Formulation of Powdered Beverage Combination of Ginger, Lemongrass and Vegetable Creamers using Foam Mat Drying Technique

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Abstract. A spice drink is made from natural ingredients that contain many benefits for the health of the body**.** Ginger, lemon grass, and vegetable creamer can be used as raw materials in spice powder drinks. This study aims to determine the effect of variations in the ratio of ginger, lemongrass, and vegetable creamer on the physicochemical characteristics of spice drink powder and to determine the total phenol and mass change rate of spice powder, which panelists prefer. This study used a completely randomized design (CRD) with multiple factors with three replications. The first factor is the spice ratio of 80:20 and 20:80. The second factor is the difference in the percentage of creamer by 0%, 5%, and 10%. The data obtained were analyzed for a variety of ANOVAs. Suppose there are differences in the treatment significantly followed by an analysis of Duncan's New Multiple Range Test (DMRT) at the P level ≤ 0.05. The results showed that the addition of the spices and vegetable creamer ratio had a significant effect on dissolution time, dissolution rate, solubility, hygroscopicity, water absorption, and water content. The preferred formulation based on the results of the organoleptic test of spice powders is the A3B1 treatment with a ratio of 80% ginger and 20% lemongrass with the addition of 10% vegetable creamer. The results of the physicochemical analysis on the A3B1 formula were at a dissolution rate of 0.045 g/sec, a solubility of 89.2%, a hygroscopicity of 12.2%, a water absorption capacity of 1.23 ml/g, total phenol was 3.81%, and the resulting mass change rate decreased in the 27th minute and tended to be constant concerning mass change

Keywords: Drying, Formulation, Ginger, Lemongrass, Vegetable Creamer.

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1 Introduction

Powdered drinks are food products in the form of granules, so they dissolve quickly if added to water (cold or hot). One of the powder beverage products developed is a spice-based beverage product. According to [1], powder drinks produced must meet the requirements, namely not hygroscopic, not clumpy, easily soluble in water, have practical presentation, and have a relatively longer shelf life because of its low water content, thus inhibiting microbes that grow. Powder drinks with spice raw materials are expected to be an alternative to providing healthy drinks for the community.

Ginger (*Zingiber officinale var. marum)* is traditionally beneficial for preventing diseases such as nausea, indigestion, flu, and asthma. The compound that causes ginger to taste spicy and somewhat bitter is oleoresin. Ginger has a role as an antioxidant besides helping prevent various diseases [2]. Lemongrass *(Cymbopogon citratus*) is a plant that has components, namely *citral* or *lemonal* by 75-80%, which plays a role in refreshing aromas such as citrus, which can function as an anti-inflammatory, antioxidant, and anti-depressant [3]. According to [4], lemongrass has benefits that can remove harmful substances from the body and reduce fever due to the presence of citronella, geraniol, and citronellol, which are antiseptic. [5] researched lemongrass freshening drinks that directly influenced the water content produced by comparing lemongrass juice and ginger juice. Adding vegetable creamer improves the taste and quality of spice drink powder. Adding vegetable creamer to manufacture spice drink powder provides *a flavor* that can later affect public acceptance. Vegetable creamer is made based on constituent ingredients combined into a solution and then dried. The constituent ingredients of vegetable creamers include vegetable oils, proteins, glucose syrup, sodium caseinate, stabilizers, and emulsifiers [6]. The research results by [7] show that adding vegetable creamer to instant ginger drinks has an authentic influence on color and taste. References to the formulation of ginger, lemongrass, and plant-based creamer spice drinks have yet to be widely developed. The combination of these three raw materials was chosen because it is commonly obtained and used in the community. The suitable formulation will produce a spice drink powder that consumers prefer.

