

## CASE STUDY

# Implementation of Hazard Analysis of Critical Control Points (HACCP)

*-- A Food Safety Management  
System in Pakistan*



**PAKISTAN INSTITUTE OF QUALITY CONTROL**

304, 3<sup>rd</sup> Floor, Eden Centre, 43 Jail Road

Lahore – Pakistan

Ph: (+92 42) 7563645-7562260 Fax: 7552656

E-mail: [piqc@brain.net.pk](mailto:piqc@brain.net.pk); Web Site: <http://www.piqc.com.pk>

# Implementation of Hazard Analysis of Critical Control Points (HACCP),

*“A Food Safety Management System”, in Pakistan*

by

Mr. Muhammad Abdul Basit  
Manager Quality Systems

Chaudhry Dairies Limited

## WHAT IS HACCP?

**HACCP** (Generally pronounced as “Hyssop”) stands for “**Hazard Analysis of Critical Control Points**”. It is a systematic and science based approach for identification, assessment and control of food safety hazards. From a practical point of view, it is the most effective tool to prevent the occurrence of food borne diseases and to avoid consumer injuries and illness linked to consumption of products.

HACCP has been internationally acknowledged by FAO/WHO through Codex Alimentarius, Ag Canada and International Life Science Institute (ILSI). It is becoming increasingly mandatory for all food business as an effective means of ensuring food safety, quality and as a mean of complying with new legislation. As a regulation, it has been embraced by USA, UK, European Union, Japan, Canada, Australia and New Zealand till now.

HACCP can easily be incorporated into ISO 9000 or TQM based quality management systems and has got very strong relationship with systems like Risk Management, Good Manufacturing Practices, Good Laboratory Practices, Preventive Maintenance Systems, Non Safety Regulatory Requirements and Standards Sanitary Operations Practices (SSOP). (HACCP and ISO relation diagram annex – 6))

## HISTORY OF HACCP

- 1960 – NASA (National aeronautics and space administration) & U.S.Military Natick Laboratory - to establish risk of Salmonella infection.
- 1971 - HACCP Concept took proper form in National Conference on Food Protection.
- Pillsbury Company used it in U.S space program. To make the food free from food borne hazards (bacterial & viral) to use it in space. Dr. Bauman
- 1973 – First comprehensive treatise on HACCP was published by Pillsbury Company. HACCP principles were developed in very primary form and FDA inspectors were trained.
- 1985 – HACCP was recommended by National Academy of Science (NAS) USA
- 1987 – National Advisory Committee on Microbiological Criteria for Foods (NACMCF) was established.

- 1989 – National Advisory Committee on Microbiological Criteria for Foods (NACMCF) gave the final approval for HACCP document, and it was sent to cabinet secretaries of department of agriculture, health and human services.
- 1989 – NACMCF published - HACCP Guidelines titled “HACCP Principles for Food Production (Famous HACCP Seven Principles).
- 1989 – NACMCF’s HACCP Guide addressed only microbiological hazard, however, it was intention of the committee to include chemical and physical hazards. In the system.
- 1989 - Chemical and Physical hazards were included in the HACCP system.
- 1992 – Updated version was published by NACMCF that was compatible to the Codex Committee report on Food Hygiene, published in 1991.
- 1995/6 – HACCP was first time used in US Regulations
- 1997 – UN/Codex Alimentarius HACCP System was developed and adopted by US regulatory authorities.
- 2000 – Not only USA but Europe as well as many other areas in the world have accepted this as a food safety system through legislation
- 2000 – Today this concept has expanded on following lines:
  - a) Medical Devices
  - b) Market-driven HACCP
  - c) Regulatory-driven HACCP
  - d) Integrated product safety system (e.g. “farm-to-table”; “concept-to-end-use”)

## SCOPE:

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.

## **WHY HACCP**

### *BENEFITS:*

Successful implementation of HACCP brings along;

