Determination of Shelf Life and Proximate Analysis of Orumy Beverage Produced by Micro, Small and Medium Enterprise INOKAM in Dolly Distric

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Abstract. In this research, Orumy beverage have been made with the main ingredient of the Eucheuma cottoni seaweed species. For labeling and commercialization purposes, it is necessary to determine the shelf life and nutritional contents of seaweed beverages. The shelf life investigation in this study was conducted by Accelerated Shelf Life Testing (ASLT) method. While on the determination of nutritional content, the proximate analysis method was used. The Orumy beverage used in this research consists of three flavors: strawberry, lemon, and lychee. This study results that the shelf life of Orumy beverages with strawberry, lemon, and lychee flavors are 44 days, 45 days and 38 days at 30°C storage temperature respectively. The nutrients available in Orumy beverages with strawberry, lemon, and lychee flavors are ash content by 0.11 ± 0.01%, 0.11 ± 0.00%, 0.12±0.02%, moisture content by 89.54±0.01%, 88.53±0.01%, 88.52±0.01%, protein content by 0.65±0.22%, 0.33±0.23%, 0.33±0.23%, crude fiber content by 3.34±0.01%, 3.49±0.01%, 3.39 ± 0.01%, fat content by 2.71±0.24%, 2.75±0.28%, 2.87±0.21%, and carbohydrate by 2.71±0.24%, 4.78±0.55%, 4.78±0.05%.

1. Introduction

Surabaya is the capital of East Java Province, the center of regional government, politics, trade, industry, education and culture. Surabaya is one of the metropolis that has a variety of socio-cultural Surabaya is a city with a variety of faces. Surabaya is also a city that has the six largest localization points in Southeast Asia including Gang Dolly, Bangunsari, Kermil-Tambak Asri, Klakah Rejo, Moroseneng and Putat Jaya [1]. Most people who live, depend on the localization area, it is a reason to maintain prostitution activities. In addition to supporting survival, the absence of special abilities and low education is also the background of the development in this prostitution activity. The development process of prostitution activities is also supported by a market mechanism that makes prostitution a profitable sex business that is badly needed [2]. Prostitution activities do not always run smoothly without problems because they not only cause economic turmoil but also present social problems and are considered to be contrary to social and religious norms that apply in the pattern of life arrangements of a community group.

Finally on June 19, 2014, the localization of "Dolly" located in the village of Putat Jaya was declared closed by Mrs. Dr. Ir. Tri Rismaharini, M.T as Mayor of Surabaya. However, many polemics occurred, especially the problem of employment for the people affected by the closure. So before this politician was made, she also made politicians that every prostitution activity in the Dolly area would
be given Rp 3,000,000 for capital to make new businesses and social ministers also give Rp 4,200,000. However, this effort did not run successfully and only reduced prostitution activities temporarily. To overcome this, some community organizations have provided assistance, both in the socio-cultural field such as assistance in improving the quality of education in localization areas, conducting religious activities, community services. In addition, assistance is provided in the economic field such as the development of the Dolly area as a tourist center and building mass media that focuses on children and women [1]. However, no one has conducted food related training. While there are many people in the MSMEs and made Dolly set up a business in the food sector, for example is a beverage product based on "Orumy" seaweed made by MSMEs INOKAM. (Inovasi Kampung Mandiri) Jalan Putat Jaya Gang III-A RT. 03 RW. III Kecamatan Sawahan, Surabaya. Currently practical packaging drinks are quite popular in the public. So that it becomes very dangerous if there is no specific understanding for the community, because a lot of food and drinks are dangerous to consume, especially the problem of food and beverage expiration date. Besides the expiration date, nutritional information from food or drinks that will be consumed is also something that needs attention. The expiration date on the food or beverage label is the time limit for which the food has passed from the date of consumption [3]. Foods or drinks that have passed the expiration date are harmful to health if they are still consumed. So the shelf life information is one of the information that must be entered by the producer on the packing of food products.

Shelf life assessment can be carried out in accelerated conditions (Accelerated Shelf Life Test) which is able to predict the shelf life of the product. The ASLT method uses conditions in the environment that can accelerate the reaction to a decrease in the quality of food products [4]. This ASLT method is very good to use because the testing time is relatively short with high accuracy. Furthermore, the Arrhenius approach is used as an equation to account for changes in activation energy [5]. So, in this research ASLT method was used in determining the shelf life of seaweed drinks.

