Application of critical control points with the scoring method in the flavoring industry in Indonesia

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Abstract. The aim of the study is to evaluate of application of critical control points (CCP) with the scoring method in the flavoring industry. Application of CCP in food industry is very important to maintain food safety in the product. To obtain data, the observation in flavoring food industry, interviews, recording, and literature study were conducted by comparison of scoring method that has been prepared. The conclusions from this research were the scoring method could be used to improve food safety and to make easier to implementation of critical control points in the flavoring industry.

1. Introduction

Food quality control is a step to ensure food safety by every food industry. The food industry in Indonesia needs to apply the Critical Control Point (CCP) method in the production process so that the products produced do not pose a danger to consumers. CCP is a quality control of food safety with various factors that affect ingredients, products and production processes to product packaging.

The CCP is a preventive system that is controlled at critical control points of materials or process stages to determine how conditions or process stages must be treated appropriately to ensure that the products produced by the company are safe and meet the requirements. The stages in implementing CCP include the raw material handling stage, the raw material selection stage, the preparation stage, the processing stage and until the serving food on the table. CCP is a quality management system to maintain food safety that is based on a strategy for preventing hazardous substances and the risk of poisoning the human body from a product at a critical point in the processing series [17].

Determination of Critical Control Points (CCP) is an identification at each stage in the process that is not controlled properly can cause danger. Critical limits are defined tolerances and must not be exceeded (to ensure CCP is under control). These limits can be quantitative or qualitative. Monitoring / monitoring is a planned action to observe and test the effectiveness of controlling a CCP. Monitoring can provide early warning of irregularities, prevent / reduce losses, and help localize and solve problems that arise. Corrective action is a planned remedy against monitoring results that indicate that a particular CCP is out of control. If there is a deviation, it should be returned to the actual process. Furthermore, the product produced at the time of the deviation needs to be identified.

Verification is an action to ensure whether the CCP system is running effectively according to plan, or if modifications need to be made. Verification can be in the form of audits or microbiological tests on processed products. Records (Documentation) are all procedures and records regarding these
principles and their application needs to be documented. The aim of the study is to evaluate of application of critical control points (CCP) with the scoring method in the the flavoring industry.

2. Material and Methods
Observation, namely collecting data by observing and observing directly an object of activity. Observations are carried out on all processes carried out from receiving raw materials, production processes to final products. Scoring method to know what is the condition of fact using value. Interview, namely data collection by conducting direct questions and answers to the herbal industry company. The next step is documentation and literature study.

| Table 1. Scoring of CCP |
|-------------------------|
| **Highest** | **High** | **Medium** | **Small** | **Thin** |
| Very likely | 10 | 9 | 8 | 7 | 6 |
| More likely | 9 | 8 | 7 | 6 | 5 |
| might | 8 | 7 | 6 | 5 | 4 |
| rarely | 7 | 6 | 5 | 4 | 3 |
| impossible | 6 | 5 | 4 | 3 | 2 |

**Table 2. Scoring criteria of CCP**

| Criteria | **Score** |
|----------|-----------|
| Impact of very danger | 9-10 |
| Impact of great danger | 7-8 |
| Impact of medium danger | 5-6 |
| Impact of small danger | 3-4 |
| Impact of low danger | 1-2 |

Source: [1].

High risk (High risk product). This type of product must not be processed or manufactured and any irregularities must be corrected and corrected. Products must be detained or stopped in the production process so that they are not marketed and tested for safety.

Medium Risk (Medium risk product). This type of product can be processed, but it needs to be repaired in a short time (within a few days). Special monitoring is required until all irregularities are resolved.

Low Risk (Low risk product). This type of product may be processed, but it must be corrected and repaired. The product is still subjected to regular monitoring to ensure the status of the risk which may turn into a medium or high risk.

3. Result and Discussion
The determination of critical limits is a limit that has been determined so that it cannot be contaminated by CCP, the determination of critical limits is the separation between safe and unsafe on the product. This limit is done in order to maintain the safety of the quality of the products that have been produced. The critical limits in the EMP (Meat Powder Extract) process and the critical limits in the raw material production process that have been determined by the seasoning industry in Indonesia are seen in Table 3.

| Table 3. Critical point of Processing of EMP |
|---------------------------------------------|
| **CCP** | **Rial Hazard** | **Critical point** |
| Drying (raw chicken meat) | TPC, *Salmonella* | Temperature in 120°C ± 5°C |
| Metal Catching | Heavy metal | 0 |
| Sterilisasi *Chicken Fat* | TPC, *E.coli* | 0 |
The drying process is carried out to reduce the moisture content in the raw material and in the bulk production process so that when the temperature does not match the standard, the product will still have a high moisture content, therefore the temperature given during the drying process is in accordance with the predetermined standards if it will not there may be microbiological growth in the product after packaging. So that the drying process is given a score of 9 because it is possible to grow microbes.

