Analysis of Quality Control of Raw Materials with the Seven Tools Method on Sweet Bread Products at UD. Sarigut Bakery in Banda Aceh

Zia Ulhaq[1*], Dewi Mulyati[2*], Dini Fahlevi[3], & Maulinda[4]

[1,2,3,4]Faculty of Industrial Engineering, Universitas Serambi Mekkah,
Aceh, Indonesia

*Corresponding Author: Dewi Mulyati, Email: dewimulyati@serambimekkah.ac.id

Abstract
Product quality is an important factor that affects the level of development and progress of a company. Companies that operate without paying attention to the quality of their products are tantamount to losing hope for the future of the company. The resulting product must always be checked for compliance with the established standards, so that the damage that occurs to the product can be reduced and eliminated. This study aims to analyze the quality control of raw materials using the seven tools method on sweet bread products at UD. Sarigut Bakery Banda Aceh. This research data is primary data obtained by researchers from questions posed to original sources and also observations of researchers at the location directly. The results of the study found that the quality control of raw and supporting materials was not good enough because the company was not able to maintain the quality standards and brands of materials set by using non-standard materials with lower quality levels. As for the feasibility of the storage warehouse, the control is quite good because the arrangement and placement of materials is orderly and the cleanliness of the warehouse and factory is quite well maintained. Disability caused by working hours is $R^2 = 0.1336$ or 13.36%. Defects due to long storage of raw materials are $R^2 = 0.7254$ or 72.54%. Meanwhile, defects due to the use of non-standard wheat flour raw materials are $R^2 = 0.8621$ or 86.21%. Non-standard raw materials are the biggest factor in causing product defects, this is caused by the condition of substitute materials that are not up to standard, which results in high water content in bread.

Keywords: *Quality control of raw materials, seven tools, sweet bread*

1. Introduction

Quality is a very important factor in products and processes, where a quality will show the competitive advantage of a company with other companies (Zonnenshain & Kenett, 2020). Every company certainly wants to produce quality products, so that their products can sell well in the market and excel in market competition (Astuti & Wahyudin, 2021). One of the things that can be done to produce quality products is to control the quality of the product. Quality control is an effort that consists of testing, analysis, and action to control the quality of a product using equipment, machines, at a minimum cost in accordance with consumer wishes (Ginting & Fattah, 2020). The better the quality control, the less it will produce defective products, in the end it will be able to increase sales volume and prevent a decrease in income for the company (Purnawati, 2018).

Therefore, every company, in this case UD. Sarigut Bakery Banda Aceh, must implement a good and appropriate quality control system for the products it produces. This quality control effort is a maintenance effort and is carried out before the product quality error occurs. With good and proper quality control, the products produced can meet the

quality standards set by the company, and consumer trust and satisfaction can be maintained.

UD. Sarigut Bakery produces output in the form of sweet bread with 16 kinds of fillings and creations of shapes and white bread, but in this study the problem is limited to controlling the quality of sweet bread because according to data and company owners defects occur more frequently and exceed the tolerance limit, namely in the production of sweet bread. In producing sweet bread, the owner of UD. Sarigut Bakery always strives to create products whose quality meets the quality standards of sweet bread that have been set by the company, namely: The bread is well risen and quite soft, has a delicious taste (savory without any sour taste), and the shape is flawless and the level of maturity is sufficient. However, even though the owner and workforce have tried to carry out their duties as best as possible, in reality the production of UD. Sarigut Bakery still experiences failure/damage that exceeds the damage tolerance threshold of 3.5% of total production. The damage is in the form of: The bread is overcooked/scorched so the bread is dark brown to black in color, hard and tastes bitter, the shape of the bread is not well developed (hammered) so the bread is smaller in size, and the shape of the bread is imperfect (defective) and crushed.

