

HAZARD ANALYSIS & CRITICAL CONTROL POINT SYSTEM

(A Guide for Food Manufacturers / Producers)



Small and Medium Enterprises Development Authority

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1. INTRODUCTION OF SMEDA

The Small and Medium Enterprise Development Authority (SMEDA) was established with the objective to provide fresh impetus to the economy through the launch of an aggressive SME development strategy. Since its inception in October 1998, SMEDA had adopted a sectoral SME development approach. A few priority sectors were selected on the criterion of SME presence. In depth research was conducted and comprehensive development plans were formulated after identification of impediments and retardants. The all-encompassing sectoral development strategy involved overhauling of the regulatory environment by taking into consideration other important aspects including finance, marketing, technology and human resource development.

After successfully qualifying in the first phase of sector development SMEDA reorganized its operations in January 2001 with the task of SME development at a broader scale and enhanced outreach in terms of SMEDA's areas of operation. Currently, SMEDA along with sectoral focus offers a range of services to SMEs including over the counter support systems, exclusive business development facilities, training and development and information dissemination through a wide range of publications. SMEDA's activities can now be classified into the three following broad areas:

1. Creating a Conducive Environment; includes collaboration with policy makers to devise facilitating mechanisms for SMEs by removing regulatory impediments across numerous policy areas
2. Cluster/Sector Development; comprises formulation and implementation of projects for SME clusters/sectors in collaboration with industry/trade associations and chambers
3. Enhancing Access to Business Development Services; development and provision of services to meet the business management, strategic and operational requirements of SMEs.

SMEDA has so far successfully formulated strategies for sectors, including fruits and vegetables, marble and granite, gems and jewelry, marine fisheries, leather and footwear, textiles, surgical instruments, transport and dairy. Whereas the task of SME development at a broader scale still requires more coverage and enhanced reach in terms of SMEDA's areas of operation.

Despite the structural shift towards industrialization, agriculture sector is still the largest sector of the economy with deep impact on socio-economic set up. Knowing this fact, SMEDA, since its inception, is highly committed to enhance the competitiveness of local food processing industry in the country. SMEDA 'Agro Food Services' offers a wide range of services to support the industry, including; Identification of potential investment opportunities in the sector, development of business plans and feasibilities etc. Training and capacity building and hand holding of entrepreneurs.

2. DISCLAIMER

Form of this document and the contents therein are provided only for general information purpose and on an "as is" basis without any warranties of any kind. Use of this document is at the user's sole risk. SMEDA assumes no responsibility for the accuracy or completeness of this document, its form and any of the information provided therein and shall not be liable for any damages arising from its use.

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3. What is HACCP?

HACCP is a systematic preventive approach to food safety from biological, chemical, and physical hazards in production processes that can cause the finished product to be unsafe, and designs measurements to reduce these risks to a safe level. In this manner, HACCP attempts to avoid hazards rather than attempting to inspect finished products for the effects of those hazards. HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product. It is a systematic preventive approach to food safety from biological, chemical, and physical hazards in production processes that can cause the finished product to be unsafe, and designs measurements to reduce these risks to a safe level. HACCP is based on following 7 principles:

1. Conduct a hazard analysis
2. Identify critical control points
3. Establish critical limits for each critical control point
4. Establish critical control point monitoring requirements
5. Establish corrective actions
6. Establish procedures for ensuring the HACCP system is working as intended
7. Establish record keeping procedures

4. What is importance of HACCP for SMEs?

SMEs contribute substantially to the production, manufacture and retail of food in Pakistan. It is evident that a considerable proportion of food and food products are produced, processed and sold by SMEs and the safety of their operations affects the integrity of the entire food chain. HACCP is important because it prioritizes and controls potential hazards in food production. By controlling major food risks, such as microbiological, chemical and physical contaminants, the industry can better assure consumers that its products are as safe as good science and technology allows. By reducing foodborne hazards, public health protection is strengthened.

5. What HACCP does?

An effective implementation of HACCP leads to:

- a) Better product quality;
- b) Better product pricing;
- c) Improved sales and profiting;
- d) Improved product and business reputation.

6. Why HACCP?

Processors and consumers awareness / consciousness is increasing day by day, especially processors involved in the export industry are being forced by their customers to get HACCP certification in order to continue the business.

National & International Scope:

In Pakistan Pure Food Rules there is no such provision of this system but food hygiene and safety is emphasized. Increase number of terms are being used to describe the scope of this system, 'farm to fork', stable to table, and gate to plate. As a matter of fact, HACCP is for every one and encompasses the entire food chain. That's why it is said that full benefits of HACCP can only be obtained if it is applied throughout the supply chain, i.e. from product design and incoming material suppliers through manufacturing and distribution up to the preparation and consumption by the end user.