The methal catcher process in the raw material production process and the bulk production process did not find metal because the production process did not use metal so it was impossible for metal material to be carried away until the product had been packed, therefore the methal catcher process was given a score of 6 because it was impossible metal on the product.

The process of sterilizing chicken fat in the raw material production process is carried out using a predetermined temperature according to the standard, if the sterilization check by the QA department shows that the chicken fat is not sterile, the chicken fat cannot be used so that the chicken fat is discarded, if the chicken fat is used, the raw material will be overgrown by microbes due to the process of adding unsterile chicken fat. Therefore the chicken fat sterilization process is given a score of 8 because there may be microbial growth.

The sieving process in the raw material production process is used to separate granules that are of standard size, granules that are too large and the process of taking wood chips, threads, and rope. Therefore the sieving process is carried out so that the debris does not enter the product. The sieving process is given a score of 7 therefore flakes rarely get into the product.

Corrective action is taken if monitoring fails to take place so that corrective action will function to ensure that the products produced are safe for consumption. Corrective action aims to correct the causes of deviations in the CCP, rearrange a process such as heating temperature, and rearrange a control on the CCP. Corrective action may include decisions on handling non-conforming products, correcting the causes of product deviations, and repeating a process to ensure CCP compliance. If a CCP is found, the production process is temporarily stopped until the cause of the CCP is found, in the metal catching process a correction process will be carried out, namely by looking for the CCP source and taking the metal which is then carried out up to 3x checks if there is still metal, the checking process is carried out until it is not found materials that can endanger consumers.

Verification is an activity that determines that the production system is running according to plan, and verifies that at the check in the QA department there is nothing that can be dangerous to the consumer's body so that the verification process is carried out by analyzing samples by QA so that QA provides information that in the analysis there are no ingredients that are found, dangerous. Tool verification is carried out for 1x for 1 month.

### Table 4. CCP score

| CCP | Real hazards | Scoring |
|-----|--------------|---------|
| Drying (raw chicken meat) | TPC, *Salmonella* | 9 |
| Metal Catching | Logam berat, | 6 |
| Sterilisasi Chicken Fat | TPC, *E.coli* | 8 |
| Drying product | TPC, *Salmonella* | 9 |
| Sieving | Material like ropes, woods, chips | 7 |
| Metal catcher | Metal Materials | 6 |
Verification is the application of methods, procedures and other evaluations that complement monitoring to ensure compliance with the HACCP plan. Typical verification procedures include establishing an inspection schedule, reviewing CCP records, reviewing reports of irregularities and corrective actions, performing random sample collection and analysis, visual inspection of production operations to ensure CCPs are under control, and re-critical point deviations and their handling measures.

| Critical Control Point | Verification |
|------------------------|--------------|
| Drying                 | Drying product | Shift leader, QC |
| Metal catcher          | Capture metal catcher | Shift leader operator |
| Sterilization chicken fat | Good or not | QA department |
| Drying of raw materials | Drying product of raw materials | Operator, operator |
| Sieving                | The result of sieving to separate impurities | QC internal |
| Metal catcher          | The result of metal withdrawal in the product | QC internal |

Table 5. Verification of CCP

Document or data verification that has been carried out by QA is an action that has been taken to smooth the production process. Documentation is an important part of the CCP plan so that it can be used during inspections. Documentation can also serve as evidence during an audit of the CCP procedures applied. CCP records also include verified production flow charts, corrective actions, monitoring reports, critical point data. CCP records must be accompanied by date or time, operator signature, observational data, and signature of the reviewer.

| Critical Control Point | Documentation |
|------------------------|---------------|
| Drying of EMP process  | Result of inlet temperature used |
| Metal catcher          | Check sheet verification of metal catcher, check sheet metal catcher |
| Sterilization of chicken fat | Data verification analysis of QA department |
| Drying of raw materials | Result of inlet temperature used 1|
| Sieving                | Check sheet verification sieving by internal QC |
| Metal catcher of raw materials | Data Check sheet verification of metal catcher |

Table 6. Dokumentation of CCP

4. Conclusion
The conclusion of this study is that the scoring method can be used in the spice industry in Indonesia. In this study it can be concluded that the score on drying raw materials is 9, metal catching 6, sterilization 6, product drying 9, sieving 7, and final catching metal 6. This shows that the need for continuous improvement according to the stages of the score has been found to make it easier for the process to be improved. that will be done.
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