Making spice drink powder usually has problems when the drying process is not suitable, namely the loss of several essential substances such as vitamins and minerals [8]. The drying process using high temperatures can cause a loss or damage to part of the *flavor,* which is an active component in the material, by precipitation when the powder is dissolved, reducing the quality of the resulting product. The *foam mat* drying technique is drying that can be done as an excellent alternative technique. Foam mat drying is a drying method in liquid form through foaming techniques with the addition of foaming agents [9]. (2) The advantage of the foam mat drying technique is that the process is cheap and straightforward; drying is done at low temperatures so that color, taste, vitamins, and other nutrients can be maintained [8]. Factors affecting the quality of spice powder with foam mat drying techniques include fillers in the form of maltodextrin and foamers in tween 80

[10]. This study aims to determine the effect of variations in the ratio of spices and vegetable creamers on the physical characteristics of spice drink powder. They know the total phenol of spice drink powder preferred by panellists and the rate of change in the mass of spice drink powder preferred by panellists

2 Method

2.1 Place and Time of Research

The research was conducted at the Laboratory of Agroindustrial Technology and Management, Faculty of Agricultural Technology, Jember University. The implementation time is carried out from December 2022 to February 2023

2.2 Material and Tools

The ingredients used are ginger, lemongrass, vegetable creamer (Avi), equates, mineral water (Aqua), lime, salt, maltodextrin, *tween* 80, Folin-Ciocalteu reagent and Na_{2CO3} 10%. The tools used are scissors, knives, cutting boards, boilers, basins, stoves, beakers, measuring cups, drip pipettes, test tubes, Philips HR2115 blenders, *hand mixers (*Maspion MT 1150), volume pipettes, stirring rods, analytical balances, digital balances*, vortex,* aluminum foil, filter cloths, baking sheets*, microwaves (MC8188HRC/00), ovens, magnetic stirrers,* sartorius (*Vibra AJ-3200E),* hot plates, stirrers, refrigerator, petri dish, spoon, erlenmeyer, glass funnel, centrifuge (Hermle z206a), *stopwatch,* ziplock plastic, whatman no 41 filter paper.

2.3 Research Design

The research was conducted experimentally in the laboratory using a Complete Randomized Design (RAL) with a double factor. The first factor is the ginger: lemongrass ratio of 80:20 and 20:80. The second factor is the percentage of creamer of 0%, 5%, and 10%. The experiment was conducted in this study with six treatments with three repeats.

2.4 Research Stages

Spice Extraction. Ginger and lemongrass are extracted in a ratio according to the formula. Ginger and lemongrass are done *blanching* for 3 minutes. Then, crushed using a blender, the ratio of spices: water is 1 2. Next, filtering is carried out using a filter cloth. The filtered material is followed by settling for 30 minutes. Then, the extract is filtered with a filter cloth and obtained spice filtrate.

Formulation and Manufacturing of Spice Drink Powder. Spice drink powder is made by *foam mat drying technique* with the addition of fillers and foamers in the form of maltodextrin (10%) and tween 80 (1%). The ratio of ginger and lemongrass is divided into 2, namely 80%:20% and 20%:80%. Then add vegetable creamer (0%,5%,10%), lime juice 3%, and salt 0.5%. Extract spices with additional ingredients, stirring with a mixer for 11 minutes. Furthermore, drying is carried out using a 400-watt microwave and then dried for 29 minutes with stirring every 1 minute. After drying, it is further mashed with a blender until it becomes a spice drink powder.

Physical Testing of Spice Drink Powder. The spice drink powder obtained is then carried out by physical testing. The physical parameters to be carried out are solubility, dissolving speed, water absorption, and hygroscopicity.

Determination of Preferred Formulation, Analysis of Total Phenol, and Rate of Mass Change. Organoleptic testing is based on the panelists' assessment of spice drink powder products. The preferred formula is determined with a theoretical approach and analyzed by the *spider web method*. Values that approach the literature or theory of each parameter will then be selected as the preferred formula. After obtaining the preferred formula, the total phenol and mass change rate are analyzed.

