



# Study of GMP and WISE Applications in UKM Amplang “Y” Samarinda

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**Abstract.** Amplang is an iconic snack of Samarinda which is mostly produced by small and medium enterprises. One of the SMEs that produced amplang in Samarinda is SMEs Ampang “Y”. Amplang “Y” was established in 2010. The production process of amplang in SMEs “Y” was conducted manually with six workers. The production process of food industries needs to comply to BPOMs’ criteria. The BPOM criteria (CPPB-IRT) were similar to Good Manufacturing Process’s criteria. Initial observation showed that not all GMP’s criteria were fulfilled. Besides products’ quality and hygiene, the food industries require to increase their productivity. Work Improvement in Small Enterprise (WISE) is a guidance for SMEs to increase their productivity through effective, efficient and simple techniques. WISE assesses 8 criterias. This paper, therefore, aims to measure the conformity of working conditions in SMEs Amplang “Y” with GMP and WISE criteria. Furthermore, this paper also intends to give suggestions for improving quality, hygiene and productivity of SMEs Amplang “Y”. The results showed that average conformity of GMP criterias was 68%, which was considered “moderate”. GMP evaluation showed that out of 14 criteria, 9 criteria classified as good, 2 criteria categorized as “low”, and the rest grouped as “moderate”. Product withdrawals (0%), and making records and documentation of the final product produced (20%) were the “low”category’s variabels. WISE evaluation presented that Prevention of fire hazards, worker welfare, and potential electrical hazards were criteria that needed to be improved.

**Keywords:** Amplang, Good Manufacturing Practice, Work Improvement in Small Enterprise, SME.

## 1 Introduction

Food safety is an important issue for collective health. Unsafe food causes a great number of acute and lifelong diseases ranging from diarrhea to various form of cancer, with more than 200 diseases spread through contaminated food [1]. To ensure the safety and quality of food, it is important to implement a preventive approach that focuses on es-

establishing quality and food safety throughout the food chain. Good Manufacturing Practices (GMP) has been considered as an important tool to ensure safety and quality of food.

In Indonesia, GMP is written in Peraturan Kepala BPOM no. HK 03.1.23.04.12.2206 year 2012 as CPPB-IRT (Cara Pengolahan Pangan yang Baik- Industri Rumah Tangga) or Good Food Processing in domestic industry. GMP/CPPB-IRT ensures that ingredients, products, and packaging materials are handled safely and that food products are processed in a suitable environment. [2, 3] GMPs determine the hazards associated with personnel and environment during food production. GMPs also apply to all parts of a food operation including receiving, storage, processing, handling, and shipping of the finished product [4]. The benefits for implementing GMP are extending the shelf and storage life of products, reducing the risk of a product or process suspension and the risk of foodborne disease, reducing product reprocessing, product rejections or complaints as well compliance with government regulation for registering PIRT number (Pangan Industri Rumah Tangga).

According to Perka BPOM number HK.03.1.23.04.12.2206 year 2012 about CPPB-IRT and Institute of Food Science and Technology, the GMP is particularly focused with management practices associated with affecting factors: product safety, product legality and product quality; product manufacture in terms of product and process control and handling of food under hygienic conditions in conformity with product, packaging and labelling specifications; and issues such as training of personnel, documentation and record keeping, suitability of premises and equipment and site standards, waste avoidance, traceability, verification activities, and preventive and corrective action and the management of customer complaints and product recall [2, 5].

Amplang, the iconic cracker from East Kalimantan, is usually produced in small industry/enterprise. Therefore, most of the industries produce amplang manually. In order to get PIRT, amplang industries need to implement GMP/CPPB-IRT. These small and medium Enterprises (SMEs) play an important role in supporting Indonesia economy. Data showed that they contributed 60% of GDP (gross domestic product) Indonesia and employed 97% or 120 million workers [6]. Although SME is important for the national economy, problems of low productivity and poor quality, as well as marketing and finance, may lead them to bankruptcy. WISE (Work Improvement in Small Enterprise) also known as "Higher Productivity and a Better Place to Work" is developed by ILO to assist small and medium-sized enterprises in improving working conditions and productivity using simple, effective and affordable techniques that provide direct benefits to owners and workers [7-9].

