USAID
FROM THE AMERICAN PEOPLE

IRAQ

Good Manufacturing Practices
and
Hazard Analysis for Critical Control Points

FOR FOOD PROCESSING PLANTS IN IRAQ
FRESH FRUIT AND VEGETABLE PACKING

This publication was produced for review by the U.S. Agency for International Development (USAID). It was prepared by Kamal Hyder, Ph.D., for the USAID *Inma* Agribusiness Program, implemented by The Louis Berger Group, Inc.

***Inma* Agribusiness Program - USAID/Iraq**

2008

Contract No. 267-C-00-07-00-500-00

An *Inma* Agribusiness Program Publication Series
www.inma-iraq.com

2008

This publication presents an adjustment of the author's original "GMP and HACCP for Almond and Dried Fruit Processing Plants in Afghanistan" (USAID/Afghanistan, 2006). The original publication was produced under the USAID/RAMP, Contract No. 306-C-00-03-00502-00-ROP.

The "Inspection for Small Processing Plants Checklist" is reproduced with the courtesy of the North Carolina Department of Agriculture and Consumer Services (NCDA&CS), Meat and Poultry Inspection Division.

The *Inma* Agribusiness Program and this publication are made possible by the support of the American People through the U.S. Agency for International Development (USAID). The contents of this publication are the sole responsibility of The Louis Berger Group, Inc. and do not necessarily reflect the views of USAID or the United States Government.

Good Manufacturing Practices
and
Hazard Analysis for Critical Control Points

FOR FOOD PROCESSING PLANTS IN IRAQ
FRESH FRUIT AND VEGETABLE PACKING

2008

Table of Contents

Introduction 7

Good Manufacturing Practices 9

- Plant and Grounds 10
- Design of Equipment and Utensils 13
- Sanitation Facilities and Controls 13
- Sanitary Operations 15
- Processes and Controls 17
- Personnel 19

Hazard Analysis for Critical Control Points 21

- Definition of Terms used in HACCP 22
- Seven Principles of HACCP 25
- Critical Steps for the Development of HACCP 26
- The Hazard Analysis Process 27
- Determination of the Critical Control Points 30

General Management Principles 33

- Record Keeping 33
- Management Policies for Plant 33

Inspection for Small Processing Plants Checklist 35

- Guidelines for New Processing Plants 35
- The Courtesy Review 35
- Processing Checklist Pre-Of Preparation 41
- Processing Uncooked Raw Product 42
- Processing / Cooking 44
- Transportation 45

Introduction

Food processing plant owners have a social responsibility to insure that the food they produce and sell to the general public will not damage consumers' health. Responsible plant owners take many steps to make sure that the food they produce is healthy and wholesome for human consumption. The cumulative steps result in a food quality assurance system that includes:

- Good Manufacturing Practices (GMP) and
- Hazard Analysis and Critical Control Points (HACCP).

The purpose of this manual is to assist owners and managers of fruit and vegetable processing plants in Iraq obtain a basic understanding of these components of a responsible food quality assurance system and alert them to important issues to consider when installing and operating these systems.

The manual will discuss basic concepts and suggest the food safety and quality assurance system that should be implemented in food processing plants in Iraq. The actual procedures and programs for fresh fruit and

vegetable processing plants in Iraq should be developed and installed with the help of food safety experts, employed either by the individual plant owners or through some organization of plant owners.

Good Manufacturing Practices (GMP)

Good manufacturing practices are the procedures that should be followed during plant construction and operation to assure food wholesomeness. GMP refers to the minimum sanitary and processing conditions required in a properly built processing plant.

GMP contains cleanliness and sanitary requirements for personnel, building and facilities, equipment and utensils, in addition to food processing requirements and controls. Cleaning and sanitation is a multi-step procedure that involves first cleaning and then sanitizing in the processing plant. Food processing refers to the actual manufacturing operations, such as cleaning, sorting, grading and packaging that are applied to the fresh or processed food products. When implemented properly, GMP not only reduces new forms of biological, chemical and physical contamination, but eliminates existing contamination.

Food processing plants or packing sheds must be constructed with these practices in mind. To comply with U.S. and European standards, processing facilities must be constructed with approved materials and maintained

under hygienic and sanitary conditions. Construction materials should be safe, non-toxic and approved for use in a processing facility. All of the equipment, walls, floors, doors, windows, and fixtures must meet approved standards. The plant layout should be such that it can avoid accumulating dirt and can be easily cleaned and sanitized.

