained in these plants so that they have specific and effective therapy (Maroyi, 2013).

Spice plants are used as medicine in several ways, specifically drinking, smearing, sticking, and spraying. There are several ways to process spice plants as medicinal ingredients before drinking them, specifically by boiling, bruising, squeezing, grating, filtering, and mashing. Polished, it can be processed first by mashing and peeling it. Then the last one was sprayed, by chewing it first.

CONCLUSION

There are 8 types of medicinal spice plants from the Zingiberaceae family in the Dayak Linoh tribe in Belonsat Village. There are 3 parts of the plant that are used and there are 11 ways to use the plant. The parts that are often used are the rhizomes, while those that are rarely used are the flowers and young stems. The method most often used is by pounding and boiling. This research implies that the people of Belonsat Village, especially the Linoh Dayak tribe and the general public can know and use medicinal spice plants from the Zingiberaceae family for health.

REFERENCES

Ani, N., Rohyani, I. S., & Ustadz, M. (2018). Pengetahuan masyarakat tentang jenis tumbuhan obat di kawasan taman wisata alam madapangga sumbawa. *Jurnal Pijar MIPA, 13*(2), 160-166. Retrieved from https://jurnalfkip.unram.ac.id/index.php/JPM/article/view/751/pdf

Hashiguchi, A., San Thawtar, M., Duangsodsri, T., Kusano, M., & Watanabe, K. N. (2022). Biofunctional properties and plant physiology of kaempferia spp.: status and trends. *Journal of Functional Foods, 92*(2022), 1-13. Retrieved from https://doi.org/10.1016/j.jff.2022.105029

Hakim, L. (2015). *Rempah dan herba kebun pengarangan rumah masyarakat.* E.book.

Huh, E., Lim, S., Kim, H. G., Ha, S. K., Park, H. Y., Huh, Y., & Oh, M. S. (2018). Ginger fermented with: schizosaccharomyces pombe alleviates memory impairment via protecting

hippocampal neuronal cells in amyloid beta1-42 plaque injected mice. *Food and Function, 9*(1), 171–178. Retrieved from https://doi.org/10.1039/c7fo01149k

Julung, H., Supiandi, M. I., Ege, B., Mahanal, S., & Zubaidah, S. (2018). Analisis sumber pengetahuan tradisional tanaman obat yang digunakan oleh masyarakat suku dayak desa. *Proceeding of Biology Education, 2*(1), 67-74. Retrieved from http://journal.unj.ac.id/unj/index.php/pbe/article/view/8707/5995

Mao, Q. Q., Xu, X. Y., Cao, S. Y., Gan, R. Y., Corke, H., Beta, T., & Li, H. Bin. (2019). Bioactive compound sand bioactivities of ginger (*Zingiber officinale* Roscoe). *Foods, 8*(6), 1–21. Retrieved from https://doi.org/10.3390/foods8060185

Maroyi, A. (2013).Traditional use of medicinal plants in south-central zimbabwe: review and perspectives. *Journal of Ethnobiology and Ethnomedicine, 9*(1), 9-31. Retrieved from https://doi.org/10.1186/1746-4269-9-31

Mutaqin, A. Z., Nurzaman, M., Setiawati, T., Budiono, R., & Noviani, E. (2017). Pemanfaatan tumbuhan famili zingiberaceae oleh masyarakat sekitar kawasan wisata pantai rancabuaya kecamatan caringin kabupaten garut. *Sains & Matematika, 5*(2), 35-41. Retrieved from https://journal.unesa.ac.id/index.php/sainsmatematika/article/view/6278/3185

Nasution, J., Riyanto., & Chandra, R. H. (2020). Kajian etnobotani zingiberaceae sebagai bahan pengobatan tradisional etnis batak toba di sumatera utara. *Media Konservasi,* 25(1), 98-102. Retrieved from https://journal.ipb.ac.id/index.php/konservasi/article/download/30529/19696/

Ningsih, D. Q. W. (2021). Etnobotani tumbuhan rempah-rempah oleh masyarakat kabupaten ponorogo jawa timur. *Skripsi.* Malang: Universitas Islam Negeri Maulana Malik Ibrahim Malang. Retrieved from http://etheses.uin-malang.ac.id/28737/1/16620118.pdf

