Product Safety Management System (PSMS) in Pyrethrum Value Chain of Kenya

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Introduction

A product safety management system (PSMS) helps in managing and enforcing food and feed safety, to ensure that the pyrethrum value chain product meets high and acceptable quality and safety standards. It therefore assists in reducing customer complaints or legal disputes.

What is PSMS

Product Safety Management System (PSMS) is a controlled program used to ensure a product is safe and meets quality standards. The PSMS considers every step of development production, from farm to finished products. It ensures a defined process for every activity and function related to product safety. PSMS helps food businesses create a food safety plan and outlines procedures that must be followed to ensure food safety.

In addition, PSMS should also follow the principles of Hazard Analysis Critical Control Point (HACCP). Each step is responsible for forming key procedures based on this principle.

Why is PSMS Important

PSMS assures pyrethrum producers, suppliers and processors that pyrethrum products are effective and safe. It guarantees that every potential risk has been planned and thought through. An example of such risks in pyrethrum could be the adverse effects of indiscriminate and injudicious pesticide application that results in reduced pyrethrin content in the flower and possible pesticide residue, which could by carried by the pye product into the pesticide manufactured.

Key Elements of Product Safety Management System

To set up an effective Product Safety Management System (FSMS) in the pyrethrum value chain, there are several key elements that need to be considered. These include Interactive Communication, Prerequisite Programs, System Management, and HACCP Principles. Each of these plays a crucial role in ensuring that pyrethrum PSMS is robust and effective in safeguarding product and food safety.

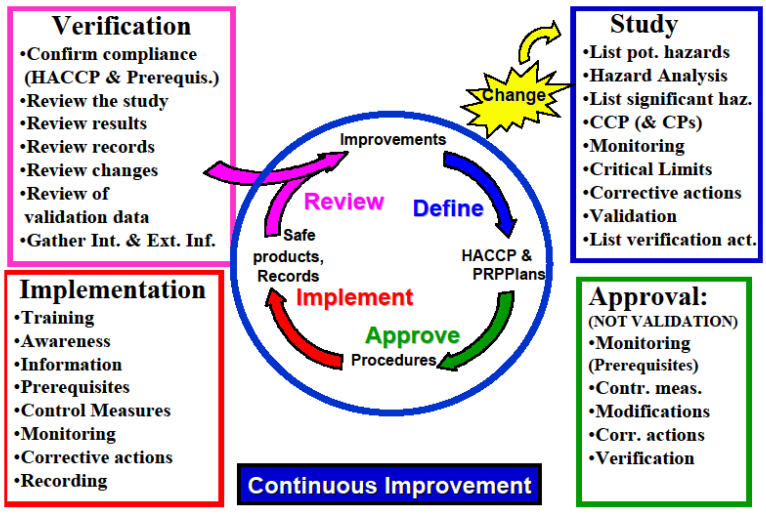

Fig. 1: *Overview of FSMS*

a. Interactive Communication

Interactive communication is a vital component for successful pyrethrum FSMS. This involves clear, timely, and effective communication between all pyrethrum value chain actors such as between producers, suppliers, distributors, staff members, and even customers.

This type of communication ensures that all parties are aware of any potential food safety hazards, changes in procedures, or updates in regulation. It also fosters an environment where responsibilities are clearly defined and understood and where any issues or concerns can be promptly addressed.

b. Prerequisite Programs

Prerequisite programs are basic conditions and activities necessary to maintain a hygienic environment throughout the pyrethrum value chain suitable for the production, handling, and provision of safe pyrethrum end. These include measures that guard against contamination of the product:

- Proper sanitation and hygiene practices: Regularly clean and disinfect all surfaces and equipment, ensuring hand washing facilities are readily available for staff and customers.
- Pest control measures: Implementing effective pest prevention methods, such as regular inspections, sealing entry points, and proper waste disposal to minimize the risk of infestations.
- Waste management: Proper segregation and disposal of waste according to local regulations, promoting recycling and reducing environmental impact.
- Training of staff in product safety practices: Providing comprehensive training on product handling, storage, and preparation, emphasizing the importance of personal hygiene and following food safety guidelines.

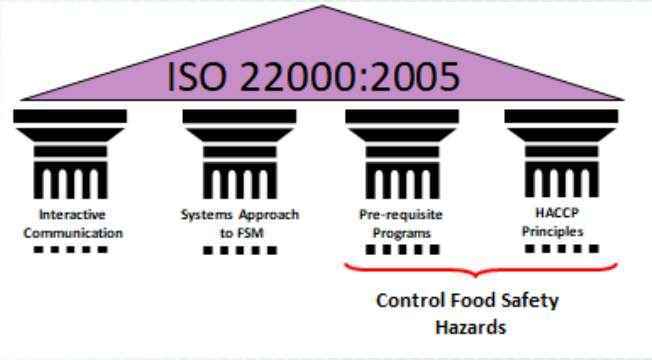

Fig. 2: *The flow chart of key elements for FSMS*

c. System Management

System management refers to the organizational structure, procedures, processes, and resources needed in order to implement, maintain, and continually improve the PSMS. It process includes:

- Leadership commitment: Demonstrate a strong dedication to food safety through active involvement and setting clear expectations for all team members.
- product safety policies: Develop and implement comprehensive policies that prioritize food safety and outline guidelines for handling, storing, and processing.
- Planning: Establish effective processes for identifying and managing potential food safety risks, including proper training and resources for staff.

