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Quality Control Analysis Using Statistical Quality Control (SQC) and Fault Tree Analysis (FTA) Methods in Semoga Laris Tofu Factory

Mutiara Qurrota Aini*, La Ode Ahmad Safar Tosungku, Suwardi Gunawan
Faculty of Engineering, Mulawarman University, Jalan Sambaliung No.9, Samarinda City, East Kalimantan 75119 Indonesia

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A B S T R A C T

Semoga Laris tofu factory is a business engaged in the production of tofu. This factory produces approximately 80 drums of tofu per day. There are problems faced at this factory, namely the increase in defective products, namely the texture of the tofu that is too soft, dirty tofu, and the shape of the tofu that is too thin. This can lead to decreased consumer confidence. Every day there are at least 10-15% defective products. This study was conducted to determine the types of product defects, the causes of product defects, and propose improvements to minimize defective products in tofu processing. The methods used in this research are Statistical Quality Control (SQC) and Fault Tree Analysis (FTA). The quality tools of SQC method are check sheet, histogram, pareto diagram, P control map, and fishbone diagram. Then proceed using the Fault Tree Analysis (FTA) method to determine suggestions and corrective actions. Based on the results of research using the SQC method, it is known that the number of thin size defects is 46.231, there is dirt on the tofu as many as 16.093 seeds, and the texture of soft tofu is 27.357 seeds. The results of the analysis using the fault tree analysis (FTA) method show that the causes of product defects include insufficient rest time (D2), irregular machine maintenance (E2), insufficient rest time (F1), and no temperature checker. Proposed improvements that can be given are by providing measuring instruments, making machine maintenance schedules, making machine control cards, giving breaks, supervising, giving gifts to workers, and providing thermometers.

Corresponding Author
Mutiara Qurrota Aini
E-mail: mutiaraqurrotaa@gmail.com

1. INTRODUCTION

Along with the times, the level of competition in the world of trade, industry and manufacturing is getting higher. This increasingly high competition forces business people to continue to rack their brains so that the products created can survive in the market so that they can adapt to the rapidly growing industrialization process. The quality of a product is one of the important keys for companies to compete in the industrial world. Quality is defined as the properties contained in

a product and can provide satisfaction for consumers. According to Ariani 2020), the definition of quality is to maintain product quality so that it can still meet customer wants and needs and can compete in the market, it is necessary to control quality. Quality control is a company management activity in maintaining and directing so that product quality can be maintained and improved to achieve company goals. Based on Law No. 5 of 1984, industry is an economic activity that processes raw materials, raw materials, semi-finished materials, and finished goods into goods with higher value in terms of their use (Pujoalwanto, 2014). The food industry according to Pamukti and Juwitaningtyas (2021), is an industry that processes agricultural products into finished products that are ready to be marketed and consumed by humans. This makes the food industry one of the most common industries in Indonesia. One of the many food industries found is the tofu industry, this causes tougher competition for tofu processors so that to be able to compete it is necessary to pay attention to the quality aspects of the tofu products produced (Hairiyah and Amalia, 2020). The quality requirements of tofu have been regulated in the Indonesian National Standard 01-3142- 1998 and SII No. 0270-1190, which is based on the type of state test using the five senses that good tofu physically has a normal smell and taste like the smell of fresh soy milk, has a normal white or normal yellow color, and has a normal appearance which when touched is not slimy (Rizka and Khasanah, 2023).

Semoga Laris tofu factory is a business engaged in the production of tofu. This factory produces approximately 80 drums of tofu per day to meet the demand of consumers in the city. All processing from soaking, boiling, cutting, to packaging is done manually. Based on the results of preliminary observations, there are problems faced at this factory, namely the increase in defective products, namely the texture of tofu that is too soft, dirty tofu, and the shape of tofu that is too thin. Soft tofu texture has a physical condition that is easily crushed and torn when held. Dirty tofu is said to be defective when there is dirt, dust or sand on the tofu so that the tofu is considered unhygienic by consumers. In addition, there are defects in thin tofu with a dense and hard texture when held. This can lead to decreased consumer confidence. Every day there are at least 10-15% defective products from the total production. The more defective products produced, the less profit will be obtained.

