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Evaluation of the Application of Sanitation Standard Operating Procedures for Boiled Herbal Drinks in MSMEs X, Central Java Province, Indonesia

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Abstract: ***Sanitation Standard Operating Procedures (SSOP) are an important step in meeting food safety standards. In terms of field conditions, several food companies have yet to completely adopt SSOP.MSMEs X is one of the food industries in Central Java, Indonesia that produced fresh herbal drinks. This study aimed to assess the use of eight SSOP keys in MSMEs X. This study used qualitative descriptive research methodologies and was conducted in MSMEs X. The data collected was primary and secondary data. The results revealed that MSMEs X had not completely applied the eight SSOP keys.Four important processes were not carried out properly: the condition and cleanliness of surfaces in contact with foodstuffs, cross-contamination prevention, handwashing, sanitation, toilet facilities maintenance, and employee health control.The issue that needed to be addressed in the industry's adoption of SSOP was the continued demand for manual procedures for various sanitation implementations.***

Keywords: sanitation, herbal medicine, food safety, industry

1. Introduction

Jamu is a traditional health herb that has been used by Indonesians for generations to meet their health requirements[1].A back-to-nature lifestyle enhances awareness of the need of using natural ingredients (traditional medicine) as medicine. Because of the growing public interest in the use of natural remedies, the growth of the herbal medicine and healthy food industries in Indonesia has also increased, thus the prospect for the development of Indonesian traditional medicine remains open.The high number of herbal medicine consumers in Indonesia encourages the expansion of herbal medicine industry business actors, particularly Micro, Small, and Medium Enterprises (MSMEs)[2], [3]. Boiled herbal medicine or “jamu godhog” (in Indonesia) is one of the herbs that has been passed down through centuries. Boiled herbal medication is created from fresh herbal components that are packed and consumed promptly. MSMEs X is a company that makes natural herbal medications. Natural herbal medicine is a product whose quality degrades quickly since it contains various natural components that are beneficial to one's health[1]. Damage to the quality of herbal medicine items is commonly caused by a production method that does not follow Sanitation Standard Operating Procedures (SSOP)[4].SSOPs are written procedures that an establishment develops and implements to prevent direct contamination or adulteration of products in industries during processing [5].

Most people use herbal medicine because they believe it provides substantial health benefits. Food safety is an important issue considering Indonesia's fast growth in the food sector. Food safety refers to the condition and effort necessary to maintain food safe from possible biological, chemical, and other contaminants that might interfere with, hurt, or threaten human health and does not contradict people's faith, beliefs, or culture[6]. Food safety is currently linked with small-scale businesses due to insufficient sanitation and hygiene practices[7]. Food safety may be maintained if producers have a system in place to prevent their products from not fulfilling the specified requirements. Quality and nutrition dictate that the home industries have to obtain a household industry food production certificate called SPP-IRT provided by the public health office or food and drug control agency of Indonesia for larger industries [8]. To acquire SPP-IRT, numerous factors are considered, including the location and environment of production, buildings, facilities, equipment, sanitation, staff, and so on, as indicated in the rules on Good Manufacturing Practices (GMP) for the household industry[9].

GMP is one of the indicators that sanitation in production operations has been carried out properly. Through GMP, the food industry can produce quality food, suitable for consumption, and safe for health[8]. The systematic application of the GMP standard in the form of SSOP documentation is a step forward toward meeting food safety requirements[6]. Documentation in the form of SSOPadds value to food enterprises' capacity to penetrate the export market in compliance with the destination country's trade rules. SSOPs in the processing unit, the company has implemented eight SSOP keys which include water and ice supply, surfaces in direct contact with the product, prevention of cross-contamination, maintaining handwashing facilities, cleaning chemical and sanitary ware, labeling and storage, employee health and hygiene, and pesticide control[4]. The implementation of SSOP in some small industries in Indonesia has been studied in the food processing industry such as Carica juice, fish, squid, and crackers processing [9]–[13], This study aimed to evaluate the application ofSSOP in MSMEs X.

2. Research Methods

This research was conducted at MSME X in Jepara Regency, Central Java Province, Indonesia. The method

used in this study was a qualitative descriptive method. The data used were primary and secondary. Primary data was obtained from direct observations at the research site and interviews with employees and company owners. Secondary data was obtained from company documentation which was then analyzed by looking at eight key aspects of SSOP requirements that must be applied in a company, especially in producing herbal medicine.

