

PHARMACOLOGICAL ACTIVITIES OF KENCUR PLANT (*KAEMPFERIA GALANGA*) AS AN ASMA AND ANTI BACTERIAL MEDICINE

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ABSTRACT

Kaempferia galanga is one of the Indonesian plants that has medicinal properties. Herbs that have medicinal properties are considered safer, more effective, and have smaller side effects than chemicals. There are compounds contained in *Kaempferia galanga* isolates including Ethyl Cinnamate 65.98%, Ethyl p-methoxycinnamate 23.65%, (+) - 3-Carene 3.42%, Beta-Pinene 2.09%, Camphene 1.67%, Hexadecane 1.61%, Alpha-Pinene 0.71%, Myrcene 0.50%, 1-Limonene 0.37%. In several studies showed that *Kaempferia galanga* has activities such as Antifungal, Anti-inflammatory, and Antibacterial. This proves that herbs like kencur have various benefits.

Keywords: *Kaempferia galanga*, phytochemicals, pharmacological activities

1. INTRODUCTION

Kaempferia galanga or kencur is a species in the Zingiberaceae family which is an important medicinal plant species for the people of Asia, including Indonesia. In India, rhizome *Kaempferia galanga* is used as an ingredient in the preparation of Ayurvedic medicines, making perfumes, and cosmetics. By local Indonesian people, *Kaempferia galanga* is used as an ingredient for herbal medicine or what is known as herbal rice kencur and as a cooking spice [1].

The use of kencur both in industry and households is not only used as medicine but also as food, drink which is rich in health benefits [2]. In developing countries such as Indonesia, the use of herbal raw materials is now more frequently used because it has cheaper prices and grows in many tropical areas [3]. Herbal preparations are also considered safer, more effective, and have fewer side effects than chemicals in medicinal preparations.

The use of kencur as a cooking spice and medicine is related to its secondary metabolites. Secondary metabolites are produced by plants as an adaptation or for defense in a less favorable environment. Alkaloids, phenolic compounds and terpenoids are the main group of secondary metabolites produced by plants. Essential oils, also known as essential

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oils, are a group of terpenoids, especially monoterpenoids and sesquiterpenoids which are volatile at room temperature and have a distinctive aroma[4].

2. LITERATURE REVIEW

Herbal medicines such as kencur have well-known uses among the public both as a cooking spice, or as a treatment, usually kencur is known as a drug to treat various health problems including treating coughs, nausea, swollen ulcers and as anti-toxins such as poisoning [5, 6, 7] . Besides that, there are also other benefits of kencur which when mixed with other ingredients such as coconut oil can soothe sprained feet [8]. Kencur itself when it is processed into a drink such as kencur rice can increase endurance, prevent and eliminate colds [9, 10], this is because in kencur there are several compounds such as essential oils, saponins, flavonoids, polyphenols which are known to have many benefits [11, 12, 13]

One of the medicinal compounds is found from herbal plants, namely herbal medicinal raw materials which contain secondary metabolites [14, 15] . Secondary metabolites are defined as compounds produced or synthesized from plants which are often used as defenses found in specific plants so that secondary metabolites only occur under certain conditions in small amounts [16, 17].

One of the compounds contained in kencur rhizome is ethyl paramethoxycinnamate (EPMS), this compound is the largest or most abundant compound in kencur rhizome. cosmetics, namely sunscreens (skin protectors from sunburn) [18, 19] besides that there are also several studies which state that kencur has activity as an asthma drug, anti-fungal and antibacterial [20, 21].

3. EXPERIMENTAL

This study uses the literature review method or the SLR (systematic literature review) approach to examine research, assess and interpret and gather information about the compounds contained in white turmeric and their role in helping cure cancer [22, 23, 24]. To determine the content, phytochemicals were used, then chemdraw ultra 12.0 and chem 3 D pro 12.0 to make the structure of the compound that was in the previous [https:// pub parameter \(internal and cartesian coordinate table\) \[25, 26, 27, 28\]. In addition, <http://swisstargetprediction.ch/> is also used to predict that these compounds are more active in healing any disease. \[cbi.nlm.nih.gov/\]\(http://cbi.nlm.nih.gov/\) and specify \[29, 30\].](https://pubchem.ncbi.nlm.nih.gov/compound/10101)

