

# Storage Time of Yoghurt with Addition of Pomelo Peel Flour as Stabilizer

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**Abstract:** *The purpose of this research is to determine time of storage of yoghurt using pomelo peel flour as stabilizer of yoghurt based on the viscosity, syneresis, carbohydrate and fat content. Yoghurt was made from cow's milk with the addition of 2% of bacterial starters and addition of pomelo peel flour 0,8% and also all treatments in the incubation with room temperature ( $\pm 230C$ ) for 24 hours. The variables observed were the viscosity, syneresis, carbohydrate and fat content. The method was experimental laboratory with 4 treatments of storage time (S0= 0 day, S1= 5 days, S2= 10 days and S3= 15 days) and using yoghurt with addition of pomelo peel flour 0,8% as a stabilizer. The results showed that the addition of pomelo peel flour gave highly significant different ( $P \leq 0.01$ ) on syneresis, viscosity, carbohydrate and fat content. The results of the study can be concluded that storage time can be influenced to decrease viscosity, syneresis, carbohydrate and lipid content.*

**Keywords:** Storage; yoghurt; pomelo peel flour; stabilizer

## 1. Introduction

Yoghurt is one of the processed types of fermentation milk which has textual and has acid process caused by fermentation bacteria, by lactate acid bacteria. Hattingh and Viljoen (2001) said probiotics are a live microflora, either in single form or a mixture added to the food sector, which has a positive effect on naan illuminating because it can hamper unfavorable bacteria in the intestine. Variations of the bacteria that were added in yogurt making with other probiotic bacteria were yogurt innovation that is developing now with the objective of providing better benefit. One of yogurt quality improvement is with stabilizer (Agarwal and Prasad, 2013). Hasna Rahma's 2017 research result indicated that adding to the stabilizer as a citrus fruit skin would affect the physical properties of sherbet. The higher the concentration of stabilizer then increasing the viscosity, total density, water binding, protein level, repair mouth-feel and prevent syneresis. One of the contents of pomelo peel flour used to be stabilizer is pectin. The Citrus maxima is a fruit plant that contains many nutrient components in it. Most of the pomelo component is on its skin, including alkaloid compound, flavonoid, licopen, vitamins C, and dominant most of which are pectin. Pomelo have more pectin content than other kinds of fruit. One pomelo flesh contains about 3.9% pectin, while pectin's contents at pomelo peels range from 15-30% of the dry heavy (Rahmawati, 2015). Based on the above explanation, research was conducted to know the quality of yogurt with increasing pomelo peel flour against physicist.

Yogurt holds longer saving power than fresh milk, as yogurt has lactate acid that serves as a natural preservative. However, yogurt storage and temperature in yogurt will long affect saving time and change the quality of the product, among other is pH and total acid. The drop in the pH in yogurt will occur continually during storage after incubation. Yoghurt stored at higher temperature may speed up the drop of pH. The yogurt storage at 4°C temperature for 6 days will fall to pH from 4.68 to 4.15 (Sutrisno, 2009).

## 2. Material and Method

Yogurt production is conducted at the Brawijaya University's Faculty of Animal Science Technology Laboratory, Malang, on Tuesday. Viscosity, syneresis, carbohydrate and fatty levels testing were conducted at Brawijaya University School Food and Food Security Laboratory and Brawijaya Malang University.

### 2.1 Material

The material used in this research is yogurt, which is based on fresh cow milk with addition to the peeling powder on the leather of bali. The material used is fresh milk coming from Mitra Bhakti Makmur Junrejo Malang which was taken directly after the government, pomelo peel flours were bought commercially from Yogyakarta, bacterium starter coming from Yoghurt Junrejo's house, Malang. The tools used are knives, scales, blenders, stiffers, cloth, wedge, oven, term ometers, jars, tissue, movie pot, centrifuge tools, centrifuge tubes, reaction tubes, beakers, viscometer, petri dish.