Commercially this system is mainly applicable to;

1. All food processing facilities/factories:
 - Fish industry
 - Meat industry
 - Beverage industry
 - Cereal Industry
 - Confectionary Industry
 - Dairy industry · Sugar Industry
 - All other food processing concerns
2. Hotels & Restaurants
3. Hospitals
4. Specialized areas where effect of food may become critical.

7. HACCP in Pakistan

In Pakistan, the agriculture sector contributes to about 25 percent of the national GDP. Processing of agricultural products for diversification, value addition and quality assurance can further enhance the contribution of agriculture to the national economy through minimizing wastage of agricultural/food products, promoting export of such products, etc. The main sub-sectors of the food processing and packaging industries in Pakistan are dairy processing (milk, powder milk), seafood, fruit and vegetable processing, grain processing, sugar processing, vegetable oil processing, beverage production, packaging (metal, polyethylene, plastic, paper and paperboard). Although Pakistan possesses a fairly developed manufacturing base, food processing has not kept pace with overall industrial development. The major reasons for the developmental lag of the processed food industry are: short supply of meat and dairy products; the perishable nature of fruits and vegetables; lack of adequate refrigeration and transportation

facilities; shortage of packaging and storing facilities; and lack of incentives to encourage the processing of foods and their exports. Awareness of comprehensive quality assurance systems in the small- and medium sized food processing enterprises is low. It is only the exporting organizations that are aware of the international standards of ISO 9000 and are following them. In Pakistan around 2,000 organizations are already ISO 9000 certified. There are about 400 food processing companies and about 30 percent are ISO certified. Many other companies, especially those in the export business, are moving to get ISO certification. Presently the HACCP is implemented in 18 approved establishments/plants which are processing and packaging seafood for export. HACCP is mandatory according to the Pakistan Fish Inspection and Quality Control Act, 1997, and Rules, 1998.

8. How to implement HACCP?

The application of HACCP principles consists of the following tasks:

i. Assemble HACCP team

The food operation should assure that the appropriate product specific knowledge and expertise is available for the development of an effective HACCP plan. Optimally, this may be accomplished by assembling a multidisciplinary team. Where such expertise is not available on site, expert advice should be obtained from other sources. The scope of the HACCP plan should be identified. The scope should describe which segment of the food chain is involved and the general classes of hazards to be addressed (e.g. does it cover all classes of hazards or only selected classes).

ii. Describe product

A full description of the product should be drawn up, including relevant safety information such as: composition, physical/chemical structure (including A_w , pH, etc.), microcidal/static treatments (heat-treatment, freezing, brining, smoking, etc.), packaging, durability and storage conditions and method of distribution.

iii. Identify intended use

The intended use should be based on the expected uses of the product by the end user or consumer. In specific cases, vulnerable groups of the population, e.g. institutional feeding, may have to be considered.

iv. Construct flow diagram

The flow diagram should be constructed by the HACCP team. The flow diagram should cover all steps in the operation. When applying HACCP to a given operation, consideration should be given to steps preceding and following the specified operation.

v. On-site confirmation of flow diagram

The HACCP team should confirm the processing operation against the flow diagram during all stages and hours of operation and amend the flow diagram where appropriate.

vi. List all potential hazards associated with each step, conduct a hazard analysis, and consider any measures to control identified hazards

The HACCP team should list all of the hazards that may be reasonably expected to occur at each step from primary production, processing, manufacture, and distribution until the point of consumption.

The HACCP team should next conduct a hazard analysis to identify for the HACCP plan which hazards are of such a nature that their elimination or reduction to acceptable levels is essential to the production of a safe food.

In conducting the hazard analysis, wherever possible the following should be included:

- the likely occurrence of hazards and severity of their adverse health effects;
- the qualitative and/or quantitative evaluation of the presence of hazards;
- survival or multiplication of microorganisms of concern;
- production or persistence in foods of toxins, chemicals or physical agents; and
- conditions leading to the above.

The HACCP team must then consider what control measures, if any, exist which can be applied for each hazard.

More than one control measure may be required to control a specific hazard(s) and more than one hazard may be controlled by a specified control measure.

vii. Determine Critical Control Points

There may be more than one CCP at which control is applied to address the same hazard. The determination of a CCP in the HACCP system can be facilitated by the application of a decision tree, which indicates a logic reasoning approach. Application of a decision tree should be flexible, given whether the operation is for production, slaughter, processing, storage, distribution or other. It should be used for guidance when determining CCPs. This example of a decision tree may not be applicable to all situations. Other approaches may be used. Training in the application of the decision tree is recommended.