The objectives of this study were to assess implementation of GMP and WISE and to propose improvement in SME "Y". "Y" is a small industry that located in Amplang Village in Samarinda. It had been established since 2010. It employed 11 workers and produced 120 kg per batch in 3 days. Preliminary survey showed that SME "Y" did not have standard operating procedure for product recall. Record and documentation of production process and storage in SME "Y" also was not good organized. Considering safety and health issue, SME "Y" did not have countermeasure of fire hazard. It had ill welfare facilities and faced potential electrical hazard. Therefore, assessing the implementation of GMP and WISE was important for SME "Y". Proposed

improvement for closing the gap between checklist criteria and the real condition may increase the SME “Y” productivity and society trust of safety of amplang production.

## 2 Methods

To achieve the objective of this study, quantitative research methodology was used. The methodology was started by interviewing the owner regarding the main product and the process production, the number of workers, and hours of work. Next, after reading through GMP and WISE checklist, the researchers spent several minutes to observe the work area before starting to check. Then, the GMP and WISE data were collected.

GMP data was collected by using structured questions, observation, and individual face-to-face interviews with owner of SME “Y”. The GMP structured questions was constructed based on Perka BPOM No. 03.1.23.04.12.2206 year 2012 about CPPB-IRT [2]. The GMP evaluation was measured by 14 criteria, i.e., location and production environment, building and facility, production equipment, water supply, facility and activity of hygiene and sanitation, health and hygiene of employees, hygiene and sanitation maintenance and program, storage, quality control, food labelling, supervision by responsible person, product recall, record and documentation, and employee training. In this study, “Yes” and “No” scale was used. “Yes” was chosen if the statement represented SME “Y”’s condition, otherwise “No” was selected. To prevent bias, the “Yes/No” selection was also confirmed by the observation.

Evaluation of CPPB-IRT/GMP criteria were divided into 4 requirements, i.e., “must”, “should”, “may” and “can”. All of the questions were negative statement. Non-conformity of GMP criteria were categorized depended on the requirement. Non-conformity of “must”, “should”, “may” and “can” criteria were classified as critical, serious, mayor and minor respectively. Table 1 depicts example of structured questions of GMP.

**Table 1.** Example of GMP Checklist

No	Statement	Critical	Serious	Mayor	Minor
1.	Location and Production environment Location <b>doesn't</b> clean, free of garbage, smell, smoke and dust		[ ]		

Furthermore, to evaluate the implementation of WISE, WISE checklist was filled up by the owner and trusted employee (see Fig. 1) The questions were develop based on ILO guidance[10]. It consisted of 8 (eight) criteria, i.e., storage and material handling, physical environment, workspace design, welfare facilities, machine safety, potential electrical hazard, control of fire hazard, and working organization.

**1. Memiliki rute transportasi yang jelas dan diberi tanda.**

Apakah Anda mengusulkan tindakan?

Tidak       Ya

Prioritas

Keterangan: \_\_\_\_\_



**Fig. 1.** Example of WISE Checklist

Then, the checklist result was calculated for each criterion and sub criteria. Table 2 shows the classification of average of sub criteria of conformity. Table 3, furthermore, classifies the overall GMP score.

**Table 2.** Classification of sub criteria of GMP [11]

Nilai	Kategori
> 75%	Good
50 – 75%	Moderate
<50%	Poor

**Table 3.** Classification of GMP score [11]

Nilai	Kategori
> 75%	Good
65 – 75%	Intermediate
55 – 65%	Poor
<55%	?

Similar steps were followed to calculate the conformity in the WISE checklist. Then, the result was analyzed and improvement in non-conformity criteria was proposed. Finally, the conclusion of this study was drawn.

### 3 Results and Discussion

Production process in SME “Y” was conducted manually. The process started in milling the fish meat (usually flat fish or mackerel), mixing amplang dough, forming and cutting dough, frying and packaging. Fig. 2(a) to (e) shows the production process of amplang.