2.5 Parameter Analysis

Solubility. The solubility test of spice drink powder is carried out by dissolving 1 gram of powder into 50 ml of water. The powder solution of the spice drink is filtered with the Whatman No 41 filter paper. Before use, filter paper is dried in the oven at 105ºC for 30 minutes and weighed as the initial weight. After filtration, the filter paper and the residue are dried in the oven at 105ºC for 3 hours, then cooled in a desiccator for 15 minutes and weighed as the final weight. The magnitude of the solubility value is expressed as a percentage of residual weight that cannot be passed through filter paper against the sample weight of the material used and can be calculated by

$$\%\ \text{Solubility} = 1 - \frac{(c-b)}{\frac{(a-\%KA)}{100}} \times 100 \quad (1)$$

Information:
a: Sample mass (grams)
b: Filter paper mass (grams)
c: Filter paper mass and residue (grams)
KA : Water Level (%bb)

Soluble Speed. Determination of the dissolving speed is carried out by preparing 30 ml of water. A weighed sample weighing 4.5 grams was put into the water. The time it takes to dissolve the entire sample is calculated using a stopwatch. Then, the speed of dissolving is determined by the following formula:

$$\text{Soluble Speed} = \frac{sample\ mass\ (g)}{soluble\ time\ (second)} \quad (2)$$

Water Absorption. Measurement of water absorption is carried out using the centrifuge method. A powder sample of 1 g was mixed with 10 mL of equates in a test tube, then shaken for 1 minute and allowed to stand for 30 minutes at room temperature 24ºC. The following process is centrifuged at 3500 rpm for 30 minutes. Unabsorbed water is discharged, and absorbed water is the value of water absorption. The value of a is obtained from a volume of 10 mL of aquades and test tubes. The C value is the weight of the powder as much as 1 g, and the D value is the final weight of the test tube, flour, and water. DSA calculation formula:

$$DSA\ (mL/g) = (d\text{-}c\text{-}a)/c \quad (3)$$

Information:
a = weight of test tube and water (g)
c= Powder weight (g)
d = final weight of test tube, powder, and water (g)

Hygroscopicity. Determination of hygroscopicity can be done by weighing spice powder as much as 2 grams as the initial weight (A). Then, the sample is left at room temperature, and every day, the weight is weighed until the weight is stable as the final weight (B). The final weight minus the initial weight is then multiplied by 100% to know hygroscopicity. The calculation formula is:

$$\text{Hygroscopicity} = \frac{B-A}{A} \times 100\% \quad (4)$$

Information:
A = Starting mass
B = mass after being left in an open space

Organoleptic Test. The test procedure is that the powder of the brewed spice drink is served in a small glass of equal volume. 2 grams of spice drink powder is brewed in 100 ml of warm water, and 15 grams of sugar is added. Untrained panellists used the testing of this study with a total of 30 panellists. Each panellist will be given six samples that will be tested for the level of liking against 4 test criteria: colour, taste, aroma, and the overall sample given. This test is carried out by randomly coding three numbers in the sample presented so as not to cause specific interpretations by panellists. Panellists gave scores or scores based on the level of preference for spice drink powder on the questionnaire provided.

Analysis of Total Phenol. Phenol content analysis refers to the Folin–Ciocalteu Method simply by analyzing selected formulations of spice powder. The first stage is a sample weighing 100 mg of spice powder, then dissolved to 10 mL with aquades to obtain a 10 mg / mL concentration. From a concentration of 10 mg/mL pipette 1 mL and diluted with aquades up to 10 mL, a spice powder concentration of 1 mg/mL was obtained. Pipetted 0.2 mL, added 15.8 mL equates to 1 mL Reagan Folin–Ciocalteu, and shaken. Let stand for 8 minutes, then add 3 mL Na_{2CO3} 10% to the mixture. Let the solution stand for 2 hours at room temperature. Measurements with a UV-Vis spectrophotometer at a maximum absorption wavelength of 765 nm. 3 (three) Repetitions were carried out so that the phenol levels obtained on average were obtained as mg equivalent to gallic acid / g fresh samples. Then, put it into the formula:

$$\text{Total Phenol} = \frac{CxVxFp}{Bs} \quad (5)$$

Information:
C = Sample solution concentration
V = volume of sample solution
Fp = Dilution factor
Bs = Sample mass