In the results of interviews with the owner of UD. Sarigut Bakery, it is known that in terms of selecting raw materials and controlling raw materials, negligence often occurs which results in production being failed or outside the target. Supervision of the quality of raw materials and supporting materials should include: inspection of supporting information (*halal*), physical inspection of packaging conditions, expiration date check, chemical inspection (pH, heavy metals, etc.), biological examination (mold, bacteria, insects, etc.) as well as organoleptic examination (smell, taste, color, texture) (Ahyari, 2019).
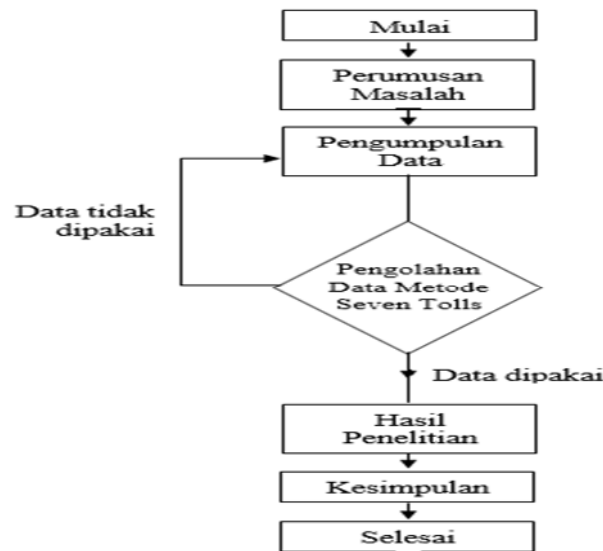
The quality requirements for sweet bread (SNI 01-3840-1995) are as follows: maximum moisture content of 40%, maximum ash content of 3%, minimum sugar content of 8%, maximum fat of 3%, maximum total microbes of 10 colonies/g, odor and normal taste (SNI, 1995). While the nutritional composition of white bread (/100g) is as follows: 40 g water, 248 kcal calories, 8 g protein, 1.2 g fat, 50 g carbohydrates, 0.8 g ash, 10 mg calcium, 95 mg phosphorus, iron 1.5 g, thiamine, 0.1 g (Mahmud, 2015). Based on these data, it emphasizes the magnitude of several efforts that can be taken and carried out in an effort to reduce the occurrence of production failures. However, these efforts will not provide significant changes without good cooperation from industry, workers and management itself. Therefore, the role of all workers is also highly expected so that they can achieve production as expected.

2. Method

The research used is descriptive survey research with the concept of the Seven Tools method. This research was carried out from 08 November 2022 to 29 November 2022 at UD. Sarigut Bakery Banda Aceh, which is located at Jl. Bilal I, Punge Blang Cut, Kec. New Jaya, Banda Aceh City. The approach used in this study is to use the seven tools method. Which is a continuous method starting from check sheets, stratification, pareto diagrams, histogram diagrams, scatter charts, control charts and fishbone diagrams which are procedures for quality control, especially in this case is raw material quality control. Observational collection techniques were carried out by researchers by going directly to the research location, namely UD. Sarigut Bakery Banda Aceh for 10 days to obtain data regarding quality control of raw materials. Meanwhile, the interview was conducted by asking questions answer directly with company leaders and employees by asking verbal questions related to planning company standards and quality control.

The data analysis technique used in this study is descriptive with a qualitative
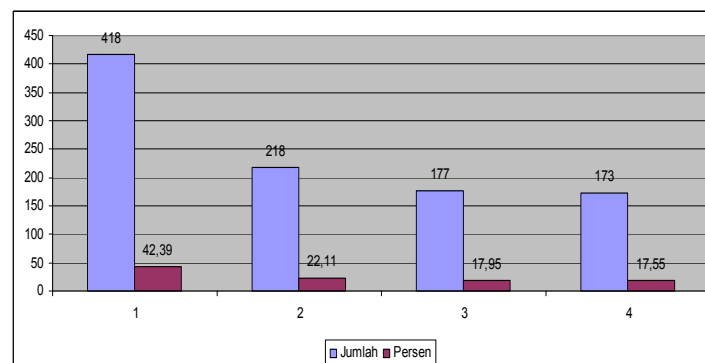
presentation. Qualitative data analysis is an effort made by working with data, organizing data, sorting it into manageable units, synthesizing it, searching for and finding problem priorities, finding what is important and what is learned and deciding what can be told to others. The analysis in this study is an analysis using the seven tools method to find the priority level of raw material quality control at UD. Sarigut Bakery Banda Aceh.