Quality control must be carried out and carried out properly and correctly, this is to have an impact on quality improvement in the production process in the next period. Product quality control can be done using the statistical quality control (SQC) method. This method is used to control, minimize, maintain, and improve production quality with quality tools in the form of check sheets, histograms, pareto diagrams, control chart, and fishbone diagrams so that it is expected to reduce defective products and improve production quality (Andespa, 2020). The results obtained from this method are the types of defects that are prioritized for improvement using the Fault Tree Analysis (FTA) method. Fault Tree Analysis is an analysis method that uses graphical models to show visual process analysis. This method can identify failure events based on an assessment of the probability of failure. Product defects that have been identified using the Statistical Quality Control (SQC) will be further identified using the Fault Tree Analysis (FTA) method until the root cause is obtained and corrective action proposals can be given (Djamal and Azizi, 2015). Based on this background, researchers are interested in raising research topics related to the quality control of tofu products at the Semoga Laris tofu factory. This study was conducted to determine the types of product defects, the causes of product defects, and propose improvements to minimize defective products in tofu processing. The researcher hopes that the results of this study can help business owners in processing tofu so as to obtain maximum profit.

2. LITERATURE REVIEW

Production management is a business activity carried out to achieve company goals. This activity is carried out by a group of people that includes planning, organizing, directing, and controlling. This is considered very important for the sustainability of the company, the company is expected to carry out activities in accordance with what has been planned and

desired through production management. Production control can be supported by controllers who are tasked with helping company managers to analyze, assess, recommend and provide information related to production activities in order to achieve effectiveness and efficiency of production (Sutopo, 2021). The definition of control according to Japina (2017), is the use of all the complete elements in an entity in introducing, directing, controlling, regulating, and examining all activities aimed at achieving entity goals. Means of control include organizational forms, charts of accounts, forecasts, budgets, schedules, reports, records, methods, checks and tools. The term quality is closely related to quality management which studies every area of operations management from initial planning of products and facilities, scheduling, and inspection of results. Quality is also part of all functions including marketing, human resources, raw materials, finance, and others. In addition, quality requires a continuous and well-measured improvement process (Ariani, 2020).

Quality identification is found in research conducted by Flyn et al. (1995) in Ariani (2020), namely as follows: (1) Management support, (2) Quality information, (3) Process Management, (4) Product design, (5) Workface management, (6) Supplier engagement, and (7) Employee engagement. The important role of quality for companies or organizations according to Russel and Taylor (2011) in Ariani (2020), is as follows: (1) Enhance the company's reputation, (2) Lower costs, (3) Increase market share, (4) Making an international impact, (5) Product liability, and (6) The appearance of the product by realizing the perceived quality is important. Quality Management according to Gasperz (1997) in Ariani (2020), namely quality management can be said to be all activities of the overall management function that determines quality policies, objectives and responsibilities, and implements them through quality management tools, such as quality planning, quality control, quality assurance, and quality improvement. All these activities are aimed at achieving the totality of product and process characteristics to meet customer needs and expectations. All these activities are aimed at achieving the totality of product and process characteristics to meet customer needs and expectations." The stages in quality management have evolved to date. There are five stages of quality management activities that are still being carried out including: (1) Inspection, (2) Control quality, (3) Quality assurance, (4) Quality management, and (5) Integrated quality management. The purpose of quality management according to Assauri (2004) in Argo et al. (2019), is to ensure that product goods can achieve predetermined quality standards. In addition, quality management can also strive for the costs incurred by the company to be as small as possible. Quality management also includes quality supervision to ensure that quality policies and standards can be applied in the final result.

Product defects can have a negative impact on the company. One of the steps in reducing product defects according to Widiaswati (2014) in Hairiyah et al. (2019), is to carry out quality control. Quality control is carried out during the production process to ensure whether the products produced are in accordance with predetermined standards or not. In addition, quality control is carried out to determine the factors that cause product defects. This can be done by making improvements and improving product quality during the production process. The purpose of quality control according to Wahyuni et al. (2020), namely activities to avoid product non-conformity by developing a plan at the quality planning stage. All activities in quality control are carried out to avoid or minimize defective products. The result of quality control is quality improvement, which is an activity to improve quality or improve product quality. The quality improvement process refers to increasing the effectiveness and efficiency of the production process to achieve company goals and provide customer satisfaction.

