Jurnal Jamu Kusuma
Vol. 2, No. 1, Juni 2022 hal 1-7

p-ISSN : 2798-0332 (print)
e-ISSN : 2798-558x (online)

PHYSICAL TEST HERBAL SYRUP OF EMPRIT GINGER (*Zingiber officinale* var. *Amarum*) AND LIME (*Citrus aurantifolia* Swingle)

Uji Fisik Sirup Herbal Rimpang Jahe Emprit (*Zingiber officinale* var. *Amarum*) *dan Jeruk Nipis* (*Citrus aurantifolia* Swingle)

Riska Chandra Pradana[1*)]
[1)]Jurusan Farmasi, Politeknik Kesehatan Kementerian Kesehatan Surakarta, Jl. Ksatrian No 2 Danguran, Klaten, Jawa Tengah Indonesia
*email: pradana.chan@gmail.com

ABSTRACT

Functional foods can provide health benefits because they contain physiologically suitable compounds for health. The level of public awareness about healthy living through food and drink needs to be increased. This awareness can be obtained through the composition of food and drink that has an attractive taste and color without neglecting certain physiological functions in the food or drink so that it is beneficial for the human body. One of the drinks that contain food additives in the form of synthetic dyes is syrup. Many syrups marketed are made of synthetic flavors, artificial sweeteners, and synthetic dyes. Of course, if consumed in the long term can interfere with the health of human organs, so there need to be innovations in making herbal syrups such as emprit ginger and lime rhizomes. This study aimed to determine the physical test results of the Rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle) syrup. The type of observational research used was to observe and record the results of physical tests on herbal syrups of a combination of rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle). The syrup viscosity combination of infunded extracts of Ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle) results in 212.0 mPas. The results of this study were the degree of acidity of the syrup with a pH meter of 6.1 organoleptic syrup, dark blue-black, the distinctive aroma of ginger and lime, and the sweet, spicy, and sour taste and the homogeneity of the syrup, namely homogeneous syrup.

Keywords : Physical Test, Herbal Syrup, Emprit Ginger (*Zingiber officinale* var. *amarum*), Lime (*Citrus aurantifolia* Swingle), Body Fitness

BACKGROUND

Foodstuffs can be sourced from plants that also have herbal benefits that may help prevent and manage heart disease, cancer, and diabetes. These benefits become potentials that can be developed through functional foods naturally or formulated with bioactive components such as dietary fiber, inulin, fructose and glucose, antioxidants, fatty acids, prebiotics, and probiotics. Indonesia, as a country rich in flora, has excellent potential as a functional food digger and developer (Rikomah, 2021).

Functional foods can provide health benefits because they contain physiologically promising compounds for health. It is said that available food has attractive taste, texture, and color characteristics so that consumers can accept it. Food is everything that comes from biological sources of an agricultural, plantation, forestry, fishery, animal husbandry, water, and water products, both processed and unprocessed, which are intended as food or drink for human consumption (Gozali & Kusuma, 2019).

The level of public awareness about healthy living through food and drink needs to be increased. This awareness can be obtained through the composition of food and drink that has an attractive taste and color without neglecting certain physiological functions in the food or drink so that it is beneficial for the human body. The rapidly growing information positively impacts natural ingredients that can be processed into food and herbal syrups. One example of food or herbal syrup is a drink in syrup or dry extract that can be dissolved by adding sugar as a sweetener.

One of the drinks that contain food additives in the form of synthetic dyes is syrup. Many syrups marketed are made of synthetic flavors, artificial sweeteners, and synthetic dyes, which, if consumed in the long term, can interfere with the health of human organs. The use of synthetic dyes can cause health and environmental problems. The use of synthetic dyes such as Rhodamine B, Methanol Yellow, and Amaranth in food and beverages is hazardous for health because it can trigger cancer and damage the kidneys and liver (Pujilestari, 2016). Utilization of natural ingredients in the manufacture of herbal syrups can be an option, namely by making formulations of herbal syrup preparations a combination of herbal plants with natural colors and distinctive herbal flavors.

