
**Good manufacturing practices for
fruits and vegetables products**

Foreword

This Ethiopian code has been prepared under the direction of the Technical committee for fruit and vegetable (TC-13) and published by Ethiopian Standard Agency (ESA).

In preparing this Ethiopian Standard reference has been made to the following:

CAC/RCP 1, Recommended International Code of Practice – General Principles of Food Hygiene.

CAC/RCP 53, Code of Hygienic Practice for Fresh Fruits and Vegetables.

PNS/BAFS 49:201_Code of Good Agricultural Practices (GAP) for Fruits and Vegetables Farming, Philippine National Standard.

Acknowledgement is made for the use of information from the above publications.

Good manufacturing practices for fruits and vegetables products

1. Scope

This Ethiopian Code applies to the receiving, preparation, processing, handling, storage, transport and distribution of processed fruits and vegetables products.

2. Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CES 58, Drinking water (other than any packaged water) - Specification.

CES 73, General standard for prepackaged foods - Labeling.

3. Terms and definitions

For the purposes of this standard the following definitions shall apply:

3.1

aseptically processed and packed

is processing and packaging of a commercially sterile product into sterilized containers followed by hermetic sealing with a sterilized closure in a manner which prevents viable microbiological recontamination of the sterile product.

3.2

canned food

is commercially sterile food in hermetically sealed containers.

3.3

cleaning

is the removal of food residues, dirt, grease or other objectionable material.

3.4

commercial sterility

is the absence of microorganisms/spores capable of growing in the food at normal non refrigerated conditions at which the food is likely to be held during manufacture, distribution and storage.

3.5

disinfection

is the reduction, without adversely affecting the food, by means of hygienically satisfactory chemical agents and/or physical methods, of the number of microorganisms to a level that will not lead to harmful contamination of food.

3.6

contaminant

is a biological, chemical, physical (foreign matter) agent not intentionally added to the product which may compromise food safety.

3.7

contamination

is introduction or occurrence of a contaminant in the product.

3.8

waste

is any substance or object that the organization discards or intends or is required to discard.

3.9

allergen

is any substance that causes allergic reactions in individuals who are sensitive to it.

3.10

food hygiene

all conditions and measures necessary to ensure the safety and suitability of food at all stages of the foodchain.

3.11

food handler

is any person who directly handles packaged or unpackaged food, food equipment and utensils, or food contact surfaces and is therefore expected to comply with food hygiene requirements.

3.12

food safety

is assurance that food shall not cause harm to the consumer when it is prepared and/or eaten according to its intended use.

3.13

hermetically sealed containers

is containers which are designed and intended to protect the contents against the entry of viable microorganisms after closing.

3.14

hazard analysis critical control point (HACCP)

is a system, which identifies, evaluates, and controls hazards which are significant for food safety.

3.15

micro-organisms

is any microscopic living organism that can cause disease or food spoilage.

3.16

potable water

safe and clean Water which is suitable for direct human consumption.

3.17

low-acid food

is any food, other than alcoholic beverages, where any component has a pH value greater than 4.6 and a water activity greater than 0.85.

3.18

sterile

free from bacteria or any other living micro-organisms.

3.19

dehydration

is the removal of moisture by natural or artificial means and in some cases in combination.

3.20

prerequisite programme

food safety basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for the production, handling and provision of safe end products and safe food for human consumption.

3.21

operational prerequisite programme

identified by the hazard analysis as essential in order to control the likelihood of introducing food safety hazards to and/or the contamination or proliferation of food safety hazards in the product(s) or in the processing environment.

3.22

quick freezing process

a process which is carried out in such a way that the range of temperature of maximum ice crystallization is passed as quickly as possible within a specified time and temperature.

3.23

quick frozen food

food which has been subjected to a quick-freezing process, and maintained at -18°C or colder at all points in the cold chain, subject to permitted temperature tolerances.

3.24

sanitation

all actions dealing with cleaning or maintaining hygienic conditions in an establishment ranging from cleaning and/or sanitizing specific equipment to periodic cleaning activities throughout the establishment to prevent contamination of products, packaging materials and food contact surfaces (including building, structural and grounds cleaning activities).

3.25

zoning

is the physical separation or demarcation of areas within a food factory to prevent potential cross contamination of food and to adequately control the access of personnel to production and laboratory areas.

