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FOOD SAFETY USING HACCP QUALITY MANAGEMENT SYSTEM

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INTRODUCTION

Food business is one of the fastest growing industries in India. The opportunities for success are greater than ever. While food contamination can happen after food has been bought and taken home, some food industries are still having problems in consistently providing safe food. Therefore we need an approach that will address the basic issue of how to achieve safe food all the time.

Food safety is about making sure that food products are safe to eat. Put simply, it means taking care with all aspects of food production and preparation to make sure that the final product is safe without any contamination. A preventive approach to food safety ensures that the manufacturer examines every stage of the process, identify the essential procedures and make sure process standards / parameters remain consistent. The way to do this is to establish and maintain a food safety programme. If your food is safe you can be confident that your business will be safe. Your customers will place their confidence in food produced under a food safety programme.

WHAT IS FOOD SAFETY PROGRAMME?

A food safety programme is a set procedure to produce safe and hygienic food every time. It involves a thorough examination of a process in order to identify and control the hazards that could make the food you produce harmful to eat. Simply stated it asks “What might go wrong, and how do I make sure it doesn’t?”. Food safety programme make sure that all the people working in your business are committed to producing safe and hygienic food by involving

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in the entire production, processing and distribution stage of the product. Food safety problems become easier to spot before they happen which leads to confidence in your product, because you will have control over the process.

General Objectives of Food Safety Programme:

- Identify the essential principles of food hygiene applicable throughout the food chain (starting from raw material reception to final product), to achieve the goal of ensuring that food is safe and suitable for human consumption.
- Recommend a HACCP based approach as a means to enhance food safety.
- Indicate how to implement those principles.
- Provide guidance for specific codes which may be needed for sectors of the food chain, processes or commodities to amplify the hygiene requirements specific to those areas.

Food safety programme will need an expert technical advice to help in identifying the hazards and to take necessary controls. Internationally it is recognized that the ideal tool to give assurance of food safety is the Hazard Analysis Critical Control Point (HACCP), a Food Safety Quality Management system.

HACCP SYSTEM

HACCP is an abbreviation for the Hazard Analysis Critical Control Point, which is synonymous with food safety management. It is a system which identifies, evaluates, and controls hazards which are significant for food safety. HACCP is a system that gives confidence that food safety is being managed effectively. HACCP was developed originally as a microbiological safety system in the early days (1960s) of the US manned space programme, as it was vital to ensure the safety of food for astronauts. The Pillsbury Company working alongside the National Aeronautics and Space Administration (NASA) of the USA and the US Army Laboratories developed the original system.

A *Hazard* as used in the HACCP system is defined as “a biological, chemical or physical agent in, or condition of food, with the potential to cause an adverse health effect”. Critical Control Point (CCP) is “a step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level”. HACCP is based on the

principle that hazards affecting food safety can be either eliminated or minimized by prevention during production rather than by inspection of the finished product. Its goal is to prevent hazards at the earliest possible point in the food production or distribution chain. The HACCP approach can be applied right from harvest to the point of consumption. Adding HACCP to traditional inspection and quality control activities would lead to a preventive quality assurance system in a company. Companies using the HACCP system will be able to provide greater confidence about food safety to consumers as well as to food regulatory authorities.

The application of HACCP may require a fundamental change in the culture or attitudes of those involved in food processing. It also requires focused record keeping and documentation even though many of the procedures to be documented themselves may remain unchanged. It is very important that all the people working in the company understand the HACCP system and that they maintain it. The adoption of HACCP simply to satisfy a regulatory requirement has the potential to lead to failure in that company. The HACCP system and guidelines for its application were developed by the Codex Committee for Food Hygiene on the Codex Alimentarius Commission, a joint Food Standards Programme of the Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO).

PRINCIPLES OF HACCP

It is important to identify the possible hazards that can occur at every stage of the food business from growth, processing, manufacturing, storage and distribution, until the point where it is sold to the customer. As far as possible manufacturer should consider how the customer might handle it too. The HACCP system consists of seven principles, which outline how to establish, implement and maintain a HACCP plan for the operation under study.