3. Results and Discussion

According to the data, MSMEs X has a fairly excellent use of SSOP for small and medium-sized industrial scales. This was demonstrated by the company's proper accomplishment of eight major parts of SSOP requirements. The company also has enough facilities to assist in the completion of SSOP requirements, as described below:

1) Water Safety

MSMEs X usedgood-quality water. The water source used comes from good water sources with characteristics: colorless (clear), tasteless, and odorless. Water quality testing was carried out periodically. The water source used was not only to produce herbal medicine but also used for the sanitation of tools and individual purposes. Water safety can never be taken lightly. Unsafe water, which results due to direct contamination or improper or inadequate water treatment processes generally result in a contaminated food products[14].

2) Cleanliness of surface in contact with foodstuff

a) Cutting tools

This cutting tool was used to peel and cut rhizomes before they were mashed. A knife constructed of non-rusting materials was utilized as the cutting instrument (stainless steel). The purpose of choosing a stainless steel knife is to minimize the occurrence of rusty knives, which can contaminate the raw materials of brewing herbs and cause safety in raw materials to be not assured again. The company does not discriminate between which knife is used for which rhizome while using this knife. This can result in cross-contamination of rhizome raw components. Before and after use, this knife tool isalways cleansed with safe dish soap and clear running water. After being thoroughly cleaned, this knife was stored in a clean and secure location. The company's manual description of the procedure of cleaning cutting instruments was not written but rather delivered verbally. This explanation demonstrates that the hygienic conditions of the cutting instruments used in the company's herbal medicine process of production are inadequate.

b) Chopping board

This cutting board is used for the base of cutting rhizomes when before mashing. The cutting boards used are numerous. The type of material chosen was a cutting board made of wood and plastic. Research states that there was a danger of using a wooden cutting board, namely the absorption of *Salmonella* bacteriacarried over from raw food, bacteria can seep into the wood and settle in it. In addition, bacteria and fungi also easy to multiply in the pores of this cutting board. With the dangers posed by the use of wooden cutting boards, the company did not explain why they used wooden cutting boards for the herbal medicine production process. In addition, cutting boards used for one rhizomewith another rhizome are not distinguished. The alternating use of cutting boards for all types of rhizomes will lead to the occurrence of cross-contamination of rhizome raw materials. However, MSMEs X always sanitizes this cutting board such as washing all types of cutting boards cleanly using safe dish soap and clean running water before the production process and after the production process so that the cutting board to be used is avoided bacteria and germs. After washing well, the cutting board is then stored in a safe and clean place. This proves that the company pays enough attention to the cleanliness of the tools used as a base in the process of cutting raw materials. However, in every cleaning process, there was no manual procedure in writing but the procedure is explained orally.

c) Washbasin

This basin was used as a reservoir for rhizomes that have been cut into small pieces before mashing. The basin used is a plastic basin. The reason for using a plastic basin is that besides not being able to rust, plastic basins are easy the washing process to avoid contamination. Basins on each type of rhizome are distinguished and are not used at alternating times.The sanitation carried out for this basin is that before use and after use, the basin is first washed using safe dish soap and clean running water to avoid germs and bacteria that are still attached to the basin. In every cleaning process, there was no manual procedure in writing but the procedure is explained orally.

d) Rhizome smoothing tool

This smoothing toolwas used to smooth the rhizome material used to produce “Jamu Godhog”. The grinding tool used by MSMEs X was a blender made of plastic and a grinding knife made of material that is not easy to rust (*stainless steel*). Stainless steel blender knives are used to avoid the occurrence of rusty knives that can contaminate raw materials and can cause safety in raw materials not guaranteed again. Sanitation blender is done by washing before use using safe dish soap and also clean running water at the time before the production process and after the production process. Then the blender is stored in a clean and safe place. This proves that the cleanliness condition of the blender used in the process of grinding the raw materials of the rhizome was quite good.

e) Sieve

This sieve was used to filter the results of rhizomes that have been mashed using a blender. This filter aimed to separate the pulp and also water from the filter. The sieve used in the production process is a sieve made of nylon material and has a hole cavity that does notbig. The sieve uses nylon material and a small cavity makes the sieve not rust and the pulp can be filtered perfectly.The sanitation carried out on this filter is before use and after use, this filter was washed using laundry soap and clean water first. After washing, this filter can only be used and stored in a clean and safe place.

