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Lemongrass, Turmeric And Ginger Effervescent Powder Formulation As A Drink Health During The COVID-19 Pandemic

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Abstract

In Indonesia, the Covid 19 pandemic has persisted for more than a year. Every government initiative aimed at preventing and enhancing community well-being has been completed. During the pandemic, the use of vitamins and pharmaceuticals has dramatically increased. Thus, costs rise. One potential solution is to use natural materials. Natural materials are difficult to work with and decay quickly. Thus, create natural components that are kid-friendly, easy to prepare, and have a long shelf life. effervescent powder made from the rhizomes of ginger, turmeric, and lemongrass Because it includes antioxidants, immunity is said to be enhanced by it. Three components This is a modern-day health beverage. The city of Palopo is where these three materials were obtained. Following the ingredients

Keywords: Effervescent powder, health drink, lemongrass, ginger, turmeric

1. Introduction

The Covid 19 epidemic, which started in March 2020, has killed a large number of people. The total number of deaths in Indonesia to date is 83,279 persons. As of July 25, 2021, there were 880 instances in South Sulawesi positive with 19 fatalities. Attempts to cut the transmission chain one way to combat corona virus is to enhance the system. Bodily defenses. In the Covid-19 period, maintaining the body's immune system is crucial. Currently by getting enough nourishment and getting enough sleep [1].

Drinks classified as "healthy" are those that not only quench one's thirst but also improve one's overall health [2]. Using ginger and turmeric as herbal remedies, vitamins for safe drinking or standardized herbal remedies. Regarding that when combined with COVID-19, the use of these plants either. The mixture may aid in boosting the body's stamina as immunodulator [3]. Among them is lemongrass a kind of therapeutic plant having a variety of beneficial bioactive ingredients because of its antioxidant properties and calming scent [4].

Ordinary powder is transformed into effervescent powder by dissolving it in either warm or cold water before to use. Carbonation is produced when the acid and base parts react with water. Earnings utilizing gas foam-containing effervescent treatments improving the freshness, portability, reaction time, and circulation of liquids within the human body. Additionally, the water's temperature affects the reaction's pace. Better carbonation results from slow action in cold water [5].

Palopo has inherent potential for the development of herbal medicine. The rhizomes of ginger, turmeric, and lemongrass plants are simple to grow gotten. Movement has been restricted by the pandemic. Make money the processing procedure will be made simpler and more robust by this product because it has. Because it is made with only cold water, it is specifically crafted and succinct. The formulation's invigorating effect when consumed is

another benefit to make it easier for youth to accept beverages prepared with components this plant.

2. Methodology

Materials

Plant materials were collected from Mt. Bawakaraeng, Gowa Regency, South Sulawesi, Indonesia. Samples were collected along the hiking trail at an altitude of 1800 m. Fresh samples (leaves, stems, flowers, and rhizomes) were taken to the laboratory to analyze the essential oil components. Also, flowers and leaves were used for antioxidant analysis. Herbarium specimens were taken for further morphological character analysis. To ascertain species, morphological observations were made using living collections.

GC-MS Analysis

Gas Chromatography-Mass Spectrometry (GC-MS) analysis using Agilent Technologies 7890 Gas Chromatograph with Auto Sampler equipped with 5975 mass selective detectors and chemistation data system. The GC-MS analysis used a column in HP Ultra 2 with a capillary column length of 30 x 0.25 (mm) I.D x 0.25 (µm) film thickness.

E. doliiformis oil was injected into the column using a GC-MS syringe as much as 0.1 µl and carried by helium gas. The column temperature was increased from 80 °C to 150 °C (1 min) and ended at 280 °C (26 min). The mobile phase flow rate was set to 1.2 /min, the injector temperature was 250 °C, the pressure was 12 kPa, and the injector split ratio was set to 8:1.

The components of essential oils were shown as a percentage of the total area of the chromatogram peak. Chromatogram results of GC-MS analysis include peak number, retention time (R), initial time (I), end time (F), curve area (area), curve height (height), curve (m/z), and the area of each curve (%T). The area of each curve represents the percentage of essential oils.

