Yoghurt Quality from Soybean Milk with Carrot Combination (Daucus Carota L)

Johannes Kurniawan[1]
[1]*Bunda Mulia Tourism Academy, Lodan Raya No.2, Jakarta, Indonesia*

Keywords: Soyghurt, Organoleptic Test, Carrot, Vegetable.

Abstract: Dietary fiber in fruits and vegetables is also beneficial for health which functions to control weight or obesity, overcome diabetes, prevent digestive disorders, colon cancer, and reduce blood cholesterol and cardiovascular disease. The method used in this study used the quasi-experimental method. Experimental research is one type of quantitative research that is very strong for measuring causal relationships. Data collection techniques in this study were conducted every 8 hours for 3 days. Data collected for the variable physical quality of soy milk includes 4 parameters, namely color, texture, aroma, and taste. Data collected for each parameter is the score data obtained from several panelists. The treatment of adding carrot extract by 15% and 30% affects the quality changes that occur in soy milk-based yogurt. By only distinguishing the addition of 15% and 30%, it can prove the influence of quality changes on soybean milk yogurt.

1 INTRODUCTION

Vegetables and fruits are a source of dietary fiber that is easily found in food and is almost always found in everyday Indonesian dishes, whether raw (fresh vegetables) or after being processed into various forms of cooking. However, lately there has been a change in food consumption patterns which has caused a decline in the level of consumption of vegetables and fruits in almost all provinces in Indonesia. The reduced level of consumption of vegetables and fruits also causes changes in patterns of infectious diseases into degenerative and metabolic diseases. Vegetables are a source of iron and minerals, and complex B vitamins are good for the body Food fiber in fruits and vegetables is also beneficial for health which functions to control weight or obesity (obesity), cope with diabetes, prevent gastrointestinal disorders, colon cancer, and reduce blood cholesterol and cardiovascular disease.

The decline also occurs in urban communities with high mobility and tend to consume ready-to-eat foods resulting in a shift in diet from high carbohydrate, high fiber, and low fat to low carbohydrate and fiber, high fat and protein consumption patterns. Carrots and tomatoes are some examples of fruits and vegetables that are rarely consumed directly by the public even though the nutrition of both is very good for the body. Carrots are foods that are rich in beta-carotene and function as body protectors from cell damage. Vitamin A in carrots can maintain healthy eyes, skin and hair, and improve the body's immune system. Calcium in carrots can maintain healthy bones and teeth and help work various muscles and nerves.

One of the things that can be done to increase the level of consumption of vegetables and fruits is by modifying the vegetables into foods that are liked by most people, especially children. Yogurt is a fermented milk product by microbial bacteria. Fermentation of lactose produces lactic acid which works on milk proteins, making yogurt denser and has a distinctive texture, flavour, and aroma. Generally yogurt is made using cow's milk, but with the advancement of biotechnology yogurt can also come from vegetable milk, for example soyghurt raw material for milk (soybeans) and cocoghurt (coconut milk). Yogurt has many advantages, one of which can reduce the symptoms of lactose intolerance. As long as the fermentation of lactose content in the yogurt drops, the fermented milk is easier to digest, especially for lactose sufferers. If milk can on average 90% digested within 3 hours, then yogurt only takes 1 hour. Living bacteria in yogurt also produce the lactase enzyme needed to degrade lactose to glucose and galactose. Yogurt is more durable than fresh milk (cow's milk) which can last up to several days, even up to several weeks in cold conditions. This is because lactic acid

Kurniawan, J.
Yoghurt Quality from Soybean Milk with Carrot Combination (Daucus Carota L).
DOI: 10.5220/0009858000610066
In *Proceedings of the International Conference on Creative Economics, Tourism and Information Management (ICCETIM 2019) - Creativity and Innovation Developments for Global Competitiveness and Sustainability*, pages 61-66
ISBN: 978-989-758-451-0

in the yogurt functions like a natural preservative.

Along with the development of food technology, vegetable milk was introduced as an alternative ingredient in making yogurt, whose nutritional value was not inferior to animal milk yogurt. In order to be more attractive to increase revenue and add colouring, with natural dyes namely carrots given there has never been a research on making yogurt by adding carrots as colouring and natural flavourings. So that the level of quality and level of preference is unknown.