PLANT AND GROUNDS

The design of the plant layout should include the following points:

- The ground selected should be above the road level and water drainage system.
- The building should be a few feet above ground level for cleaning water to flow out.
- Adequate protection should be provided against rain and dust storms.
- Areas for incoming raw material and outgoing finished goods should be segregated.
- Plumbing must be of adequate size and design to:
    - o Supply enough water to areas in the plant where it is needed.
    - o Properly convey sewage or disposable liquid waste from the plant.
- Not create a source of contamination or unsanitary condition.

- o Provide adequate floor drainage where hosing-type cleaning is done or where operations discharge water or liquid waste onto the floor; floor drains must be designed to trap material that could clog the drainage system; floor drains must be designed for easy cleaning to remove trapped material. Where practical, any solid material that can clog the drains should be removed prior to disposal.
- o Water supply for the plant should be tested to see if it is potable. High bacterial count and excessive mineral content should be eliminated by treatment with chlorine and filtration or ion exchange system.
- o Used process water should also be treated before disposal to reduce biological and chemical oxygen in the effluent.
- o There should be no backflow from cross-connections between piping systems that discharge waste water or sewage and those that carry water for fruits and vegetables.

- Air filters should be used to clean air for in-plant use. Any emission of air with high polluting materials should be filtered or scrubbed prior to its discharge.
- Electricity should be supplied through a distribution switch board. Proper safety switches and fuse boxes should be installed to avoid overload and electrical fires. Wiring inside the plant should be protected with waterproof covering that can be wiped during clean up.

- In some cases stand by generators may be needed for refrigerators and freezers to avoid spoilage due to electrical interruptions.
- Lighting and ventilation systems should be adequate for visibility and safety.
- All entry points to the building should be secured against insects, rodents and other animals.
- The doors, windows, walls, floors and ceilings should be made of smooth surfaces that can be easily wiped and cleaned.
- Materials used in construction of floors and walls should be non-toxic.
    - o Cement walls and floors are acceptable if they are smooth enough without rough corners and crevices. Special plastic wall covers such as "Kimlite" panels may be ideal because they can be easily washed and wiped.
    - o Wooden doors and windows may be covered with thin stainless steel sheets; but, if metal doors and windows are available they are preferable.
- Toxic materials such as lead paint must not be used. Asbestos sheet ceilings should be absolutely avoided. Some plants use galvanized iron sheets as roofs. This would require a false ceiling of plastic material to cover the iron sheets from the inside.

DESIGN OF EQUIPMENT AND UTENSILS

Equipment and utensils must be designed for easy cleaning and sanitation. Equipment and utensils must be made from non-corrosive materials.

SANITATION FACILITIES AND CONTROL

- Toilet, hand-washing, ablution and locker-room facilities:
  - o Toilets and hand-washing facilities must be provided inside the processing centre;
  - o Toilet tissue must be provided;
  - o Toilets must be kept sanitary and in good repair;
  - o Signs must be posted that direct employees to wash their hands with soap or detergent after using the toilet.
  - o Toilet rooms must have self-closing doors;
  - o Toilet rooms must not open directly into areas where processed products are exposed unless steps have been taken to prevent airborne contamination (example: double doors, positive airflow, etc.);
- Hand-washing facilities must provide:
  - o Running water at a suitable temperature;
  - o Effective hand-cleaning and hand-sanitizing preparations;

- o Clean towel service or suitable drying devices;
- o Easily cleanable waste receptacle;
- o Water control valves designed and constructed to protect against recontamination of clean, sanitized hands;
- o Signs directing employees handling unprotected fruits and vegetables to wash and, if appropriate, sanitize theirs hands before starting work, after each absence from the work-station, and any other time when the hands have become soiled or contaminated.

SANITARY OPERTIONS

HOUSEKEEPING

The plant must develop Standard Operating Procedures (SOPs) and Standard Sanitary Operating Procedures (SSOPs) relative to all cleaning and sanitizing of the plant facilities and equipment. Cleaning operations must be conducted in a manner that will minimize the possibility of contaminating fruits and vegetables and equipment surfaces that contact them. Cleaning removes the visible soil and organic matter and most of the harmful bacteria.

Plant personnel use brooms, brushes, high pressure air, low and high pressure water to remove visible soil and organic matter from:

- Plant floors
- Plant walls
- Equipment and utensils, which must be kept in a sanitary condition through frequent cleaning and, when necessary, sanitizing. If necessary, such equipment must be taken apart for thorough cleaning.