4. Prerequisite Programme

In conjunction with the application of HACCP to fruits and vegetable processing, the operations conducted, should be supported by prerequisite programmes based on good hygienic practice and good manufacturing practice. Prerequisite programmes should be specific within an individual establishment, and should be periodically evaluated to ensure their continued effectiveness. While prerequisite programmes are usually associated with food safety, properly operating prerequisite programmes will also contribute to product quality. Reference should be made to the General Principles of Food Hygiene (CAC/RCP 1-1969) and relevant Codex codes of hygienic practice and codes of practice including the Guidelines for the Validation of Food Safety Control Measures for further information to assist with the design of the prerequisite programmes for a processing facility.

4.1 Prerequisite programs will include requirements for but not limited to:

- a) Construction and layout of building;
- b) Layout of premises and workspace;
- c) Utilities
- d) Waste disposal;
- e) Equipment suitability, cleaning and maintenance;
- f) Management of purchased material;
- g) Measures for prevention of cross contamination;
- h) Cleaning and sanitizing;
- i) Pest control;
- j) Personnel hygiene and employee facilities;
- k) Rework;
- l) Product recalls procedures;
- m) Warehousing; and
- n) Product information

5. Raw material requirements

5.1 Raw materials

5.1.1 General requirement

5.1.1.1 Raw materials used should be safe, sound and suitable for further processing and shall comply with relevant Ethiopian standard for the specific fruit and vegetable products.

5.1.1.2 Procedures should be in place to ensure quality and safety of incoming materials. Freezing cannot improve quality, and it is necessary to use raw materials of optimum quality. Highly perishable raw materials and processed fruits and vegetable products should be handled with care to maintain their quality until utilization.

5.1.2 Raw material handling

a) Acceptance criteria

The raw material shall not be accepted by the plant if known to contain decomposed, toxic or extraneous substances which cannot be removed to acceptable levels by normal plant procedures of sorting or preparation.

b) Storage

Raw materials stored on the plant premises should be maintained under conditions that will protect against contamination and infestation and minimize deterioration.

Initial microbial levels in raw materials to be frozen should be kept as low as possible, both for food safety and quality reasons.

Temperatures and duration of storage should be appropriately and regularly controlled to minimize adverse microbial effects. Most quality deterioration, including the development of off odours and flavours and changes in colours and texture are due to microbial growth or enzymatic activity.

Producers of quick frozen food should as far as practicable implement measures to control physical, biological and chemical hazards in raw materials to levels that do not present a threat to human health.

5.1.3 Inspection and sorting

Prior to introduction into the processing line, or at a convenient point within it, raw materials should be inspected, sorted or culled as required to remove unfit materials and where necessary laboratory tests should be made. Such operations should be carried out in a clean and sanitary manner. Only clean, sound materials should be used in further processing.

Appropriate procedures should be in place for sorting and segregating raw materials that are unsuitable for further processing. Raw materials for processing and quick freezing should be prepared without delay and appropriate temperature control should be applied in order to minimize possible microbiological, chemical or biochemical changes that might affect safety and quality. To minimize deterioration, raw materials should be cooled and stored under appropriate conditions (e.g. pre-cooling) or transported and frozen in the shortest time possible.

For highly perishable products, product temperature control at receiving may be considered a critical control point (CCP). Additionally, the receipt temperature may also be considered an essential quality provision.

5.1.4 Sanitary Handling of Raw Food Materials

a) Equipment and product containers

Equipment and product containers should not constitute a hazard to health. Containers which are re-used should be of such material and construction as will facilitate thorough cleaning, and should be so cleaned and maintained as not to constitute a source of contamination to the product.

b) Cleaning of the raw materials

All the primary handling and preprocessing operations, methods and procedures shall be done in a clean and sanitary manner.

c) Protection of raw material from contamination

Suitable precautions should be taken to prevent the raw fruit from being contaminated by animals, insects, vermin, birds, chemical or microbiological contaminants or other objectionable substances during handling and storage. The raw or semi-processed fruit and vegetables should be moved to suitable storage or to the processing area for immediate processing.

Where fruits and vegetables are likely to have become infested with insects, rodents, birds or mites during storage as a preventive measure, suitable treatment such as fumigation. The raw materials should be handled in manner to prevent cross contamination with other foods or products known to be possible sources of allergens, such as milk, fish and nuts.

5.1.5 Transportation of raw materials

Vehicles used for the transport or distribution of food shall be easy to clean, free from odours and weatherproof, and in the case of vehicles with refrigeration, the refrigeration unit shall be adequate, to maintain the food at the required temperature.