Principle 1: Identify hazards

Identify potential hazards (microbiological, chemical and physical) associated with all stages of the production, using a flow diagram of the steps applied in the process. Assess the likelihood of occurrence of the hazards and identify preventive measures for their control.

- i. Microbiological Hazards:

Any bacterium, virus, or protozoan that is capable of causing illness and that grows or may be carried on food. Well-known examples of bacteria are *Campylobacter*, *Listeria* and *Salmonella*. It is important to have some understanding of the risks associated with different types of microbiological hazards.

ii. Chemical Hazards:

Examples include excessive or toxic amounts of *heavy metals, chemicals, pesticides, herbicides, insecticides, vitamins, minerals, preservatives, disinfectants, detergents* and *cleaning compounds*. Some hazards may be naturally present such as in green potatoes or rhubarb leaves.

iii. Physical Hazards:

Objects that get into food or are already present in food may cause illness, injury or distress to the person eating it. Some examples are *glass, metal fragments* etc. Other contaminants such as hair or insects may be offensive but not necessarily a danger to health.

Principle 2: Determine critical control points

Determine the points/procedures/operational steps that can be controlled to eliminate the hazards, or minimize the likelihood of occurrence, or reduce the hazards to an acceptable level. This means identifying whether it is the essential step to control an identified hazard. Also different types of hazard may have critical controls at different steps in the process.

- i. **Control points** are the points in the food processing chain where it is possible to control or remove hazards.
- ii. **Critical control points** are the control points in the processing chain where it is essential to a hazard, usually because there is no later step at which to establish control.

Principle 3: Establish critical limits

Establish critical limits (target levels and tolerances), which must be met to ensure the CCPs are under control. They must involve a measurable parameter and may also be known as the absolute tolerance or safety limit for the CCP. After each control point is identified, decide how to check whether it is under control during processing. This may be by observation or by measurement (such as temperature or time). Critical limits for critical control points are

measurements such as temperature and time. Critical limits need to be validated after a certain time period regularly.

Principle 4: Establish a monitoring system

It must be assured that the critical limits are always effective, it is important to set up a system to monitor and record control at the critical control point. Monitoring is the regular measurement or observation of a critical control point to ensure it is not beyond its critical limits. The monitoring system must ensure that any loss of control at the critical control point can be determined in certain time period to take corrective action before the product is rejected.

Information obtained from monitoring must be assessed by someone who has the knowledge and authority to carry out corrective actions when needed. Quick on-line chemical and physical measurements and observations are better than microbiological tests that take time to analyze. In practice a system is required to record observations. All records and documents must be signed by the person doing the monitoring and by a responsible reviewing official of the food production system.

Principle 5: Establish corrective action

Corrective action to be taken when monitoring indicates that a particular CCP is moving out of control. Decide exactly what corrective action to be taken to control a particular critical control point which is out of control. We need to think about reprocessing or dumping the affected product. Take corrective action to bring the process back under control before the problem (deviation) leads to a safety hazard. Consider proper management (disposition) of any adversely affected product. Document each and every corrective action taken in the HACCP records.

Principle 6: Establish verification procedures

Once the HACCP system is established, set up procedures to verify (check) that the system works. Verification procedures are tests and programmes that make sure the HACCP system working properly. Examples of verification include reviewing the HACCP system and its records to ensure that controls are effective. Reviewing corrective action reports to ensure that the corrective actions were undertaken to demonstrate that control has been maintained.