**Fig. 2.** production process of amplang. (a) milling fish meat, (b) mixing amplang dough, (c) forming and cutting dough, (d) frying and (e) packaging

### 3.1 Analysis of GMP Implementation

In this study, GMP conformity was analyzed in two aspects, i.e., with and without considering GMP 4 requirements (“must”, “should”, “may” and “can”). By considering these requirements, GMP level was distributed into four levels. The requisite for applying PIRT is level 1 or 2.

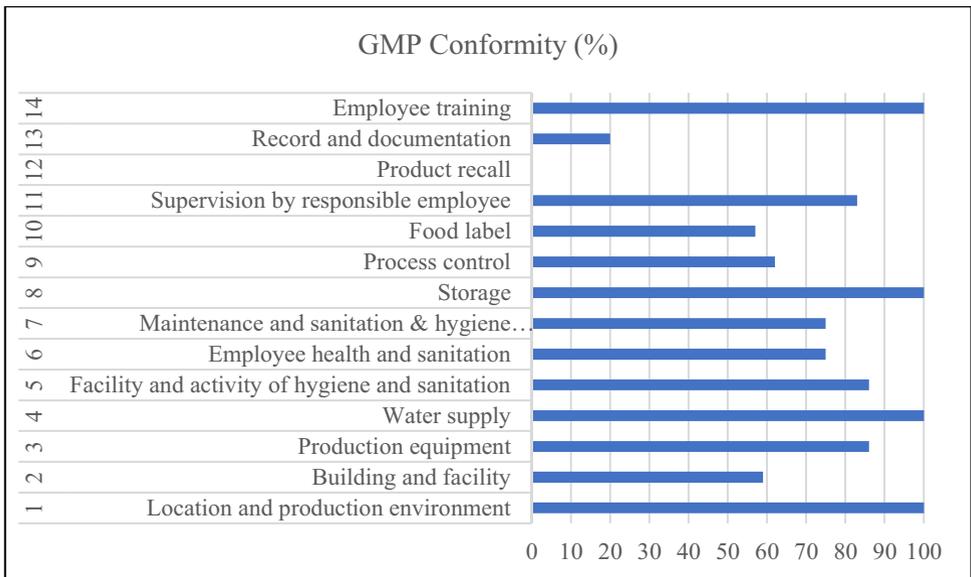
Table 4 depicts the conformity percentage of GMP in SME “Y”. It showed that SME “Y” needs to improve practices in product recall and record & documentation, which had score 0% and 20% respectively. SME “Y” has not concerned about product recall procedure since it has not been experienced recalling a batch of product before. SME “Y” had not developed a management system for recording and documentation of data. There was no periodic record of raw material and additives acceptance as well as finished product storage and selling. Employee only reported number of finished products per day verbally to the owner. The owner, then, recorded the number but did not maintain the record. In addition, SME “Y” had not established a standard flow of production process and composition. It also did not provide a schedule for cleaning the place, including the employees’ toilet.

As for building and facility aspect, SME “Y” should clean the partition between departments and ventilation in production area. Furthermore, a gauge needed to be installed in the ventilation and washbasin needed to be built in the production department. In production control aspect, SME “Y” should forbid pet (cat) to enter the production area, provide apron, plastic glove, hair protector for the production employees. SME “Y” already printed out a product label, however the label did not include the expired date and production code.

Besides those mentions before, SME “Y” had already conformed other aspects, i.e., cleanliness of location, facility, production equipment, and hygiene and sanitation facilities. It also provided clean and sufficient water supply. Furthermore, it also quite concerned about maintenance and sanitation & hygiene program. Based on those result, overall, the GMP conformity in SME “Y” was 68%, which classified as moderate.