- Support services: Provide necessary resources, such as training programs and equipment, to ensure compliance with product safety standards and regulations.
- Operation processes: Implement robust procedures and protocols for maintaining cleanliness, hygiene, and proper product handling practices throughout all stages of operations.
- Performance evaluation: Regularly assess and measure the effectiveness of product safety practices, using metrics and feedback to identify areas for improvement and recognize achievements.
- Improvement procedures: Continuously enhance product safety practices by implementing corrective actions, conducting regular audits, and staying informed about industry best practices and emerging trends.

Effective system management ensures that product safety is a shared responsibility and is integrated into daily operations. At the same time, it provides a framework for continual improvement and adaptation to changing circumstances.

HACCP Principles

Hazard Analysis Critical Control Point (HACCP) is an internationally recognized system for reducing the risk of safety hazards in food and non-food consumer products. The HACCP system does this by identifying physical, allergenic, chemical, and biological hazards (steps) in production processes that can cause the finished product to be unsafe and designs measurements to reduce these risks to a safe level. It forms the backbone of any FSMS and should be implemented by all food businesses regardless of their size or scale.

Table 1. HACCP Principles

Principle 1	Conduct a hazard analysis.
Principle 2	Determine the critical control points.
Principle 3	Establish critical limits.
Principle 4	Establish monitoring procedures.
Principle 5	Establish corrective actions.
Principle 6	Establish verification procedures.
Principle 7	Establish record-keeping and documentation procedures.

Fig 3: *HACCP principles should be applied as shown and continues throughout*

Every Critical Control Point (CCP) must be assigned a critical limit, which represents the minimum or maximum value. The remaining HACCP principles will require the following:

Monitoring procedures: These are the methods and processes used to regularly track and assess the progress, performance, or status of a particular system or activity.

Verification procedures: These are the steps taken to confirm or validate the accuracy, completeness, or effectiveness of a process, system, or product.

Corrective actions: These are the measures or steps taken to rectify or resolve any identified issues, problems, or non-conformities.

Documentation procedures: These are the established guidelines or processes for creating, recording, organizing, and managing documents and records related to a particular system,

process, or project.

Implementing an FSMS is a methodical process guided by a step-by-step approach that tailors the system to the specific needs and objectives of a food business. With a clear vision and commitment, food establishments can develop and maintain a robust FSMS that ensures the provision of safe food and complies with regulatory standards.The five key steps involved in developing and implementing an FSMS are:

a. Step 1: Identify Needs, Scope and Objectives

The first step in creating an PSMS involves identifying the needs and the scope of the system. It's essential to clarify the types of pyrethrum products, the processes involved, and the risks associated. Establishing the objectives of the PSMS, which might include compliance with standards, improving customer satisfaction, or minimizing food safety hazards, lays the foundation for what the system should achieve.

A PSMS should start with product business operators asking themselves why they need a system, what their goals are, and how the system will help achieve these objectives. To ensure that the PSMS meets product and food safety requirements, it's essential to involve product and food safety experts in this step.

b. Step 2: Establish a Product Safety Policy

Developing a food safety policy is a vital step in articulating the commitment to maintaining food safety. It provides a clear guideline for handling, storing, and preparing products safely. The policy needs to be communicated and understood across all levels of the organization and should be reviewed and updated regularly to reflect any changes in food and product safety regulations or operations.

A Product Safety Policy should contain procedures for managing complaints and reporting product safety issues, ensuring that everyone within the system is vigilant and accountable. It is essential to have the policy written down and displayed in prominent locations within the food establishment. By doing so, the policy will serve as a constant reminder of the organization's commitment to food safety.

c. Step 3: Develop a Hazard Control Plan

A hazard control plan, based on the principles of HACCP, is essential in identifying and managing product safety risks.This step requires thorough knowledge of the food production process and should be carried out by a team with expertise in food safety. The pyrethrum product business should develop a hazard control plan for every product being introduced or sold.

This plan should include the following aspects:

- ***Identification of Hazards:*** This involves identifying potential hazards that could compromise product quality and safety, including biological, chemical, and physical hazards. These could come from raw materials, the environment, or poor handling practices.