2 LITERATURE REVIEW

2.1 Framework

Carrots are seasonal vegetable crops in the form of shrubs (shrubs) that grow upright with a height between 30 cm - 100 cm or more, depending on the type or variety. Carrots are classified as seasonal plants because they only produce one time and then die. Carrot plants have a short life of around 70 - 120 days depending on the variety. The skin and flesh of carrot tubers are yellow or orange. Carrots have short, almost invisible stems. The yellow color of the carrot tuber is reddish due to the presence of carotene pigments. The skin is thin and tastes good, crispy, tasty, and rather sweet. The taxonomic position of carrots is as follows: Kingdom: Plantae; Race: Umbelliferales; Division: Spermatophyta; Tribe: Umbelliferae; Subdivision: Angiosperma; Clan: Daucus; Class: Dicotyledonae; Type: Daucus carota L The organs in carrot plants are(Cahyono, 2013):

1. Leaves
   Leaves of carrot plants are compound leaves, double or triple double pinnate, and stemmed. Children of leaves are lanceolate with leafy edges. Each plant has 5-7 stems that are rather long, stiff and thick with a smooth surface, while the leaf strands are limp and thin. Its function as a place for photosynthesis to produce substances needed in the formation of vegetative and generative organs.
2. Stems
   The stem of the carrot plant is so short that it is almost invisible, round, not woody, rather hard, and 1 - 1.5 cm in diameter. Generally the color is dark green. The stem is not branched but is overgrown with long stalks that look like branches. The stem has a smooth surface and has thickening in the place where the petiole grows. Its function is as a way to transport water and food substances from the ground to leaves and assimilated substances from leaves to all parts of the plant's body.
3. Root
   The roots of carrot plants include a rooting and fiber system. Rooting roots will undergo a change in shape and function to be a storage area for food reserves, the shape will change to large and round length to reach a diameter of 6 cm and extend to 30 cm depending on the variety. Rooting roots that have changed shape and function are known as "carrot tubers". The fiber root attaches to the enlarged root (tuber), grows sideways and is yellowish (ivory white). Its function is to absorb nutrients and water that are needed by plants to carry out photosynthesis and strengthen the establishment of plants.
4. Interest
   Flowers of carrot plants grow on the ends of plants, in the form of multiple umbrellas, and are white or pink rather pale. Flowers have short and thick stems. The florets are located in the same arch area. Flowers that have undergone pollination will produce small and hairy fruit and seeds.

The activities carried out in the stages of processing soybeans into soy milk consist of several types, namely: destruction, dilution, boiling I, filtering, mixing of ingredients, boiling II, bottling, and pasteurization. The sequence of activities in processing soybeans into soy milk can be explained as follows(Suprapti, 2005):

1. Destruction Destruction activities are carried out on soybeans that have undergone a softening process. Destruction activities use boiling water 10 times the weight of soybeans to be ground. Boiling water is poured little by little during the process of destruction or grinding takes place.
2. Dilution Dilution is done to get soy juice with a protein content of less than 7%. The diluent used is boiling water from the water used to water soybeans in destruction activities
3. Boiling 1 Soybean juice results from dilution are then boiled but not until boiling (limited to foam on the surface 2 times).
4. Addition of other ingredients Materials that can be mixed in the form of sugar, salt, vanilla, sodium benzoate, pandan leaves, suspension stabilizers and coloring agents.
5. Boiling II Boiling II is done on soy milk which has been mixed with other ingredients. Boiling process is done until boiling for 5 minutes.
6. Bottling Soy milk is packaged using sterile packaging bottles. Filling soy milk is done up to 99%

of the maximum volume of packaging bottles.

7. Pasteurization Pasteurization is done by steaming for 5 minutes and soaking with cold water until the temperature of the bottle and its contents are the same as the room temperature.

