

DRAFT KENYA STANDARD

DKS 2752: 2018

ICS 65.060

**Processed Fruits and Vegetables- Code of
practice**

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Kevian Kenya Ltd
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Ministry of Health- Food Safety Unit
Ministry of Agriculture, Livestock and Fisheries
Kenya plant health inspectorate services
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Processed Fruits and Vegetables- Code of practice

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Foreword

This code of practice was prepared by the Processed Fruits and Vegetables Technical Committee under the guidance of the Standards Projects Committee and it is in accordance with the procedures of Kenya Bureau of Standards.

This code is aimed at providing requirements that will assist processors achieve safe and quality products based on international standards. The code is developed to complement the Kenya standards specifications on processed fruits and vegetable products.

During preparation of this code of practice, reference was made to the following documents:

- Codex Code of hygienic practice for canned fruit and vegetable products (CAC/RCP 2-1969)
- Codex Code of hygienic practice for dried fruits (CAC/RCP 3-1969)
- Codex Code of hygienic practice for dehydrated fruits and vegetables including edible fungi (CAC/RCP 5-1971)
- Codex Code of practice for the processing and handling of quick frozen foods (CAC/RCP 8-1976)
- Codex Code of hygienic practice for aseptically processed and packaged low-acid foods (CAC/RCP 23-1979)
- ISO/TS 22002 Part 1 Prerequisite programmes on food safety — Part 1: Food manufacturing

Acknowledgement is hereby made for the assistance derived from these sources.

This code cancels and replaces KS CAC RCP 2:1969 *Recommended international code of hygienic practice for canned fruit and vegetable products*, KS CAC RCP 5:1971 *Recommended international code of hygienic practice for dehydrated fruits and vegetables including edible fungi* and KS CAC RCP 3:1969; *Recommended international code of hygienic practice for dried fruits*

Introduction

This code of hygienic practice for processed fruits and vegetable is aimed at providing guidance for the processing and handling of processed fruits and vegetables products so as to ensure that they are safe and of good quality. It is expected that full implementation of this code at industry level will eliminate hazards associated with unhygienic conditions such as microbial contaminations. It is expected that users of this code will use the product specification standards as well as the labelling standards so as to achieve wholesome products.

The code guides hygienic aspects of processing fruits and vegetables in the value chain by making normative reference to the code of hygienic practice of primary production (KS 1758) and emphasising on processing and storage. The code fills gaps in the general standard for food hygiene (KS EAS 39) specific to dehydrated, quick frozen, canned/bottled as well as the aseptically processed and packed fruits and vegetables products. The code primarily incorporates Hazard Analysis and Critical Control Point (HACCP) approach while emphasising on the application of both prerequisite and operation prerequisite programs so as to achieve Food safety and quality

The fruits and vegetables shall be subjected to a safe and appropriate treatment in preparation and packing to permit marketing in normal trade channels.

This code which makes extensive reference to Codex codes of hygienic practices for dried fruits KS CAC RCP 3:1969), dehydrated fruits and vegetables including edible fungi (KS CAC RCP 5:1971), canned fruit and vegetable products (KS CAC RCP 2:1969) was developed to combine the key aspects in those codes into single user friendly document mainly by the industry.

DRAFT KENYA STANDARD

Processed Fruits and Vegetables- Code of practice

1.0 Scope

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

2.0 Application

The code shall apply to the following processed fruits and vegetables products:

- 2.1 Quick frozen
- 2.2 Dehydrated,
- 2.3 Canned/bottled,
- 2.4 Aseptically processed and packed

3.0 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.

KSEAS 38, *Standard Specification for Labelling of Pre-packaged Foods*

KS EAS 39, *Code of practice for hygiene in the food and drink manufacturing industry*

General Requirements for Establishing a Hazard Analysis Critical Control Point (HACCP) Programme for Food Processing Establishments

KS EAS 12, *Standard Specifications for Drinking (Potable) Water*

CAC/GL 69-2008; Food Hygiene Control Measures

CAC/RCP 1-1969; General Principles of Food Hygiene

4.0 Definitions

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

4.1 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.

4.2 Canned food

Is commercially sterile food in hermetically sealed containers.

4.3 Cleaning

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

4.4 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.

4.5 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.

4.6 Contaminant

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

4.7 Contamination

Is introduction or occurrence of a contaminant in the product

4.8 Waste

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

4.9 Allergen

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

4.10 Food hygiene

All conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain

4.11 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

4.12 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

4.13 Hermetically sealed containers

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

4.14 Hazard Analysis Critical Control Point (HACCP)

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

4.15 Micro-organisms

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

4.16 Potable water

Safe and clean Water which is suitable for direct human consumption

4.17 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.