f) Wok

This pan was used for the cooking process of water from filtering raw materials that have been mashed. The pan used here was a pan that has aluminum material, was concave in shape, and has large in size. The reason for choosing an aluminum pan is that it is not easy to rust. The use of large and concave pans aims to collect filtered water used in large quantities. Sanitation that was carried out on the pan was in the form of washing the pan after the production process is complete and before the production process.

g) Plastic crates

This plastic crate is used to hold cooked herbal powder. This plastic crate uses plastic material and is large in size. This plastic crate uses plastic material and is large in size because it is easy in the sanitation process and it can accommodate a lot of herbal powder produced. The sanitation carried out on this plastic crate is washing before and after the production process so that it is exposed to germs and bacteria that stick.Sanitation is carried out using safe dish soap and clean running water. After washing, the box is stored in a safe place andcleaned. However, in every cleaning process, there is no manual procedure in writing but the procedure is explained orally.

3) Prevention of cross-contamination

Cross-contamination can create harborage sites for microorganisms, especially when those surfaces or items are improperly cleaned and sanitized [15], [16]. Employees at MSMEs X have been taught and have understood the importance of sanitation and hygiene for the quality and safety of the product. Starting from employees cleaning their bodies before going to the company, washing their hands using soap before entering the production room, not wearing jewelry and watches, using clean clothes, using slippers specially prepared by the company for use while in the production room,using masks, use gloves, use head coverings for male ones, and cover wounds with bandages if any employee suffers injuries. All these applications were carried out by all employees. With this implementation, some employees feel uncomfortable with the rules applied on the grounds of heat, stuffiness, itching, and much more. However, the company still enforces the implementation even though some employees complain to maintain the quality and safety of products.Employee behavior that can cause cross-contamination in MSMEs Xwas that employees often talk to other employees without masks. Employees are not used to wearing masks for long periods.

The company has a lot of rooms that are well organized. This was evidenced by every room from the receipt of raw materials to the storage of products already using a limiter. The process of receiving raw materials was carried out on the ground floor and the process of storing finished products is on the upper or second floor.

4) Facilities ofhandwashing, sanitation, and toilet

Employees can use hand soap at the handwashing station. The soap used was an antiseptic liquid soap, which is effective in killing germs that attach to the hands. This hand soap is provided in the outside restroom before entering the manufacturing room. The necessity of cleanliness was understood by all firm personnel. Employees will automatically wash their hands before entering the production room and after using the restroom. Employees were aware that the items they manufacture are herbal products that must maintain quality security

The enterprise's restrooms or toilets were not adjacent to the production room. The company's restrooms were already fairly clean. Every morning before starting work, the office lad cleans the toilet. The restroom facilities were adequate, with trash cans supplied, however, there were no hand dryers or tissues. Furthermore, the toilet door is constantly closed to avoid contamination from the toilet. Employees are quite aware of the need of keeping the toilet clean.

5) Protection from contaminants

Every day, MSMEs X generates a large amount of garbage. The garbage was transferred once the manufacturing process was done. The garbage was then disposed of in a location behind the facility to be burnt quickly so that bacteria and flies did not accumulate and pollute the company's surroundings. Waste that can be utilized as organic fertilizer, on the other hand, will be used as organic fertilizer. Then, hazardous items such as insecticides, cleaning agents, disinfectants, and other chemicals were stored in a separate room away from the manufacturing area. This treatment was used to keep the product from becoming contaminated with dangerous chemicals. When doing sanitation with hazardous products, sanitary material mixing was done away from the workers.This procedure was used to keep the product free of potentially hazardous substances. When doing sanitation with hazardous products, sanitary material mixing was performed distant from the point of production. Typically, sanitary materials were mixed outside of the manufacturing room, which was in a separate room away from the production site.

6) Labeling, Storage, and Use of Toxin Ingredients

The MSMEs X utilized paper labels with normal ink for product labeling. The ink on the label is resistant to fading and will not harm the final product. This label contains the product's name, content, instructions for product presentation, description, and net weight.