Cleaning is done on a pre-planned, regular schedule. Most cleaning operations are conducted at the end of the work day or at a prescribed time before the shift begins.

Sanitation requires that a sanitizing compound such as chlorine be applied to the cleaned surfaces so that the level of bacteria can be reduced to an acceptable level. Sanitation is done at different times for various parts of the plant. The following is a recommended schedule of sanitation for the various parts of a processing plant:

- Plant floors every day and during mid shift
- Plant walls every day before each shift
- Equipment before use for every batch
- Other utensils prior to use

PEST CONTROL

Food plants must have structures to control insects, rodents, birds, cats and other animals. Flies, bees, rats and mice invade the food plants in search of food. Cats and other animals enter the plant in search of rats and mice. All structures and equipment should be secured against them. Doors, windows and other openings must be secured. Openings that are typically left open for ventilation should be screened. Installation of air curtains, fans and electrocutors at strategic locations will be extremely helpful. Snap traps, glue boards and bait stations must be placed around the immediate building exterior and interior walls.

PROCESSES AND CONTROLS

RAW MATERIALS AND CONTAINERS

Raw product and finished product must be stored in segregated areas under conditions that prevent contamination and the growth of undesirable microorganisms. Product flow zones must be protected from all sources of contamination.

FOOD PROCESSING

It is necessary to process, package and store fruits and vegetables under conditions that will minimize the potential for undesirable microbiological growth, toxin formation, deterioration or contamination. This will require careful monitoring (via a HACCP program described below) of such factors as time, temperature, humidity, pressure, flow rate, etc. The object is to assure that mechanical breakdowns, time delays, temperature fluctuations or other factors do not allow the fruits and vegetables to decompose or become contaminated. Good manufacturing practices include the following:

- Fruits and vegetables must be held under conditions that prevent contamination and the growth of microorganisms.
- Mechanical manufacturing steps such as shelling and packaging, etc. must be performed in a manner that:
    - o provides adequate protection from contaminants that may drip, drain or be drawn into the products,
    - o adequately cleans and sanitizes all contact surfaces
    - o uses materials for fruit and vegetable containers and packaging materials that are safe and suitable
    - o uses an HACCP program to check for possible contamination and assure that GMPs are being followed.

- Measures such as sieves, traps, or metal detectors must be used to protect against the inclusion of metal or other extraneous material in food;
- Measures such as sterilizing, irradiating, or pasteurizing must be adequate to destroy or prevent the growth of undesirable micro-organisms.
- Equipment, containers and utensils must be constructed, handled and maintained to protect against contamination.
- Fruits and vegetables that are adulterated must be disposed of without contaminating others.

PACKAGING, CODING AND FINISHED FOOD PRODUCTS

- A coding system should be utilized that will allow positive lot identification in the event it is necessary to identify and segregate lots of fruits and vegetables that may be contaminated.
- Records should be kept for a period of time that exceeds the self life of the product.

PERSONNEL

Employee sanitation requires that plant personnel use personal hygiene to insure that food products do not become contaminated. Personal hygiene for processing plant personnel includes:

- Use of protective clothing, shoes, hair-nets, beard guards, etc. approved by management.
- Washing and sanitizing of hands and body parts that may come in contact with the food during preparation.
- Food processing personnel should not wear jewelry while processing food. The owner of the processing plant should establish strict jewelry rules so that watches, rings, earrings etc. are not worn by processing personnel and may not contaminate the products. The plant owner should provide a place for plant personnel to safely store their jewelry prior to entering the processing areas.
- All personnel should be screened regularly for any illness that can be transmitted to food.

Hazard Analysis for Critical Control Points (HACCP)

HAACP is a system for monitoring food-processing plants to insure that all established procedures for maintaining food quality are followed. It establishes a series of scheduled inspections in the plant at critical points of manufacture. Physical, chemical and biological tests are performed at the critical points. When the results are acceptable, food processing/ manufacturing moves forward. When the results of tests are unacceptable, food processing ceases until the problems are corrected.

HACCP is not a stand-alone system. It requires GMP to be in place before HACCP can be applied. It is now used extensively in the food industries all over the world for making sure that processed foods are prevented from contamination with hazardous elements, pathogenic microorganisms, physical objects like glass, metal or bone, and chemicals like toxins, heavy metals or pesticide residues. It helps monitor strict adherence to processing and storage parameters.