Rate of Mass Change. The rate of mass change is only by analyzing selected formulations of spice drink powder. The rate of mass change can be expressed as the amount of mass moved from within the material of the union of time, thus illustrating how fast the drying process takes place. The rate of mass change is determined by measuring the change in mass of the material for time intervals of 0, 7, 15, 19, 23, 24, 27, 28, and 29 minutes. The calculation of the rate of mass change uses the following equation:

$$M = \frac{mo-mt}{tkumulatif} \quad (6)$$

Information:
m_0 = mass of starting material
m_t = t-minute spice drink powder mass (g)
$T_{kumulatif}$ = cumulative time (minutes)

2.6 Data Analysis

The research results related to physicochemical characteristics were analyzed statistically using ANOVA variety analysis. If there is a significant difference in treatment, proceed with Duncan's New Multiple Range Test (DMRT) analysis at $P \leq 0.05$. Determining the preferred formulation based on organoleptic test results is described descriptively. Data on total phenol test results and mass change rate are presented in graphs and analyzed descriptively.

3 Result and Discussion

3.1 Physical Analysis

Soluble Speed. The value of the dissolving speed of spice drink powder is 0.035-0.049 g / second. The value of the dissolving velocity analysis can be seen in **Figure 1.**

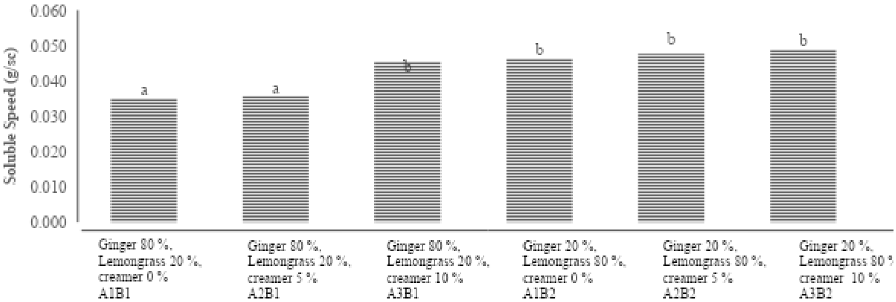

Fig 1. Soluble Speed

The variance analysis results show that the vegetable creamer factor has a natural effect on the value of the resulting soluble speed. The results of variance analysis on the variation factor of adding vegetable creamer showed sig. 0.005 < 0.05. The analysis showed that the more vegetable creamer the addition, the higher the value of the resulting soluble speed. Vegetable creamer contains ingredients easily soluble in water; the material is dextrin, one derivative of starch with high soluble properties (Srihari et al., 2010). This is because the surface of the powder becomes wide, so it increases, which causes the powder, when dissolved, to dissolve faster and faster when it meets deep water. The speed of dissolving a product is increasing, and the product quality is improving [11].

The results of the variance analysis showed that the spice ratio factor had a natural effect on the value of the soluble speed produced. The results of the variance analysis on the variation factor of adding vegetable creamer showed sig. 0.000 < 0.05. A comparison of the ratio of ginger and lemongrass gives the resulting values at different dissolving speeds. A ratio with lemongrass, 80%, indicates a higher value compared to the ratio of ginger, 80%. The lower the water content in a product, the tendency to blend also increases; it helps the time to increase to dissolve the product entirely in water. Treatments that have low water content are treatments with a larger lemongrass ratio. This is because the less water content in a product, the higher the ability of particles to absorb water on its surface, so the faster the time it takes to be wetted by water.