### *PRIMARY BENEFITS*

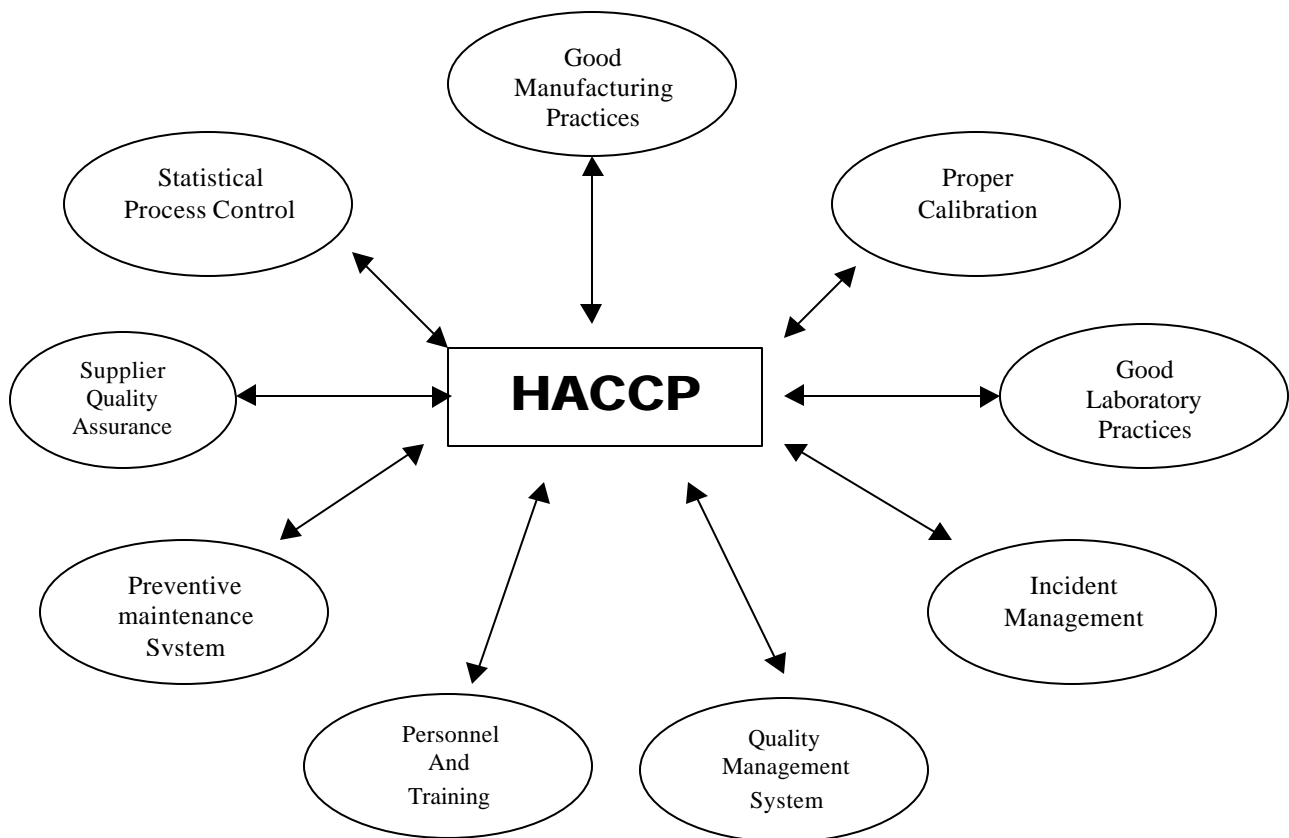
- Product Safety

### *SECONDARY BENEFITS:*

- Quality improvement
- Cost effectiveness
- Loss and down time reduction
- Increase consumer confidence in product safety
- Design of line/product
- Hygiene and housekeeping
- Reduce maintenance
- Reduce inspection time
- Improve manufacturing conditions
- Competitive advantage

## **HACCP PREREQUISITES**

1. Management commitment
2. Recourses (finance & manpower)
3. Training & education
4. Facilities (adjacent properties, building exterior/interior)
5. Raw materials controls (e.g., specifications, supplier approval, receipt and storage, testing)
6. Sanitation and personal hygiene (e.g. master schedule, pest control, environmental surveillance, chemical control, housekeeping cleaning (routine) personal health and hygiene)
7. Production controls (e.g., product zone controls, foreign material control, metal protection program, allergen control, glass control)
8. Storage and distribution (e.g., temperature and humidity control; transport vehicle cleaning and inspection)
9. Product controls/traceability (e.g. labeling; complaint investigation and product recall) &
10. Basic support network.



The HACCP Basic Support Network

## HOW HACCP IMPLEMENTED

We can implement this very effective continuous food safety improvement engine by adopting Seven famous principles of HACCP, explained in Codex Alimentarius - a joint publication of FAO and WHO and by adopting Implementation procedures from reference guides.