Figure 1. Flow chart of the research

The flowchart in this study shows the flow of the process of making original peeled white bread products at Anni Bakery and Cake. This flow chart is one of the quality control tools to describe the sequence of the process of making original peeled white bread starting from the preparation stage to the product packaging stage. Flowcharts aim to analyze, discuss, communicate, and can assist in finding stages or parts of improvement in the production process.

3. **Results and Discussion**

Figure 1. Product Defects Stratification Chart

The data in the graph above is the number of product failures (defects) in the production of bread making during two weeks of working days. It is known that product

defects are: product uniformity, undercooked, leaking contents, burnt. Size uniformity is a condition where the product has various sizes in 1 type of variant so that it can affect the weight of the bread. Undercooked is the condition of the bread that is made is still not suitable in terms of maturity, maturity is characterized by a brownish color that appears on the surface of the bread skin that has gone through the oven stage (maturation). This maturation process must be very concerned, especially in products that still use simple tools.
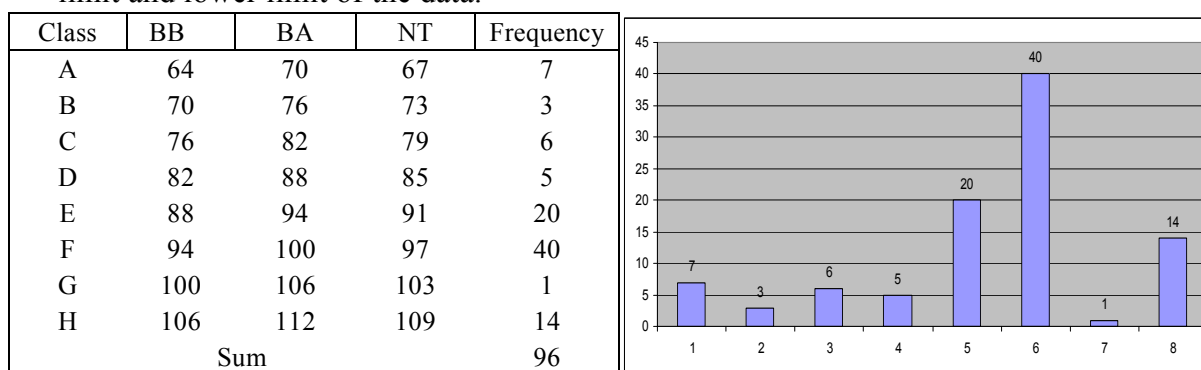
- **Check Sheet**

    The following is a check sheet that is used to carry out daily bread weight inspections. In the inspection, 8 samples were taken, each of which was taken at a different time. The check sheet data for UD bakery products Sarigut Bakery can be seen in Table 1 below.

Table 1. Product Check Sheet at UD. Sarigut Bakery
(Source: primary data, 2021 (processed)