Solubility. The percentage of solubility value produced from spice drink powder products ranges from 87,9-92.2%. The solubility value of the spice drink powder can be seen in **Figure 2.**

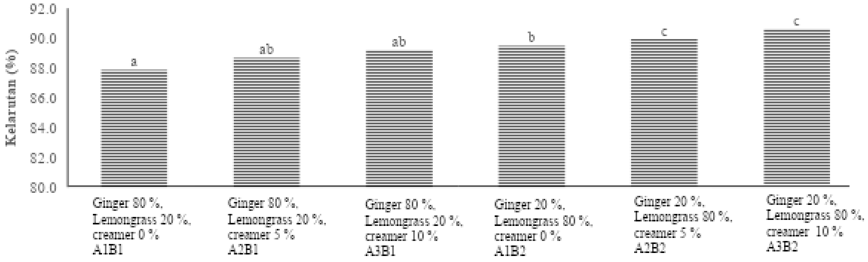

Fig 2. Solubility Value

The analysis results show that the vegetable creamer factor naturally affects the solubility value produced. The results of variance analysis on the variation factor of adding vegetable creamer showed sig. 0.035 < 0.05. The use of dextrin leads to high solubility of the product. This is because the surface of the spice drink powder becomes wide, increasing interaction with water more and more on the surface of the powder. The high surface area of the powder causes the powder to dissolve faster. This is to the statement of [12] that dextrin is helpful as a filler and increases the surface area of the powder. The results of the variance analysis showed that the spice ratio factor had a natural effect on the solubility value produced. The results of the variance analysis on the variation factor of adding vegetable creamer showed sig. 0.00 < 0.05. The resulting solubility can also be affected by the moisture content of the material. A3B2 treatment has the highest solubility value allegedly because the treatment also has the lowest moisture content value, causing the powder to dissolve more easily in water. The higher the water content of spice drink powder, the more difficult it is to dissolve in water, causing low powder solubility [1]. This is because the more water content in a product, the higher the ability of particles to absorb water on the surface. The higher the solubility value obtained, the better the product quality [1].

Hygroscopicity. The average hygroscopicity yield of spice drink powder ranges from 10.1-14.5%. The value of hygroscopicity analysis can be seen in **Figure 3.**

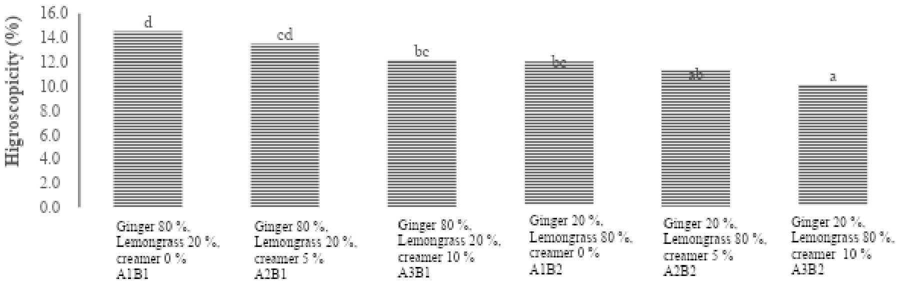

Fig 3. Value of Hygroscopicity Analysis of Spice Drink Powder Samples

The variance analysis results show that the vegetable creamer factor naturally affects the hygroscopicity value produced. The results of variance analysis on the variation factor of adding vegetable creamer showed sig. 0.009 < 0.05. The highest hygroscopicity value was in the A1B1 sample, which was 14.5%. The lowest high hygroscopicity result was in the A3B1 sample at 10.1%.