Generally fermented milk products can be divided into 2 groups, namely fermented milk products and cheese. Almost all of the initial constituents in fermented milk products still exist, with the exception of contituents that have been metabolized by microorganisms. In cheese, the portion of most of the initial contituents of milk is removed in the curd to obtain the final product. Whereas one of the dairy products that has been developed is fermented milk, a term for a dairy product obtained through a fermentation process, a process of reforming organic materials carried out with the help of enzymes produced by microbes. Yogurt is coagulated milk from lactic acid fermentation through the activities of Lactobacillus bulgaricus and Streptococcus thermophilus. Besides being made from fresh milk, yogurt can also be made from skim milk (nonfat milk) which is dissolved in water with a certain ratio depending on the desired thickness of the product. Apart from animal milk, yogurt can be made from skim milk mixture with vegetable milk(Afrianti, 2013).

Symbiosis or mutual assistance between microorganisms during growth often occurs in foods containing 2 or more types of microorganisms. One type of microbe can produce metabolite products that are needed for the growth of other microorganisms that cannot produce them. In contrast, the second microorganism species produces a nutrient that stimulates the first microorganisms to grow better. Symbiosis is found in the production of some fermented foods such as yogurt. Streptococcus thermophilus initially hydrolyzed milk protein by extracellular proteinase enzymes and produced amino acids needed for the growth of Lactobacillus bulgaricus. Conversely, Lactobacillus produces formic acid which stimulates the growth of Streptococcus. Both types of bacteria are needed to produce the desired yogurt product.

Fermentation reactions vary depending on the type of sugar used in the products and products produced. Briefly, in milk contains glucose (C6H12O6) and through fermentation will produce yogurt. This fermentation reaction is carried out by microorganisms in the form of homofermentative bacteria (Lactobacillus bulgaricus and Streptococcus thermophilus) and used in food production.

Glucose fermentation is described by considering several mechanisms used by microorganisms to obtain phosphorylation of substrates using glucose. In principle, phosphorylation of ADP into ADP can be paired with both balanced chemical transformations;
Glucose $\Rightarrow$ 2 Lactic Acid
(C6 H12 O6) (C3 H6 O3)
Or
Glucose $\Rightarrow$ 2 Ethanol + 2 Carbon dioxide
(C6 H12 O6) (C2 H6 O) (CO2)

In broad outline the factors that influence food quality are as follows:

a. Color
The color of the ingredients must be combined in such a way that it does not look pale or the color is not harmonious. The color combination is very helpful in consumers' appetite.

b. Appearance
Expression - looks good enough to eat|| is not an excessive expression. Food must be well seen while on a plate, where it is an important factor. Freshness and cleanliness of the food served are important examples that will affect the appearance of food either or not to be enjoyed

c. Portion
In each serving of food, a standard portion is called the standard portion size.

d. Form
The form of food plays an important role in the attractiveness of the eye. Interesting forms of food can be obtained by cutting various food ingredients, such as carrots cut in the form of dice or commonly called dice pieces combined with chiffonade cut lettuce which is an irregular cut in vegetables.

e. Temperature
Consumers like temperature variations that are obtained from food from one another. Temperature can also affect taste, for example the sweetness of a food will be more pronounced when the food is still warm, while the saltiness of the soup will be less noticeable when the soup is still hot.

f. Texture
There are many food textures including smooth or not, liquid or solid, hard or soft, dry or moist. Thin and smooth levels and forms of food can be felt through pressure and movement of receptors in the mouth.

g. Aroma
Aroma is a reaction of food that will affect consumers before consumers enjoy food, consumers can smell the food.

h. Maturity Level
The level of food maturity will affect the texture of food. For example, boiled carrots will be soft enough than boiled carrots faster. For certain

foods such as steaks, everyone has their own taste about the level of maturity of the steak

i. Taste
The taste point of the tongue is the ability to detect the basis of sweet, sour, salty, bitter. In certain foods these four flavors are combined to become a unique and interesting taste to be enjoyed.

3 RESEARCH OBJECTIVES AND BENEFITS

3.1 Research Purposes

a. To find out the combination of carrots and yogurt made from soybean milk causes a difference in quality and level of preference (organoleptic test).

b. To find out the right combination of carrots to get yogurt made from soybean milk with the best quality and preferred by panellists.