4.18 Sterile

Free from bacteria or any other living micro-organisms

4.19 Dehydration

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

4.20 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

4.21 operational prerequisite programme

PRP 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

4.22 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

4.23 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.

4.24 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).

4.25 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.

5.0 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.

Prerequisite programs will include requirements for but not limited to:

- a) Construction and layout of building;
- b) Layout of premises and workspace;
- c) Utilities - air, water, energy;
- 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 recall procedures;
- m) Warehousing; and
- n) Product information

NOTE: The PRPs needed depend on the segment of the food chain in which the organization operates and the type of organization (see Annex C). Examples of equivalent terms are: Good Agricultural Practice (GAP), Good Veterinarian Practice (GVP), Good Manufacturing Practice (GMP), Good Hygienic Practice (GHP), Good Production Practice (GPP), Good Distribution Practice (GDP) and Good Trading Practice (GTP).

6.0 Raw material requirements

6.1 Raw materials

6.1.1 General requirement

6.1.1.1 Raw materials used should be safe, sound and suitable for further processing and shall comply with relevant Kenya standard for the specific fruit and vegetable and should be produced in accordance to part 2 of KS 1758

6.1.1.2 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.

6.1.2 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 according to the recommendations of the relevant sections of the *KS EAS 39*

6.1.3 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.

6.1.4 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 in accordance to PCPB Act 346 of the laws of Kenya may be applied.

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.

6.1.5 Transportation of raw materials

Vehicles used for the transport or distribution of food shall be, easy to clean, 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 the point of harvest or storage 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.

6.1.6 Zoning**6.1.6.1 General zoning requirements**

The manufacturer shall take effective action to protect processed 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.

6.1.6.2 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

6.1.6.3 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.

7.0 Plant facilities and operating requirements

7.1 Plant Construction and Layout.

7.1.1 Location, size and sanitary design

The building and surrounding area should be such as can be kept reasonably free of objectionable odours, smoke, dust, or other contamination; should be of sufficient size for the purpose intended without crowding of equipment or personnel; should be of sound construction and kept in good repair; should be of such construction as to protect against the entrance and harbouring of insects or birds or vermin; and should be so designed as to permit easy and adequate cleaning.

7.1.2 Sanitary 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

An ample supply of hot and cold water should be available. The water supply should be of potable quality complying with KS EAS 12

c) Ice

Ice should be made from water of potable quality and should be manufactured, handled, stored and used, so as to protect it from contamination.

d) Auxiliary water supply

Where non-potable water is used - for such purposes as fire control - it must be carried in completely separate lines, identified preferably by colour and with no cross-connection or back-siphonage with the lines carrying potable water.

e) Plumbing and waste disposal

All plumbing and waste disposal lines (including sewer systems) must be large enough to carry peak loads. All lines must be watertight and have adequate traps and vents. Disposal of waste should be effected in such a manner as not to permit contamination of potable water supplies. The plumbing and the manner of waste disposal should be approved by the official agency having jurisdiction.

f) Removal of solid or semi-solid wastes

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.

7.1.3 Drying and ripening yards

7.1.3.1 Where fruit is dried by the sun in drying yards, whether drying is carried out on a grower's property or as a commercial operation and where fruits require ripening before processing, they shall be stored in appropriate ripening sheds awaiting natural ripening or artificial ripening. Such yards shall be considered as food processing areas and shall therefore meet the following requirements:

- a) Located a sufficient distance from cattle feed lots, settling ponds and/or other waste collection areas to prevent contamination from these sources.
- b) They shall have proper and adequate drainage.
- c) Shall be well maintained so as to prevent contamination of applicable fruit or vegetable.
- d) They shall be fenced, where necessary, to keep out animals as far as practicable, and the area around the drying yard should be kept clean, free from weeds and other debris that can blow into the yard
- e) Cutting sheds in which fruit is pitted, cut or otherwise prepared and spread on trays for drying should preferably be closed buildings with screened windows that do not permit access by rodents, insects, or birds
- f) Where cutting is done in open sheds, adequate precautions should be taken to protect against insect, rodent and bird contamination or harbourage.
- g) The yards shall be adequately lit and ventilated, and adequate, clean toilet and hand-washing facilities should be provided.
- h) Hygienic operating requirements- Drying trays, cutting equipment, and storage bins should be kept clean and free from fruit residue and foreign substances that may cause contamination

7.1.3.2 Before proceeding to the next step, the quality of the ripened or dried raw materials shall be reviewed for suitability for processing.