Conveyance for transporting the raw material from storage area should be adequate for the purpose intended and should be of suitable material and construction as will permit thorough cleaning and should be so cleaned and maintained as not to constitute a source of contamination to the product. The transport facilities shall be designate for conveyance of food materials only and not for other purposes.

All handling procedures should be such as will prevent the product from being contaminated. Extreme care should be taken in transporting perishable products to prevent spoilage or deterioration. Special equipment such as refrigeration equipment should be used if the nature of the product or distances involved so indicate. If ice is used in contact with the product, it should be of sanitary quality.

5.1.6 Zoning

5.1.6.1 General zoning requirements

The manufacturer shall take effective action to protect fruits and vegetable products from those operations which may cause contamination with undesirable microorganisms, chemicals, filth or extraneous matter. The manufacturer shall control access to areas where food is sensitive to contamination and shall take adequate precautions to ensure that personnel entering fruits and vegetable processing areas are not a source of contamination from other areas.

5.1.6.2 Specific zoning requirements

- a) Production areas where processed foods are exposed shall be physically separated where possible from areas where unprocessed or partially processed food is stored, prepared or handled. Where this is not possible, due care shall be taken to ensure that the final product is not contaminated by food which has not been fully processed.
- b) Separate storage areas shall be provided, for processed and unprocessed foods, unless it can be demonstrated that contamination of the processed food cannot occur.
- c) Access to processing areas and particularly areas where food is exposed shall be restricted. The level of restriction required, will depend on the risk contamination of the processed fruits and vegetable products.
- d) Microbiological laboratories shall be physically separated from production areas and protective clothing used in the laboratories shall not be worn in food processing areas

5.1.6.3 Zoning recommended practices

- a) The manufacturer should identify areas and operations from which there is a risk of contamination of the food with undesirable microorganisms, odours, chemicals, filth and extraneous matter. These areas should be physically separated either by partition, location or other effective means and access to these areas should be adequately controlled, to prevent contamination of fruits and vegetable products.
- b) Personnel working or entering the processing areas should not enter the microbiological laboratories.
- c) Personnel should not go from areas where raw materials are handled into areas where finished product is exposed; if essential, adequate precautions should be taken to ensure that microorganisms are not carried on their person.
- d) High risk processing areas access should be through a changing room, where personnel entering the area are required to change their foot wear and protective clothing and to wash their hands; or via an air lock fitted with a foot and boot bath, hand washing facilities and changing facilities.

6 Plant facilities and Operating requirements

6.1 Plant Construction and Layout

6.1.1 Location, design and layout

6.1.1.1 The building and surrounding area should be such as can be kept reasonably free of objectionable odours, smoke, dust, or other contamination.

6.1.1.2 Premises and structures should be located, designed and constructed to avoid contaminating products and harbouring pests such as insects, rodents and birds.

- Where appropriate, the internal design and layout should permit compliance with good hygienic practices for the primary production of fruits and vegetables products indoors, including protection against cross-contamination between and during operations. Each establishment should be evaluated

individually in order to identify specific hygienic requirements for each product.

6.1.2 Building

- 6.1.2.1 Separate production area out of the residential area.
- 6.1.2.2 Internal building structure and its components shall be strong and durable and easy to maintain and clean or disinfect.
- 6.1.2.3 Floor is made of durable materials which permit effective cleaning and facilitate maintenance. The floor surface is non-slippery, nonabsorbent of water, non-cracking and in good conditions with slope to the drains.
- 6.1.2.4 Ceiling is in good conditions without dirt accumulation or water droplets.
- 6.1.2.5 Walls, doors and windows are made of materials that are easy to clean, light coloured, have a smooth surface, non-absorbency of water and good conditions.
- 6.1.2.6 Availability of effective systems for drainage and waste disposal of the building and the production area, without causing any contamination to fruits and vegetables products or potable water system
- 6.1.2.7 Separate potable water system from non-potable water supply and clearly identify with tags or signs.
- 6.1.2.8 There shall be no unused or irrelevant item in the production area.
- 6.1.2.9 Availability of sufficient space for the installation of machines, tools and equipment as well as for the operations
- 6.1.2.10 Design and plan the production line layout in order to facilitate hygienic practices, maintenance and cleaning, and to prevent pets, pest and cross-contamination.
- 6.1.2.11 Separate the areas of washed fresh fruits and vegetables products against the receiving unwashed raw materials.