### *Major Steps:*

1. Decision by management to use the HACCP system
2. Training and formation of the HACCP team
3. Development of the HACCP plan document, including the following parts:

## *PRELIMINARY STEPS*

- *Assemble a HACCP team*
- *Describe the product and its distribution*
- *Describe the intended use and consumers of the food.*
- *Construct a flow diagram, which describe the process.*
- *Verify the flow diagram on site.*

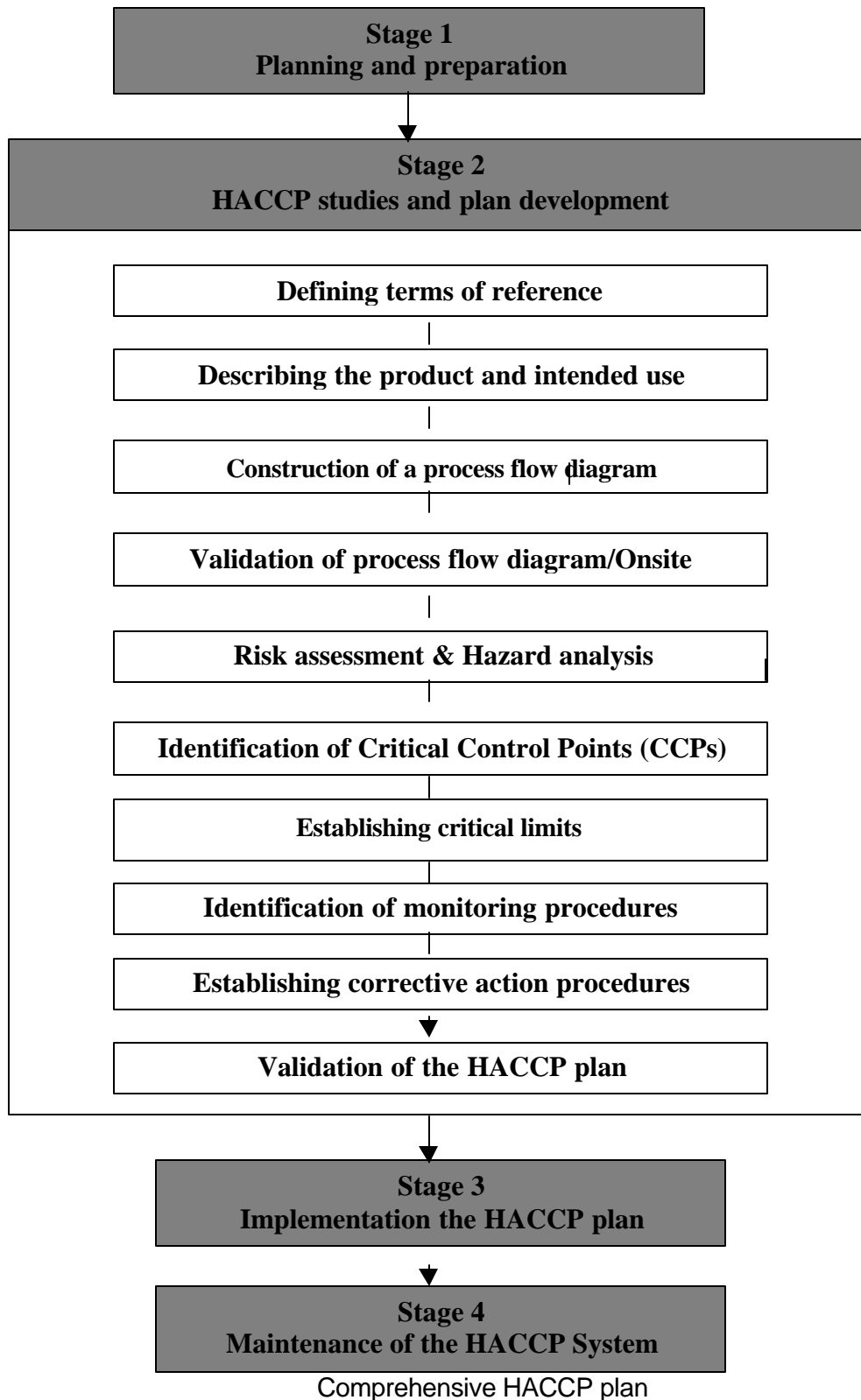
## *SEVEN PRINCIPLES*

1. *Identify and list all relevant hazards, risk assessment and preventive measures*
  2. *Identify CCPs and apply the decision tree*
  3. *Establish target levels and critical limits for CCPs*
  4. *Establish monitoring system*
  5. *Establish corrective action plan*
  6. *Establish verification procedures*
  7. *Establish documentation and record keeping*
4. Implementations of HACCP plan to establish and operate the HACCP system in the Food Company. Team plays a key role in these activities
  5. Verification auditing of the HACCP system, to determine that it is working correctly.