### 2.2 Method

The method used is to use laboratory experiments with long save treatment (S0= 0 days, S1= 5 days, S2= 10 days and S3=15 days) at refrigerator temperature (40C) and use yogurt with an addition of pomelo peel flour 0.8% as stabilizer.

## 3. Research Procedure

### Yoghurt Making Procedure:

The making of yogurt is to prepare fresh cow milk, put together 0.8% of orange jumps in the body, and then it is distributed at 720C temperature for 15  $\pm$  seconds and temperature measurement is done termometer. Then mend want milk until it's 430C, then added a yogurt bacteria starter as much as 2% of the milk volume, then incubated for

24 hours. Then it's stored at the refrigerator temperature at 40C temperature in the treatment of S0= 0 days, S1= 5 days, S3= 10 days, S4= 15 days. The observed variable is the viscosity, syneresis, carbohydrate concentration and lipid.

### Viscosity

Viscosity test procedures use viscometer tools after the 2005 AOAC method, 2005, the spindle is put into the sample 100 ml after the needle has shown a stable number, and then the number of which the dial needle has shown, each sample is measured 5 times what it takes.

### Syneresis

The synertical test procedure using the centrifuge follows the AOAC procedure (2005), was weighed down by the centrifuge tubes and then added a sample of 15 grams, put it into the centrifuge tube, and then put it into a verbal form for 20 minutes at a rate of 1535 rpm, and then separated the fluids from the yoghurt deposit, and then weighted in the form as well as follows:

$$\text{Syneresis (\%)} = (A-B)/A \times 100\%$$

### Carbohydrate

The carbohydrate concentration in yogurt with additional orange peels as stabilizer is analyzed by determining the low sugar concentration and starch. The levels of sugar production and starch are analyzed using the Nelson-Somogy method, i.e., spectrophotometry (Sudarmadji dkk., 1989). The sample solution is measured by how light absorbances appear on a 540 mm long wave, which then make a standard glucose curve with a 0.0 concentration; 0.3; 0.6; 0.9; 1.2; 1.5 mg/ml of aquades. Reduction sugar levels are determined based on sample solution absorbantion and glucose standard curve.

### Lipid content

Lipid levels were analyzed by the Folch et al method. (Sudarmadji dkk., 1989). A sample of yogurt as much as 1 ml was put into 20 ml of chloroform-methanol solution 1:1 v/v, then placed in shaker at 150 rpm speed for 2 hours. After 2 hours, samples plus 20 ml KCl 1M and 20 ml H2PO4 0.2 M. The solution is put in separate funnel, wag up to two layers, the bottom layer containing fat taken and placed in an empty petri dish that has been known to weighs, then stored in the oven 400C for 24 hours. After 24 hours the petri dish was lifted from the oven (total weight). The weight of the lipid is the difference in the total weight of the minus with the petri dish weight being empty.

The aim of this analysis is to find out about impact save time with a treatment of 0 days, 5 days, 10 days and 15 days on yogurt with an increase in the stabilizer of pomelo peel flour by 0.8% as a stabilizer.

## 4. Result

The result for yogurt with an addition of citrus peels 0.8% with 0-day, 5-day, 10 days and 15 days can be seen in the table below:

**Table 1:** Table of viscosity

Treatment	Mean
S0	1078,50±1,914(d)
S1	882,75±6,075(c)
S2	708,25±4,573(b)
S3	595,50±1,914(a)

Note: Superscript in the same column showed different of significant with P ( $\leq 0,01$ )