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Another important thing that must be considered besides the expiration date label is the label of nutritional information on food products. Because nutritional information shows the main components of an ingredient and the nutritional content of food. For foodstuffs, the main components consist of water content, ash content, carbohydrates, protein, and fat [6]. Proximate analysis is generally not expensive and relatively easy to do [7]. The survey results of the products of MSMEs INOKAM Orumy were not found on the expiration date and the nutritional content of the packaging so it was necessary to pay attention the importance of information about the expiration date and information on the nutritional content of seaweed produced by the Dolly people.

2. Materials and Methods

Orumy beverage were used as ingredients in this research. This beverage made by INOKAM UMKM (Kampung Mandiri Innovation) Jalan Putat Jaya Gang III-A RT. 03 RW. III Sawahan, Surabaya. The reagents used in this research were 50% NaOH, NaOH 0.02 N, H₂C₂O₄ 0.02 N, HCl 0.02 N, NaOH 3.25%, 1.25% H₂SO₄, anhydrous Na₂SO₄, n-hexane, ethanol 96%, phenolphthalein indicator, methyl red indicator, and methyl blue indicator.

2.1. Production of Orumy Beverage

Dried Eucheuma cottonii seaweed spesies were soaked in water for 24 hours. Then seaweed is washed using running water until it is clean and drained. After that, 225 grams of seaweed were weighed, then the seaweed was roughly cut and blended with 1 liter of water. Blended seaweed is put into 2 liters of boiling water. Then add 400 grams of sugar, 2 tablespoons of salt, and 1 gram of sodium benzoate which has been dissolved in 0.5 liters of water, then stirred until boiling. Added 2 grams of CMC-Na which has been dissolved in 0.5 liters of water, then stirred until boiling. Then add 100 mL of fructose, then stir and wait for it to boil.

After boiling, seaweed is immediately removed and filtered using a stainless steel filter. After that drink seaweed is added flavor and citric acid warm. Then seaweed beverage are packed in plastic bottles that have been sterilized first with warm water and labeled. Seaweed drinks in plastic bottles
are awaited until cool, after that the bottled bottoms are closed with a seal. Seaweed beverage used in this research were produced by MSMEs INOKAM (Inovasi Kampung Mandiri) Jalan Putat Jaya Gang III-A RT. 03 RW III Kecamatan Sawahan, Surabaya.

2.2. Shelf-life Determination of Orumy Beverage
Packaged seaweed drinks have a net weight of 350 mL. The drinks are stored in crisis temperature variations of 10, 20 and 30°C. Observations are carried out periodically every 7 days from day 0 to day 42, so there are 7 observation points. In this research two parameters were used to determine shelf life, namely water content and pH value. The results of data analysis for each parameter are plotted against time (days) and obtained linear equations. Three equations are obtained for three storage temperature conditions with the following equation:

\[ y = ax + b \]  

Order reaction for a parameter is chosen by comparing the regression value (R\(^2\)) of each linear equation at the same temperature. The order reaction with a greater R\(^2\) value is the reaction order used as a parameter for determining shelf life. After obtaining a linear equation for each storage temperature, the slope value (equation 1) which shows the change in product characteristics is calculated as \(\ln a\). Then the value of \(\ln a\) is plotted on the graph of the Arrhenius equation. In the graph of the Arrhenius equation, \(\ln a\) is the \(\ln k\) value plotted against \(1/T\) (K\(^{-1}\)). From the graph of the Arrhenius equation, the slope and intercept values of the linear regression equation 2.

\[ \ln k = \ln k_0 \frac{E_a/k}{1/T} \]  

From the equation, the value of \(k_0\) is obtained which is an exponential factor and shows a decrease in the quality of the product that stored at certain temperature. From the equation, the activation energy value (E\(_a\)) is also obtained which is a reaction to changes in the characteristics of the stored product. Next, the model of the reaction rate equation for temperature is determined, where the \(k\) value indicates a decrease in product quality which can be calculated using the following equation 3.

\[ k = k_0 e^{E_a/RT} \]  

Based on the Arrhenius equation (equation 3) and the calculation of \(k\) values, the shelf life of seaweed drinks can be calculated using the order of zero (equation 4) or the first order (equation 5).

\[ t_{\text{zero order}} = \frac{\Delta A}{k} \]  
\[ t_{\text{first order}} = \frac{\ln(A_0/A)}{k} \]

2.3. Determination of Orumy Beverage Nutrition Content
Determination of seaweed content was carried out using proximate analysis based on SNI 01-2891-1992. Proximate analysis consists of ash content, water content, protein, crude fiber, fat, and carbohydrates.