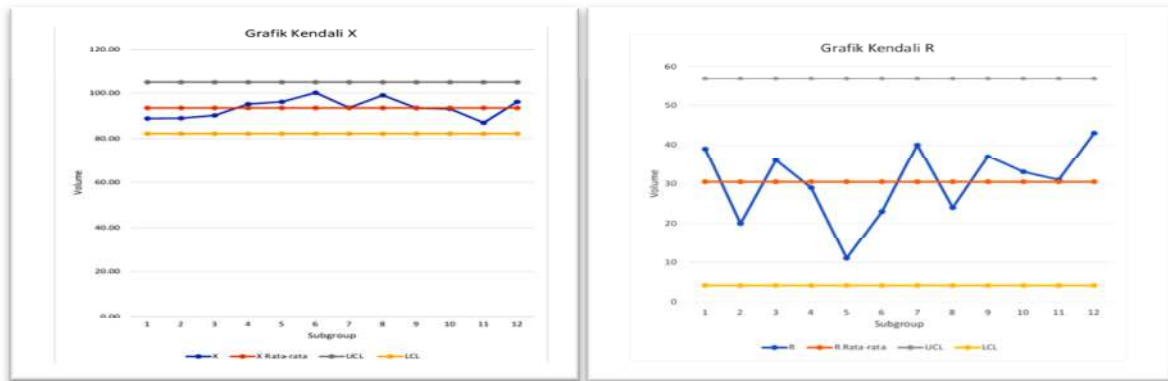| Dates	1 07.00	2 08.00	3 09.00	4 10.00	5 11.00	6 12.00	7 13.00	8 14.00
08 Nov 2021	108	99	96	69	96	70	73	100
09 Nov 2021	94	78	89	91	92	91	79	98
10 Nov 2021	88	79	95	100	88	90	109	73
11 Nov 2021	107	92	103	87	95	78	100	100
12 Nov 2021	100	99	98	97	89	89	99	99
13 Nov 2021	89	89	90	109	96	106	112	111
15 Nov 2021	88	89	69	100	97	97	100	109
16 Nov 2021	88	109	97	98	89	112	110	90
17 Nov 2021	89	79	89	112	98	109	97	75
18 Nov 2021	90	98	67	98	95	99	98	100
19 Nov 2021	94	78	98	98	98	95	68	67
20 Nov 2021	92	100	99	111	68	100	100	100

- **Histogram**

    Based on the data obtained from the check sheet, the data is processed into a frequency distribution by determining the data range, data class, interval class, upper limit and lower limit of the data.

Class	BB	BA	NT	Frequency
A	64	70	67	7
B	70	76	73	3
C	76	82	79	6
D	82	88	85	5
E	88	94	91	20
F	94	100	97	40
G	100	106	103	1
H	106	112	109	14
Sum				96

Figure 2. Histogram of Bread Weight Data Distribution
(a. Bread Class Based on Weight; b. Bread Weight Data Distribution Distribution)
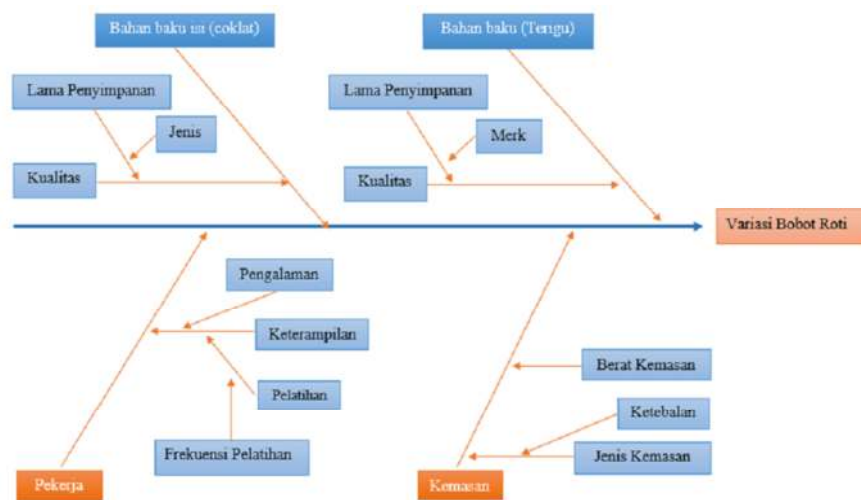
Based on the histogram data above, it can be seen that the distribution of bread weight is not normal, so further analysis is needed, namely by using a process control chart.