The chromatogram peak that appears from the GC-MS results represents the essential oil compounds. It is identified by comparing them with the Essential oils compound library (library). Identification of essential oils components was carried out based on the comparison of the mass spectra from the NIST 2005 v.2.0 library and the Wiley 7 library 2003. After being matched with the library, the essential oil component is then showed its identity, including the retention time and compound name.

The main compound was determined based on the percentage from each part. Compound grouping was based on information on Pubchem NCBI. Then, a potential review was compiled on several components that have been studied and have the potential for bioactivity and industry.

Antioxidant Capacity Analysis

Antioxidant capacity analysis was carried out using DPPH (1,1-difenil-1-pikrilhidrazil) method. Preparation of 0.1 mM DPPH was carried out by dissolving 4 mg of DPPH in 1000 ml of methanol. The extract of 1000 ppm was made by weighing 12.5 mg of extract, dissolved in 1250 l of dimethyl sulfoxide, heated until dissolved, and vortexed. The antioxidant activity test was carried out by taking a 50 µl and placing it in a test tube, adding 450 µl of methanol, then adding 3 ml of DPPH solution, vortexed until homogeneous, allowed to stand for 30

minutes in a closed and darkroom. The absorbance was measured on UV-vis spectrophotometry with a wavelength of 517 nm.

The antioxidant test of vitamin C was carried out by dissolving 20 mg vitamin C in 100 ml of 96% ethanol. The solution was made in several concentrations, namely 500 µl, 400 µl, 300 µl, 200 µl, 100 µl of methanol were added to each concentration. Then 3 ml of DPPH solution was added, and the absorbance was measured using UV-Vis spectrophotometry with a wavelength of 517 nm.

The percent inhibition of the sample was calculated using the formula:

Inhibition rate (%) = "Ablank - Asample" /"Ablank" x 100%

3. Result and Discussion

Morphological Character of *Etlingera doliiformis*

The morphological character was described by [6]. *E. doliiformis* belongs to the Acanthodes group of Sulawesian Etlingera. *E. doliiformis* has characteristics rhizome 2.5 cm diameter, subterranean, pubescent, scales 3.5 cm long; stilt roots absent. The rhizome is an organ that has a sharp aroma typical of the Zingiberaceae family. Leafy shoots to 2.5 m to long, base to 3.5 cm diameter (when dry), sheath yellowish to reddish brown, with scattered hairs, margin glabrous or ciliate near ligule; ligule to 16-18 mm long, reddish brown, rounded; petiole 5-6 mm long, orange-brown, with scattered hairs. The stems of *E. doliiformis* have clear ligules. Flowering shoot 13 cm long, arising from rhizome, erect, receptacle 2-7 cm long, with 120-125 flowers, and 2-4 open at time. Flower 3.9 – 4.9 cm long; calix 2.5 cm long, reaching 5.5 – 16 mm short of apex of stamen and 7 – 13 mm short of apex of corolla lobes, and pinkish (figure 1) [6] Young inflorescence *E. doliiformis* is reddish-orange and is conical in shape with a larger diameter base

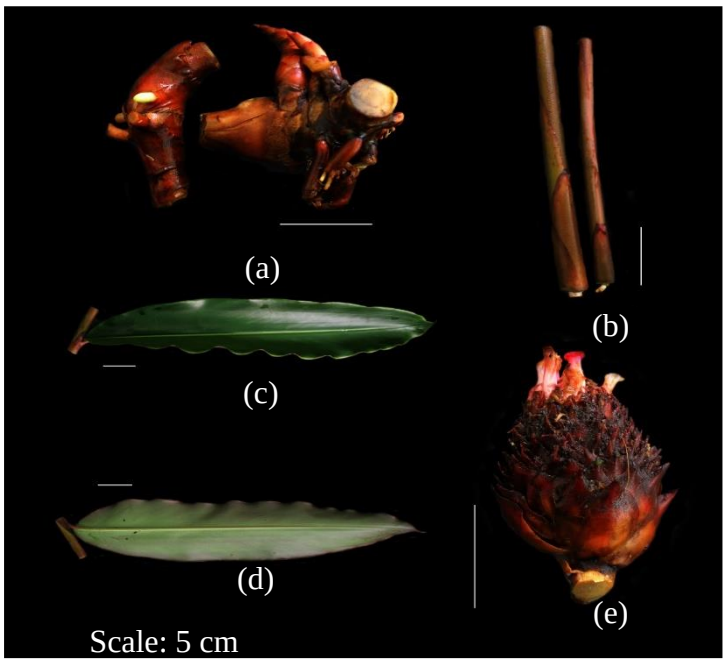

Figure 1. Morphology of *E. doliiformis*. (a) rhizome, (b) stem (c) upper surface of leaf, (d) lower surface of leaf, (e) inflorescence