2.3.1. Ash Content Analysis
Analysis of the contents of ash using the ignition method. 5 grams of wet sample is weighed in a porcelain cup that has been dried and weighed. After that, the sample is heated until it turns into charcoal using a bunsen heater until the sample produces no more smoke. Then the sample is put into
a furnace with a temperature of 600°C until the ignition process is complete. After the ignition process is complete, the cup containing ash is weighed to reach a constant mass.

2.3.2. Water Content Analysis
Water content analysis was carried out using the gravimetric method by drying in an oven to obtain a constant mass. The wet sample was weighed 2 grams in a porcelain cup which was dried and weighed. Then the sample is put in the oven at 105°C for 3-5 hours. After drying, the sample is cooled in the desiccator for 15 minutes, then the mass of the cup containing the dry sample is weighed to reach a constant mass.

2.3.3. Protein Content Analysis
Rough protein content analysis using the Kjeldahl method is based on the determination of nitrogen content to calculate the protein content that contained in the sample. 0.1 gram of wet sample is weighed and put into a test tube, after which 2 mL of concentrated H₂SO₄ is added and 1 gram of anhydrous Na₂SO₄ catalyst. Then the mixture is destructed for 2 hours at 85°C, then cooled. After the destruction process, the mixture was transferred to the distillate flask and added 50 mL aqua DM and 10 mL of 50% w/v NaOH solution then the distillation process was carried out. The results of the distillation process are accommodated in an erlenmeyer containing 10 mL 0.02 N HCl, each of 5 drops of methyl blue and methyl red indicator. The distillation process is carried out until the volume of the solution on erlenmeyer reaches 2 times the initial volume. After that, the distillate solution was titrated using standardized NaOH with 0.02 N H₂C₂O₄ solution. The end point of the titration process is marked by the color change from purple to green. Then take note the volume of NaOH used and made blank as a comparison

2.3.4. Crude Fiber Content Analysis
Crude fiber analysis using hydrolysis method. Weighed as much as 2 grams of dried sample, then put into a Three-neck Rounded Flask. Then added 50 mL of H₂SO₄ solution and the mixture was refluxed for 30 minutes while stirring using a magnetic stirrer with a speed of 400 rpm. After 30 minutes, 50 mL of 3.25% NaOH solution was added, then reflux process was carried out for 30 minutes while stirring using a magnetic stirrer at a speed of 400 rpm. Then the sample in a hot state is immediately filtered using filter paper that has been dried and weighed. The precipitate contained in the filter paper was washed successively with 1.25% H₂SO₄, hot aquademin, and 96% ethanol each as much as 10 mL. Filter paper is removed and placed in a watch glass, then dried using an oven at 105°C for 1 hour. After the oven, the filter paper is cooled in a desiccator and weighed until a constant mass is obtained.

2.3.5. Fat Content Analysis
Fat content analysis was carried out using the Soxhlet method. Dry samples weighed 5 grams, then extracted using n-hexane organic solvents in soxhlet for 6 hours. Extraction results are collected in a round flask, evaporated with an oven at 50°C until the fat deposits are left on the bottom of the round pumpkin. After that, the extraction results are cooled in a desiccator and weighed until a constant mass is obtained.

2.3.6. Carbohydrate Content Analysis
The total carbohydrate content in the sample was determined using the method by different.

3. Results and Discussion

3.1. Production of Orumy Beverage
Seaweed used for this research is Eucheuma cottoni seaweed species. In the seaweed, the immersion process is needed with clean water for 24 hours to remove the dirt. After that, the seaweed is washed
again using running water until clean. The seaweed is drained to reduce the water content. Then seaweed is cut into small pieces and mashed using a blender.

Seaweed that has been smooth then filtered first because it wants a low viscosity drink. Furthermore, the smooth seaweed is processed by heating until boiling by adding other food additives such as, salt, sugar, fructose, Carboxyl Methyl Celulose (CMC), sodium benzoate, flavoring, and citric acid. After the processing is complete, seaweed drinks are immediately removed and filtered with a stainless steel filter to separate the seaweed that still has a rough texture. Then added flavor to the seaweed beverage. In this research, 3 seaweed flavors were used to compare and analyze, namely seaweed beverage with the addition of lemon, lychee, and strawberry flavoring. After adding flavoring, seaweed beverage were also added to citric acid in each taste. Orumy beverage in a bottle are waited until cold, then the bottle is sealed with a seal.