DEFINITION OF TERMS USED IN HACCP

Many terms used in discussion of HACCP must be clearly understood to effectively develop and implement a plan. The following definitions are provided for clarity:

- Acceptable level means the amount of a hazard that is unlikely to cause a health risk.
- Control point means any point where loss of control does not lead to an unacceptable health risk.
- Critical control point, as defined in the Food Code, means a point at which loss of control may result in an unacceptable health risk.
- Critical limit, as defined in the Food Code of the FDA, means the maximum or minimum value to which a physical, biological, or chemical parameter must be controlled.
- Deviation means failure to meet a required critical limit for a critical control point.
- HACCP plan, as defined in the Food Code, means a written document that delineates the formal procedures for following the HACCP principles developed by The National Advisory Committee on Microbiological Criteria for Foods.

- Hazard, as defined in the Food Code, means a biological, chemical, or physical property that may cause an unacceptable consumer health risks.
- Monitoring means a planned sequence of observations or measurements of critical limits designed to produce an accurate record and intended to ensure that the critical limit maintains product safety. Continuous monitoring means an uninterrupted record of data.
- Preventive measure means an action to exclude, destroy, eliminate, or reduce a hazard and prevent recontamination.
- Risk means an estimate of the likely occurrence of a hazard.
- Sensitive ingredient means any ingredient historically associated with a known microbiological hazard that causes or contributes to production of a potentially hazardous food as defined in the Food Code of the FDA.
- Verification means methods, procedures, and tests used to determine the HACCP system to be in compliance.
- Flow chart is a diagram that shows how products move through a processing plant. Each step or node on the flow chart represents a separate operation that is applied to the product. The first operation in the flow of product through the plant is reception of the raw product. . Cleaning, sorting , grading and packaging are examples of other operations that are applied to the product as it flows

through the plant. Such operations are represented as nodes on the plant's flow chart. One of the first steps in establishing HACCP in a plant is to prepare a flow chart with potential hazards identified at each step2. Below is an example flow chart in tabular form for a typical fruit and vegetable processing plant.

Step 1	Receiving raw materials in the bulk storage bins at the plant
Step 2	Fumigation of raw materials to kill insects and molds prior to processing , if required
Step 3	Storage of fumigated raw materials in the processing area
Step 4	Cleaning and removing undesirable fruits and vegetables and drying
Step 5	Sizing, sorting and grading
Step 6	Pass through color sorter if necessary
Step 7	Initial quality check to observe any visible defects
Step 8	Quality control tests for moisture, density, firmness, color and flavor
Step 9	Pass through check point to isolate off quality fruits and vegetables
Step 10	Final quality check for physical, chemical and sensory tests
Step 11	Bagging and boxing
Step 12	Random batch tests of packaged products for quality assurance
Step 13	Final check of packaged finished goods to avoid any recontamination with insects and molds
Step 14	Storage of finished packaged products in a cool dry place
Step 15	Shipping of products in bags, boxes and large containers with batch control for any recall of product from the market

SEVEN PRINCIPLES OF HACCP

Seven principles are applied to establish an HACCP program. They are given below with reference to fresh fruit and vegetable processing industries.

1. Perform analysis of hazard (type of physical, chemical and biological hazard in fruits and vegetables)
2. Determine critical control points (locate the areas during handling and processing of fruits and vegetables)
3. Establish limits for the critical control points (establish the safety limits acceptable at the points)
4. Monitor critical control points (check and re-check the occurrence of hazards at the points)
5. Take corrective action (establish procedures to eliminate the hazards through treatments)
6. Keep records (maintain the history of events that includes observation, action and results)
7. Verify that the system works (check and re-check that the procedures are updated and functioning).

CRITICAL STEPS FOR DEVELOPMENT OF HACCP

The following steps are essential for consideration at the time of establishing a HACCP program:

- Assemble a multi-disciplinary team that includes managers, scientists, process workers, engineers and book keepers so that intelligent input can be provided at periodic HACCP meetings. In the case of fruit and vegetable processing, people with knowledge of growing, handling, storage and distribution should be included to provide input of the local conditions.
- Engage an external safety consultant with technical knowledge to provide guidance at the HACCP meetings. The consultant can coordinate the external testing and laboratory services and discuss test results and corrective measures.
- Prepare a flow chart of the operation of processing. This should be a step by step flow chart.
- Examine the steps and identify the hazards at each step.
- Determine curative measures such as cleaning the surfaces in contact with the product or reducing water and airflow on the produce that can contaminate them.
- Establish tests to measure the elimination of contaminants.