## ESTABLISHING A HACCP SYSTEM IN A FOOD COMPANY:

To make the concept more understandable, in this paper, we have elaborated the whole procedure with the help of an example- Tetra pack Ultra Heat Treated (UHT) Milk line.

For successful results project was divided into four different stages.



## STAGE 1

1. HACCP Presentation to convince the top management.
2. Decision by the top management to implement this system
3. Main Team was developed

Main team was comprised of members from following areas of training.

- Team Leader (Having the back ground and skill of HAACP implementation)
- Quality assurance
- Operations or production
- Microbiology
- Engineering

## STAGE 2

1. Milestone plan development (annex -1)

Mile stone plan was covering all areas and activities to meet the requirement of Comprehensive HACCP plan with time frame.

### STAGE 2 EXECUTION:

#### 1. Training

Following subjects were mainly covered in baseline training of concerned personnel. (Trainings were given at different stages).

- Objective of the training
- Concept of Sanitation, Food hygiene and safety.
- Discussion on food borne diseases
- Overview of HACCP
- Use of HACCP to protect consumer safety
- Key definitions of the concepts involved in HACCP. (annex - 2)
- Preliminary steps to HACCP planning
- Techniques to work on HACCP seven principles
- HACCP plan execution/Implementation
- HACCP auditing techniques
- Post HACCP problems

After training baseline audit /Gap analysis was conducted to know the current control measures for food safety and quality management

### PRODUCT DESCRIPTION AND ITS INTENDED USE:

UHT milk is sterilized, homogenized ultra heat treated milk (obtained from buffalos or cows) packed in tetra pack and is commonly used by people of all ages and segments for drinking as well tea making. It is considered as a safe and quality product.



## CONSTRUCTION OF FLOW DIAGRAM:

Milk procured through field staff is brought to the factory milk reception and during processing, passes through pasteurization, UHT section, aseptic filling, and tray packing/shrink wrapping area before going to the warehouse. From warehouse it is transported to the distribution network. (Flow diagram annex 3)

## FLOW DIAGRAM WAS VERIFIED ONSITE: USE OF SEVEN PRINCIPLES OF HACCP:

After the provision of basic requirements, by adopting seven HACCP principles, risk assessment was done, all hazards were listed and high-risk points were identified as Critical Control Points by using HACCP decision tree (decision tree annex – 4). To check these hazards on CCPs Control limits were definitely the requirement, so these standards were identified. Monitoring procedures, frequencies and assigned responsibilities were among the needs to observe these critical limits effectively, which were finalized in the next stage. It was also defined that what corrective action could be necessary in case of deviation from critical limits.

Information collected through this exercise was used to complete the following HACCP control chart.

CCP No	Process step	Hazard Type	Preventive action	Critical Limits	Monitoring			Corrective Action	
					Procedure	Frequency	Responsibility	Procedure	Resp.
1	Filter	P, B	Cleaning, Replacement.	No choking or damage	Cleaning	Hourly	Pasteurization operator	Replace immediately if damage is done	Pasteurization operator

*HACCP Control Chart*

*Completed HACCP control chart (annex 5)*

## STAGE 3

Following steps were adopted to fulfilled the requirements of Stage 3 - Implementation