The results of the variance analysis showed that the spice ratio factor had a natural effect on the hygroscopicity value produced. The results of the variance analysis on the variation factor of adding vegetable creamer showed sig. 0.001 < 0.05. The ratio of lemongrass to the increasing amount causes the hygroscopicity of spice drink powder to decrease compared to the more significant amount of ginger. This is because the water content in ginger is more significant than lemongrass. Hygroscopicity is related to the consistency and shelf life of the resulting product. If the resulting hygroscopicity value is significant in the product, it can cause more moisture to be absorbed. If the moisture content of the material produced is high, the food quality will increase [13]. So, the addition of ginger has a higher impact when compared to the addition of lemongrass. The average value of the water content test shows that spice drink powder with a larger lemongrass ratio has a lower moisture content value. This concludes that a larger lemongrass ratio can reduce the value of hygroscopicity. According to the [14], materials with a 1-15% hygroscopicity level are classified as slightly hygroscopic. Based on the existing literature, the average value of hygroscopicity produced in spice drink powder is 10.1-14.5%, which belongs to the group of slightly hygroscopic ingredients. So, the resulting product is classified as suitable for the type of beverage powder.

Water Absorption. The water absorption value of the spice drinking powder ranges from 1,02-1.41 ml/g. The value of the water absorption force analysis can be seen in **Figure 4.**

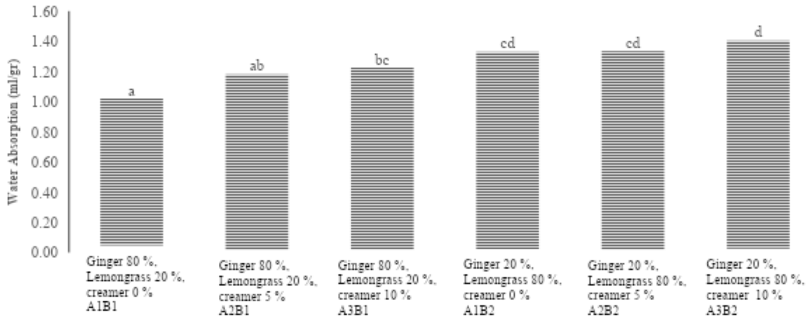

Fig 4. Water Absorbent Force Analysis Value Sample Spice Drink Powder

The variance analysis results show that the vegetable creamer factor naturally affects the water absorption value produced. The results of variance analysis on the variation factor of adding vegetable creamer showed sig. $0.011 < 0.05$. The results of the analysis of variance on the spice ratio factor showed sig. $0.00 < 0.05$. The water absorption of powder products can decrease if the moisture content value produced is significant and the storage area is moist. The result of the water content of spice drink powder with a higher ginger ratio of 80% tends to have a high moisture content value. This causes the absorption value to be lower. The content of spices with different ratios also causes the water absorption value to differ. The higher the use of the lemongrass ratio, the higher the water absorption value obtained. According to [15], the absorption power of powder water or the absorption power of powder water states the amount of water that powder can absorb. The study results got an average water absorption value of 1.02-1.41 mL/g. If the value of water absorption is high, the product has better quality because it can absorb water well [16].

3.2 Determination of Preferred Formula

The determination of the preferred formulation of the spice drink powder was analyzed using the *spider web method.* Test the level of preference for panellists conducted to produce product formulations consumers select. Determination of the preferred formulation based on organoleptic results. This assessment was conducted to determine the panellists' responses in describing and expressing the level of liking for the spice drink products produced. Test the panellists' level of colour, taste, aroma, and overall liking. The scale used by the test is 1-5 from the results of spice drink powder. Data on the analysis of the preferred formulation can be seen in **Figure 5.**