- Record all sources of ingredients to establish traceable connections to eliminate hazard sources.
- Display the critical control points and repeat the review of actions taken periodically, like daily, weekly and monthly.
- Standardize procedures and update them as frequently as possible with new techniques.
- Make sure that the management approves and signs records of inspections regularly.

THE HAZARD ANALYSIS PROCESS

The hazard analysis process consists of asking a series of questions at each operational step in the processing of the product as it flows through the plant. The analysis examines the effect of a variety of factors upon the safety of the food. Sample questions are given below.

INGREDIENTS

- Do the produce contain any sensitive ingredients that are likely to present microbiological hazards (e.g., Salmonella, Staphylococcus aureus), chemical hazards (e.g., aflatoxin, antibiotic, or pesticide

- What is the normal microbial content of the food stored under proper conditions?
- Does the microbial population change while the food is stored before consumption?
- Does that change in microbial population alter the safety of the food?

FACILITY DESIGN

- Does the layout of the facility provide an adequate separation of raw materials from ready-to-eat foods?
- Is positive air pressure maintained in product packaging areas? Is this essential for product safety?
- Is the traffic pattern for people and moving equipment a potentially significant source of contamination?

EQUIPMENT DESIGN

- Will the equipment provide the time and temperature control that is necessary for safe food?

- Is the equipment properly sized for the volume of produce that will be package?
- Can the equipment be sufficiently controlled so that the variation in performance will be within the tolerances required to produce a safe food?
- Is the equipment reliable or is it prone to frequent breakdowns?
- Is the equipment designed so that it can be cleaned and sanitized?
- Is there a chance for product contamination with hazardous substances?
- What product safety devices, such as time and temperature integrators, are used to enhance consumer safety?

PACKAGING

- Does the method of packaging affect the multiplication of microbial pathogens and/or the formation of toxins?
- Is the packaging material resistant to damage, thereby preventing the entrance of microbial contamination?
- Is the package clearly labeled "Keep Refrigerated" if this is required for safety?
- Does the package include instructions for the safe handling and preparation of the food by the consumer?

- Are tamper-evident packaging features used?
- Is each package legibly and accurately coded to indicate production lot?
- Does each package contain the proper label?

DETERMINATION OF THE CRITICAL CONTROL POINTS (CCP)

Determination of the Critical Control Points (CCP) is made by analyzing each operational step in the flow of product through the plant to evaluate the potential for contamination by biological, chemical and physical vectors. The table below provides an example of the analysis of the flow of product through a typical food processing plant. At each step in the processing plant the potential for biological, chemical or physical contamination is analyzed. Critical Control Points (CCP) are identified where the potential for contamination is significant.

Operation	Biological Control Point	Chemical Control Point	Physical Control Point	Remedy	Critical Control Point
Receiving	Check bacteria, mold	Check pesticide & insecticide	Check dirt, debris & filth	Treatment to remove them	Yes
Fumigation if required	Kill insects, mold	Check for residue	Check for insect fragments	Treat and remove physically	Yes
Culling/ Removing	Check for bacteria and mold	Check for chemical residue	Check for discolored fruits etc.	Remove the discolored fruits	Yes
Sizing & Grading	Quality check	Quality check	Quality check	Remove blemished and off grade fruits	No for food safety
Line & QC Inspection	Final line check for bacteria and mold	Final line check for any chemical residue	Final line check for any foreign material	Eliminate the off grade items and clean fruits	Yes
Packing	Check packaging materials for bacteria	Check packaging materials for chemicals	Check any damage and tear	Eliminate damaged packaging materials and cartons	Yes
Storage	Check storage area	Check storage area	Check storage area	Make sure the storage area is clean and dry	Yes
Shipping	Check shipping condition	Check shipping condition	Check shipping condition	Clean the shipping vehicles	Yes

HACCP Flow Chart of Food Processing Plant with examples of CCP

Note: The sizing and grading operation may not be directly related to health hazards but for quality of fruit size and grade, the operation is critical.

Tests will have to be performed regularly in the plant. Some examples of tests are given below.