If a hazard has been identified at a step where control is necessary for safety, and no control measure exists at that step, or any other, then the product or process should be modified at that step, or at any earlier or later stage, to include a control measure.

viii. Establish critical limits for each CCP

Critical limits must be specified and validated if possible for each Critical Control Point. In some cases more than one critical limit will be elaborated at a particular step. Criteria often used include measurements of temperature, time, moisture level, pH, A_w , available chlorine, and sensory parameters such as visual appearance and texture.

ix. Establish a monitoring system for each CCP

Monitoring is the scheduled measurement or observation of a CCP relative to its critical limits. The monitoring procedures must be able to detect loss of control at the CCP. Further, monitoring should ideally provide this information in time to make adjustments to ensure control of the process to prevent violating the critical limits. Where possible, process adjustments should be made when monitoring results indicate a trend towards loss of control at a CCP. The adjustments should be taken before a deviation occurs. Data derived from monitoring must be evaluated by a designated person with knowledge and authority to carry out corrective actions when indicated. If monitoring is not continuous, then the amount or frequency of monitoring must be sufficient to guarantee the CCP is in control. Most monitoring procedures for CCPs will need to be done rapidly because they relate to on-line processes and there will not be time for lengthy analytical testing. Physical and chemical measurements are often preferred to microbiological testing because they may be done rapidly and can often indicate the microbiological control of the product. All records and documents associated with monitoring



CCPs must be signed by the person(s) doing the monitoring and by a responsible reviewing official(s) of the company.

x. Establish corrective actions

Specific corrective actions must be developed for each CCP in the HACCP system in order to deal with deviations when they occur.

The actions must ensure that the CCP has been brought under control. Actions taken must also include proper disposition of the affected product. Deviation and product disposition procedures must be documented in the HACCP record keeping.

xi. Establish verification procedures

Establish procedures for verification. Verification and auditing methods, procedures and tests, including random sampling and analysis, can be used to determine if the HACCP system is working correctly. The frequency of verification should be sufficient to confirm that the HACCP system is working effectively. Examples of verification activities include:

- Review of the HACCP system and its records;
- Review of deviations and product dispositions;
- Confirmation that CCPs are kept under control.

Where possible, validation activities should include actions to confirm the efficacy of all elements of the HACCP plan.

xii. Establish Documentation and Record Keeping

Efficient and accurate record keeping is essential to the application of a HACCP system. HACCP procedures should be documented. Documentation and record keeping should be appropriate to the nature and size of the operation.

Documentation examples are:

- Hazard analysis;
- CCP determination;
- Critical limit determination.

Record examples are:

- CCP monitoring activities;
- Deviations and associated corrective actions;
- Modifications to the HACCP system.

9. What are the benefits of HACCP to the business?

HACCP based procedures provide businesses with a cost effective system for control of food safety, from ingredients right through to production, storage and distribution to sale and service of the final consumer. The preventive approach of HACCP based procedures not only improves food safety management but also complements other quality management systems. The main benefits of HACCP based procedures are:

- Saves your business money in the long run
- Avoids you poisoning your customers
- Food safety standards increase
- Ensures you are compliant with the law
- Food quality standards increase
- Organizes your process to produce safe food



- Organizes your staff promoting teamwork and efficiency
- Due diligence defense in court.

10. What is the cost of HACCP certification?

Individual based certification in Pakistan can be obtained from the Food authorities of the respective provinces on a cost as low as 1100/- Rs. For certification of the restaurant or food business accredited bodies can be contacted which upon initial inspection would decide the cost of the certification which will be valid for one year.

11. What is the procedure to avail the HACCP certification?

In the very first step a certified accredited body is approached for certification. Business registration documents along with the application for is submitted by Company (as Manufacturer, supplier, distributor or Producer) with following credentials:

- Company Name
- Processing / Plant Info
- Applicant should submit a list of all products produced by the company

When an application is obtained at Certification Body, the concerned office will screen the documents submitted by applicant. If the documents are found complete in all respects, the application is ready for further submission at next stage for scrutiny and audit otherwise application will be rejected. First stage in processing is the documents review by Audit Team & Inspection Committee consists of Islamic academician, food scientist, industrial manufacturing specialist (like Department of Livestock in case of slaughter house). After the first audit and Inspection clearance, documents will be evaluated and inspection report will be generated. If the report contains acceptable number of nonconformities, HACCP certificate will be issued for a period of 1 year during which the entire process will remain subject to review and observation as and when felt appropriate by the Audit and Inspection Committee during the currency of that period.

12. Who are the major accredited bodies working in Pakistan for HACCP Certification?

Following are the major accredited bodies:

- Bureau Veritas Certification (BV Certification)
- SGS Pakistan (Pvt.) Limited, Systems and Servicer Certification
- Moody International (Pvt.) Limited
- Pakistan Systems Registrar
- RICCI Pakistan
- CeSP (Certification Services Pakistan)