**Table 4.** GMP assessment of production process in SME “Y”

No	Statement	Percentage	Category
1	Location and production environment	100%	Good
2	Building and facility	59%	Moderate
3	Production equipment	86%	Good
4	Water supply	100%	Good
5	Facility and activity of hygiene and sanitation	86%	Good
6	Employee health and sanitation	75%	Good
7	Maintenance and sanitation & hygiene program	75%	Good
8	Storage	100%	Good
9	Process control	62%	Moderate
10	Food label	57%	Moderate
11	Supervision by responsible employee	83%	Good
12	Product recall	0%	Poor
13	Record and documentation	20%	Poor
14	Employee training	100%	Good



**Fig. 3.** GMP conformity of UKM “Y”

Considering the GMPs’ 4 requirements (“must”, “should”, “may” and “can”), the number of critical, serious, mayor and minor non-conformity of SME “Y” were 2, 4, 2 and 1 respectively. Based on Table 5, it was classified as Level 4, which mean that SME “Y” was in need of being audited internally every day.

**Table 5.** GMP assessment criteria

Level	Frequency of internal audit	Number of non-conformities			
		Minor	Mayor	Serious	Critical
I	Every 2 months	1	1	0	0

Level	Frequency of internal audit	Number of non-conformities			
		Minor	Mayor	Serious	Critical
II	Every month	1	2-3	0	0
III	Every 2 weeks	NA	≥4	1-4	0
IV	Everyday	NA	NA	≥5	≥1

NA= not relevant

### 3.2 Analysis of WISE Implementation

Table 6 shows that some element of WISE had not obtained by SME “Y”. Several elements that need to be concerned were availability of PPE (personal protective equipment) such as apron, glove, hair protection since only one employee wore apron and availability of rest corner where employees could eat, drink and rest outside the production area. Overall, the conformity of WISE element in SME “Y” was 42% (see Table 7).

**Table 6.** WISE assessment in SME “Y”

Element	Currently condition	Picture
Material storage and handling	There was clear and ample transportation route, however no mark of transport ways. Although no mark of transport ways, employees was easy to find the way since there was no partition between departments. There were no stairs but washing area lower than production area. UKM “Y” didn’t utilize hand truck, roller or other wheeled device to move the materials.	
Workstation design	Frequently used tools and materials were put within easy reach of workers. There is no placed home for each tool. Worker sat on a small low chair without back rest	
Machine safety	There was no attach proper guards to moving parts and power transmission of the milling machine. Machine was well-maintained and had safe wiring connectors for supplying electricity.	

Element	Currently condition	Picture
Physical environment	<p>There were ventilation, wide window and open door to ensure the daylight. UMK “Y” constructed wide window in front of the stove so the hot temperature could be reduced.</p> <p>Noise appeared from milling machine; however milling process started earlier than any other process. Noise was only bothered the operator of milling machine.</p>	
Potential Electrical hazard	<p>There was no gauge on the window, door or ventilation to prevent the dust.</p> <p>There was no high voltage machine. There was a cable that peeled off. There was no warning sign for electricity hazards.</p>	
Fire hazard management	<p>UKM “Y” provided 1 (one) fire extinguisher. It was located in the storage. There was no evacuation route, safe muster point, and fire drill.</p>	
Welfare facility	<p>UKM “Y” provided adequate supply of safe drinking water in the cutting department. However, there was no resting corner and a separate hygienic place for eating needs. Employees rested and ate on cutting department.</p> <p>There was a clean toilet. UKM “Y” didn’t provide first aid equipment and trained a qualified first-aider. In addition, there was no adjustment for pregnant employee since female employee worked in cutting department which had low table for working.</p>	

Element	Currently condition	Picture
Work organization	Employees could have short rest between the production process. There was no safety and health policy so the employee had not gotten safety and health training.	

**Table 7.** WISE conformity of UKM “Y”

No.	Element	Total element	Yes	No	% conformity
1	Material storage & handing	10	2	8	20
2	Workstation design	10	5	5	50
3	Machine safety	4	1	3	25
4	Physical Environment	9	8	1	89
5	Potential electrical hazard	10	4	6	40
6	Control of fire hazard	9	2	7	22
7	Welfare facility	5	2	3	40
8	Work organization	2	1	1	50
Average					42

### 3.3 Suggestions and Recommendations

The following recommendations suggested for improving product safety:

- SME “Y” needs to develop record and documentation of the production process, such as SSOP (Sanitation Standard Operating Procedure) and SOP for production flow
- SME “Y” also needs to develop SOP for product withdrawal. Production date should be written on product label to identify when the product was produced
- Employee training about safety and health also need to be conducted
- As for ensuring the cleanliness of building, facility and production equipment, SME “Y” should execute 5S program (Seiri/sort, Seiton/set in order, Seiso/Shine, Seiketsu/standardize, Shitsuke/sustain).