3.2. Shelf-life Determination of Orumy Beverage

The shelf life of Orumy beverage produced by MSMEs INOKAM is estimated by the Arrhenius model of the Accelerated Shelf Life Testing (ASLT) model which is widely used to estimate the shelf life of food products that are easily damaged by chemical reactions. In the ASLT method, temperature is a key parameter for determining damage because of the temperature increases, the damage reaction will be faster [5]. Storage temperatures used in this study are temperatures of 10, 20, and 30°C.

Storage temperature is chosen because seaweed is a product that must be stored in cold temperatures. To determine the decline in the quality of seaweed beverage, the main parameters used are the pH value and water content that has been determined as a parameter to determine the decline in the quality of seaweed beverage due to the influence of temperature and storage time. The values of the two parameters are then plotted on the Arrhenius model.

3.2.1. The Water Content Parameter

Water Content is an important component in food ingredients because water content can affect the texture, appearance and taste of food products in general. The water content in a food product can determine the freshness and durability of the food product. If the water content is relatively high, it can be estimated that the material will be damaged faster by microbes that are easily breed in food products or by other reactions. The higher of water content in a food product will affect the freshness of the food [8][9].

Measurement of water content using a drying method (gravimetric). In the drying method (gravimetric) is based on measuring the reduction in the weight of the dried material. Selection of drying temperature in this method is very influential on the results of moisture content. This method is chosen because it is accurate, relatively easy, inexpensive, and can do sample analysis simultaneously [10]. Measurement of water content was carried out on Orumy beverage stored at 10, 20, and 30°C for 42 days. Water content is measured by removing the water in a sample of Orumy beverage through evaporation. Evaporation of water content in Orumy beverage is done by oven at 105°C for 3-5 hours.

Based on the comparison of linear regression results, the water content parameter follows a zero order reaction. The results of determining the water content of Orumy beverage with strawberry, lemon, and lychee flavors stored at different storage temperatures, each taste plotted against storage time at different storage temperatures can be seen in Figure 1.

Water content of Orumy beverage changes differently at each storage temperature condition. The changes of water content in strawberry, lemon and lychee flavored Orumy beverage at different temperature storage are shown in Figure 1. Based on Figure 1, the linear regression equation in sample 283, 293 and 303 can be seen in Table 1, 2 and 3.

| Sample | Equations       | R² Value |
|--------|-----------------|----------|
| 283    | $y = -0.0051x + 89.036$ | 0.050    |
| 293    | $y = 0.0051x + 88.536$  | 0.041    |
| 303    | $y = -0.0102x + 88.929$ | 0.333    |

Table 1. The Equations of Linear Regression for Sample of Strawberry Flavors
Figure 1. The Change of Water Content in (a) Strawberry Flavor, (b) Lemon Flavor, (c) Lychee Flavor

Table 2. The Equations of Linear Regression for Sample of Lemon Flavors

| Sample | Equations       | $R^2$ Value |
|--------|-----------------|-------------|
| 283    | $y = 0.0026x + 88.661$ | 0.020       |
| 293    | $y = 0.0051x + 88.036$ | 0.100       |
| 303    | $y = -0.0077x + 88.946$ | 0.187       |

Table 3. The Equations of Linear Regression for Sample of Lychee Flavors

| Sample | Equations       | $R^2$ Value |
|--------|-----------------|-------------|
| 283    | $y = 0.0128x + 89.089$ | 0.625       |
| 293    | $y = 0.0102x + 89.000$ | 0.153       |
| 303    | $y = -0.0026x + 89.125$ | 0.041       |

From the linear equation obtained the slope value at each storage temperature is plotted against $1/T$ in the Arrhenius equation.

Figure 1 showed the effect of storage time on changes in water content in samples of Orumy beverage stored at different temperatures. The changes of water content in products are factors that greatly affect the decline in the quality of food products. Water content is closely related to water activity, where changes in water content are possible due to water activity ($a_w$) which is also closely related to the growth of bacteria, fungi, and other microbes. The higher of water activity, shows that the more bacteria that grow [9].