8.0 Hygiene requirements in the processing area**8.1 Lighting and ventilation.**

Premises should be well lit and ventilated in accordance to OHS 2007 Act. Special attention should be given to the venting of areas and equipment producing excessive heat, steam, obnoxious fumes or vapours, or contaminating aerosols. Good ventilation is important to prevent both condensation (which may drip into the product) and mould growth in overhead structures – which growth may fall into the food. Light bulbs and fixtures suspended over food in any step of preparation should be of the safety type or otherwise protected to prevent food contamination in the case of breakage.

8.2 Toilet-rooms and facilities

Adequate and convenient toilets should be provided and toilet areas should be equipped with self-closing doors. 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. The facilities should comply with public health Act cap 242 of the laws of Kenya

8.3 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, foot or electronically operated

8.4 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.

8.5 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

8.6 Gas supply

8.6.1 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

8.6.2 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. 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.

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

8.7 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.

8.8 Equipment and Utensils

8.8.1 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.

8.8.2 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.

8.8.3 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

8.9 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

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.

iii) 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..

d) Exclusion of domestic animals

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

e) 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.

8.10 Personnel hygiene and food handling practices

8.10.1 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.

8.10.2 All food handlers shall undergo medical examinations at defined intervals to ensure that their health status in regard to communicable diseases likely to be transmitted through the food being handled are monitored

8.10.3 All persons working in a food plant should maintain a high degree of personal cleanliness while on duty. Clothing including suitable headress should be appropriate to the duties being performed and should be kept clean.

8.10.4 Hands should be washed as often as necessary to conform to hygienic operating practices.

8.10.5 Spitting, eating and the use of tobacco or chewing gum should be prohibited in food handling areas.

8.10.6 All necessary precautions should be taken to prevent the contamination of the food product or ingredients with any foreign substance.

8.10.7 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.

8.10.8 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.

9.0 Operating Practices and Processing Requirements

9.1 Washing or other preparation

Raw materials should be washed as needed to remove soil or other contamination. Water used for such purposes should not be recirculated unless suitably treated to maintain it in a condition as will not constitute a public health hazard. Water used for washing, rinsing, or conveying final food products should be of potable quality.

9.2 Preparation and processing

9.2.1 Preparatory operations leading to the finished product and the packaging operations should be so timed as to permit expeditious handling of consecutive units in production under conditions which would prevent contamination, deterioration, spoilage, or the development of infectious or toxigenic microorganisms. The processing methods should ensure compliance to the relevant standard

9.2.2 Size reduction – shredding, cutting, comminuting, crushing, blending, pulping, pitting, coring shall be done in a manner to avoid product contamination and minimize deteriorative reactions such as browning.

9.2.3 Heat processing – the application of heat or removal of heat through processes such as blanching, pasteurization, sterilization, chilling or freezing should achieve the objectives of fruit and vegetable processing. During such treatments, the temperature and time combinations will be guided by the safety and quality criteria desired for the final product.

9.2.4 Dehydration – the application of physical and or artificial dehydration (sun drying, solar drying, mechanical or cabinet drying, freeze drying or osmotic dehydration) either singly or in combination should be done according to the dehydration requirements for the particular fruit or vegetable product.

9.2.5 Concentration – the application of partial removal of water with simultaneous concentration of soluble solutes and organic acids shall be done to achieve preservation.

9.3 Packaging of finished product

9.3.1 All primary packaging materials shall be of food grade and complying with relevant standards

9.3.2 Packaging materials should be stored in a clean and sanitary manner

9.3.3 Packaging should be done under conditions that preclude the introduction of contamination into the product.

9.3.4 Labelling of the prepackaged products should be in compliance to KS EAS 38

9.4 Storage and transport of finished products.

9.4.1 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.

9.4.2 The product should be stored under suitable conditions of time, temperature, humidity, and atmosphere, to prevent significant deterioration.

9.4.3 Where dried fruits are stored under conditions in which they may become infested by insects and mites, appropriate methods of protection should be used regularly. Dried fruits should be stored in such a manner, that they can be fumigated in situ or so stored that they can be removed elsewhere for fumigation in special facilities (e.g fumigation chambers, steel barges, etc.). 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.

10.0 Training of staff

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 programs

should be in place (either formal training courses or training provided whilst working) to ensure that staff have these skills and knowledge.

10.1 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.

10.2 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.

10.3 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.

10.4 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.

11.0 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

12.0 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.

13.0 End product specifications

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

14.0 Traceability

14.1 Recall procedures

Managers 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 Records

15.1 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.

15.2 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 the 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 showing that the tubes in insect electrocuters are replaced at appropriate intervals.
 - 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 has 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