The following recommendations are suggested for increasing productivity and safety & health of the employees. The recommendations involved material handling and storage, workstation design, machine safety, physical environment, potential electronic hazard, work organization.

For improving material handling and storage, SME “Y” should:

- keep a wide and clear passageway for two-way movement of people
- have clear passageway for smooth transportation of materials
- have carts/ wheeled device to move the materials
- provide good grips for all containers and packages



Fig. 4. Improvements in material handling and storage

For enhancing workstation design, SME “Y” should:

- provide convenience storage for tools
- use clamp, pliers to hold materials
- put label or color with local language on controls

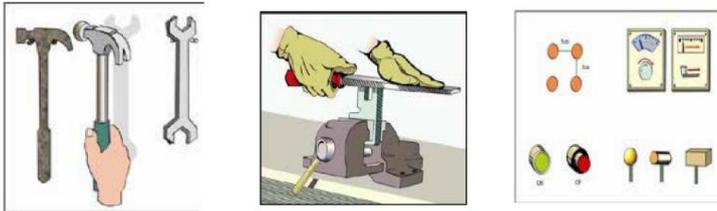


Fig. 5. Improvements in workstation design

For increasing machine safety, SME “Y” should:

- Attach proper guards to dangerous moving parts of machines
- Use barrier to prevent employee reach dangerous part when machine is running
- Make sure machines are well maintain

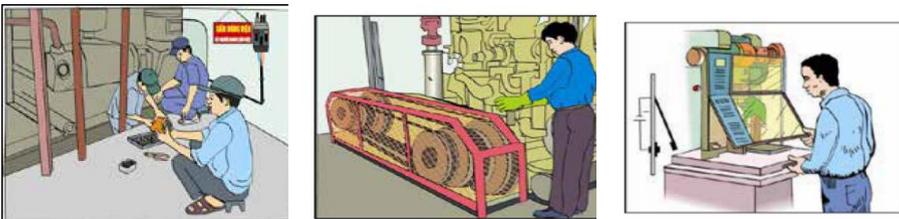


Fig. 6. Improvements in machine safety

In order to promote better physical environment and work organization as well as reducing potential electronic hazard, SME “Y” should:

- Isolate the source of dust, hazardous chemical, noise, or heat from the workplace
- Ensure safe wiring connectors for supplying electricity
- Provide rest corner for employee
- Provide employee knowledge about K3

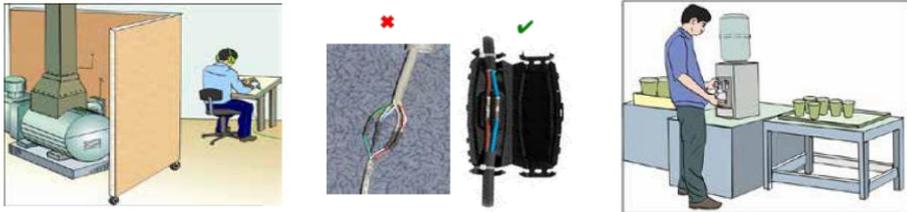


Fig. 7. Improvements in physical environment, potential electronic hazard, work organization

## 4 Conclusion

From the interpreted results of the individual face-to-face interviews that were used to supplement information from the checklist, it is evident that GMP and WISE systems are not fully implemented in SME “Y”. It is evident that partial implementation of GMP is 68% and the results confirm a need for enforcement for establishments to meet GMP requirements, which is a prerequisite for the food manufacturing establishments. In line with GMP, the WISE system also implemented partially (42%) in SME “Y”, therefore several recommendations should be followed in order to promote better workplace for employee safety and health. Enhancement of employee safety and health can increase firms’ productivity.

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