3.2.2. The pH Parameter

PH value is one of the parameters to determine the change in acidity of a product. If the level of acidity (pH) in a food ingredient is lower, then the food is not suitable for consumption because indirectly a decrease in pH indicates internal changes in products such as microbial activation [11][12].
The pH value of Orumy drinks was measured using a pH meter which was calibrated first with a phosphate buffer pH 4, 7, and 10. pH measurements were made on Orumy beverage stored at 10, 20, and 30°C for 42. Based on the results of the comparison of linear regression values, the pH parameter follows a zero-order reaction. PH value of Orumy beverage strawberry, lemon, and lychees flavor stored at different storage temperatures, each taste plotted against storage time at different storage temperatures can be seen in Figure 2.

![Figure 2](image)

**Figure 2.** The Change of pH in (a) Strawberry Flavor, (b) Lemon Flavor (c) Lychee Flavor

The pH value of Orumy beverage changes differently in each storage temperature condition. The effect of storage time on the pH value of strawberry and lemon flavored orumy beverage can be seen in sample 303 which is stored at 30°C and has the highest change in moisture content of samples stored at other temperatures (Figure 2). Based on Figure 2, the linear regression equations in sample 283, 293, and 303 respectively, can be seen in Table 4, 5 and 6.

| Table 4. The Equations of Linear Regression for Sample of Strawberry Flavors |
|---|---|---|
| Sample | Equations | R² Value |
| 283 | y = -0.0184x + 3.400 | 0.987 |
| 293 | y = -0.0204x + 3.328 | 0.985 |
| 303 | y = -0.0250x + 3.396 | 0.980 |

| Table 5. The Equations of Linear Regression for Sample of Lemon Flavors |
|---|---|---|
| Sample | Equations | R² Value |
| 283 | y = -0.0194x + 3.564 | 0.960 |
| 293 | y = -0.0209x + 3.496 | 0.972 |
| 303 | y = -0.0270x + 3.439 | 0.989 |

| Table 6. The Equations of Linear Regression for Sample of Lychee Flavors |
|---|---|---|
| Sample | Equations | R² Value |
| 283 | y = -0.0189x + 3.525 | 0.989 |
| 293 | y = -0.0199x + 3.417 | 0.970 |
| 303 | y = -0.0245x + 3.357 | 0.982 |
From the linear equation obtained the slope value at each storage temperature is plotted against 1/T in the Arrhenius equation. The changes in pH values indicate the presence of decay due to microbes contained in drinks stored for 42 days under different temperature conditions. If the level of acidity (pH) in a food ingredient is lower, so the food is not suitable for consumption because indirectly a decrease in pH indicates internal changes in products such as microbial activation [11][12].

3.2.3. Kinetics Reaction Model with Arrhenius Equations

Estimation of shelf life of Orumy beverage using the Arrhenius model's Accelerate Shelf Life Test (ASLT) method. This method uses conditions in an environment that can accelerate the reactions of food product quality degradation [4]. To determine the shelf life value with the Arrhenius equation, the values ln k and 1/T are needed, where the value of k is obtained from the slope value of the graph of water content and pH against time. The Arrhenius plot for moisture and pH parameters can be seen in Figure 3.

![Figure 3. Arrhenius Plot for (a) The Changes of Water Content, and (b) The Changes of pH Value](image)

Based on the Arrhenius plot (Figure 3) on the parameters of water content and pH, the equation can be seen in Table 7 and 8.

| Sample       | Equations           | R² Value |
|--------------|---------------------|----------|
| Strawberry   | y = -2936.9x + 4.983| 0.732    |
| Lemon        | y = -4665.9x + 10.571| 0.986    |
| Lychee       | y = 6775.7x – 28.108| 0.840    |

| Sample       | Equations           | R² Value |
|--------------|---------------------|----------|
| Strawberry   | y = -1308.8x + 0.611| 0.958    |
| Lemon        | y = -1407.9x + 1.001| 0.896    |
| Lychee       | y = -1104.6x – 0.092| 0.879    |