The syrup is a liquid preparation in the form of a solution containing sucrose. Sucrose content ($C_{12}H_{22}O_{11}$) is not less than 64% and not more than 66% (Depkes RI, 1995). In its usefulness, the syrup can be used as a thirst-quenching drink and medicine with herbal ingredients that can prevent and treat disease. The syrup has a variety of flavors depending on what the syrup is made of. Synthetic dyes or natural dyes can be added to make syrup, and however, for herbal syrups, it is better to use natural dyes.

Rhizome of ginger emprit is a plant commonly found in home gardens; rhizome of ginger emprit is one of the medicinal plants in Indonesia that has a distinctive aroma and functions as a spice for seasoning, food, or drink mixtures, medicines, cosmetics, and functional food preparations. For generations, the rhizome of ginger emprit has been used as a body-warming drink to treat nausea and colds. Several studies have proven ginger to have potent antioxidant activity. The pharmacological research results indicate that compounds in ginger that are antioxidants, such as gingerol, shogunal, and zingerone, have higher antioxidant activity than vitamin E (Siska & Yunianta, 2015). Rhizome of ginger emprit can be combined with other food ingredients such as lime (*Citrus aurantifolia* Swingle) to add flavor to the herbal syrup. As a traditional medicinal ingredient, ginger can be used singly or in combination with other herbal medicinal ingredients that have mutually reinforcing and complementary functions (Redi Aryanta, 2019).

Lime, apart from functioning as a sour taste, also acts as a freshener, fragrance, and prevention of discoloration in ingredients (Fikri Hamidi1, Raswen Efendi, 2016). Lime (*Citrus aurantifolia swingle*) is a plant that comes from the family Rutaceae with the genus Citrus having a plant height of about 150-350 cm and white fruit. Lime (*Citrus aurantifolia swingle*) is widely used by the community as a cooking spice and medicine (Prastiwi & Ferdiansyah, 2013).

A combination of herbal syrup formulation with Rhizome of ginger emprit (*Zingiber officinale var. amarum*) and lime (*Citrus aurantifolia swingle*) ingredients are used as herbal flavors. 2015). In the health sector, lime (*Citrus aurantifolia swingle*) is used as an appetite enhancer, diarrhea medicine, antipyretic, anti-inflammatory, antibacterial, and dietary (Mursito and Haryanto, 2006).

Preparation of syrup preparations must be tested to obtain syrup that meets syrup quality standards. So a physical test of syrup is needed. A physical test is a test where the quality of the product is measured objectively based on the material things that appear in a product. The physical test aims to determine whether the syrup preparations are suitable for consumption and meet the standards. The physical examination consisted of a viscosity test, an organoleptic test, a pH test, and a homogeneity test. The viscosity test is to measure the level of viscosity in preparation. The tool used is a viscometer. An organoleptic test is a test that observes the shape, color, taste, and

smell of a rehearsal. A pH test is a test carried out to determine whether the practice is acidic or basic. PH test uses a pH meter and litmus paper. While the homogeneity test is a test carried out to see whether there are insoluble particles in the preparation.

Based on the description above, the research of the rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) has been widely studied, but no one has ever investigated the herbal syrup of rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle). The author is interested in conducting research on the "Physical test of Rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle) syrup. Physical examinations to be carried out include viscosity test, pH test, organoleptic test, and homogeneity test.

METHOD

Type of Research

The type of observational research used was to observe and record the results of physical tests on herbal syrups of a combination of rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle).

Variable of Research

The variable used in this study was a single variable, namely the physical test of the herbal syrup formulation combination of rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and lime fruit (*Citrus aurantifolia* Swingle).

Sample

This study used purposive sampling, namely purposive sampling, based on the characteristics or characteristics of the population that have been known previously. The sample in this study was a herbal syrup formulation of a combination Rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and 500 ml of lime (*Citrus aurantifolia* Swingle) syrup which was used by researchers to be tested.

Materials and Tools of Research

Ingredients for herbal syrup: Rhizome of ginger emprit extract (*Zingiber officinale* var. *amarum*) and lime fruit (*Citrus aurantifolia* Swingle), sucrose, Na-CMC, and aquadest. The tools used are as follows: Tools for making an herbal syrup of rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and lime fruit (*Citrus aurantifolia* Swingle): pot : zebra decoctum, stove maspion S-302, scale ohaus, stirrer: herma, filter: Custom, thermometer: herma.