6.1.3 Facilities and controls

a) Separation of processes

Areas where raw materials are received or stored should be so separated from areas in which final product preparation or packaging is conducted as to preclude contamination of the finished product.

Areas and compartments used for storage, manufacture or handling of edible products should be separate and distinct from those used for inedible materials. The food handling area should be completely separated from any part of the premises used as living quarters.

b) Water supply

- ✓ Availability of sufficient supply of clean water and/or potable water for the operations.
- ✓ An ample supply of hot and cold water should be available. The water supply should be of potable quality complying with CES 58.
- ✓ Control and check quality of water used for washing raw material and fruits and vegetables. These shall be checked according to frequency and requirements, and kept as the records.
- ✓ Control and check the quality and temperature of water used in cooling system according to established frequency and requirements. Keep the records.
- ✓ Water used in direct contact with fresh fruits and vegetables in the production line shall be potable water.

c) Waste Management programme

- ✓ Removal of wastes from the product preparation and processing areas should be on a continuous or near continuous basis using water and/or appropriate equipment so that these areas are kept clean and there is no danger of contaminating the product. Also they should be disposed off in a way that they cannot be used

for human food. Waste materials should be disposed off in a place and in such a manner that they cannot contaminate food and water supplies and cannot offer harbourages or breeding places for rodents, insects or other vermin.

- ✓ Availability of methods for distinguishing between containers for production waste against the containers for products. Availability of appropriate management, disposal and removal of waste and unwanted leftover after processing.

7 Hygiene requirements in the processing area

7.1 Lighting and Ventilation

- ✓ Adequate natural or artificial lighting shall be provided throughout the factory to enable personnel to operate in a hygienic manner. Further, the light produced shall not distort colours and be shadow free at the inspection area. Lighting fixtures & light bulbs must wherever appropriate shall be protected to ensure that food is not contaminated by breakages of electrical fittings. The fixtures should be designed to avoid accumulation of dirt & be easy to clean.
- ✓ Food premises shall have adequate natural and/ or mechanical ventilation including air filters, exhaust fans to effectively remove fumes, smoke, dust, condensation, steam and vapours from the premises. Ventilation system natural and/or mechanical including air filters, exhaust fans, wherever required, shall be designed and constructed so that air does not flow from contaminated areas to clean areas and can be adequately maintained and cleaned.

7.2 Toilet rooms and facilities

- ✓ Adequate and convenient toilets should be provided for male and female and toilet areas should be equipped with self-closing doors. An adequate number of toilets separately for males and females, of appropriate hygienic design each with hand-washing, drying and, where required, sanitizing facilities; shall be available and connected to an effective drainage system. Toilet rooms should be well lit and ventilated and should not open directly into a food handling area. They should be kept in a sanitary condition at all times. There should be associated hand-washing facilities within the toilet area and notices should be posted requiring personnel to wash their hands after using the toilet.
- ✓ Adequate changing facilities for personnel shall be provided. Toilets and change rooms shall not open directly into rooms in which food is handled and shall be maintained in a clean condition.

7.3 Hand washing facilities

Adequate and convenient facilities for employees to wash and dry their hands should be provided wherever the process demands. They should be in full view of the processing floor. Single-use towels are recommended. The facilities should be kept in a sanitary condition at all times. It is recommended that the taps should be operated to the much extent by foot, elbow, knee or automated. Wash hand basins, troughs or washing fountains shall be supplied either with warm water or cold and hot water and the taps shall be elbow, knee and foot or electronically operated.

7.4 Disinfection facilities

Where the fruit and vegetable products come in direct in direct contact such as packing materials, machines, adequate facilities for cleaning and disinfection of working implements and equipment should be provided. These facilities should be constructed of corrosion-resistant materials, capable of being easily cleaned, and should be fitted with suitable means of supplying hot and cold water in sufficient quantities.

7.5 Steam Supply

Steam supply to the thermal processing system should be adequate to the extent needed to ensure that sufficient steam pressure is maintained during thermal processing, regardless of other demands for steam by the plant.

Steam which comes into direct contact with food or with water shall only contain additives that are permitted for use by law or good manufacturing practices and the total solids in the boiler shall be controlled so as to avoid carry-over of boiler solids.