Tofu is a product derived from soybeans that is processed through the agglomeration of protein extracts in soybeans. Tofu making consists of two main steps including: (1) Manufacture of soy milk to form coagulant, (2) The coagulation of soy milk will form a white precipitate which will then be molded to obtain tofu. The content of tofu consists of 88% water, 6% protein, 1.9%

carbohydrate, 0.6% ash, and 3.5% fat. The coagulant used in tofu making is calcium sulfate which has low solubility in water. This coagulant will react slowly with soy milk so that it allows the formation of curd with a high water binding capacity to produce soft and smooth tofu (Andarwulan et al., 2018). Statistics is a technique for making decisions on the analysis of information through selected samples. Statistical methods play an important role in quality assurance by providing ways of sampling, testing and evaluating information in data used to control and improve the product manufacturing process. Quality control with statistical quality control (SQC) methods can be used in analyzing production errors that can cause defective products so that improvements can be made immediately to minimize the occurrence of product defects. This method can control and manage the production process of manufacturing and service industries (Bakhtiar et al., 2013). The statistical quality control (SQC) method according to Assauri (2004) in Elmas (2017), includes a system developed to maintain production quality, cost levels, and assist in achieving efficiency. Decision making in this method can be done using tools such as check sheets, histograms, pareto diagrams, P control maps, and cause and effect diagrams.

The quality of tofu is influenced by the tofu processing process, soybean varieties, and the coagulant used. Tofu texture is one of the quality attributes that can affect product acceptance by consumers. Soybean storage also has an impact on tofu texture quality. Prolonged storage of soybeans can reduce the hardness and elasticity properties of soybeans, so that the tofu produced becomes softer and crumbles easily. The texture of the tofu is strongly influenced by the solid content of the soybean slurry before adding the agglomerating agent. The higher the solid content of the soybean slurry, the less water content is contained so that the tofu produced becomes hard and dense. The hardness of the tofu can also be influenced by the large pressure in the tofu molding process, this has an impact on the shape of the tofu which becomes thin due to the amount of water wasted (Andarwulan et al., 2018). Types of tofu with size defects according to Fauziah (2014) in Hairiyah and Amalia (2020), can be known through physical examination. Size defects occur when the size of the cut tofu is not in accordance with the standards set by the company. This is because the process of wrapping and measuring tofu is only based on employees. In addition, according to Hairiyah and Amalia (2020), size defects can also occur because the ruler used in the cutting process is not used as a reference in determining the size of tofu products.

The check sheet according to Hairiyah et al. (2019), includes tools to help collect data and analyze data in tabular form. The data in the table contains the number of products produced, the type of product defect, and the number of product defects. Making a check sheet is used to facilitate the process of collecting and analyzing data. Histogram is a tool in the form of a graph of the data that has been obtained from the inspection sheet. The graph is used to find out the ups and downs of production results and the number of product defects in a certain period. The purpose of making a histogram is to find out the most frequent events and variations in measurements, besides that it aims to make it easier to read data quickly (Friscilla et al., 2021). The definition of a control chart according to Heizer and Render (2013) in Fath and Darajatun (2022), is a graphical tool that can be used to monitor and evaluate an activity or production process. The goal is to ascertain whether the activity or production process remains in statistical quality control, if it is outside the quality control limits, quality improvements can be made immediately. The control map consists of three horizontal lines, namely the center line, upper control limit, and lower control limit.

A Pareto diagram is a chart that contains both bar and line diagrams. The bar chart shows the classification and value of the data, while the line chart shows the total and cumulative results. The uses and benefits of pareto diagrams in product quality improvement are: (1) Concentrate the focus on aspects that are expected to have the greatest impact, (2) Display the relative importance of the problem in a simple visual that can be interpreted quickly, (3) Help in preventing problems where solutions eliminate some causes but exacerbate others, and (4) Analyzing Pareto functions in manufacturing and non-manufacturing quality

improvement applications. The function of the Pareto diagram based on Hairiyah et al. (2019), is to identify the priority of problems in improving quality from the largest to the smallest. Pareto diagrams can show problems that will be prioritized or the most important by focusing on the frequency of occurrence of problems in the product. The principle of the pareto diagram is to hint at what problems need to be addressed first in order to provide greater benefits and advantages. A cause and effect diagram is also called a fishbone diagram. This diagram serves to show the main factors that influence quality control and have an effect on the problem under study. In addition, the purpose of making this diagram is to help find out the factors that affect the errors that occur, identify the categories and sub-categories of causes that affect a certain quality characteristic, and provide clues about the kinds of data collected The elements of the cause that are suspected of causing this problem, of course, must be eliminated to avoid losses for the company (Hairiyah et al., 2019).