3.2 Benefits of Research

a. For Researchers
Obtain knowledge or research insights in the field of food and beverage processing.

b. For Institutions
Enriching the repertoire of knowledge originating from educational institutions, so as to require institutions to continue to provide further research opportunities.

c. For the community
Provide information about the use of soybeans as an alternative raw material for fermentative drinks, in the form of yogurt and added with carrot extract as an increase in the level of preference.

3.3 RESEARCH METHODS

3.3.1 Research Procedure

The method used in this study uses quasi-experimental methods. Experimental research is one type of quantitative research that is very strong for measuring causal relationships. This research was conducted to find out how much influence the double entry journal strategy had with the help of wall chart media on learning to produce short story texts.

Experimental research methods can be interpreted as research methods used to find the effect of certain treatments on others under controlled conditions. Through research on the results of this experimental trial, the author tried to find quantitative data related to students' ability to write short stories. The data used to analyse the quantitative approach is data in the form of numbers.

3.3.2 Data Source

The data collection technique in this study is done once every 8 hours for 3 days. Data collected for the physical quality variables of soy milk include 4 parameters, namely colour, texture, aroma, and taste. Data collected for each parameter is the score data obtained from several panellists.

3.3.3 Data Analysis Technique

Data processing obtained in this study was carried out using Microsoft Excel and SPSS version 25.0. Data analysis used a one-way ANOVA test based on the Duncan method at p 5 0.05 and bivariate correlation test. Data is displayed in the form of graphs and tabulations. The data analysis technique used to test the hypothesis is the analysis of variance (Anava).

3.3.4 Hypothesis Testing Criteria

The hypothesis carried out in this study is arranged in the form of statistical hypotheses, namely:
H0 = The addition of carrot extract to soybean milk yogurt has no effect
H1 = 15% addition of carrot extract to yogurt made from soybean milk
H2 = 30% addition of carrot extract on yogurt made from raw soy milk
This statistical hypothesis is tested by comparing the price of Fcount with Ftable. The hypothesis testing criteria are as follows;

a. If F count $\leq$ F table 5% means that H0 is accepted, H1 is rejected and it is stated that the treatment given does not significantly affect the length of time yogurt fermentation is made from raw soybean milk.

b. If the price of F count $\geq$ F table 5% means that H0 is rejected, H1 is accepted and it is stated that the treatment given has a significant effect on the length of time fermented yogurt made from soy milk.

4 RESULTS AND OUTREACH ACHIEVED

Based on the graph data above it can be seen that the average value of the quality of the yogurt texture

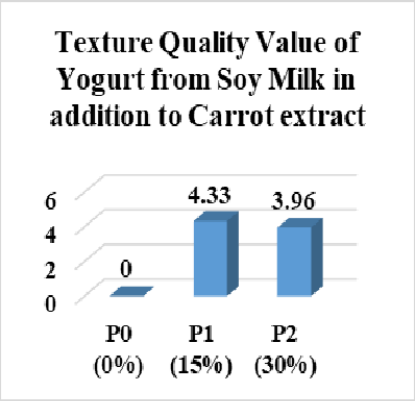

Figure 1: Parameters of Texture Quality of Yogurt Made from Soybean Milk in addition to Carrot extract

for each treatment level indicates a variation in the data. This is evident in the average value of the texture quality of yogurt made from raw milk from soybeans added with the highest Carrot extract is in the treatment of 15% carrot extract which has an average value of 4.33 with very softer indicators. The average value of the texture quality of milk yogurt made from soybeans is added to the lowest Carrot extract at 30% treatment of carrot extract of 3.96 with a very soft indicator.

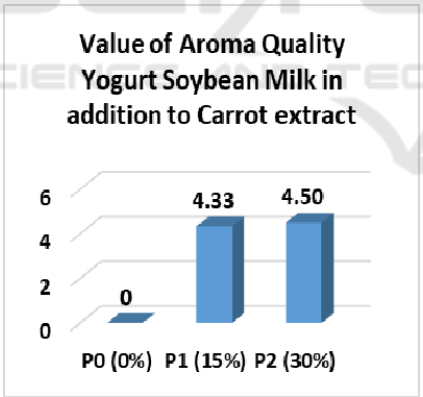

Figure 2: Parameters of Aroma Quality Yogurt Made from Soybean Milk with additional Carrot extract

Based on the graph data above it can be seen that the average value of the quality of the yogurt aroma for each treatment level indicates a variation in the data. This is evident in the average value of the aroma quality of yogurt made from raw milk from soybeans added with the lowest Carrot extract is in the treatment of 15% carrot extract which has an average value of 4.33 with indicators very flavourful. The average value of the aroma quality of milk yogurt made from soybeans is added to the highest Carrot extract in the treatment of 30% carrot extract of 4.50 with indicators very flavourful.