A measure to define immense on a food ingredient is viscosity. From the table above, it is known that the viscosity of yogurt with its addition to the 0.8% of pomelo peel flour stored at refrigerator temperature, increasingly decreasing the value of the structure. yogurt saving time with an addition of 0.8% pomelo peel flour rate in each of 1078.50 cP for the storage in day 0, while the 15-day storage fell in 595.50 cP. Over time deposits will be increasingly decreasing the viscosity value as proteins especially existing in milk will be able to further break into simpler compounds by protein enzym's activities. This is in line with Purwani (2021) research that shows that yogurt quality of flour in flour is increasing gradually in line with term of storage. Yoghurt flour saved 0 days showed the greatest viscosity value of 944.9 cP. Storage at 0 days gives the highest visibility value among other storage. The drop in viscosity value of yogurt suweg flour could be caused by the fact that the yogurt storage will lead to further break the protein, particularly casein in milk, will experience further solutions to the simplest compounds by proteinase enzyme activity. Because of yogurt being skewed and decreasing Viscosity (Evanuarini, 2011). The addition of pomelo peel flour as stabilizer on yogurt is 0.8% has little effect on yogurt viscosity value.

### Syneresis

The data for diverse analysis shows that increases in pomelo peel flour have very real impact ( $P \leq 0.01$ ) on syneresis value can be seen in Table 2.

**Table 2:** Table of Syneresis

Treatment	Mean
S0	59,39±0,035(d)
S1	56,16±0,031(c)
S2	51,24±0,025(b)
S3	46,31±0,031(a)

Note: Superscript in the same column showed different of significant with P ( $\leq 0,01$ )

From the data above, it can be seen that the yogurt synergy value with an addition of the peel powder which is 0.8% involved in different saving time produces syneresis value which is increasingly declining from 0 days storage time of 59.39% to 46.31% in storage time to 15 days. Syneresis is starting to drop because yogurt gel was formed because of acidification by lactate acid so that there is only protein interaction and because of pH degradation to isoelectric point, then the tendency of syneresis can be hampered. Syneresis happens because shrink of a three-dimensional structure of protein that causes the capacity of water binding power to decreased so that will cause whey separated from gel (Bahrami et al., 2013). The addition of pomelo peel flour on yogurt spikes to increase the significant impact on syneresis value in different saving time treatment.

### Carbohydrate

The results of ragam analysis show that the addition of citrus peels on different levels differs from the effects on ( $P \leq 0.01$ ) carbohydrate levels. This can be seen in Table 3.

**Table 3:** Table of carbohydrate content

Treatment	Mean
S0	3,16±0,009(d)
S1	2,46±0,009(c)
S2	1,66±0,009(b)
S3	0,92±0,009(a)

Note: Superscript in the same column showed different of significant with  $P (\leq 0,01)$

Based on the table, it is known that the lowest carbohydrate level value is represented in the 15th day, 0.92 and the highest character value is found in the 3rd day of saving (0.16). The storage of orange peel yogurt during the study caused carbohydrate to decline. It because during storage, lactate yogurt acid will keep increasing so it can break lactose. According to Octavia's research, dkk (2015), the total acid increase was related to the number of lactate acid bacteria in black murbei yogurt. During the period of storage, the lactate acid that is produced on yogurt will reduce the pH of the yogurt media, so the amount of lactate acid bacteria in black jug yogurt will decrease as a result of the degradation of the lactate acid bacteria activities and the lactate the lactate sour activities to lactate acid will also decrease. The carbohydrate concentration on pomelo peel flour does not cause the effect on yogurt with different saving time treatment.

### Lipid Content

The table below shows the lipid levels of yogurt, which adds 0.8% of pomelo peel flour in treatment of 0 days, 5 days, 10 days and 15 days.

**Table 4:** Table of Lipid Content

Treatment	Mean
S0	1,79±0,009(d)
S1	1,22±0,009(c)
S2	1,02±0,009(b)
S3	0,85±0,009(a)

Note: Superscript in the same column showed different of significant with  $P (\leq 0,01)$

### 5. Conclusion

The research result shows that adding 0.8% of pomelo peel flour in different save time treatment could decrease syneresis, viscosity, carbohydrate concentration and fatty levels. Over time deposits, moreover value of syneresis, viscosity, carbohydrate level and protein level.

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