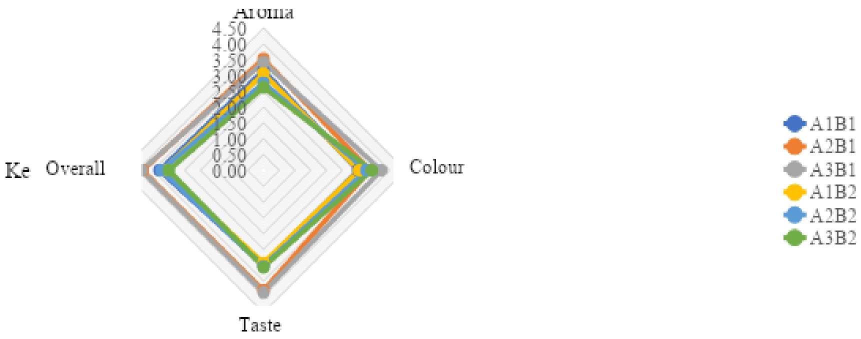

Fig 5. Determination of the preferred formulation of the Spider Web Method

Based on the results of spider web hedonic tests on colour, aroma, taste, and overall parameters, samples favoured by panellists, namely A3B1 (ginger 80%, lemongrass 20%, and vegetable creamer 10%) were obtained. The formulation of A3B1 in *the results of spider web* analysis shows that the parameters on A3B1 are mainly located on the outside, which means that the A3B1 sample in colour, aroma, taste, and overall is liked by the panellists. The A3B1 sample produces a high colour favorability value. The discolouration of spice powder is due to the addition of vegetable creamer. Judging from the colour characteristics produced in the use of vegetable creamers based on the quality criteria of SNI powder vegetable creamer (2009), vegetable creamer products have a white to yellowish-white colour. This is according to what is produced in spice powder drinks with the addition of vegetable creamer, which is yellowish-white. The higher the number of vegetable creamer additions to the product, the colour of the product is close to white.

Based on the analysis of aroma preferences in spice drink powder, panellists preferred samples with a spice ratio of 80%. The distinctive aroma of spices, namely ginger and lemongrass, used as raw materials, can provide added value to consumer preferences for spice drink powder beverage products. This is to [17] that spices have a distinctive aroma that is refreshing and warming to meet consumer tastes. The essential oil content of the spices used makes the aroma appear. This is the opinion of [18], who states that spices contain essential oils often used as flavorers.

Taste preference for spice drink powder showed that the more plant-based creamer added to spice drinks led to an increase in favorability among panellists. According to [6], the content of glucose syrup in vegetable creamer gives a sweet taste, and sodium caseinate gives a savoury taste to drinks added with vegetable creamer. This is because spice drinks have a sweet, slightly spicy taste and a characteristic taste of spices. The sweetness in this powdered spice drink comes from the vegetable creamer added. The vegetable creamer added can be a powder because its function is the same: adding flavour to the drink. So vegetable creamers are widely used as additional ingredients for beverage products. The taste of whole and solid food generally consists not only of one taste but is a combination of various flavours. The quality requirements for the taste of powdered spice drinks are generally typical of spices. Adding creamer to the spice drink powder will add a distinctive taste when brewed. The spicy taste produced due to the presence of spices is classified as a type of spicy spice, namely ginger. The spicy taste in ginger is caused by unevaporated compounds, namely *zingerone, gingerol*, and *school.*

The panellists' overall preference for spice powder products favoured the A3B1 formula (ginger 80%, lemongrass 20%, and vegetable creamer 10%) with spice drinks with a sweet, slightly spicy taste, made from various spices and have a distinctive aroma and made from natural ingredients. The physical analysis results in formula A3B1 are the value of soluble speed 0.045 g / s, solubility 89.2%, hygroscopicity 12.2%, and water absorption 1.23 ml / g. The results of the A3B1 treatment (ginger 80%, lemongrass 20%, and vegetable creamer 10%) were overall the formulation preferred by the panellists and physically qualified for the appropriate spice powder

3.3 Analysis Total Phenol

The total phenol analysis aims to determine the amount of phenol in the sample. Based on the analysis of phenol levels in the best samples with a ratio of ginger 80%: lemongrass 20% with creamer as much as 10% has a total phenol content of 3.81%. The content contained in ingredients containing phenols comes from ginger and lemongrass. [19], ginger contains phenol compounds that can be reduced so that it also has antioxidative and hypoglycemic activity. Antioxidants in ginger derived from phenolic compounds have a function: their ability to stabilize free radicals by giving them hydrogen atoms to free radicals. Lemongrass compounds are known to contain phenol-active compounds that can act as antioxidants.