The Fault Tree Analysis (FTA) method is one of the methods used to find the root cause of problems from various problems that occur. Fault Tree Analysis (FTA) is an analysis method that uses a top down approach. This method starts from the top level event that has been defined first, then looks for the cause of the error or its combination to the most basic event (Satriyo and Puspitasari, 2017). Fault Tree Analysis (FTA) according to Kartikasari and Romadhon (2019) can identify risks by taking a top down approach. The assumption of failure from the top event is the beginning of making FTA, then detailing the causes of the top event to the basic cause of failure (root cause). FTA identifies the relationship between the top event and the causal factors displayed in the form of a fault tree. The fault tree contains symbols to signal events in a process. FTA symbols can be seen in Figure 1. The starting point for fault tree analysis (FTA) according to Papadopoulos (2004) in Djamal and Azizi (2017), is to identify failures at the top level of a system. The relationship between the main event and the basic event is illustrated into components using logic gates. From these gates, cut sets and minimum cut sets can be compiled. A cut set is a series of system components that, if something goes wrong, can cause a failure. The minimum cut set is an event that can cause a failure in the system

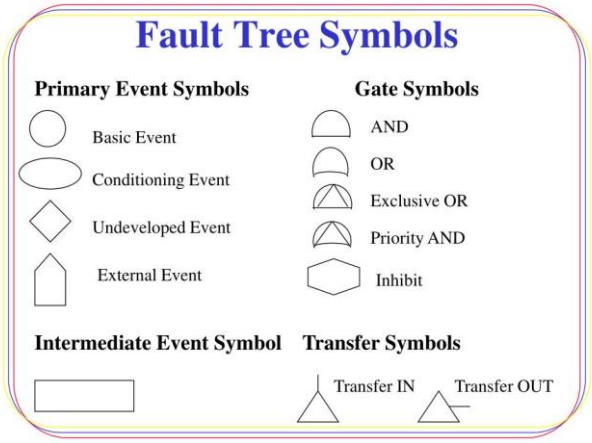

Figure 1. Fault tree symbols

3. RESEARCH METHOD

The research conducted is comparative research. The subject of this research is the Semoga Laris tofu factory located on Jalan M. Said Gg. 21, Samarinda City, East Kalimantan. The methods used in this research are Statistical Quality Control (SQC) and Fault Tree Analysis (FTA). The research steps used in detail are described in the research framework, as in Figure 2.

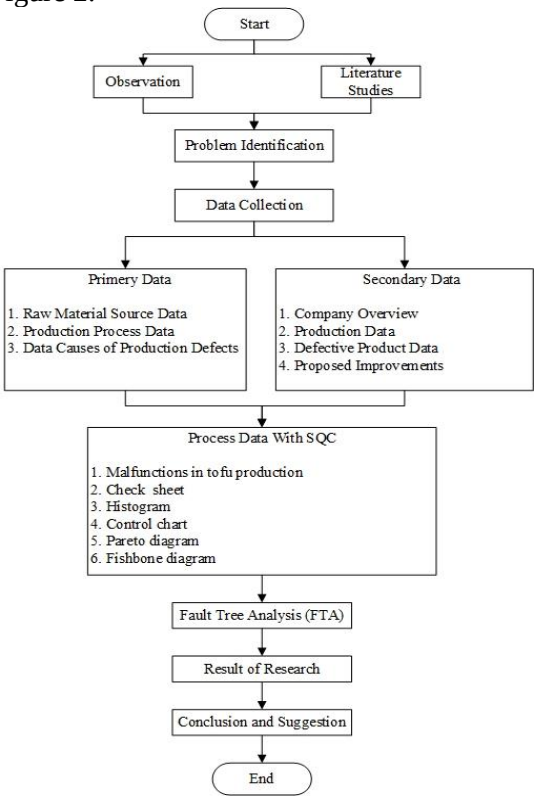

Figure 2. Research framework

4. RESULT AND DISCUSSION

Semoga Laris tofu factory was established in 2006 and is engaged in the production of white tofu made from soybean juice. The processing of soybeans into tofu is carried out for 24 hours with a 2-shift work system. Every day this business manages 250-350 kg of soybeans and produces 7000-11.500 tofu. The turnover obtained is IDR 8.280.000/day. Identification of defective product problems that occur at the Semoga Laris tofu factory using statistical quality control methods can be seen in the description below.

