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Improving the Quality of Tempe Products with GMP and Model Based Integrated Process Improvement in SME Pacarkeling

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Small and Medium Enterprises, Tempe Pacarkeling is one of the centers for Small and Medium Enterprises in Pasuruan. This Small and Medium Enterprise Center is located in Pacarkeling-Kejayan-Pasuruan Village. One of the UKM that was used as the research object was the Tempe UKM owned by Mr. Muizzi. In the production process, there is still less attention to environmental cleanliness. So it requires an assessment of Good Manufacturing Practice (GMP) as an assessment of the environment and working conditions. In addition, this study aims to evaluate the level of application of GMP. Based on the research conducted, the results of the evaluation of the application of GMP as a whole, the total value of GMP application of all respondents obtained 8,145 points or an average of 247 points, while the percentage of the deviation value is 46% and the conformity value is 54% in the aspects of Good Manufacturing Practice (GMP) so that it has not meet the GMP criteria. Evaluation obtained from processing GMP data, the level of seriousness in implementing Good Manufacturing Practice (GMP) in this UKM is 247 points, which means that it is at the classification level ((nx2) +1) to (nx3), which is very good.

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1. Introduction

Indonesia is one of the countries that produces the largest tempe in the world (Daputra, Wahyudi, and Uslianti 2011) (Syafa'at and Wahid, 2020) According to data from Rumah Tempe Indonesia, the tempe industry in Indonesia currently amounts to approximately 115,000 tempe craftsmen. The tempe industry in Indonesia is generally still on a household scale whose production process is still done using traditional methods (Junaedi and Mas'ud, 2018) (Wardani 2015). Tempe SMEs in Indonesia need to be developed so that they become a major role in advancing the nation's economy, so that it becomes a huge potential for the people of Indonesia. Tempe, which is a type of food for most Indonesian people, in the production process must be considered to produce a quality product and its safety is guaranteed, to be able to produce quality and safe tempe products, a system is needed to monitor the production process from input, process, and output. The system that must be able to supervise and maintain every process of tempe production must meet food safety standards in accordance with Government Regulation No. 28 of 2004 Article 43 concerning food safety, quality, and nutrition which contains the obligation for small household scale industries to have a Home Industry Food

Production Certificate (SPP-IRT) issued by the regional head according to the location of the UKM (Suhardi, Kadita, and Laksono 2018)(Afrizal Arif 2010).

Home Industry Food Production Certificate (SPP-IRT) is a certificate issued by the regional head, in this case the regent or mayor. SPP-IRT is used for SMEs or household scale industries as a guarantee that the products produced are registered and can expand the marketing network. In the process of submitting an SPP-IRT, there are many aspects that need to be prepared as assessment points, including location and environment, buildings, facilities, equipment, sanitation, employees who work must comply with standard regulations on Good Food Production Practices for Home Industries (CPPB-IRT) (LPOM et al. 2019; Luthringer et al. 2015; Sukania and Gunawan 2014) This aspect has also been regulated by the government based on the Food Law no. 7 of 1996 in the chapter on food safety which explains the requirements that must be carried out by every food processing industry, which must carry out sanitation activities and prepare facilities which include the start of production, storage, transportation, and distribution of product

A system that is in accordance with the standards of Good Food Production Practices for Home Industries (CPPB-IRT) which can supervise and maintain the products produced according to existing standards is Good Manufacturing Practice (GMP) (Panghal et al. 2018; Suhardi, Wardani, and Jauhari 2019). GMP is a system that contains basic requirements in a food industry that implements supervision of the entire processing process in order to produce a quality and safe product for consumption (Rizki 2019; Trienekens and Zuurbier 2008). The basic requirements in implementing GMP consist of several aspects that need to be considered for an industry engaged in food processing (Trienekens and Zuurbier 2008).

Aspects that need to be considered in the application of GMP in accordance with the CPPB-IRT regulatory standards include the environment, location, buildings and business facilities, business unit facilities, sanitation facilities and activities, pest control systems, employee hygiene requirements, raw material requirements. , control of production processes, control of post production, management of supervision, recording and documentation (El- Hofi, El-Tanboly, and Isamil 2009). The basic requirements that fall within the scope of GMP include the quality of raw or auxiliary materials, product processing procedures, product packaging, product storage stages, and product distribution stages (Wahid, Munir, and Hidayatulloh 2020).