- ***Determination of Critical Control Points (CCPs):*** Critical Control Points are stages in the product production process where control is crucial to prevent, eliminate, or reduce a food safety hazard to an acceptable level.

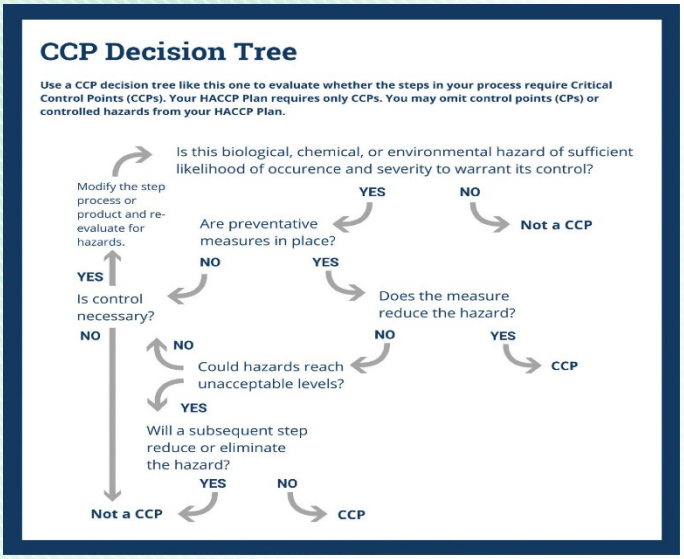

Fig. 5: *Decision tree for CCP identification*

- ***Establishment of Critical Limits:*** For each CCP, a maximum and/or minimum value must be determined at which the hazard can be controlled. These values can be related to temperatures, times, moisture levels, pH, and other parameters that can be measured and monitored.
- ***Monitoring of Critical Control Points:*** Regular monitoring of CCPs is vital to ensure the process is under control at each CCP. The frequency of monitoring should be sufficient to guarantee the CCPs are in control.
- ***Development of Corrective Actions:*** In cases where monitoring indicates a deviation from an established critical limit, defined corrective actions must be taken to bring the process back under control.
- ***Verification Procedures:*** Verification procedures ensure that the hazard control plan is functioning as intended. Verification activities include reviewing the records, recalibrating, measuring, and monitoring equipment, or taking product samples for detailed analysis.
- ***Record Keeping:*** Detailed and accurate documentation provides evidence of effective compliance with agreed safety procedures. Records should include details about hazard identification, CCP determination, critical limits, monitoring system, and actions taken to correct potential process deviations.

d. Step 4: Follow Prerequisite Programs

Prerequisite programs provide the foundational conditions for an PSMS. They establish basic practices and conditions necessary for maintaining a hygienic environment suitable for product production and handling. Examples of prerequisite programs are GAP, GHP and GMP:

1. ***Good Agricultural Practices (GAP):*** GAPs are a collection of principles for on-farm production and post-production processes, resulting

in safe and healthy food and non-food agricultural products. The application of GAP ensures that the products are produced, processed, and handled in the safest possible manner while considering economic, social, and environmental sustainability.

2. ***Good Hygiene Practices (GHP):*** GHPs form the basis for effective product safety controls, focusing on conditions and measures necessary to ensure the safety and suitability of product at every step of the food chain. Key GHP areas in an PSMS include premises design and facilities, cleaning and sanitation, pest control, personal hygiene, waste management, and storage.

3. ***Good Manufacturing Practices (GMP):*** GMPs are guidelines that dictate the aspects of production and testing that can impact the quality of a product. In the context of a pyrethrum safety management system, GMPs ensure that the pye product and finished product are consistently produced and controlled to quality standards. They cover various aspects of manufacturing, including sanitation and hygiene, personnel qualifications, equipment verification, process validation, and complaint handling.

Implementing these PRPs as part of an PSMS can significantly enhance food and product safety, minimize risks, and ensure compliance with food and product regulations and standards.

e. Step 5: Measure the Effectiveness of the System

The effectiveness of the PSMS should be measured and evaluated regularly. This involves monitoring and verification procedures to ensure compliance with the established food safety policy and objectives. Regular audits and reviews provide valuable insights into the system's performance, identifying areas for improvement and acknowledging successful practices. It is through this continuous evaluation and improvement that an PSMS remains effective and compliant over time.

Questions to Consider When Assessing FSMS

When evaluating the efficacy of a Product Safety Management System (PSMS), specific questions need to be asked to gain a comprehensive understanding of its performance. These questions are meant to scrutinize each critical aspect of the FSMS, identifying potential areas of improvement while also highlighting effective practices. These assessments contribute to a more secure, efficient, and compliant food safety management system.

- Is the product safety policy clearly defined, regularly reviewed, and communicated across all levels of the organization?
- Are potential hazards effectively identified and evaluated for each step in the product production process?
- Are critical control points (CCPs) correctly identified and sufficiently controlled?
- Do established critical limits adequately control the identified

hazards?