According to the standards, the finished products were subsequently packaged in a large cardboard box with the necessary amount of product. The cardboard is then sealed with tape and placed in the storage space for completed products, which was located on the second floor across from the manufacturing area. The manufactured goods already meet market demand. If marketing requires that a product be produced again, the company will comply. The utilized storage area already complies with criteria such as cold room temperature, objects not coming into direct contact with floors and walls, the room being clean and free of insects, and the room's door being permanently secured and inaccessible to random individuals.

7) Health employees control

Employees of MSMEs X were concerned about hygiene. Before entering the manufacturing room, employees wash

their hands using the provided hand soap. The staff then enter a designated room or locker to keep their luggage and change into company-supplied apparel and slippers. Before entering the locker, staff must remove their shoes and place them on the supplied shelves outside the production area. Two lockers are provided. One for ladies and one for gentlemen. The lockers contain liters of water for employees who need to hydrate but do not want to leave the production area.

These lockers provide personnel with cool air conditioning, locker cabinets, and enormous panes of glass. In addition, the locker contains protective clothing that cannot be removed from the manufacturing room to prevent contamination. Employees are prohibited from wearing hand jewelry and watches. If an employee is ill, he or she may request time off. The corporation does not conduct health checks on its employees, but it does provide health insurance for each employee.Heath employee control is one important factor to support the success of food processing companies[17].

8) Pest Control

MSMEs X keep their manufacturing company clean. This is evidenced by the lack of pests in this establishment. In addition, the animals that roam the premises are missing. Following the production process, any garbage that remains is put directly into the trash can, with nothing left on the floor.

Evaluation of SSOP Implementation

Evaluation of SSOP implementation in MSMEs X is presented in Table 1.

Table 1: Evaluation of SSOP Implementation

SSOP Keys	Real Condition	Ideal Condition
The safety of water	• The water used comes from a regional drinking water business, and it is used for more than just washing. • Water is also utilized for component addition raw material production	• Water in touch with food, equipment, and manufacturing processes must be safe and derived from clean water or water that has been mee the quality standard
Condition and cleanliness of surfaces in contact with foodstuffs	• The cutting knife and the blender knife are both made of stainless steel. • A wooden cutting board and a plastic cutting board are both utilized • The basins and crates are made of easy-to-clean plastic. • All tools are washed before and after use.	• All food-contact equipment and supplies must be designed and constructed from materials that are simple to clean. • Equipment and supplies must be cleaned using efficient procedures.
Prevention of cross-contamination	• Employees do not wear jewelry. • Employees continue to interact with one another. • When the production process begins, employees wear masks, head covers, and scabbard hands.	• During the manufacturing process, employees should not wear jewelry. • Throughout the process, workers are not permitted to speak. • Compulsory workers wear masks, head coverings, and gloves.
Maintain handwashing, sanitation, and toilet facilities	• Employees have easy access to sanitation and handwashing facilities. • There is currently no available hand dryer machine. • There are four toilets available, and they are kept clean.	• Workers should have easy access to sanitation and handwashing facilities. • Installation of a hand dryer machine. • The provision of toilets should be sufficient for 50-100 workers, with at least three toilets kept clean.
Protection from contaminants	• There are separate storage areas for food and non-food ingredients. • The garbage can is located behind the company, away from the production area. • There should be a suggestion from an expert regarding the pest-repellent ingredients used.	• Foods and non-foods must be protected from physical, chemical, and biological contamination, respectively. • The premises are spacious and distant from the production site. • The use of chemicals should adhere to the applicable regulations.
Correct labeling, storage, and use of toxin ingredients	• Labeling complies with specified requirements. • Food and non-food ingredients have not been stored with equal care.	• Packaging must be capable of minimizing physical, chemical, and biological contamination.
Employee health control	• The company did not offer any health screenings. • Those who are afflicted with illness are permitted to take time off.	• Employee health supervisors and checks should be performed regularly. • Workers who are ill or have wounds can be a source of contaminants in the processing process, packaging, and final products.
Pests control	• There is no waste left over from production. • No factory pests or animals are roaming around the factory.	• The production site must be tidy; no materials should be left lying around. • Plant pests like insects and rodents should not be present in production areas, warehouses, or other areas.

4. Conclusion

According to the findings of the research, the MSMEs X in the implementation of standard operating procedures for sanitation (SSOP) has not been properly implemented. Four critical stages have been neglected: the condition and

cleanliness of surfaces in contact with foodstuffs, cross-contamination prevention, handwashing, sanitation, toilet facilities maintenance, and employee health control.

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