7.6 Gas supply

7.6.1 Sterile gas supply air or other appropriate gases should be filtered for removal of extraneous material (dust, oils and the like) and rendered sterile. Sterilization may be achieved by double filtration within one filter housing or two separate filter housings, or by a combination system such as incineration followed by filtration. The system used to deliver the commercially sterile air or other gas to the point of use should be capable of being sterilized prior to use and being maintained in a sterile condition during operation.

7.6.2 The filters used should have a demonstrated and verified capability to provide the degree of removal of microorganisms and extraneous material required under the conditions of use. They should be examined before installation and after removal for evidence of damage which may result in malfunction. They should not be affected by the gases in any manner which would reduce their efficacy or shorten their working life.

7.6.3 Filters used for commercial sterilization should be installed, maintained and changed in accordance with the manufacturer's instructions. Their performance should periodically be verified using appropriate test methods and records maintained.

7.6.4 If incineration is used to provide sterile air, critical factors such as final air temperature and flow rate should be controlled and recorded.

7.7 Facilities for storage of waste and inedible material

Facilities should be provided for the storage of waste and inedible material prior to removal from the establishment. These facilities should be designed to prevent access to waste or inedible material by pests and to avoid contamination of food, potable water, equipment, buildings or roadways on the premises.

7.8 Machinery, tools and Equipment and Utensils

7.8.1 Materials

All equipment and utensils used in food handling areas and which may contact food should be made of material which does not transmit toxic substances, odor or taste, is non-absorbent, resistant to corrosion and capable of withstanding repeated cleaning and disinfection. Surfaces should be smooth and free from pits and crevices. The use of wood and other materials which cannot be adequately cleaned and disinfected should be avoided except when their use would clearly not be a source of contamination. The use of different materials in such a way that contact corrosion can occur should be avoided.

Numbers of machines, tools and equipment are sufficient for the operations and ready to use. They shall be made of non-reactive materials to fresh fruits and vegetables and do not cause contamination. Tools and equipment shall have smooth surface, be corrosion resistant and easy to clean and maintain. Tools and equipment related to the control of operations, such as timers, temperature-measuring instruments and weighing scales shall be of accuracy and precision. Their function shall be verified regularly. Surface of table that comes into contact with fruits and vegetables products is made of non-reactive materials to fruits and vegetables including cleaning agents and disinfectants. Such table surface shall also be smooth, non-absorbent to water and corrosion resistant.

7.8.2 Sanitary Design, construction and installation

Equipment and utensils should be so designed and constructed as will prevent hygienic hazards and permit easy and thorough cleaning. Stationary equipment should be installed in such a manner as will permit easy and thorough cleaning.

7.8.3 Equipment and utensils marking

Equipment and utensils used for inedible or contaminating materials should be so identified and should not be used for handling edible products.

7.9 Hygienic Operating Requirements

While additional and more specific requirements may be established for certain products, the following should apply as minimal in all fruits and vegetable production, handling, storage and distribution.

a) Sanitary maintenance of plant, facilities and premises

The building, equipment, utensils and all other physical facilities of the plant should be kept in good repair and should be kept clean and maintained in an orderly, sanitary condition. Waste materials should be frequently removed from the working area during plant operation and adequate waste receptacles should be provided. Detergents and disinfectants employed should be appropriate to the purpose and should be so used as to present no hazard to public health. A maintenance schedule should be developed and maintained for the facilities, machinery and equipment.

b) Pest control

i. Control Programmes

The Organization shall have a designated trained person to manage pest control activities or deal with appointed licensed competent contractors. Pest management programmes shall be in place describing target pests and methods of addressing them, list of approved chemicals to be used, control procedures and monitoring frequency.

Availability of prevention and control measure for pest and pets in the establishment and the production area. Inspect the trace of pest harbouring in the establishment and surrounding area. Inspect the operations in accordance with pest control programme. There shall be a control measure for their application and record. No pets allowed in any area of the production building.

ii. Preventing access

External doors, windows, ventilation and any other openings shall be designed to prevent entry of pests. Drainages exiting from the establishment shall be screened to prevent entry.

iii. Harbours and infestations

Raw materials or products found to be infested shall be handled in such a way to prevent contamination of other raw materials or product.

iv. Detectors and Traps

These shall be placed in key locations to prevent chances of cross contamination, shall be tamper resistant and shall not be blocked to enable pest activity routine inspections. Detectors maps shall be maintained.

c) Exclusion of domestic animals

Dogs, cats and other domestic animals should be excluded from areas where food is processed or stored.

d) Chemicals storage

All rodenticides, fumigants, insecticides or other toxic substances should be stored in separate locked rooms or cabinets and handled only by properly trained personnel. They should be used only by or under the direct

supervision of personnel with a thorough understanding of the hazards involved, including the possibility of contamination of the product.