- Is the monitoring of critical control points regular and consistent?
- Are there predefined corrective actions in place for when deviations from critical limits occur?
- Are verification procedures being implemented effectively to ensure the functionality of the hazard control plan?
- Is there a thorough documentation and record-keeping process detailing all aspects of the PSMS?
- Are prerequisite programs (GMP, GAP, GHP) properly implemented and followed?
- Is there a regular review and audit process in place to measure the effectiveness of the PSMS?
- Are there plans for continual improvement and updating of the PSMS in line with evolving regulations, standards, and business operations?
- Is there sufficient training and competency among the staff to execute the PSMS effectively?
- Is there a strong commitment from the management towards food safety and adherence to the PSMS?

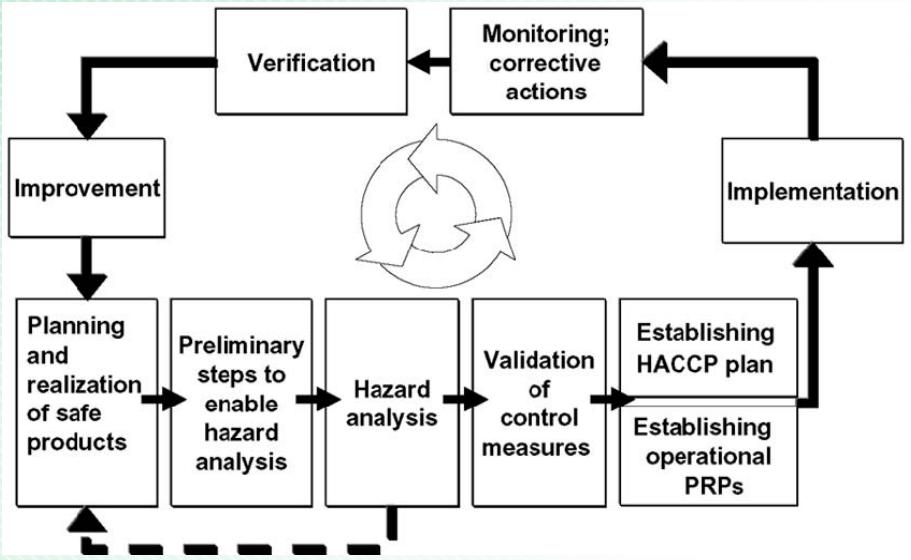

Fig. 6: *FSMS process model*

Frequently Asked Questions (FAQs)

Q1: What's the role of a product safety team in an PSMS?

The product safety team plays a crucial role in developing and implementing the PSMS. They are responsible for conducting hazard analysis, determining CCPs, setting critical limits, monitoring procedures, and developing corrective actions and verification procedures. They also ensure the PSMS complies with the necessary regulations and standards.

Q2: Can an PSMS be integrated with other management systems?

Yes, an PSMS can be integrated with other management systems such as Quality Management System (QMS) or Environmental Management System (EMS). This allows for a unified approach to managing an organization's different compliance requirements, reducing duplication and promoting consistency.

Q3: What's the importance of management commitment in an PSMS?

Management commitment is vital for the success of an PSMS. It is the management's role to provide the necessary resources, set the organization's product safety policy, establish objectives, conduct management reviews, and lead by example in following and endorsing the PSMS.

Q4: How is the effectiveness of an PSMS measured?

The effectiveness of an PSMS is measured through regular audits and reviews, which assess compliance with the established food safety policy and objectives. These audits also identify areas for improvement and acknowledge successful practices, ensuring the continuous evolution and effectiveness of the PSMS.

Q5: What is a product safety audit?

A product safety audit is a systematic examination or review of the PSMS. It assesses the system's compliance with regulatory requirements, the effectiveness of the system in ensuring product safety, and the identification and control of product safety hazards.

Q6: How often should an PSMS be reviewed?

An PSMS should be reviewed regularly to ensure its continued relevance and effectiveness. The frequency of reviews could be annually, but it might be more often depending on the organization's size, type, complexity, when significant changes occur in operation, or the food safety regulations.

Conclusion

A well-implemented Product Safety Management System (PSMS) is paramount to maintaining the quality and safety of pyrethrum products. It helps organizations identify and control product safety hazards, ensuring the final product is safe for consumption.

Regular reviews and audits are essential to gauge the PSMS's effectiveness and pinpoint areas of improvement. While implementing and maintaining an PSMS can be challenging, the benefits it brings in terms of regulatory compliance, product safety, and customer trust

are well worth the effort.

As regulations and standards continue to evolve, the importance of an effective Product Safety Management System (PSMS) cannot be overstated. Implementing a robust PSMS not only ensures compliance but also safeguards consumer health and maintains trust in the industry.

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