Tools for making herbal syrup: stove, stainless steel pot, stirrer, measuring cup, strainer, funnel, syrup bottle. The tool for testing the viscosity is the NJD-8S Digital Rotary Viscometer. The device for testing the pH is the pH meter, the mechanism for testing the organoleptic, namely the five senses, and the tool for testing the homogeneity of the glass preparations and the five senses.

Implementation of the Research

Implementation stage

Researchers prepared materials to be used in the manufacture of rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and lime fruit (*Citrus aurantifolia* Swingle)

Preparation for making syrup

Tabel 1. Formula Sirup

Syrup ingredients	Weight (gram)	Function
Ginger Rhizome Extract	200	Natural dye
Lime Liquid	300	Herbal flavoring
Sucrose	450	Sweetener
Na-CMC	0,5	Thickener
Aquadest	Add 500	Solvent

Infundation Method

Simplicia rhizome of ginger emprit as much as 10 grams was extracted by the infundation method, by heating the bottom pan with water than the top pot was given 200 ml of distilled water then the simplicia was put into the pan. Heated for 15 minutes, starting at 95˚C. The extract obtained was filtered using a filter to produce an added section of 200 ml.

Process

Heat 200 ml of aquadest in a saucepan until it boils, add sucrose, and stir until homogeneous. add the infusion of rhizome of ginger emprit extract (*Zingiber officinale* var. *amarum*) and rhizome of ginger emprit infusion while stirring, add Na-CMC and stir until thickened. After homogeneous and thickened, turn off the stove and relax, and then strain to produce 500 ml of syrup.

Physical quality test of syrup

Viscosity Test

Viscosity is a measure that expresses the viscosity of a liquid in the form of a liquid, paste, or in the form of a gel, or slurry (Yusibani et al., 2017). In measuring the viscosity test using the NJD-8S Digital Rotary Viscometer, it is done by placing the syrup sample results into the viscometer until the spindle is submerged. The viscometer is run, and the viscosity of the syrup will be read.

pH test

The pH value is the degree of acidity possessed by a solution. The pH value was measured with a pH meter which aims to determine changes in the pH of the syrup made. The pH value of the syrup ranges from 4.0 to 7 (Wijayanty et al., 2015). The level of acidity or pH is measured using a pH meter. The pH meter was dipped in a pH seven buffer solution, then rinsed with distilled water, the pH meter was dropped into the syrup sample and allowed to stand for a while, and the results can be seen from the numbers printed on the screen.

Organoleptic Test

Organoleptic tests were carried out by observing the color, taste, and odor obtained from the herbal syrup of rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) and lime.

Homogeneity Test

The homogeneity test was carried out by dripping a syrup sample on a glass slide and then covering it with a glass slide, then seeing whether the syrup preparation was homogeneous.

RESULTS AND DISCUSSION

Simplicia ginger emprit (*Zingiber officinale* var. *amarum*) as much as 100 grams was extracted by the infundation method to obtain a liquid extract of 300 ml. The liquid extract is used as the main ingredient for making syrup with additional components of sucrose and Na-CMC. The syrup produced as much as 530 ml was subjected to physical tests, including viscosity tests, pH tests, organoleptic tests, and homogeneity tests.

The physical test results of the Infunded Ginger Extract Combination Syrup (*Zingiber officinale* var. *amarum*) are shown in table 2.

Tabel 2 Syrup Physical Test Results

No	Physical Test	Standard	Result
1	Viscosity Test	214,7 mPas	212,0 mPas
2	pH Test	4 - 7	6,1
3	Organoleptic Test a. Flavor b. Color c. Smell	Sweet and spicy, dark blue-black, typical ginger emprit, and lime	Sweet and spicy Dark blue-black Specialty Ginger emprit and lime
4	Homogeneity Test	Homogeneous	Homogeneous

Based on table 2, it can be seen that the results of the physical test of Infunded Syrup Extract Infunded Ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle) obtained a viscosity of 212.0 mPas, pH 6.1, homogeneous syrup with dark blue-black color, aroma typical ginger emprit and lime and have a sweet, spicy and sour taste.