7.10 Personnel hygiene and food handling practices

- 7.10.1** Plant management should advise personnel that any person afflicted with infected wounds, sores, or any illness, notably diarrhoea, should immediately report to management. Management should take care to ensure that no person, while known to be affected with a disease capable of being transmitted through food, or known to be a carrier of such disease microorganisms, or while afflicted with infected wounds, sores, or any illness, is permitted to work in any area of a food plant in a capacity in which there is a likelihood of such person contaminating food or food contact surfaces with pathogenic organisms.
- 7.10.2** All food handlers shall undergo medical examinations at defined intervals to ensure that their healthstatus in regard to communicable diseases likely to be transmitted through the food being handled aremonitored.
- 7.10.3** All persons working in a food plant should maintain a high degree of personal cleanliness while on duty. Clothing including suitable headdress should be appropriate to the duties being performed and should be kept clean.
- 7.10.4** Hands should be washed as often as necessary to conform to hygienic operating practices.
- 7.10.5** Spitting, eating and the use of tobacco or chewing gum should be prohibited in food handling areas.
- 7.10.6** All necessary precautions should be taken to prevent the contamination of the food product or ingredients with any foreign substance.
- 7.10.7** Minor cuts and abrasions on the hands should be appropriately treated and covered with a suitable waterproof dressing. Adequate first-aid facilities should be provided to meet these contingencies so that there is no contamination of the food.
- 7.10.8** Gloves used in food handling should be maintained in a sound, clean and sanitary condition; gloves should be made of an impermeable material except where their usage would be inappropriate or incompatible with the work involved.
- Availability of personnel hygiene requirements for workers and visitors entering the production area.
 - Availability of personnel hygiene monitoring plan. Keep the records of operations.
 - Personnel shall work hygienically such as washing hands before working, after toilet using or after handling any raw materials/chemicals/materials which may cause contamination, including regularly maintain the cleanliness of hands and nails.
 - Personnel who come into contact with ready-to-eat fresh pre-cut fruits and vegetables shall be in good health without signs of respiratory or gastrointestinal tract diseases or being carrier of a communicable or skin disease, and no wounds that may cause contamination.
 - Personnel shall wear clothing, gloves, masks or hair coverings that are clean and appropriate for their operations, where necessary. Personnel who work in the production areas shall not wear personal effects such as jewelry, during the operations.
 - Availability of preventive measures against hazardous contamination, such as glasses, hard plastic and soiled shoes before entering the production area, particularly high care area operations such as packing of finished products.

- Inspect the operations according to personnel hygiene monitoring programme set forth for the personnel who work in the area that come into contact with ready-to-eat fresh pre-cut fruits and vegetables and the visitors who enter the production area.
- Prohibit eating or smoking during the operations or any unfavorable behavior that may result in the contamination of ready-to-eat fresh pre-cut fruits and vegetables.

8 Maintenance and sanitation

- Availability of plans for maintenance, sanitation and verification of the efficacy covering methods, frequency and responsible persons for specified areas and lists of machines, tools and equipment, as follows:
 1. Maintenance and repair programmes for the building, machines, tools and equipment;
 2. Cleaning programme for the building, machines, tools and equipment and disinfection;
 3. Pest control programme; and
 4. Waste management programme.
- Availability of inspection and maintenance for the establishment, machines, cooling equipment, tools and equipment to be in good working conditions and record.
- Clean the building and the production areas according to the plan schedule and record.
- Clean tools and equipment that are in contact with raw materials and fruits and vegetables products according to plan schedule before and after operations to prevent contamination. Inspect the effectiveness of cleaning activities and record.
- Appropriately store cleaned tools and equipment in a separate area and in a sanitary manner.
- In case cleaning agents and disinfectants are used, it is essential to apply correct types, dosage and amount used according to the instruction on the labels or relevant laws and regulations. There shall be a control measure for such application.

9 Packaging of finished product

- 9.1** All primary packaging materials shall be of food grade and complying with relevant standards.
- 9.2** Packaging materials should be stored in a clean and sanitary manner.
- 9.3** Packaging should be done under conditions that preclude the introduction of contamination into the product.
- 9.4** Labeling of the prepackaged products should be in compliance to CES 73.
- 9.5** Information on the label shall be complied with relevant laws and regulations as well as trading partner requirements.