4. RESULTS AND DISCUSSION

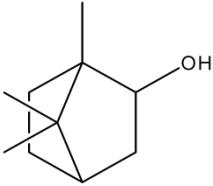
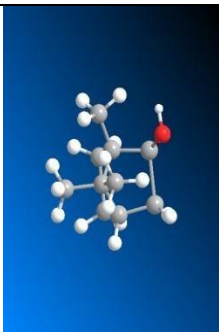
The *Kaempferia galanga* plant has 15 chemical elements / compounds:

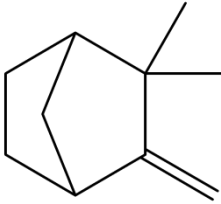
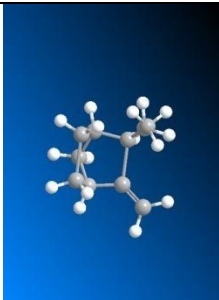
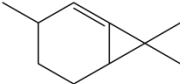
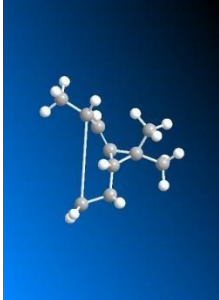
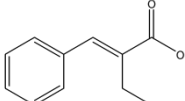
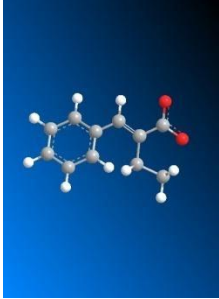
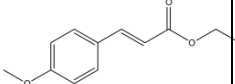
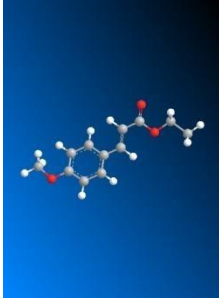

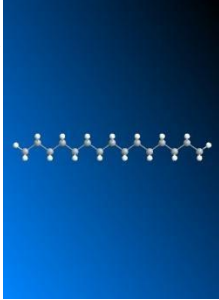
Tabel 1. Chemicals found in *Kaempferia galanga*, Dr. Duke's Phytichemical and Ethnobotanical Databases

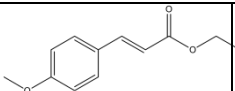
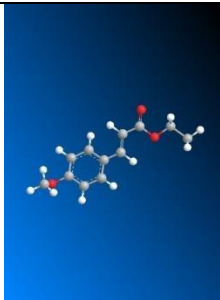
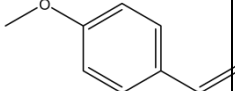
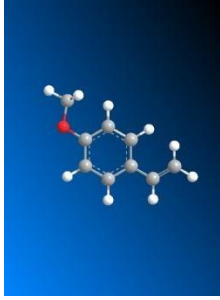
Activities Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
35	BORNEOL	Plant				--
35	BORNEOL	Rhizome				--
9	CAMPHENE	Plant				--
9	CAMPHENE	Rhizome				--
4	CARENE	Plant				--
4	CARENE	Rhizome				--
2	ETHYL-CINNAMATE	Rhizome				--
2	ETHYL-CINNAMATE	Plant				--
2	ETHYL-P-METHOXYCINNAMATE	Rhizome				--
2	ETHYL-P-METHOXYCINNAMATE	Plant				--
0	N-PENTADECANE	Rhizome				--
0	N-PENTADECANE	Plant				--
2	P-METHOXYCINNAMIC ACID-ETHYL-ESTER	Rhizome				Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
0	P-METHOXYSTYRENE	Rhizome				--
0	P-METHOXYSTYRENE	Plant				--

There are 8 active compounds found in Kamferia galangal :

Tabel 2. 8 Active compound

Elements / compounds	Chemical properties	Struktur 2D	Struktur 3D	Minimize Energy
BORNEOL	Boiling Point: 529.47 [K] Melting Point: 334.46 [K] Critical Temp: 666.59 [K] Critical Pres: 31.67 [Bar] Critical Vol: 514.5 [cm ³ /mol] Gibbs Energy: -20.5 [kJ/mol] Log P: 2.43 MR: 45.31 [cm ³ /mol] Henry's Law: 3.56 Heat of Form: -272.72 [kJ/mol] tPSA: 20.23 CLogP: 3.099 CMR: 4.6137			