Tempe UKM in Pacarkeling Village is one of the developing SME centers located in Kejayan District, Pasuruan Regency, in Pacarkeling Village, there are many tempe craftsmen to be precise in Pacarkeling Timur Hamlet. One of the tempe craftsmen in East Pacarkeling Hamlet is Mr. Muizzi. At the time of direct observation in the environment around SME, the cleanliness does not get the attention of SME owners, so this affects the quality of the tempe products produced (Ardiansah et al. 2020) (Fauzi and Mas'ud, 2019). The factors that affect the quality of the resulting tempe products include the layout of the facilities, environmental cleanliness, inadequate sanitation facilities, the absence of packaging on the product. Based on the description of direct observations in the field, the Tempe East Pacarkeling SME needs a study on how to apply the existing GMP. Model Based Integrated And Process Improvement (MIPI) is a method used for the improvement process in developing an integrated business (Daputra, Wahyudi, and Uslianti 2011) In the Model Based Integrated And Process Improvement method, a suggestion will be raised about what improvements need to be done for the Tempe East Pacarkeling SME.

2. Literature Review

This Literature Review is used as a reference for the author in conducting current research. This related research serves as the author's benchmark in conducting this research. Previous research can be used as a basis or guideline for the author in conducting research that is currently being carried out.

1. According to Bambang Suhardi, Maria Kadita, and Pringgo Widyo Laksono (2018) in their research entitled Improvement of Production Processes with Good Food Production Standards (CPPB) and Work Improvement In Small Enterprise (WISE) in the Krupuk Sala

Industry, which has a purpose Evaluating the Application of CPPB at the SALA cracker IRT using the CPPB-WISE, AHP method and concluded that the CPPB condition was 60.8%, and the WISE condition was 70%.

2. According to Puty Mairawati, Bambang Suhardi, and Rahmaniyah Dwi Astuti (2019), entitled Evaluation of Work Systems in Accordance with Cppbirt-Irt Standards, Halal Lpom Mui and Wise On Tsabita Halal Boga Sukoharjo with the aim of improving the work system by evaluating the suitability of Tsabita Halal conditions with the CPPB-IRT Standard by applying the CPPB-WISE, BORDA There are 6 non-conformities from the CPPB-IRT standard, 7 non-conformities based on the LPOM MUI halal assurance system, 8 non-conformities based on the wise checklist.
3. Rizki Ramadhani Rizki (2019) with the title Analysis of the Implementation of GMP and Sanitation Standard Operating Procedures (SSOP) for Bread Products (Case Study: M Bakery And Cake) with the aim of providing recommendations for improvements related to the application of GMP and SSOP so that the aspects are concluded. 107 aspects according to the standard with a percentage of 56.6%, while the unsuitable aspects were 82 aspects with a percentage of 43.4%.
4. According to Bambang Suhardi, Serlita Vidinia Wardani, Wakhid Ahmad Jauhari (2019) in his research with the title Improvement of Ikm Xyz Production Process Based on Cppb-Irt, Wise, and Sjh Lppom Mui Criteria with the aim of identifying food safety and halal conditions in the Small Industry production process Medium (IKM) XYZ using the CPPB-IRT, WISE, SJH LPPOM MUI method, it is concluded that IKM XYZ has 18 non-conformities based on CPPB-IRT standards and 10 non-conformities based on WISE.

3. Research Methods

Research activities on improving the quality of production in SMEs using the GMP approach were carried out at SME Tempe located in Pacarkeling Timur Hamlet, Pacarkeling Village, Kejayan District, Pasuruan Regency. This research took place from March to June 2020. The type of research used in the writing process of this final thesis is to use analytical methods and quantitative approaches. The data used are primary data and secondary data. Primary data is data whose data collection process is directly taken by interview method, direct communication via telephone and does not communicate via letter, e-mail and others, while secondary data is a type of data taken from literature, internet, statistics, books, etc. Primary data used in the study were obtained from interviews with SME owners of Tempe Pacarkeling and the results of distributing questionnaires to several respondents, while secondary data was obtained from internet literature and journals. or previous research on the application of GMP standards in a food industry. Data collection in this study was carried out by several methods, namely the method of observation, interviews, and questionnaires. The assessment provisions in the research questionnaire with a Likert scale of 0-4 are as follows:

4 = Strongly Agree (SS) 1 = Disagree (TS)
3 = Agree (S) 0 = Strongly Disagree (STS)
2 = Neutral (N)

The stages of determining the respondents in this study used a purposive sampling method. The purposive sampling method is a method of determining research respondents by determining certain criteria (Etikan 2016). The method of purposive sampling, the researcher determines the criteria himself in determining the respondents who will assess the aspects of GMP in SME Tempe Pacarkeling.