The equation obtained is used to determine the activation energy (Ea). Activation energy is obtained from the slope of the Linear Regression equation. Activation energy is a quantitative way to effectively compare samples. In Orumy with strawberry, lemon, and lychee flavors based on water content parameters, the activation energy value is 5.833; 9.266; and 13.457 kcal/mol. While based on pH parameters for strawberry flavor, lemon flavor, and lychee flavors, the activation energy was 2.599; 2.799; and 2.194 kcal/mol. Activation energy is the energy needed to activate the damage and reaction process faster. So that the decline in the quality of seaweed is getting faster too [13][14]. Based on the calculation of the Ea value obtained from the parameters of water content and pH value, to determine the shelf life of Orumy beverage with the ASLT method the smallest parameter is
chosen, namely the pH parameter. In this study, the zero order reaction kinetics is used (equation 4). Shelf life can be determined from the value of the constant decrease in quality with the initial and final quality values of drinks stored at 30°C. Based on the results of calculations from intercept, slope, and 1/T (equation 3), the quality decrease constants (k) in the strawberry, lemon, and lychee flavored Orumy were obtained based on the pH parameter of 0.024; 0.026; and 0.028. In the previous research, the shelf life of Orumy beverage with original flavor was 17 days and the taste of green tea was 34 days at a storage temperature of 30°C [15]. The results of the determination of shelf life in this research, obtained the shelf life of strawberry flavored Orumy beverage for 44 days, lemon flavor for 45 days, and lychee flavor for 38 days at a storage temperature of 30°C. Addition of citric acid to Orumy drinks can extend the shelf life of the product. Shelf life can also be extended by lowering the product storage temperature. At a storage temperature of 10°C, the shelf life of strawberry-flavored orumy beverage becomes 60 days, lemon flavor becomes 63 days, and 49 days for lychee flavor.

3.2.4. Determination of Orumy Beverage Nutrition Content
Determination of the nutritional content of Orumy's drinks using the method of proximate analysis. Proximate analysis needs to be done because the analysis in these foods is related to the level of nutrition found in these foods. Proximate analysis carried out consisted of ash, water, protein, crude fiber, fat, and carbohydrate content by different [10]. This proximate analysis as a whole refers to SNI 01-2891-1992. Determination of ash, water, and protein content was used as a sample of wet Orumy drinks so it was not necessary to prepare samples before testing. However, for determination of crude fiber content and fat content, free water samples are used so that the sample preparation must be done first. Dry samples are obtained from the samples of wet Orumy beverage that have been removed from moisture or free samples of water with an oven at 50-70°C and ensure that the sample is completely dry and free of water. Samples that have been dried are marked by nonstickiness and can be smoothed. Then the dry sample is mashed with mortar and pestle which aims to enlarge outside the surface of the sample so that it is easier to analyze. Proximate analysis for each sample with different flavors was carried out twice repetition. While the determination of carbohydrate content using the method by different in the proximate analysis is strongly influenced by other nutrient content. So the method by different is also called the indirect method which is obtained from the results of 100% deducted from the content of other nutrients such as ash, water, protein, crude fiber and fat content [16]. The results of the proximate analysis can be seen in the Table 9.

| Nutrient content | Strawberry flavor | Lemon flavor | Lychee flavor |
|------------------|-------------------|--------------|--------------|
| Ash (%)          | 0.11 ± 0.01       | 0.11 ± 0.00  | 0.12 ± 0.02  |
| Water (%)        | 89.54 ± 0.01      | 88.53 ± 0.01 | 88.52 ± 0.01 |
| Protein (%)      | 0.65 ± 0.22       | 0.33 ± 0.23  | 0.33 ± 0.23  |
| Crude Fiber (%)  | 3.34 ± 0.01       | 3.49 ± 0.01  | 3.39 ± 0.01  |
| Fat (%)          | 2.71 ± 0.24       | 2.75 ± 0.28  | 2.87 ± 0.21  |
| Carbohydrate (%) | 3.65 ± 0.02       | 4.78 ± 0.55  | 4.78 ± 0.05  |

4. Conclusion
Based on research that has been carried out the result was two. First, the lower storage temperature will extend the shelf life of the product. The results of this research was obtained by using pH parameter. So, the shelf life of Orumy beverages (with strawberry, lemon, and lychee flavors) in 30°C of storage temperature is 44 days, 45 days and 38 days. In the other side, in the storage temperature of 10°C the shelf life of the strawberry flavored will last for 60 days, the lemon flavor will last for 63 days, and the lychees flavor will last for 49 days. Second, this research also determined the nutritional
content of Orumy beverage. Orumy beverage strawberry, lemon, and lychees flavors containing ash 0.11±0.01%, 0.11±0.00%, 0.12±0.02%, water 89.54±0.01%, 88.53±0.01%, 88.52±0.01%, protein 0.65±0.22%, 0.33±0.23%, 0.33±0.23%, crude fiber 3.34±0.01%, 3.49±0.01%, 3.39±0.01%, fat 2.71±0.24%, 2.75±0.28%, 2.87±0.21%, and carbohydrate 2.71±0.24%, 4.78±0.55%, 4.78±0.05%.

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