Essential oils Component

The hydro distillated oils through GC-MS Analysis obtained data on chemical compound, retention time (RT) and percentage of the essential oils shown in table 1. Retention times were used for preliminary information for the identification of the peak. Primary data at this retention time was used to identify the compound. The GC-MS method is powerful method to identify component of essential oils at the plant. The main compounds are Hexadecanoic acid, methyl ester (50.72%), 2-Pyridinecarboxylic acid (49.06%), γ-Sitosterol (23.24%), 2-Hexadecanoyl glycerol (17.68%) and Ethyl linoleate (16.05%).

The main compound in rhizomes are 2-Pyridinecarboxylic acid (201.12%), 9,12-Octadecadienoic acid (Z,Z)-,2-hydroxy-1-(hydroxymethyl) ethyl ester (14.6%) and γ-Sitosterol (9.52%). The main compound in flowers are Ethyl linoleate (16.05%), Glycerol 1-monolinolat (12.42%) and 9-Tricosene, (Z) – (11.13%). Hexadecanoic acid, methyl ester (35.84%), 2-Pyridinecarboxylic acid (14.67%) and γ- Sitosterol (8.89%) are the main compound in stems. The main compound in leaves are Nonanoic acid, 9-(3-hexenylidenecyclopropylidene)-,2-(hydroxy-1-(hydroxymethyl)ethyl ester, (Z,Z,Z) (13.70%), Phytol (11.37%) and 2-Pyridinecarboxylic acid (9.91%).

Table 1. Essential oils component of *E. doliiformis* A.D. Poulsen

Chemical Compounds	Retention Times	Percentage (%)			
		Rhizomes	Flowers	Stems	Leaves
Monoterpene					
Cineole	4.483	2.27			
Diterpene					
9-Tricosene, (Z) -	30.396		11.13		
Neophytadiene	27.513				7.43
Acetylcysteine	27.313				1.93
Phytol	29.972			1.68	11.37
Triterpene					
Squalene	33.333		1.22		
Sesquiterpene					
Caryophyllene	15.440		1.73		
α-caryophyllene	16.681		1.16		
Nerolidol	20.970	4.97			
.+/-.-trans-Nerolidol	21.039		3.66		1.36
(-)-Germacrene d	17.764	3.84	5.06		1.70
Steroid					
Stigmasterol	38.519		1.70	1.46	
Stigmast-4-en-3-one	42.325		1.32		
γ-Sitosterol	39.539	9.52		8.89	4.83
Ethyl 9,12,15-octadecatrienoate	29.906				1.78
5,6,6,-Trimethyl-5-(3-oxobut-1-enyl)-1-oxaspiro [2.5]octan 4-one	28.486				2.29
Phenolic					
γ-Tocopherol	35.512	1.61	1.04	1.73	