Testing the questionnaire in this study using two methods, namely the method of validity and reliability testing. The validity test method is something that is related to the extent to which measuring instruments can provide targeted results (Fibri and Frøst 2020). This validity test is carried out by means of a correlation test using the one shot method (one-time measurement), namely by entering the data obtained from the distribution of the questionnaire into the SPSS program, besides

that it can also be done by calculating the correlation to each each question with a score of the value on each questions on the questionnaire using the Product Moment correlation formula (Rahayu, 2016). The formula for the Product Moment correlation technique is as follows:

$$r = \frac{N(\Sigma XY) - (\Sigma X \Sigma Y)}{\sqrt{\{N\Sigma X^2 - (\Sigma X)^2\}\{N\Sigma Y^2 - (\Sigma Y)^2\}}}$$

Information :
N = Number of Respondents
X = Score of each question
Y = total score

Reliability testing is a measure that provides information on the extent to which the results of a measurement remain consistent even though measurements have been made repeatedly using the same measuring instrument (Janti, 2014). Reliability is a test carried out to see how much a measurement is consistent or stable on the results of its size. The amount of a value at the level of reliability can be seen from the coefficient value which is usually called the reliability coefficient. Testing at this level of reliability is usually in a study using the Cronbach Alpha test method which uses questions in the questionnaire with a closed model with the Likert scale assessment method. The formula for calculating the Cronbach Alpha reliability coefficient (ri) is as follows:

$$r_i = \frac{k}{(k-1)}\left\{1 - \frac{\Sigma s_i^2}{s_t^2}\right\}$$

Information :
k = number of items on the questionnaire
Σ Si2 = number of grain variants
St2 = total variant

The next stage of the data obtained was analyzed descriptively. The assessment model for the application of GMP uses a scale of 0-4, which is as follows:

0 = the value of implementing the GMP aspect is 0%
1 = the value of implementing the GMP aspect is 1-25%
2 = the value of the application of the GMP aspects of 26-50%
3 = the value of implementing the GMP aspect is 51-75%
4 = the value of implementing the GMP aspect is> 75%

Meanwhile, according to Lukman (2001) the formula used in calculating what percentage of the conformity of aspects of GMP in SMEs Tempe Pacarkeling with standards that have been determined by the government or BPOM is as follows :

$$Y = (n_0 \text{ x } 0) + (n_1 \text{ x } 1) + (n_2 \text{ x } 2) + (n_3 \text{ x } 3) + (n_4 \text{ x } 4)$$

Information :
Y = total application value obtained
n0 = number of aspects that scored 0 in the assessment form
n1 = number of aspects that scored 1 in the assessment form
n2 = number of aspects that scored 2 in the assessment form
n3 = number of aspects that scored 3 on the assessment form
n4 = number of aspects that scored 4 on the assessment form

The next stage is the total application value (Y) which is adjusted to the percentage scale of GMP deviations that occur, which are as follows:

80-100% = the value of conformity for aspects of the GMP application that meets the requirements
60-79% = suitability value for the aspect of implementing GMP which is sufficient

40-59% = the value of the appropriateness of the GMP application aspects that do not meet the requirements
20-39% = the value of the appropriateness of the GMP application aspect which is very inadequate
0-19% = the value of the appropriateness of the GMP application aspects that do not meet

The next stage is to calculate the severity of the deviation that occurs in the application of GMP obtained from the calculation of the total application formula (Y), with the following conditions:

(n x 0) = 0 (light) / satisfies
(n x 0) +1) up to (n x 1) = 1-113 (light) / sufficiently satisfactory
(n x 1) +2) up to (n x 2) = 114-226 (moderate) / less satisfactory
(n x 2) +3) to (n x 3) = 227-339 (weight) / very unsatisfactory
(n x 3) +4) to (n x 4) = 340-452 (critical) / not fulfilled
Clarity: n = total number of aspects observed in the GMP aspect assessment questionnaire