Check Sheet

The first step taken in analyzing quality control statistically is to create a check sheet. The check sheet is made using a table containing information about the number and types of defects of the tofu produced. Making a check sheet can facilitate data collection and analysis, and determine the scope of the problem based on the type and frequency of defects that occur (Dharmayanti, 2018). The inspection sheet for tofu production at the Semoga Laris tofu factory can be seen in Table 1.

Table 1. Check sheet for January-March 2023

No.	Week	Total Production (seeds)	Product Defect (seeds)			TOTAL
			Thin Size	There is Dirt	Soft Tofu Texture	
1	01/01/23	9100	616	168	336	1120
2	02/01/23	11550	717	253	436	1405
3	03/01/23	9450	638	157	325	1120
4	04/01/23	7350	481	131	263	875
5	05/01/23	9800	509	237	438	1183
6	06/01/23	11550	651	258	447	1356
7	07/01/23	9800	555	189	366	1110
8	08/01/23	9450	578	158	315	1050
9	09/01/23	9450	601	148	306	1055
10	10/01/23	9450	562	153	306	1021
11	11/01/23	10150	613	212	290	1115
12	12/01/23	11900	715	195	390	1300
13	13/01/23	11200	672	183	366	1221
14	14/01/23	9450	573	156	313	1042
15	15/01/23	11550	669	183	365	1217
16	16/01/23	11900	365	365	486	1215
17	17/01/23	11200	647	176	353	1176
18	18/01/23	10150	600	164	327	1090
19	19/01/23	9450	602	164	329	1095
20	20/01/23	16100	936	324	540	1800
21	21/01/23	11550	715	195	390	1300
22	22/01/23	11550	729	199	398	1325
23	23/01/23	11200	715	195	390	1300
24	24/01/23	8750	563	131	312	1005
25	25/01/23	9800	594	206	343	1143
26	26/01/23	11550	729	243	378	1350
27	27/01/23	11900	762	235	388	1385
28	28/01/23	12250	672	294	434	1400
29	29/01/23	10150	683	158	378	1219
30	30/01/23	8750	604	165	330	1099
31	31/01/23	7000	420	201	254	876
32	01/02/23	7700	490	231	204	925
33	02/02/23	8750	480	170	350	1000
34	03/02/23	6650	369	130	224	723
35	04/02/23	8050	556	137	283	975
36	05/02/23	5950	385	105	210	700
37	06/02/23	7700	349	162	300	812
38	07/02/23	8400	432	171	297	900
39	08/02/23	8050	428	146	282	856
40	09/02/23	8400	471	116	302	889
41	10/02/23	8400	513	135	252	900
42	11/02/23	8050	524	129	267	920
43	12/02/23	5600	306	114	180	600
44	13/02/23	8050	495	171	234	900
45	14/02/23	8400	360	243	297	900
46	15/02/23	8400	488	151	248	887
47	16/02/23	4900	235	74	152	460
48	17/02/23	8750	456	164	292	912
49	18/02/23	5950	210	190	278	678

50	19/02/23	8400	538	137	237	912
51	20/02/23	13300	816	229	387	1432
52	21/02/23	9450	550	150	300	1000
53	22/02/23	9100	546	189	315	1050
54	23/02/23	9100	535	178	277	990
55	24/02/23	9100	540	167	275	982
56	25/02/23	9800	560	245	362	1167
57	26/02/23	4550	308	72	171	550
58	27/02/23	9800	547	267	401	1215
59	28/02/23	8400	490	134	267	890
60	01/03/23	9100	550	150	300	1000
61	02/03/23	7700	501	155	255	910
62	03/03/23	7000	421	132	272	825
63	04/03/23	4900	275	99	176	550
64	05/03/23	7000	248	224	328	800
65	06/03/23	5600	379	96	167	642
66	07/03/23	8050	498	140	236	873
67	08/03/23	9800	405	339	350	1095
68	09/03/23	8050	447	155	258	860
69	10/03/23	9800	561	153	306	1020
70	11/03/23	8050	482	132	263	877
71	12/03/23	7000	426	116	233	775
72	13/03/23	4025	268	62	148	478
73	14/03/23	9450	564	154	308	1026
74	15/03/23	9800	580	158	317	1055
75	16/03/23	8750	502	137	274	912
76	17/03/23	8750	441	189	270	900
77	18/03/23	9100	506	138	276	920
78	19/03/23	9100	545	153	258	956
79	20/03/23	9100	363	304	314	982
80	21/03/23	8050	365	243	261	869
81	22/03/23	9450	553	151	302	1005
82	23/03/23	6300	350	126	224	700
83	24/03/23	9450	334	302	442	1078
84	25/03/23	9450	416	332	291	1039
85	26/03/23	7000	456	128	216	800
86	27/03/23	7700	489	133	267	889
87	28/03/23	7350	458	158	264	880
88	29/03/23	8750	420	280	300	1000
89	30/03/23	8750	543	168	277	988
90	31/03/23	7700	424	186	274	884
TOTAL		**801.675**	**46.231**	**16.093**	**27.357**	**89.681**
Average		**8908**	**514**	**179**	**304**	**996**