Vitamin E	36.636			1.76	8.89
2-Methoxy-4-vinylphenol	12.103		1.24	2.30	
n-Tetracosanol-1	32.327		4.84		
6-Isopropenyl-4,8a-dimethyl-12345678,8a-octahydro-naphthalen-2-ol	27.445	6.65		1.74	
1,2-Trans-2,3-trans-plinol	27.872	3.44			
(1RS,2RS,6RS,7SR,1'RS)-6-(1'-Hydroxyethyl)-7-isopropenyl-2,5,5-trimethylbicyclo[4.1.0]heptan-2-ol	26.831				2.49
3,7,11,15-Tetramethyl-2-hexadecen-1-ol	27.927				6.06
1,6-Germacradien-5-ol	28.699				1.22
Miscellaneous Compounds					
2-Pyridinecarboxylic acid	8.372	20.12	4.36	14.67	9.91
Hexadecanoic acid, methyl ester	28.851	5.46	7.95	35.84	1.47
Heptadecanoic acid, ethyl ester	29.458		5.56		
Ethyl linolenata	29.906		16.05		
2-Aminoethanethiol hydrogen sulfate (ester)	30.679		2.02		
Methyl 19-methyl-eicosanoate	30.679		7.13		
Tetradecanoic acid, ethyl ester	31.320		2.13		
Glycerol 1-monolinolat	32.671		12.42		
Octadecanoic acid, ethyl ester	33.071		1.40		
4H-Pyran-4-one-,2,3-dihydro-3,5-dihydroxy-6-methyl-	7.131	1.72			2.48
7-Acetyl-2-hydroxy-2-metyl-5-isopropylbicyclo [4.3.0] nonane	26.272	4.58			
Oxireno [g] benzofuran, 1a,2,3,4,5,6a,6b-hexahydro-3,3,6a-trimethyl-5-(1-methylethenyl)-,(1a.alpha., 5.beta.,6a.alpha., 6b.alpha.)-	26.769	3.02		1.28	
Vinbarbital					
Ethyl 9,12,15-octadecatrienoate	29.148	4.30			
1,3,2-Dioxaphosphorinane-4,4,6,6-d4,2,5,5-trimethyl-,2 oxide	29.872	4.64			
2-Hexadecanoyl glycerol	31.292	1.24			
9,12-Octadecadienoic acid (Z,Z)-,2-hydroxy-1-(hydroxymethyl) ethyl ester	31.589	6.33		5.00	6.35
(-)-β.-caryophyllene epoxide	32.602	14.56			
Benzenamine, 2,4-dimethoxy-					
Dipentene diepoxide	21.452			2.13	1.12
2-Penten-1-one, 1-bicyclo[6.1.0]non-9-yl-4-methyl-	26.341				1.94
Spiro[2.5]octane, 5,5-dimethyl-4-(3-oxobutyl)-	27.010				1.35
3-Buten-2-one, 4-(5-hydroxy-2,2,6-trimethyl-7-oxabicyclo [4.1.0]hept-1-yl-	27.141				1.57
	28.300				1.50
O-hydroxybenzaldehyde thiosemicarbazone	29.010				1.49
Nonanoic acid, 9-(3-hexenylidenecyclopropylidene)-,2-(hydroxy-1-(hydroxymethyl)ethyl ester, (Z,Z,Z)	29.272				2.14
(6Z)-3,7,11-trimethyl-1,6,10-dodecatrien-3-ol	32.788				13.70
1-(4-Hydroxy-7-isopropyl-4-methyloctahydro-1h-inden-1-yl)ethanone	20.956			3.78	

10,11,dihydro-5h-dibenz (b,f) azepin	26.259	2.88
9,12,15,-Octadecatrienoic acid, ethyl ester		
S[2-[N,N-Dimethylamino]ethyl]N,N-dimethylcarbamoyl	29.168	3.12
thicarbohydroximate	29.885	6.96
(1SR,3RS,4RS)-3-exo-methoxy-7-oxabicyclo[2.2.1]heptan-2-one	30.506	1.14
	31.299	3.26

The compounds found are divided into four groups: terpenoids (monoterpenes, diterpenes, triterpenes, and sesquiterpenes), phenolic, steroids, and miscellaneous compounds (Figure 2). Terpenes are dominant in flowers and leaves. Steroids are dominant in rhizomes and stems. Phenolic are dominant in leaves and rhizomes. Miscellaneous compounds are dispersed in every organ analyzed. Flowers have the most different compounds compared to other organs. Terpenes, steroids, and phenolic have many potential bioactivities such as antibacterial, antioxidant, anti-inflammatory, anticancer, antidiabetic, etc. Isolation of this group of compounds from *E. doliiformis* can be used for the potential bioactivity. GC-MS analysis has not been carried out on *E. doliiformis* fruit because no fruit was found in all populations at the time of sampling.

Figure 2. Chemical Composition of the Essential Oils of *E. doliiformis* A.D. Poulsen

4. Conclusion

The main compounds of E. doliiformis are hexadecanoic acid, methyl ester (50.72%), 2-pyridinecarboxylic acid (49.06%), γ-sitosterol (23.24%), 2-hexadecanoyl glycerol (17.68%), and ethyl linoleate (16.05%). The review of essential oil compounds in E. doliiformis has much potential in bioactivity and industry that can be used in the future.

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