10 Storage and transport of finished products.

- 10.1** The finished products should be stored and transported under such conditions as will preclude the contamination with or development of pathogenic or toxicogenic microorganisms and protect against rodent and insect infestation and deterioration of the product or of the container.
- 10.2** The product should be stored under suitable conditions of time, temperature, humidity, and atmosphere, to prevent significant deterioration.
- 10.3** Where products are stored under conditions in which they may become infested by insects and mites, appropriate methods of protection should be used regularly. Cold storage can be used, either to prevent infestation in localities where insects are likely to be present in ordinary storage or to prevent insects damaging the fruit.
- Availability of effective preventive measures against contamination and deterioration of the products during

transportation

- Transport vehicles shall be used for food transportation only. In case product is needed to be transported together with other kinds of foodstuff or non-food commodities, effective methods shall be apparently applied to separate those commodities and record.
- If the transport vehicle or container is also used for transporting other kinds of foodstuff or non-food commodities, effective cleaning after unloading shall be carried out in combination with disinfection, where necessary. Keep the records of the use of transport vehicles and the disinfection.
- Temperature of products or necessary conditions during the transportation shall be appropriately controlled and recorded.
- Transport vehicles shall be clean, able to be disinfected, when necessary, ready for use and able to prevent contamination effectively as well as able to maintain product quality from origin to destination.

11 Training of staff

11.1 Staff should have the skills and knowledge appropriate to their work to ensure that safety and quality of foods is not adversely affected during handling. Staff should also be aware of the importance of maintaining temperature control for frozen foods to maintain the quality and safety of the foods. Training programmes should be in place (either formal training courses or training provided whilst working) to ensure that staff have these skills and knowledge.

11.2 Training programmes shall be provided to the workers at least regarding to; the good hygienic practices for processing of pre-cut fruits and vegetables products; the food hygiene necessary for the operations; and the specific items concerning packing systems used for fruits and vegetables products, the importance of temperature control during production and storage, including the risks of contamination or microbial growth during the packing. Availability of refresher training to gain knowledge on the production process and food hygiene. The training shall be regularly updated at least once a year.

11.3 Awareness and responsibilities

Food hygiene training is fundamentally important. All personnel should be aware of their role and responsibility in protecting food from contamination or deterioration. Food handlers should have the necessary knowledge and skills to enable them to handle food hygienically. Those who handle strong cleaning chemicals or other potentially hazardous chemicals should be instructed in safe handling techniques.

11.4 Training programmes

Factors to take into account in assessing the level of training required include:

- the nature of the food, in particular its ability to sustain growth of pathogenic or spoilage micro-organisms;
- the manner in which the food is handled and packed, including the probability of contamination;
- the extent and nature of processing or further preparation before final consumption;
- the conditions under which the food will be stored; and
- the expected length of time before consumption.

11.5 Instruction and supervision

Periodic assessments of the effectiveness of training and instruction programmes should be made, as well as routine supervision and checks to ensure that procedures are being carried out effectively. Managers and supervisors of food processes should have the necessary knowledge of food hygiene principles and practices to be able to judge potential risks and take the necessary action to remedy deficiencies.

11.6 Refresher training

Training programmes should be routinely reviewed and updated where necessary. Systems should be in place to ensure that food handlers remain aware of all procedures necessary to maintain the safety and suitability of food.

12 Sanitation Control programme

It is desirable that each plant in its own interest designates staff, whose duties are preferably divorced from production, to be held responsible for the cleanliness of the plant. The staff should be well trained in the use of special cleaning tools, methods of disassembling equipment for cleaning, and in the significance of contamination and the hazards involved. Critical areas, equipment and materials should be designated for specific attention as part of a sanitation schedule.

Cleaning and sanitizing programmes shall be established and validated by the organization to ensure that all parts of the establishment and equipment are cleaned and/or sanitized to a defined schedule, including the cleaning of cleaning equipment. Cleaning and/or sanitizing programmes shall specify at a minimum:

- a) Areas, items of equipment and utensils to be cleaned and/or sanitized;
- b) Responsibility for the tasks specified;
- c) cleaning/sanitizing method and frequency;
- d) Monitoring and verification arrangements;
- e) Post-clean inspections;
- f) Pre start-up inspections.