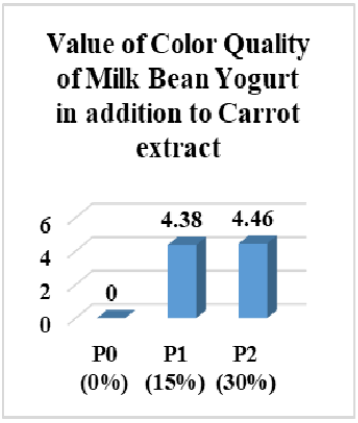

Figure 3: Color Quality Parameters of Yogurt Made from Soybean Milk in addition to Carrot extract

Based on the graph data above, it can be seen that the average value of the quality of the yoghurt color for each treatment level indicates a variation in the data. This is evident in the average value of yogurt color quality from raw milk from soybeans added with the lowest carrot extract is in the treatment of 15% carrot extract which has an average value of 4.38 with indicators very attractive. The average value of the color quality of milk yogurt made from soybeans is added to the highest carrot extract at 30% treatment of carrot extract at 4.46 with very attractive indicators.

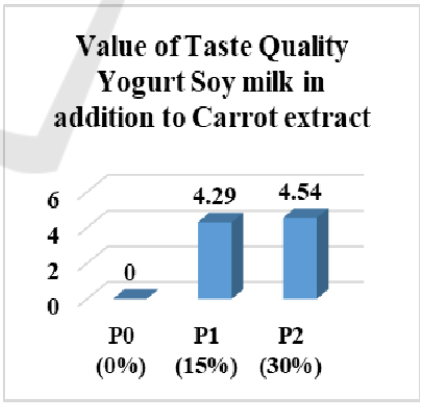

Figure 4: Taste Quality Parameters of Yogurt Made from Soybean Milk in addition to Carrot extract

Based on the graph data above it can be seen that the average value of the quality of the yogurt texture for each treatment level indicates a variation in the data. This is evident in the average value of yogurt flavor quality from raw milk from soybeans added with the lowest Carrot extract is in the treatment of 15% carrot extract which has an average value of 4.29 with

very good indicators. The average value of the texture quality of milk yogurt made from soybeans is added to the highest Carrot extract in the treatment of 30% carrot extract of 4.54 with very good indicators.

5 CONCLUSIONS AND SUGGESTION

5.1 Conclusion

Based on the research conducted by the author about the organoleptic test of yogurt made from soybean milk based on the addition of carrot extract, it was concluded that:

a. Treatment of adding carrot extract by 15% and 30% affect the quality changes that occur in soybean milk yogurt. By only distinguishing the addition of 15% and 30%, it can prove the influence of quality changes on soybean milk yogurt.

b. By organoleptic tests, respondents were more likely to say that the texture, aroma, color and taste of yogurt made from soy milk added with carrot extract can be accepted and consumed as yogurt in general.

5.2 Suggestions

Based on research conducted by the author about the organoleptic test of yogurt made from soybean milk based on the length of fermentation time, as an input and consideration material:

a. By being able to add other new variations to become flavorings from other fruit or vegetable extracts that have never been done to be an attraction in consuming vegetable yogurt made from soy milk.

REFERENCES

Afrianti, L. H. (2013). Food preservation technology. *Alpabeta, Bandung*.

Cahyono, B. (2013). Carrots cultivation techniques for farming analysis. *Kanisius, Yogyakarta*.

Suprapti, L. (2005). Teknologi pengolahan pangan tepung tapioka dan pemanfaatannya. *PT Gramedia Pustaka: Jakarta*, 80.