- For visual tests, magnifiers, microscopes and UV lights will be needed.
- For color control of the fruits, color charts or electronic eyes for color comparison may be needed.
- For microbiological examination, equipment will be needed for incubation and plate count
- For physical debris and filth removal, cleaning devices, cyclones and dust removal equipment will be needed.

General Management Principles

Management support and involvement are extremely important in achieving success. The following points for record keeping and plant policies are of paramount importance.

RECORD KEEPING

The procedure of testing and re-testing requires record keeping in an archive that is chronological, permanent and readily accessible. It should be maintained by the management in a safe and secured place. This will also help product recalls if they are needed.

MANAGEMENT POLICIES FOR PLANTS

All policies regarding the hygiene of employees and visitors should be posted in prominent places. They should be strictly enforced. Safety of material handling should also be monitored with great care.

References

[1]Refer to the United States Food and Drug Administration (FDA) codes

[2] Refer to the United States Food and Drug Administration (FDA) codes in Section 21 of the Code of Federal Regulations, Part 110 for further detail

[3] For further detail on flow chart and critical control points for HACCP consult the HACCP User's Manual by D.A. Corlett,Jr. 1988. Aspen Press, Gaithersburg, MD, USA.

INSPECTION FOR SMALL PROCESSING PLANTS CHECKLIST

This checklist was developed for the North Carolina Department of Agriculture and Consumer Services (NCDA&CS), Meat and Poultry Inspection Division . It has been adapted for Iraq.

GUIDELINES FOR NEW PROCESSING PLANTS

I. THE COURTESY REVIEW

A. Structure

- Interior walls and ceiling of waterproof materials
- Joints tight fitting (wall-ceiling and wall-floor)
- Adequate ceiling height
- Metal doors (tight fitting)
- Floor (concrete slanting to floor drains)
- Covering (at the wall-floor juncture)
- Drains (in floor (four inch) with traps)
- Adequate square footage for production and equipment
- No exposed wood
- Ventilation adequate for space and function
- Correct traffic flow

B. Equipment

- Product wash/recondition sink
- Hand wash sink with foot or knee valve
- Equipment wash sink (3 compartments)
- Hot water supply
- Soap and single service towel dispensers
- Approved grinders, choppers, stuffers, cookers, saws, pots, lugs, knives, racks, stands, tables, cutting boards
- No exposed wood on tables, shelves, racks
- Hose and hose rack

C. Lighting

- Adequate lighting (50 foot candles at work level)
- Shatter proof bulbs or light covers with ends
- Plastic or stainless fixtures (do not rust)
- Waterproof switches for lights in processing
- Must have lighting in coolers, freezers, dry storage

D. Coolers

- Four inch floor drains
- Waterproof walls, floor and ceiling
- Metal racks 12 inches up off the floor
- Tight fitting metal door

- Accurate thermometer
- Cooling unit with fan covers and drain pan
- Adequate lighting
- Separate cooler for chilling cooked product

E. Welfare

- Number of restrooms adequate for number of employees
- Equipped with hand wash sink, soap and towel dispenser
- Hot water supply
- Must not enter directly into processing
- Provide space for lockers, hangers, and boot racks

F. Dry Storage

- Metal racks, stands, cabinets for wrap, spices, labels
- Adequate space for volume
- Tight fitting construction
- Adequate lighting

G. Office Space

- Metal table or desk
- File drawer or cabinet (lockable)`
- Metal chair
- Trash receptacle

- Dedicated phone line

H. Entrance-Traffic Flow

- No direct entrance from outside into processing
- Vestibule on outside entrance
- Concrete pad at loading area
- "Employee Only" sign on processing door

I. Separation

- Finished goods and raw product should be separated
- Inspected and custom product must be separated
- Retail and inspected areas must be separated

J. Chemicals

- Approved chemicals, cleaners only
- Must be stored away from processing area in designated area
- Material safety data sheets (MSDS) for all chemicals
- Storage cabinets for flammables

K. Safety

- Lighted exit signs
- Exit diagram
- Fire extinguishers

- Approved electrical boxes with grounded circuits
- Water proof socket covers
- Evacuation plan
- No spliced wires or undersized extension cords
- All fans must have covers and moving parts must have guards
- Safety glasses should be provided
- Hazard communication program in inspector file
- Lockout Tag out program

L. Water and Sewer

- Water and sewer systems must be approved
- Water samples must be submitted regularly
- Hot water heater of adequate size and volume