13 Laboratory Control Procedures

In addition to official inspection and verification, it is desirable that each plant in its own interest should have access to laboratory control of the sanitary quality of products processed. The amount and type of such control will vary with the food product as well as the needs of management. Such control should reject all foods that are unfit for human consumption. Analytical procedures used should follow recognized or standard methods in order that the results may be readily interpreted. For certain products it may also be desirable to check the process by incubation of samples.

14 End product specifications

The processed product shall comply with the specific national standard for that product.

15 Traceability

15.1 Recall procedures

Plant should ensure effective procedures are in place to deal with any food safety hazard and to enable the complete, rapid recall of any implicated lot of the finished food from the market. Where a product has been withdrawn because of an immediate health hazard, other products which are produced under similar conditions, and which may present a similar hazard to public health, should be evaluated for safety and may need to be withdrawn. The need for public warnings should be considered. Recalled products should be held under supervision until they are destroyed, used for purposes other than human consumption, determined to be safe for human consumption, or reprocessed in a manner to ensure their safety.

15.2 Identification or lot number shall be indicated to enable recall and traceability in case of safety problems.

16 Records

16.1 General records requirements

It is essential that records are maintained of all actions taken to assure the safety of food. These records can be used to demonstrate that appropriate action has been taken to assure the safety of the food. In addition they can be used as an aid to effective management of product safety. The manufacturer shall establish and maintain procedures for identification, collection, indexing, filing, storage, maintenance and disposition of hygiene records.

16.2 Specific record requirement

- i. Records and or documents shall be maintained of all actions, test results and other relevant information required in ensuring that hygiene is maintained at an appropriate level to assure the safety of the products produced.
- ii. These records shall be indexed, filed, stored and maintained for a suitable period and procedures shall exist for the disposition of out of date records.
- iii. **Records shall include**
 - A record of all critical parameters and tests carried out to assure the safety of the finished product, and the results of these tests, including microbiological results.
 - The calibration status and procedures used to calibrate all devices used to assure the safety of the finished product.
 - Records showing that all staff members have been appropriately screened as suitable to work in a food premises by a medical examiner and they are trained in the principles of hygiene.
 - Records showing that the cleaning programme has been adhered to and that the strengths, temperatures and contact time of cleaning solutions complies with specified requirements.
 - Records showing that the factory has been inspected for evidence of infection by rodents, birds, animals or insects at, at least three monthly intervals, by a suitably qualified person.
 - Records showing that incoming material, where appropriate, have been inspected for the presence of rodents or insects and that distribution vehicles have been inspected.
 - Records showing that water storage vessels are inspected on a weekly basis for the presence of birds, rodents, etc., daily records of residual free chlorine levels and records of other water analysis.
 - Records showing that a hygiene/housekeeping inspection has been carried out at defined intervals using a written checklist.
- iv. Where appropriate to ensure the safety of food, the following records shall also be maintained.
 - Chemical, functional, microbiological and organoleptic specifications for raw materials, in process materials and finished product.
 - Records of environmental tests.
 - Records of controlled conditions such as temperature, relative humidity, controlled atmosphere and positive and negative air pressures and air quality during production, storage and distribution.
 - Appropriate records for the effluent plant to show that treated effluent complies with specified requirements.
 - Records showing that glass pipes, flow meter and glass equipment have been routinely inspected for cracks, splinters, etc.
 - Records showing that air filters have been inspected and replaced at appropriate intervals.
 - Records of sensitivity checks on metal detectors.
- v. Where it is found, that hygiene is not being maintained at the defined level, records shall be maintained of the corrective action taken, to bring it under control.
- vi. All records shall be signed by an appropriate person or persons and dated.

- vii.** Medical examination records of personnel.
- viii.** Training and professional records for personnel.
- ix.** Relevant equipment and calibration records.
- x.** Cleaning schedules.
- xi.** Licenses from the relevant authorities.

DRAFT

Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010. ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1998.

ESA's objectives are:-

- ❖ Develop Ethiopian standards and establish a system that enable to check whether goods and services are in compliance with the required standards,
- ❖ Facilitate the country's technology transfer through the use of standards,
- ❖ Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational institutions, research institutes, government organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.

Orders For all Ethiopian Standards, International Standard and ASTM standards, including electronic versions, should be addressed to the Documentation and Publication Team at the Head office and Branch (Liaisons) offices. A catalogue of Ethiopian Standards is also available freely and can be accessed in from our website.

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