DISCUSSION

The physical tests carried out on the syrup preparations of Infunded Ginger (*Zingiber officinale var. amarum*), and lime (*Citrus aurantifolia swingle*) extract included: viscosity test, pH test, organoleptic test, and homogeneity test. Based on these results, the viscosity of the syrup infundation of emprit ginger and lime extracts is not much different from the syrup on the market. The addition of sucrose can affect the density of the syrup. The density of a liquid with the addition of sucrose depends on the length of heating time. This happens because the higher the heating temperature, the higher the solubility of sugar. Sugar will bind a lot of water so that the viscosity will increase.

Na-CMC as a thickening agent affects the physical and taste of the syrup. The use of Na-CMC in the manufacture of cashew syrup is more effective, easy to obtain, and practical than gum arabic or gelatin. In other studies, the addition of CMC with a concentration of 0.5 – 3% is often used to maintain the stability of the suspension. The treatment of adding 1.5% CMC (Carboxyl Methyl Cellulose) material gave the best results in manufacturing cashew syrup (Setiawan, 2019). Concentration in the manufacture of a combination syrup of ginger and lime is 0.72% of the total ingredients or 0.5 grams. Before being mixed into the syrup material, Na-CMC was dissolved using aquadest and stirred until evenly distributed and not lumpy. The addition of Na-CMC also affects the viscosity of the syrup; the addition of Na-CMC causes the thickness to increase because Na-CMC, which is hydrophilic and dispersed in water, moves freely and causes an increase in the density of the syrup preparation.

The pH test is one of the essential parameters because the stable pH value of the solution indicates that the distribution process of the primary ingredients in the preparation is evenly distributed. The pH test is an assessment of the level of acidity that will affect the durability of a product. High acid content (low pH) accompanied by high total dissolved solids such as in syrup is a preservation technique in dosage products (Mukaromah et al., 2010). The result of the pH in the syrup formula is 6.2. pH. The citric acid content in lime has an acidic pH of 2.48-2.5. According to the research by Price, Sedarous, and Hiltz, seven office bleaching products have a pH of 3.67-6.53 (Rochmah et al., 2014). The Indonesian National Standard (SNI) recommended pH value for syrup is between 4-7. This result is determined by the SNI, which is acidic (SNI, 2013).

An organoleptic test is a test with observations using the five senses to describe color, smell, and taste. The Combination Syrup of Infunded Ginger Extract (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle) obtained dark blue-black color, and this blue color is obtained from an infused extract of ginger and lime, which contains natural pigments that have the potential to be used as natural dyes are anthocyanins. The blackish color is caused by ginger extract containing oleoresin, and ginger oleoresin is bright yellow, yellow to dark brown. In the infunded extract of emprit ginger, a dark brown color was obtained so that when combined with lime, it produced a dark blue-black syrup color.

The smell of the syrup Combination of Emprit Ginger (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle) extracts is typical of the emprit ginger aroma, and this is because the composition of emprit ginger is more than lime, which is 1:10. The spicy taste and aroma of Typical ginger characteristics can be affected due to the presence of oleoresin content. The fragrant aroma of ginger is caused by ginger oil, while oleoresin causes a spicy taste. The ginger oleoresin contains many components that form a tangy flavor that does not evaporate, which consists of gingerol, zingiberene, shagaol, ginger oil, and resin. (Hargono, Fitra Pradhita,

2013).

A sweet taste is obtained from sucrose. Sucrose is a chemical compound with a sweet taste and white color and is easily soluble in water. Sucrose functions as a sweetener and has an essential role because it can increase the acceptance of food taste, especially in syrup preparations with a sugar content of 64-66% (SNI, 2013).

The homogeneity test was conducted by observing the particles in the preparation in a transparent container. The test was carried out on syrup dripped on a glass slide and then covered with a glass slide and observed. A good syrup is stable, homogeneous, not cloudy, does not clot, does not have deposits, and is free from contamination and microbial growth. Combination Syrup Infunded Extracts Ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle) do not have lumps and deposits in the solution, so this syrup is homogeneous. The homogeneous nature of the syrup indicates that the mixture of syrup and sucrose is evenly mixed, and its constituent properties do not change.