M. Plant File

- Approved labels
- Approved blue prints
- MSDS sheets
- Evacuation plan
- Water and sewer letter
- Processing reports

- Operating hours
- Activity report
- Equipment List
- Letters of guarantee
- Inedible letter
- Pest control letter
- Chemicals list
- Formulations if any
- Plant profile
- Application and grant of inspection

N. Exterior

- Graded drive to prevent standing water
- Concrete pad at loading door
- Weed control around plant
- Fly fans and electrocuters where indicated
- Control of rust and flaking paint

O. Employees

- Trained in basic hygiene practices
- Clean work smocks and aprons
- Head covers (hard hats or caps)
- No smoking, eating or chewing in processing areas

- Hair and beards should be trimmed
- Frequent hand washing and clean nails
- All cuts and health problems should be cared for promptly
- Safety boots should be provided
- No rings, watches, bracelets worn by employees in plant working areas

P. Transportation

- Clean, enclosed vehicle
- Refrigeration

PROCESSING CHECKLIST

PRE-OF PREPARATION:

Through cleaning of facilities, equipment and containers

- Hot water must be available
- Cooler must be operating within required limits
- Lighting must be adequate
- No signs of insects or rodents
- No buildup of blood, oil, tissue, or dirt on cutters, choppers, dicers, tables, cutting boards or containers
- Check equipment for wear of blades, loose fittings to reduce chances of metal contamination

- Trays, boxes, wrap and other direct contact material checked for cleanliness and
- foreign material contamination
- Hand sanitizers and/or sterilizers available with proper strength and approved chemicals
- All chemicals and cleaning materials should be removed from the processing area Coats, hats, boots, and aprons should be checked for cleanliness and wear
- All lugs and food containers should be checked for cleanliness and cracks
- All floor drains should be functional and free from odor
- Check for flaking paint and rust on all metal including fans
- Check all raw product for expiration date, spoilage, species, and freshness
- Disassembled equipment should be inspected before use

PROCESSING UNCOOKED RAW PRODUCT

- During processing only authorized employees are allowed in the processing area
- Hands should be thoroughly cleaned with soap and water; nails should be clean
- Knives should be sanitized or sterilized

- Clothing such as coat sleeves should not be allowed to contact raw product
- Do not put product containers on the floor; use stands twelve inches off floor
- While cutting examine raw product for foreign material (paper, plastic, wire, dirt, bone, insects, and other abnormalities)
- If foreign material is found, processing should be stopped and the entire lot should be examined and identified
- If you are unsure about the source or safety of raw product, put the product in the retained area of the cooler for examination
- Accurate certified scales should be used for net weights
- All product should be labeled with an approved label. Safe handling labels and nutritional labels when required
- Raw product must be cooled, refrigerated, or frozen immediately after processing
- Raw product should be transported in clean containers under refrigeration
- All additives should be measured and used in accordance with formulations and regulations
- Inedible material should be denatured and stored in containers with lids marked "inedible"

PROCESSING / COOKING

- All preparatory procedures listed under raw product apply
- Cookers are examined for cleanliness and proper function
- Cooking time and temperatures are mandated by regulations and must be carefully followed
- Cook charts showing temperature and time should be kept
- Cooked product should be rapidly cooled in accordance with regulations and cooling guidelines
- A cooling time chart should be kept
- Measurements of temperature should be made with a good probe type thermometer
- Cooked product should be kept separate from raw product
- Shrink test should be done where applicable
- Restricted ingredients must be carefully monitored
- Accurate inventories should be kept on any restricted ingredients
- Identification of lots should be maintained at all stages of processing

TRANSPORTATION

- Check all product to be shipped to be sure that it is properly packaged and correctly labeled before it leaves the plant
- The transportation vehicle should be clean and cooled prior to loading
- The vehicle should be equipped with a thermometer
- If an accident occurs, call the inspector
- Do not distribute product to public unless cleared by the quality inspection service
- Transportation boxes must be clean and of the appropriate type
- Do not use boxes with another establishment's legend or label

An *Inma* Agribusiness Program Publication Series

www.inma-iraq.com

Previous publications:

Lamb Feedlot Management Guide,

published in English, Arabic and Kurdish (2008)

Beef Feedlot Management Guide,

published in English, Arabic and Kurdish (2008)

To obtain copies of the *Inma* Program Publication Series, please contact:

info@inma-iraq.com


IRAQI AGRIBUSINESS
Inma
Inma
AGRIBUSINESS PROGRAM