The total phenol content value produced is 80.33 mg, equivalent to 0.8% in the manufacture of functional instant drinks. The resulting value is smaller than the manufacture of spice drink powder, which is produced at 3.81%. Analysis of total phenol instant spice products ginger has a total phenol content of 26.00%. The resulting value was more significant in making instant powder of spice drinks in research. The difference in values is also due to many factors. The addition of ingredients is also one of the factors that cause the total value of phenol produced to be different.

In the process of making spice drink powder, the processing stage is carried out, namely heating and exposure to light, which can cause damage to phenol compounds in spice drink powder. According to [19], phenol compounds have a function to be the main contributor to antioxidant activity against free radicals phenol damage can be caused by environmental factors such as light, temperature, and oxygen.

3.4 Rate of Mass Change

The rate of mass change can be shown when the material is evaporated in the amount of time produced in the amount of water mass lost so that it can find out how fast the drying process is taking place. Testing on the preferred formulation is on 80% ginger and 20%

lemongrass with the addition of 10% creamer. The result of the mass change rate for 29 minutes can be seen in **Figure 6.**

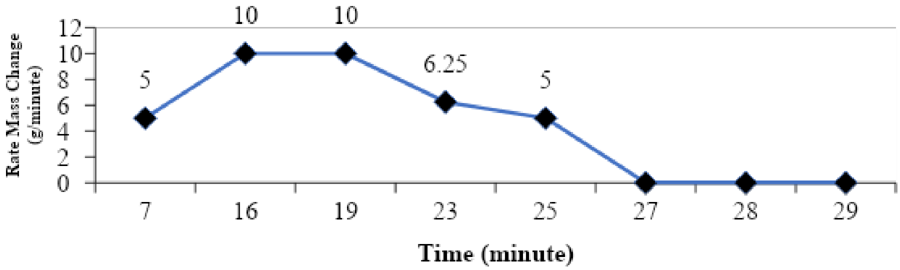

Fig 6. Mass Change Speed Graphics On Spice Drink Powder

Based on the resulting value, it can be seen that the rate of mass change in the drying process is decreasing. When the material is carried out, the initial drying process is still very fast, the decline which takes place subsequently, the rate gets slower until the end of the drying process carried out. In the 27th minute, it was shown that the drying process had undergone constant changes until the 29th minute. The end of the drying process can usually be seen with no loss occurring at the change in mass rate. Research by [20], states that if the air temperature increases during drying, the material can deliver water from the surface. As a result the water content in the material becomes smaller. If the use of drying time, the mass of evaporated water is also more significant, so that the mass decreases with the change in time, the mass value decreases during the drying process. It does not rerelease the mass so that the rate of change in the water mass in the A3B1 formulation in the 27th minute there is a reduction in mass and goes to constant.

5. Conclusion

The results showed that the addition of the ratio of spices and vegetable creamers significantly affected the speed of dissolving, solubility, hygroscopicity, and water absorption. More the ratio of ginger and not added vegetable creamer leads to a high hygroscopicity value. The increasing ratio of lemongrass and adding vegetable creamer by 10% leads to high dissolving speed, solubility, and water absorption. The preferred formulation based on the results of organoleptic tests of spice drink powder is A3B1 treatment with a ratio of 80% ginger and 20% lemongrass with the addition of 10% vegetable creamer. %. The results of physical properties in formula A3B1 are at the value of soluble speed 0.045 g / s, solubility 89.2%, hygroscopicity 12.2%, water absorption 1.23 mL / g, total phenol 3.81%, and mass change rate decreased and tended to be constant at the 27th minute with no other water mass lost.

6. Suggestion

Suggestions that can be given in future research are the need for further testing of the shelf life of herbal drink powder with the addition of creamer so that it knows more about the quality during powder making to storing herbal powder so that later it can be marketed by MSMEs. In addition, it is expected that the powder can be stored in a refrigerator with an airtight state so that the powder is not easily damaged because when stored at room temperature the powder will more readily absorb water and oxidize so that it can change the form of spice powder.

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