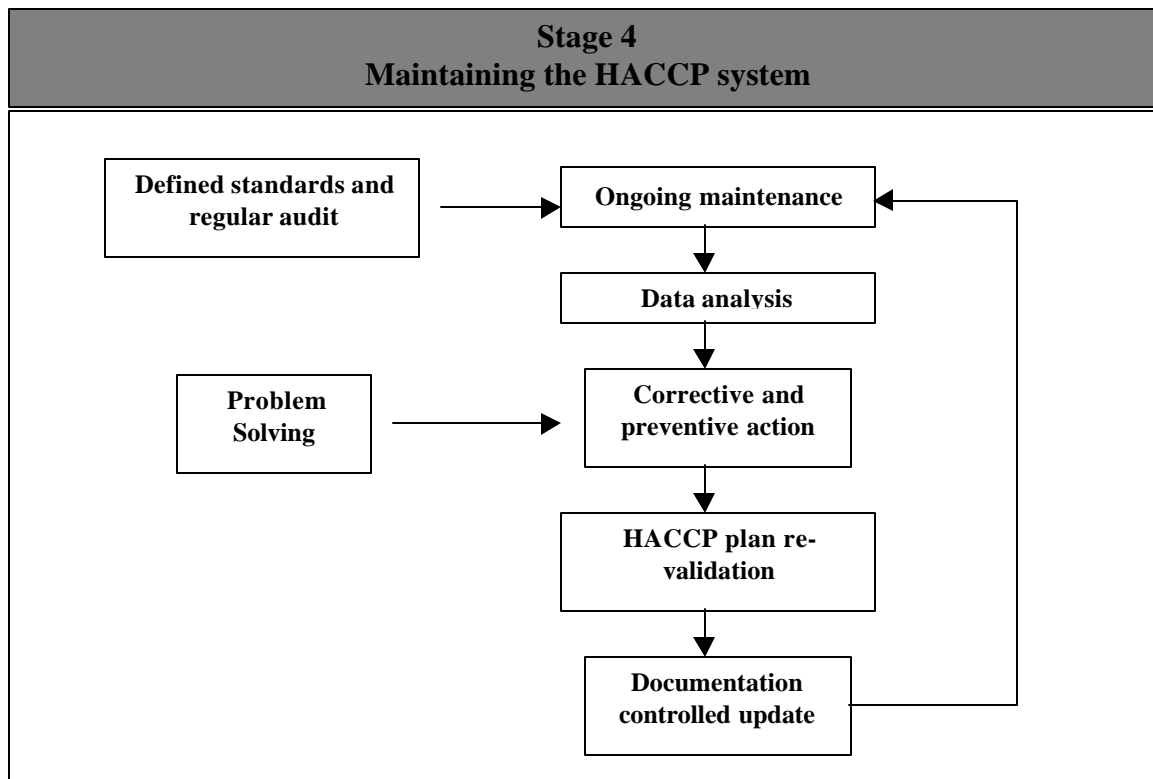
- Determination of method of implementation
- Setting up implementation team
- Agreement on actions and time table
- Training sessions for implementation staff.
- On line training of supervisors/Line operators/workers
- On line Critical Control Points (CCPs) identification
- Pasting of CCP stickers and trading of line staff regarding CCPs
- Review of HACCP documents/formats
- Setting up monitoring system
- Setting up equipments and facilities
- Establishing process capability
- Establishing record keeping requirement

- Confirmation of actions completed.
- Verification of implementation through audits
- Necessary action against findings

## STAGE 4

1. Maintaining the system
2. Review of post implementation problems
3. Decision of effective measures to over come post HACCP complications

Following model was adopted to fulfill the requirements of Stage 4 - maintaining HACCP



## MAKING HACCP ALIVE

*MAJOR BOTTLENECKS IN DESIGNING, IMPLEMENTATION AND MAINTENANCE:*

- Management's diluted vision/Lack of interest
- Hazards linked to raw materials/ weak supplier support
- Too many CCPs
- Take too long to put modifications in place
- Money to implement modifications
- Time is a constraints because others specialized packages have to be covered at the same time
- Coordination of HACCP Team and availability to attend the HACCP maintenance meetings
- Discontinuation of HACCP status report

## **HACCP IN PAKISTAN**

### **SCOPE:**

Same as internationally

### **AWARENESS:**

Awareness of the system is very poor but processor and consumer 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.

### **REGULATIONS:**

In Pakistan Pure Food Rules there is no such provision of this system but food hygiene and safety is emphasized.

### ***BOTTLENECKS WHILE IMPLEMENTATION OF THIS SYSTEM IN PAKISTAN:***

- Management diluted vision and weak commitment
- Short term business strategies
- Absence of regulation/laws
- Ineffective check and non serious behavior of the regulatory bodies
- Lack of awareness among the producer/manufacturer
- Lack of consumer awareness
- Absence of quality culture
- Unavailability of pre-requisites like GMP, GLP, preventive maintenance and SSOP.
- Weak raw material control
- Weak procedure control
- Lack of sanitation and personnel health
- Improper recall system
- Unavailability of resources (finance, trained Manpower)
- Unavailability of experts.
- People reluctance for change/ Conservation of ideas

### **FUTURE OF THIS CONCEPT:**

As the concept is emerging as the pre-requisite of food business world over and has become mandatory by regulation in different parts of the world. In the years to come, it seems, no movement across the borders for food products could be possible without HACCP certification. Even in recent years, Pakistan has been facing this problem in the export of Fish industry. Customers from abroad are demanding food safety certificate but it is not possible so early. Definitely, it will take time, and a lot of resources and expertise would be also required to undertake this activity. Govt of Pakistan has requested for relaxation to continue this worthy source of revenue and has got time period of two years to be get this system in place. To meet the dynamic business environment, authorities need to very vigilant, informed and practical otherwise a big chunk of foreign exchange obtained through this sector will be lost.