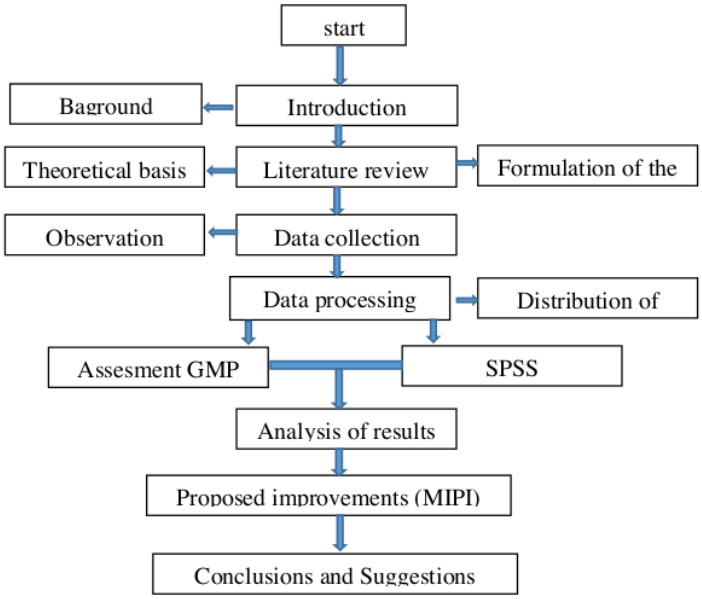

Figure. 1 Concept Concept

4. Results and Discussion

In testing the validity of the criteria, determining whether the questionnaire is valid or not is done by comparing the value of r count and r table with the determination if the value of r count> r table then the questionnaire being tested is declared valid, but if the value of r count <r table then the questionnaire which is being tested is invalid (Trima and Oktavianto 2013). Based on the validity test of all the question items in the questionnaire, the results of the r count > r table are valid. In testing the reliability of the criteria for a questionnaire, it can be declared reliable if the Cronbach Alpha value obtained is greater or equal to 0.70 (Fidela, Pratama, and Nursyamsiah 2020). In testing the reliability of all aspects of GMP tested on the questionnaire, the overall value of each aspect is greater than 0.70, so it can be declared reliable.

The next stage in this research is data processing. Data processing was carried out by assessing GMP activities by filling out a questionnaire. From the results of filling out the questionnaire, then the addition was carried out for each of each aspect to determine the weighted value for each aspect. Following are the results of data processing using an assessment of GMP.

Tabel 1. Hasil Assesment GMP

No	Name Aspect	Number Respondent	Highest Questionnaire Rating Scale	Number of Sub Criteria	Total Value of Overall Application (Per Respondent)	Total Total Value of Respondents	GMP Application Value	Conformity Value (%)	Deviation Value (%)	Information
1	**Location and Environment**	**33**	**4**	**7**	**28**	**924**	**549**	**59%**	**41%**	Less
	a. Location	33	4	5	20	660	382	58%	42%	Less
	b. Envirental	33	4	2	8	264	167	63%	37%	Enough
2	**Building**	**33**	**4**	**30**	**120**	**3960**	**2069**	**52%**	**48%**	Less
	a. Room Design and Layout	33	4	4	16	528	267	51%	49%	Less
	b. Floor	33	4	5	20	660	336	51%	49%	Less
	c. Wall	33	4	4	16	528	274	52%	48%	Less
	d. Roof	33	4	1	4	132	75	57%	43%	Less
	ePalate	33	4	3	12	396	209	53%	47%	Less
	f. Door	33	4	3	12	396	196	49%	51%	Less
	g. Window	33	4	2	8	264	154	58%	42%	Less
	h. Lighting	33	4	4	16	528	281	53%	47%	Less
	i. Ventilasi	33	4	4	16	528	277	52%	48%	Less
3	**Sanitation Facilities**	**33**	**4**	**24**	**96**	**3168**	**1676**	**53%**	**47%**	Less
	a. Water Supply Facilities	33	4	2	8	264	168	64%	36%	Enough
	b. Disposal and Waste Facilities	33	4	3	12	396	215	54%	46%	Less
	c. Toilet	33	4	11	44	1452	783	54%	46%	Less
	d. Hand washing facilities	33	4	4	16	528	317	60%	40%	Enough
	e. Employee Hygiene Facilities	33	4	4	16	528	193	37%	63%	Very less
4	**Production Equipment**	**33**	**4**	**8**	**32**	**1056**	**562**	**53%**	**47%**	Less
	a. Tools	33	4	3	12	396	255	64%	36%	Enough
	b. Equipment Layout	33	4	3	12	396	199	50%	50%	Less
	c. Supervision and Monitoring	33	4	2	8	264	108	41%	59%	Less
5	**material**	**33**	**4**	**5**	**20**	**660**	**448**	**68%**	**32%**	Enough
	a. Raw Material	33	4	3	12	396	271	68%	32%	Enough
	b. Water	33	4	2	8	264	177	67%	33%	Enough
6	**Processing**	**33**	**4**	**4**	**16**	**528**	**302**	**57%**	**43%**	Less
7	**The final product**	**33**	**4**	**2**	**8**	**264**	**152**	**58%**	**42%**	Less
8	**Laboratory**	**33**	**4**	**2**	**8**	**264**	**72**	**27%**	**73%**	Very less
9	**Employees**	**33**	**4**	**5**	**20**	**660**	**366**	**55%**	**45%**	Less
10	**Containers and Wrapping**	**33**	**4**	**5**	**20**	**660**	**392**	**59%**	**41%**	Less