Combination Syrup Infunded Extract Ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle) are valuable antioxidants. Antioxidants are compounds that can scavenge free radicals. Free radicals are generated due to several factors such as smoke, dust, pollution, and the habit of consuming fast food which is not balanced between carbohydrates, proteins, and fats. Sources of natural antioxidants are found in many foodstuffs such as fruits, spices, tea, chocolate, medicinal plants, seeds, vegetables, enzymes, and proteins. Antioxidant activity is caused because these plants contain secondary metabolites or active compounds, including flavonoids, phenolics, tannins, and anthocyanins.

Rhizome of ginger emprit (*Zingiber officinale* var. *amarum*) has antioxidant compounds, including gingerol, shogunal, and zingerone. Phenol components such as 6-gingerol and 6-shogunal have good antioxidant activity. Oleoresin in ginger can provide a spicy taste that acts as a natural antioxidant (Siska & Yunianta, 2015)

CONCLUSION

Based on the results of this study, it can be concluded that the syrup viscosity of the infused extracts of Ginger emprit (*Zingiber officinale* var. *amarum*) and lime (*Citrus aurantifolia* Swingle) was 212.0 mPas. The degree of acidity of the syrup with a pH meter of 6.1, the organoleptic syrup is dark blue-black, has a distinctive aroma of ginger and lime, and tastes sweet, spicy, and sour. The homogeneity of syrup is homogeneous syrup.

BIBLIOGRAPHY

Depkes RI. (1995). *Farmakope Indonesia* (Edisi IV). Departemen Kesehatan Republik Indonesia.

Fikri Hamidi1, Raswen Efendi, F. H. (2016). Penambahan Sari Jeruk Nipis (Citrus Aurantifolia) Terhadap Mutu Sirup Buah Kundur (Benincasahispida). *Jom Faperta UR*, *18*(2), 33–37. http://www.tjyybjb.ac.cn/CN/article/downloadArticleFile.do?attachType=PDF&id=9987

Gozali, G., & Kusuma, B. J. (2019). Identifikasi Potensi Pangan Lokal untuk Penganekaragaman Produk Pangan Kota Balikpapan. *JSHP : Jurnal Sosial Humaniora Dan Pendidikan*, *3*(2), 111–115. https://doi.org/10.32487/jshp.v3i2.650

Hargono, Fitra Pradhita, M. P. A. (2013). Pemisahan Gingerol Dari Rimpang Jahe Segar Melalui Proses Ekstraksi Secara Batch. *Momentum*.

Prastiwi, S. S., & Ferdiansyah, F. (2013). Kandungan Dan Aktivitas Farmakologi Jeruk Nipis (Citrus Aurantifolia S.). *Farmaka*, *15*(2), 2.

Pujilestari, T. (2016). Review: Sumber dan Pemanfaatan Zat Warna Alam untuk Keperluan Industri. *Dinamika Kerajinan Dan Batik: Majalah Ilmiah*, *32*(2), 93. https://doi.org/10.22322/dkb.v32i2.1365

Redi Aryanta, I. W. (2019). Manfaat Jahe Untuk Kesehatan. *Widya Kesehatan*, *1*(2), 39–43. https://doi.org/10.32795/widyakesehatan.v1i2.463

Rikomah, S. E. (2021). Tingkat Pengetahuan Masyarakat tentang Dagusibu Obat di Kelurahan Tanah Patah Kota Bengkulu. *Jurnal Penelitian Farmasi Indonesia*, *9*(2), 51–55. https://doi.org/10.51887/jpfi.v9i2.851

Rochmah, N., Ch.R, D. M., & Lestari, S. (2014). Potensi Jeruk Nipis (Citrus aurantifolia) dalam Memutihkan Email Gigi yang Mengalami Diskolorasi Lime (Citrus aurantifolia) Potential to The Whiten Discoloration Tooth Enamel. *Insisiva Dental Journal*, *3*(1), 78–83.

Siska, F., & Yunianta. (2015). Pengaruh Konsentrasi Karagenan dan Rasio Sari Jahe Emprit(Zingiber Officinale Var. Rubrum) terhadap Sifat Fisik, Kimia, dan Organoleptik Jelly Drink Jahe. *Pangan Dan Agroindustri*, *3*(2), 542–550.

SNI. (2013). *Standart Nasional Indonesia 01-3544: Sirup*. Badan Standarisasi Nasional Indonesia.