CAMPHERE	Boiling Point: 440.88 [K] Melting Point: 267.66 [K] Critical Temp: 623.65 [K] Critical Pres: 28.84 [Bar] Critical Vol: 482.5 [cm ³ /mol] Gibbs Energy: 182.6 [kJ/mol] Log P: 2.95 MR: 43.74 [cm ³ /mol] Henry's Law: -0.57 Heat of Form: -31.15 [kJ/mol] tPSA: 0 CLogP: 4.702 CMR: 4.4352			
CARENE	Boiling Point: 445.86 [K] Melting Point: 267.26 [K] Critical Temp: 632.45 [K] Critical Pres: 28.91 [Bar] Critical Vol: 484.5 [cm ³ /mol] Gibbs Energy: 149.85 [kJ/mol] Log P: 2.9 MR: 45.05 [cm ³ /mol] Henry's Law: -0.64 Heat of Form: -69.08 [kJ/mol] tPSA: 0 CLogP: 4.442 CMR: 4.4752	 This name appears to be ambiguous		
ETHYL-CINNAMATE	Boiling Point: 557.59 [K] Melting Point: 309.14 [K] Critical Temp: 752.4 [K] Critical Pres: 31 [Bar] Critical Vol: 539.5 [cm ³ /mol] Gibbs Energy: 44.28 [kJ/mol] Log P: 2.4 MR: Henry's Law: 1.93 Heat of Form: -115.4 [kJ/mol] tPSA: 40.13 CLogP: -0.793 CMR: 5.3863	 Caution: A net charge appears to be present This name appears to be ambiguous		
ETHYL-P-METHOXYCINNAMATE	Boiling Point: 590.62 [K] Melting Point: 322.92 [K] Critical Temp: 765.22 [K] Critical Pres: 24.65 [Bar] Critical Vol: 623.5 [cm ³ /mol] Gibbs Energy: -182.21 [kJ/mol] Log P: 2.41 MR: 60.34 [cm ³ /mol] Henry's Law: 4.88 Heat of Form: -398.23 [kJ/mol] tPSA: 35.53 CLogP: 2.913 CMR: 6.0919			
N-PENTADECANE	Boiling Point: 542.8 [K] Melting Point: 258.31 [K] Critical Temp: 690.25 [K] Critical Pres: 14.15 [Bar] Critical Vol: 875.5 [cm ³ /mol] Gibbs Energy: 75.42 [kJ/mol] Log P: 6.76 MR: 71.27 [cm ³ /mol] Henry's Law: -2.95 Heat of Form: -352.93 [kJ/mol] tPSA: 0 CLogP: 8.629 CMR: 7.1344			

P-METHOXYCINNAMIC- ACID-ETHYL- ESTER	Boiling Point: 590.62 [K] Melting Point: 322.92 [K] Critical Temp: 765.22 [K] Critical Pres: 24.65 [Bar] Critical Vol: 623.5 [cm ³ /mol] Gibbs Energy: -182.21 [kJ/mol] Log P: 2.41 MR: 60.34 [cm ³ /mol] Henry's Law: 4.88 Heat of Form: -398.23 [kJ/mol] tPSA: 35.53 CLogP: 2.913 CMR: 6.0919			
P-METHOXYSTYRENE	Boiling Point: 456.28 [K] Melting Point: 250.1 [K] Critical Temp: 678.33 [K] Critical Pres: 32.99 [Bar] Critical Vol: 430.5 [cm ³ /mol] Gibbs Energy: 110.52 [kJ/mol] Log P: 2.54 MR: 43.07 [cm ³ /mol] Henry's Law: 2.18 Heat of Form: -10.82 [kJ/mol] tPSA: 9.23 CLogP: 2.785 CMR: 4.2837			

5. CONCLUSION

Based on the descriptive results and data analysis of *Kaempferia galanga*, there are 15 compounds and eight active compounds were obtained, namely Borneol, Camphene, Carene, Ethyl cinnamate, Ethyl P methoxycinnamate, N Pentadecane, P-Methoxycinnamic- Acid-Ethyl Ester and P-Methoxystyrene.

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