Nurhazizah, Sabrina, R., Maftuhatun N, W., & Vivanti, D. (2021). Perbandingan keanekaragaman dan pemanfaatan famili zingiberaceae dalam kehidupan suku jawa dan suku dayak. *JB & P: Jurnal Biologi dan Pembelajarannya, 8*(2), 72-83. Retrieved from https://ojs.unpkediri.ac.id/index.php/biologi/article/view/16684/2299

Park, G., Kim, H. G., Ju, M. S., Ha, S. K., Park, Y., Kim, S. Y., & Oh, M. S. (2013). 6-shogaol, an active compound of ginger, protects dopaminergic neurons in Parkinson's disease models via antineuroinflammation. *Acta Pharmacologica Sinica, 34*(9), 1131–1139. https://doi.org/10.1038/aps.2013.57

Puspitasari, S. O. A., Asyiah, I. N., & Astuti, P. (2019). Pemanfaatan famili zingiberaceae sebagai tumbuhan obat oleh dukun bayi di sepanjang pesisir pantai di kabupaten jember, jawa timur. *Prosiding Seminar Nasional Masyarakat Bidiversitas Indonesia, 5*(3), 444-449. Retrieved from file:///C:/Users/user/Downloads/3933-Article%20Text-16378-2-10-20200108.pdf

Raburega, A. S. (2022). Potensi tanaman rempah-rempah sebagai bahan obat menurut kebiasaan masyarakat desa belonsat dan pengembangan sebagai buku referensi. *Skripsi.* Sintang: STKIP Persada Khatulistiwa

Robi, Y., Siti, M, K., & Muflihati. (2019). Etnobotani rempah tradisional di desa empoto kabupaten sanggau kalimantan barat. *Jurnal Hutan Lestari, 7*(1), 130-142. Retrieved from https://jurnal.untan.ac.id/index.php/jmfkh/article/view/31179/75676580049

Rukmana, R., Mukhtar, M., & Zulkarnain. (2021). Kajian etnobotani untuk menggali potensi tanaman obat. *Prosiding Seminar Nasional Biologi, 7*(1), 232–236. Retrieved from https://journal.uin-alauddin.ac.id/index.php/psb/article/view/24201

Sharifi-Rad, M., Varoni, E. M., Salehi, B., Sharifi-Rad, J., Matthews, K. R., Ayatollahi, S.A., & Rigano, D. (2017). Plants of the genus zingiber as a source of bioactive phytochemicals: from tradition topharmacy. *Molecules*, *22*(12), 1–20. Retrieved from https://doi.org/10.3390/molecules22122145

Shetu, H. J., Trisha, K. T., Sikta, S. A., Anwar, R., Rashed, S. S. B., & Dash, P. R. (2018). Pharmacological importance of *Kaempferia galanga* (Zingiberaceae): A mini review. *Journal of Research, 3*(3), 32-39. Retrieved from https://www.researchgate.net/profile/Pritesh-Dash-2/publication/330117569_Pharmacological_importance_of_Kaempferia_galanga_Zingiberaceae_A_mini_review/links/5c2e70f4458515a4c70a6252/Pharmacological-importance-of-Kaempferia-galanga-Zingiberaceae-A-mini-review.pdf

Soleimani, V., Sahebkar, A., & Hosseinzadeh, H. (2018). Turmeric (*Curcuma longa)* and its major constituent (curcumin) as nontoxic and safe substances: review. *Phytotherapy Research, 32*(6), 985–995. Retrieved from https://doi.org/10.1002/ptr.6054

Subramanian, P., & Nishan, M. (2015). Biological activities of greater galangal, *Alpinia galanga* – a review. *Research & Reviews: Journal of Botanical Sciences*, *4*(2), 5–14. Retrieved fromhttps://www.researchgate.net/publication/281276496_Biological_Activities_of_Greater_galangal_Alpinia_galanga_-_A_Review

Takoy, D, M., Rizal, L. & Irwan, L. (2013). Tumbuhan berkhasiat obat suku dayak seberuang di kawasan hutan desa ensabang kecamatan sepauk kabupaten sintang. *Jurnal Protobiont., 2*(3), 122-128. Retrieved from file:///C:/Users/acer/Downloads/3878-12648-1-PB%20(1).pdf