Based on the inspection sheet in Table 1 above, it can be seen that the total production from January to March 2023 was 801.675 seeds with a total number of defective products of 89.681 seeds. There are 3 types of defective products including thin size, dirt and soft tofu texture with a total of 46.231 seeds, 16.093 seeds, and 27.357 seeds respectively.

Histogram

The stage after making the inspection sheet is making a histogram which is useful for knowing the types of defects that occur most or often. The Histogram Graph in Figure 3 above shows that the highest type of defect is thin size with a total of 46.231 seeds, the medium type of defect is soft tofu texture with 16.093 seeds, and the lowest type of defect is dirt on the tofu with 27.357 seeds.

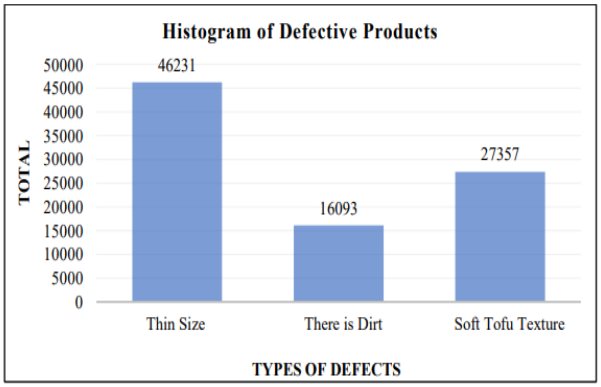

Figure 3. Histogram

Control Chart

Control maps are used to determine whether the quality control at the Semoga Laris tofu factory is under control or not so that when something is still outside the control limits, improvements can be made immediately (Solahudin, 2021).

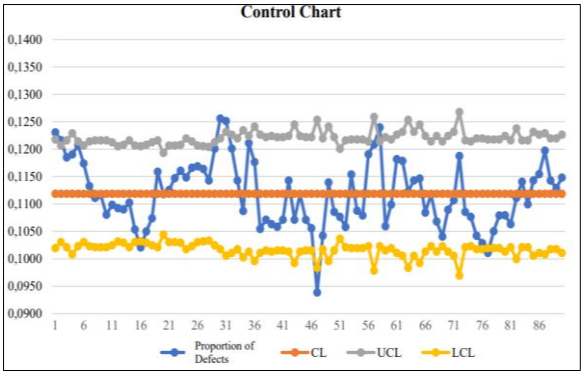

Figure 4. Control chart

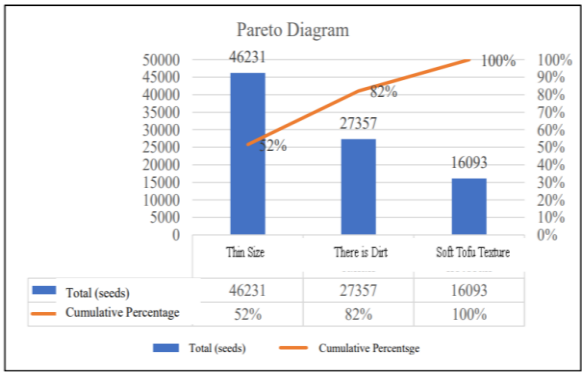

Figure 5. Pareto diagram

Based on Figure 4 above, it shows that there are still 8 points that are outside the control limits, including on January 1, 2023, January 2, 2023, January 16, 2023, January 30, 2023, January 31, 2023, February 16, 2023, February 27, 2023, and March 18, 2023.