Principle 7: Establish record keeping and documentation requirements

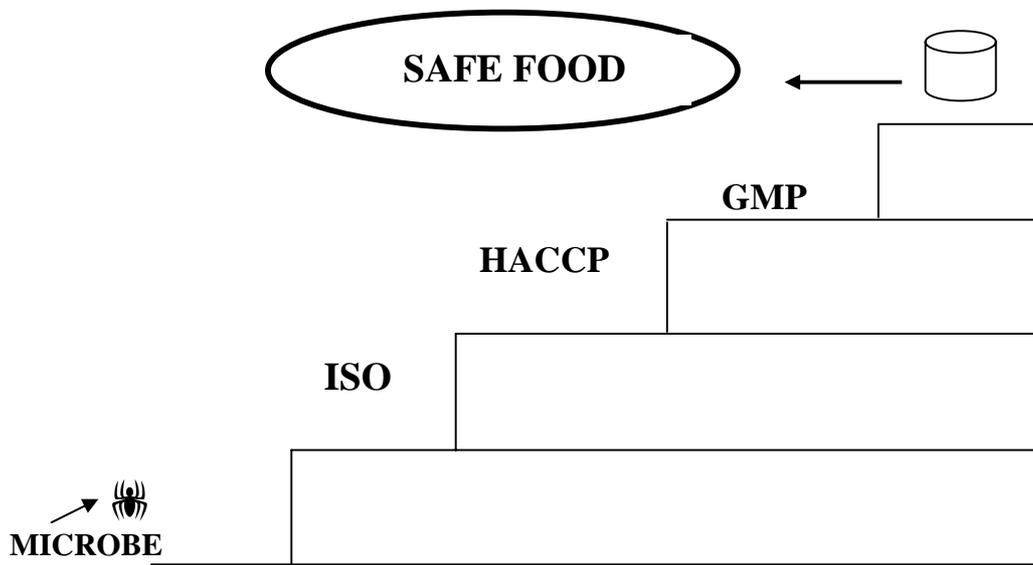
The level of documentation required will depend upon the needs and the complexity of the food business. In a small business, a simple log book or diary may be all that is needed. If your business is bigger or more complex, more detailed or formal documentation will be necessary. Record keeping and documentation systems must meet the needs of the business and be adequate to show that the food safety programme is working without any deviation.

HACCP and ISO 9000

The food industry is highly regulated by local, national and international laws relating to food safety. More importantly consumers are very careful in their buying decisions relating to raw or processed foods. Consumers usually feel more confident when they have evidence of quality management during the manufacturing of food and beverages, in addition to supervision by food regulators.

The ISO 9000 family of standards is generic in nature and has been developed to assist organizations of all types and sizes that wish to implement and operate a Quality Management System (QMS). There are no restrictions on its implementation by any sector of industry, including the food and beverage industry. Large and small companies that process and/or package food products worldwide have implemented ISO 9000 and obtained third party certification. These companies may also use HACCP or similar systems as part of their quality assurance system. Many companies today are using both ISO 9000 and HACCP as an integrated food safety and quality management system. Applying HACCP within an ISO 9000 QMS can result in a food safety system that is more effective than applying ISO 9001 or HACCP separately. The emphasis of both systems is prevention rather than correction of problems or deficiencies after they occur. A company implementing a HACCP system does not have to comply with ISO 9001 but it is desirable. HACCP forms tool in controlling hazards that may be harmful to humans and provides a hurdle to microbes to multiply further. Hence a safe food is guaranteed by increasing the number of hurdles which can tackle growth of microbes effectively. These hurdles may include Good Manufacturing Procedures (GMP), ISO etc. together with HACCP system. An example of *Hurdle Technology* is clearly depicted in the figure represented below.

HURDLE TECHNOLOGY



Hurdle Technology provides good number of hurdles for spoilage microorganisms either in the form of Food Quality Management System (GMP, HACCP, ISO etc.) or in the form of processing parameters (Acidity, Temperature, Pressure etc.) before they can reach the food item. The whole process takes enough time in the form of *hurdle* for any microbe to spoil the food product thus increasing the shelf life, quality, sensory attributes of the food item. Practicing different Food Quality systems together in the whole system will be of great advantage for achieving better quality product and consumer satisfaction.

CONCLUSION

Food Safety, HACCP and other Quality management System looks for hazards, or anything that could go wrong regarding product safety and implements controls subsequently to ensure that the product will not cause harm to the consumer. Food Safety system mainly focuses on identifying and preventing hazards that may lead product to deteriorate. Food Safety system permits more efficient and effective government oversight and places responsibility for ensuring safe food to consumers from the food manufacturer. It helps food companies compete more effectively in the world market by reducing barriers to international trade.

HACCP helps in reducing the risk of manufacturing and selling of unsafe products and thus providing better confidence to consumers. Food regulatory authorities in many countries are adopting or likely to adopt HACCP and other Food Quality Management systems as a part of their Food Safety system in order to ensure safe food reaching the consumers.

FURTHER READING

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