11	**Label**	**33**	**4**	**1**	**4**	**132**	**42**	**32%**	**68%**	Very less
12	**Storage**	**33**	**4**	**17**	**68**	**2244**	**1154**	**51%**	**49%**	Less
	a. Raw Material Storage Area	33	4	11	44	1452	720	50%	50%	Less
	b. Final Product Storage Area	33	4	6	24	792	434	55%	45%	Less
13	**Maintenance**	**33**	**4**	**5**	**20**	**660**	**361**	**55%**	**45%**	Less
	Total			**115**	**460**	**15180**	**8145**	**54%**	**46%**	Less
	Severity						**246,82**			Very less

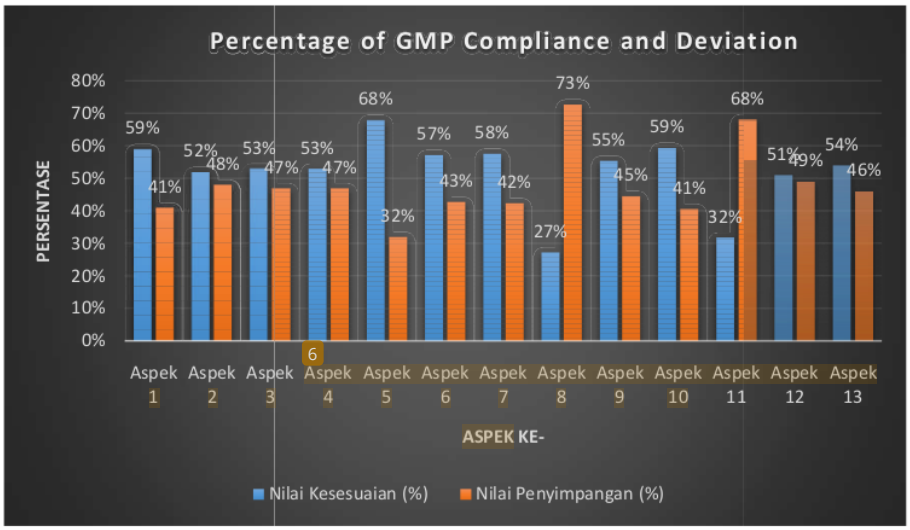

Figure. 3 GMP Conformity and Deviation Values

After analyzing the conformity and deviation values in the description of the results obtained from the Pareto diagram, it shows that of the thirteen aspects of GMP, the highest deviation value is in aspect 8, namely laboratory at 73%, followed by aspect 11, namely labeling. 68%, while the highest suitability value was in aspect 5, namely materials at 68%, followed by aspect 1, namely the environment at 59%. The deviation value in the laboratory aspect is high because in the process of tempe products produced by UKM Tempe Pacarkeling, quality checking activities have never been carried out in the laboratory, while the deviation value in the second highest label aspect is because there is no label on the Pacarkeling UKM tempe product, it is only wrapped in plain clear plastic.

5. Conclusion

Based on the research that has been carried out by the author, it can be concluded that the existing work environment conditions based on the results of observations are still far from the GMP standard, from the observations made by researchers from th 13 aspects carried out by observing the average value per aspect. the criteria are insufficient and the overall implementation value of the application of GMP in SMEs Tempe Pacarkeling Timur is included in the criteria of "VERY LESS". In the results of the assessment of the GMP aspects of Mr. Muizzi's Tempe Pacarkeling as a whole, the total value of the GMP application of all respondents obtained was 8145 points or an average of 247 points per respondent, while the percentage of deviation value was 46% and the value 54% conformity on the aspects of GMP in Mr. Muizzi's Tempe Pacarkeling Timur, which means that it does not meet the GMP criteria. The evaluation obtained from the data processing of the GMP assessment, the severity of the implementation of GMP in Mr. Muizzi's Tempe Pacarkeling UKM, is 247 points, which means that it is at the classification level ((nx2) +1) to (nx3) which is very inadequate in the

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criteria. From the assessment of the SME environment based on the aspects of GMP, the conceptual design of proposed improvements that can be done is laboratory testing on raw materials and finished products, redesigning the layout of SMEs, redesigning building designs, and designing Standard Operational Procedures (SOP). on several aspects**.**

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