Pareto Diagram

Based on the calculation of the percentage of defects, the percentage of types of defects in tofu production at the Semoga Laris tofu factory is obtained. The type of thin size defect has a percentage of 52%, there are impurities with a percentage of 18%, and soft tofu texture with a percentage of 30%. The following is a pareto diagram of tofu defects based on Figure 5 that has been presented.

Based on Figure 5 using the principle of pareto diagrams where 80% of product defects are caused by 20% of product defects. The results of calculations using the principle of pareto diagrams, it is known that 20% of the types of tofu defects are thin size defects so that the most dominant type of defect at Semoga Laris tofu factory is a thin size of 46.231 seeds.

Fishbone Diagram

The use of fishbone diagrams aims to identify the factors that cause a deviation or defect in the product (Solahudin, 2021). Based on the Pareto diagram that has been made, there is a type of defect that is prioritized, namely thin size. The fishbone diagram based on the priority defect types at Semoga Laris tofu factory can be seen in Figure 6.

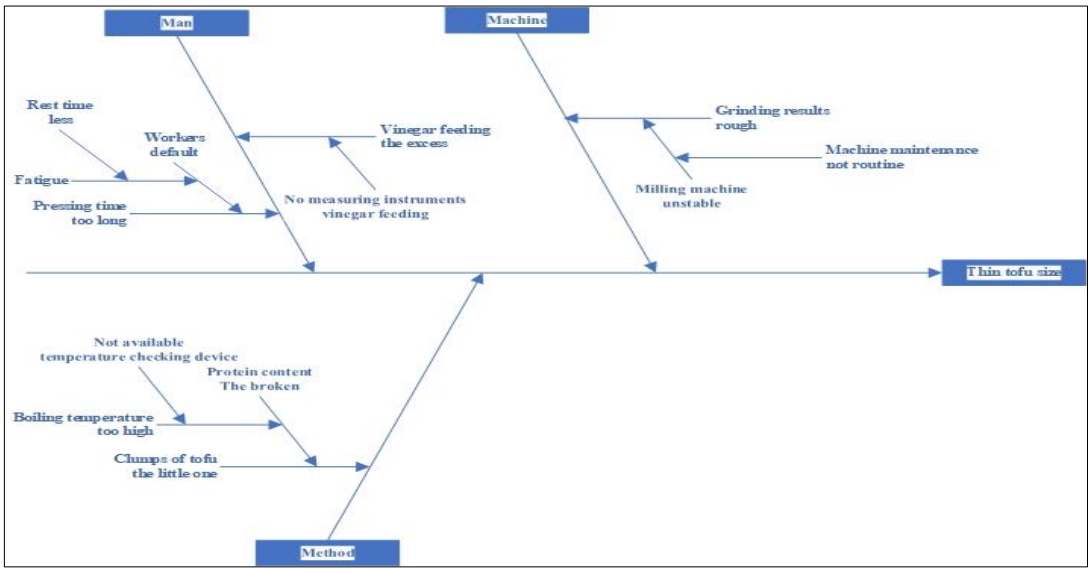

Figure 6. Fishbone diagram

Fault Tree Analysis (FTA)

The Fault Tree Analysis (FTA) chart on the thin size defect type can be seen in Fugure 7.