Figure 3. Control Graph (a. Graph of Control Variable X; b. Graph of Control of Variable R)

Based on the X and R control charts above, it can be seen that the average volume in the production process is still within the control limits. However, on the control chart R, the amplitude on the graph still looks large, this could be related to the unstable production process. Therefore, to find out whether the process is in accordance with the process specifications or not, it is necessary to do a process capability analysis.
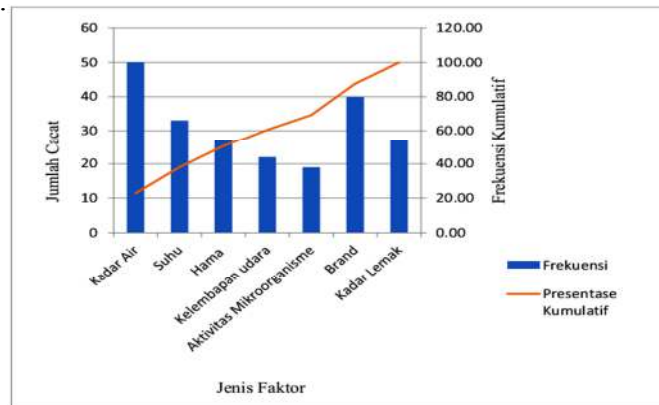
• **Cause and Effect Diagram (Fishbone)**

Figure 4. Bread Weight Variation Fishbone Diagram

In the picture above it can be concluded that there are 4 causes that influence the variation in bread weight, namely: raw material for filling (chocolate), raw material (flour), workers and packaging. The quality of the raw material (chocolate) can be affected by the length of storage, while the length of storage can be affected by the type or variety of the chocolate itself. On the raw material factor, the quality of wheat can be influenced by the length of storage, while the length of storage can be affected by the brand of wheat flour itself. The worker factor can be influenced by the skills of the workers themselves, the skills of the workers are obtained from the experience of the workers and also the training that has been done before, while the results of the training can be determined from how many times the training has been undertaken. In the packaging factor, product weight can be affected by the type of packaging, and the type of packaging can be affected by the thickness of the packaging. It can also be affected by the weight of the packaging.

• **Pareto Charts**

Pareto charts are used to identify and sequence and work to eliminate permanent product defects. With this diagram it can be known which factors are dominant and which are not dominant.

Figure 5. Diagram Pareto (Stocking Variations in Weight based on Raw Material Factors)

Based on the Pareto diagram above, it can be seen that the components of raw materials that often experience problems are water content and also the brand or brand of the raw material, causing the weight of the product to not match the existing specifications. , the main factor for the record of bread can also be seen in the Pareto diagram, where the water content factor (22.94%) and the brand factor (18.35%) are the biggest factors in producing defects in bread/moisture content and this brand becomes one unit, where on non-standard brands of wheat flour used at UD. Sarigut Bakery does not have as good quality as standard wheat flour. Standard flours such as "Cakra Kembar" and "Segi Tiga Biru" brands are able to absorb large amounts of water, have good elasticity to produce bread with a soft texture, large volume.

4. **Conclusions**

Based on the results of the study it can be concluded that

1. Quality control of raw and supporting materials for CV Sarigut Bakery is not good enough because CV Sarigut Bakery is apparently not able to maintain the quality standards and brands of ingredients that are set by using non-standard materials with lower quality levels.
2. The most defects in the finished product are damage to the weight of the bread which is not uniform, this is caused by the condition of the replacement material which is not up to standard, which results in the water content in the bread being still quite high.
3. The percentage of product defect factors can be seen in Graphs 4.8, 4.9 and 4.10, where defects caused by working hours are $R^2 = 0.1336$ or 13.36%. Defects due to long storage of raw materials amounted to $R^2 = 0.7254$ or 72.54%. While the defects due to the use of non-standard wheat flour raw materials are $R^2 = 0.8621$ or 86.21%.

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