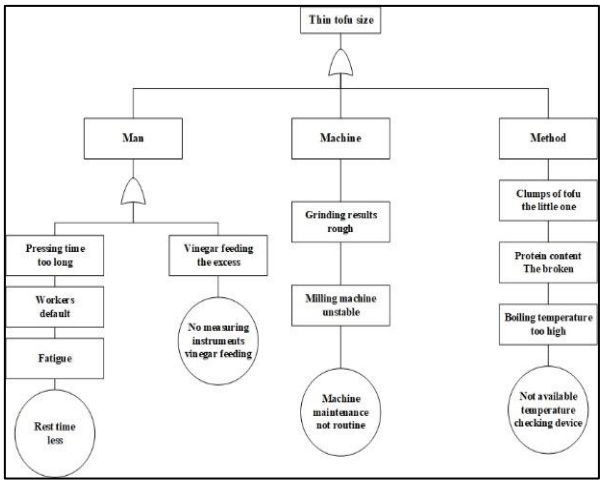

Figure 7. Thin size fault tree analysis

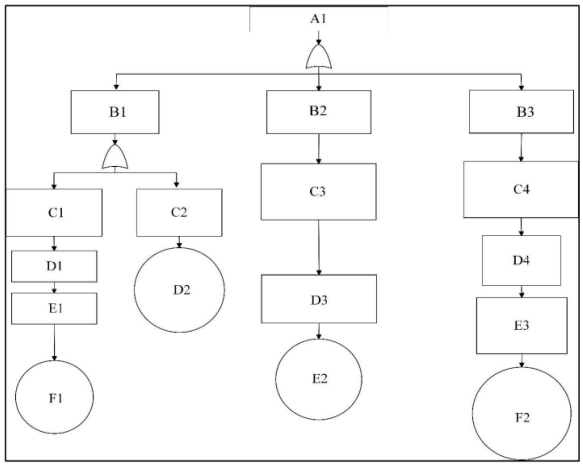

Figure 8. Fault tree symbols Semoga Laris

Based on the fault tree chart of thin size defects that occur, then look for the minimum cut set. A cut set is a combination of fault tree formers that cause a peak event to occur (Djamal and Azizi, 2015).

The description of the fault tree symbol at the Semoga Laris tofu factory based on Figure 8 above can be seen in Table 2 below.

Table 2. Fault tree symbol description

No.	Description
A1	Thin Size
B1	Man
B2	Machine
B3	Method
C1	Long pressing time
C2	Excessive vinegar feeding
C3	The grinding result is still coarse
C4	Small lumps of tofu
D1	Negligent workers
D2	No vinegar feeding measurement tool
D3	Unstable milling machine
D4	Damaged protein content
E1	Fatigue
E2	Irregular machine maintenance
E3	High boiling temperature
F1	Less break time
F2	No temperature checker available

The next step is to determine the minimum cut set using Boolean Algebra theory. Boolean algebra is a theory that can be used to simplify complex logic circuits into simpler ones. The calculation for the OR symbol is calculated by addition and the AND symbol is calculated by using multiplication (Putri and Ngatilah, 2021).

The minimum cut set calculation can be seen below:

Top Event = A1

= B1 + B2 + B3

= [C1 + C2] + C3 + C4

= [D1 + D2] + D3 + D4

= [E1 + D2] + E2 + E3

= [F1 + D2] + E2 + F2

Based on the results of the calculation of the minimum cut set of 4 basic events that can cause thin size tofu defects at the Semoga Laris tofu factory. The minimum cut set of causes of tofu defects can be seen in Table 3 below.

Table 3. Minimal cut set

No.	Description
D2	No vinegar feeding measurement tool
E2	Irregular machine maintenance
F1	Less break time
F2	No temperature checker available

Proposed improvements

Proposed improvements are given based on a minimum cut set of causes of tofu defects obtained using qualitative analysis of the fault tree analysis (FTA) method. Proposed improvements obtained from discussions with the owner by considering the situation and conditions of the Semoga Laris tofu factory can be seen in Table 4.

Table 4. Proposed improvements

No.	Code	Potential Causes of Failure	Proposed Improvements
1.	D2	No vinegar feeding measurement tool	- Provide measuring tools for pouring vinegar
2.	E2	Irregular machine maintenance	- Machine maintenance schedulemaker on a regular basis - Making machine control cards
3.	F1	Less break time	- Giving time off - Conduct intensive supervision ofworkers - Rewarding workers
4.	F2	No temperature checker	- Provide a temperature checker (thermometer)

5. CONCLUSION

The amount of tofu produced at the Semoga Laris tofu factory from January to March 2023 is 801.675 seeds with a total of 89.681 defective products. The percentage of defective products ranges from 9-12% of the amount of tofu produced. The types of product defects that occur at the Semoga Laris tofu factory include thin size defects as many as 46.231, there is dirt on the tofu as many as 16.093 seeds, and soft tofu texture as many as 27.357 seeds. Based on the Pareto diagram, the type of defect that is prioritized to be given an improvement proposal is a thin size defect of 46.231 seeds. The causes of defective products at the Semoga Laris tofu factory based on the results of the analysis using the fault tree analysis (FTA) method include insufficient rest time (D2), irregular machine maintenance (E2), insufficient rest time (F1), and no temperature checker. So that improvement proposals are given, namely by providing a measuring tool for pouring vinegar, making regular machine maintenance schedules, making machine control cards, providing rest time, conducting intensive supervision of workers, giving rewards to workers, and providing thermometers. Suggestions for further researchers to use the weighting method in determining the priority of the problem or other proposed improvements such as Six Sigma and Analytic Hierarchy Process (AHP) methods.

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