DUS 640

DRAFT UGANDA STANDARD

second Edition
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Code of practice for the production, handling and processing of dried fruits and Vegetables

Reference number
DUS 640: 2021

Compliance with this standard does not, of itself confer immunity from legal obligations

A Uganda Standard does not purport to include all necessary provisions of a contract. Users are responsible for its correct application

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Contents

Page

Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to co-ordinate the elaboration of standards and is

(a) a member of International Organisation for Standardisation (ISO) and

(b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and

(c) the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of key stakeholders including government, academia, consumer groups, private sector and other interested parties.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC 2, *Food and Agriculture*, Subcommittee SC 4, *Fruits, vegetables, spices and related products*.

This second edition cancels and replaces the first edition (US 640:2006 and US 570:2006), which has been technically revised.

Introduction

The document is intended to prepare the producers of dried fruits and vegetables to meet international requirements related to the production and marketing of products in international trade.

This code takes a holistic approach in defining the basic technical requirements for the production, processing and marketing of dried fruits and vegetables products

Code of practice for the production, handling and processing of dried fruits and vegetables.

1 Scope

1.1 This code of practice applies to fruits and vegetables that have been dried by natural or artificial means or a combination of both. The fruits and vegetables are dried to the extent that the greater part of the moisture has been removed, and in addition the fruits and vegetables may be subjected to a safe and appropriate treatment in preparation and packing

1.2 This code does not apply to fruits commonly known as "dehydrated fruits" with moisture content not exceeding 5 %.

2 Normative references

The following referenced documents referred to in the text in such a way that some or all of their content constitutes requirements 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.

US EAS 12, Potable water — Specification

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Raw materials requirements

4.1 Environmental sanitation in growing and food production areas

4.1.1 Sanitary disposal of human and animal waste

Adequate precaution shall be taken to ensure that human and animal wastes are disposed of in such a manner as not to constitute a public health or hygienic hazard and extreme care should be taken to protect the fruit from contamination with these wastes.

4.1.2 Sanitary quality of irrigation water

Water used for irrigation shall not constitute a public health hazard to the consumer through the fruit

4.1.3 Animal, plant pest and disease control

Growing areas shall be kept free from rotten or decomposing fruit that is attractive to insects, rodents and birds.

Where control measures are undertaken, treatment with chemical, biological or physical agents should be done only in accordance with the recommendations of the appropriate official agency by or under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibility of toxic residues being retained by the fruit.

4.2 Sanitary harvesting and food production

4.2.1 Equipment and product containers

Equipment and product containers shall not constitute a hazard to health. Containers which are reused shall be of such material and construction as shall facilitate thorough cleaning, and shall be so cleaned and maintained as not to constitute a source of contamination to the fruit.

4.2.2 Sanitary techniques related to harvesting and production

Harvesting and production operations, methods and procedures should be clean and sanitary.

4.2.2.1 Removal of obviously unfit materials

Unfit products shall be segregated during harvesting and production to the fullest extent practicable and should be disposed of in an appropriate manner. The harvested fruit shall be examined by competent persons to ensure that it is fit for further processing into food.

4.2.2.2 Protection of product from contamination

This shall be achieved as follows:

a) 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 nature of the fruit and the methods of harvesting shall indicate the type and degree of protection required.

b) The raw or dried fruit shall be moved to suitable storage, or to the processing area for immediate processing, as soon as possible after harvesting or drying.

c) Where fruits are likely to have become infested with insects or mites during or after harvesting or drying as a preventive measure, suitable treatment such as fumigation shall be applied.

d) Fruit held for processing shall be stored in closed containers, buildings, or under suitable type of covering that protects it from rodents, insects, birds, debris and dust. Fumigation methods and chemicals used shall be approved by legal authorities having jurisdiction.

4.2.3 Sanitary requirements for drying yards

4.2.3.1 Designation of drying yards

Where fruit is dried by the sun in drying yards, such yards shall be recognized as food-processing yards whether drying is carried out on a grower's property or as a commercial operation. Such yards shall as far as possible comply with the relevant provisions of this code as are applicable, and in particular with the requirements in 4.2.3.2 and 4.2.3.3.

4.2.3.2 Requirements for the location of drying yards

Drying yards shall in all cases be located a sufficient distance from cattle feed lots, settling pods and/or other waste collection areas to prevent contamination from these sources.

They shall also be so located that they have proper and adequate drainage.

4.2.3.3 Requirements for the construction yards

The drying yard shall be:

a) so surfaced that it shall permit maintenance of clean yard surfaces and prevent contamination of drying fruit; and

b) fenced, where necessary, to keep out animals as far as practicable, and the area around the drying yard shall be kept clean, free from weeds and other debris that can blow into the yard.

4.2.4 Sanitary requirements for cutting sheds

4.2.4.1 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 to rodents, insects, or birds.

4.2.4.2 Where cutting is done in open sheds, adequate precautions shall be taken to protect against insect, rodent and bird contamination or harbourage. The sheds shall be adequately lit and ventilated, and adequate, clean toilet and hand-washing facilities shall be provided.

4.2.5 Sanitary requirements for storage areas

Both fresh fruit for processing and the dried fruit shall be stored in areas where it is protected from rodent, insect and bird depredations, and storage time should be kept to a minimum consistent with good manufacturing practice.

4.2.6 Hygienic operating requirements

4.2.6.1 Drying trays, cutting equipment, and storage bins shall be kept clean and free from fruit residue and foreign substances that may cause contamination of the fruit.

4.2.6.2 There shall be an adequate supply of clean potable water for hand washing, equipment cleaning, and raw product washing. Standards of potability shall not be less than those stipulated by US EAS 12

4.2.7 Sanitary requirements for transportation

4.2.7.1 Facilities

Conveyance for transporting the harvested crop or raw product from the production area, place of harvest or storage shall be adequate for the purpose intended and shall be of such material and construction as shall permit thorough cleaning and shall be so cleaned and maintained as not to constitute a source of contamination to the fruit.

4.2.7.2 Handling procedures

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

5 Plant Construction and Layout

5.1 Requirements for plant location, size and design

The building and surrounding area shall be:

a) such as can be kept reasonably free of objectionable odours, smoke, dust, or other contamination;

b) of sufficient size for the purpose intended without crowding of equipment or personnel;

c) of sound construction and kept in good repair;

d) of such construction as to protect against the entrance or harbouring of insects or birds or vermin; and

e) so designed as to permit easy and adequate cleaning;. and

f) in areas not experiencing high concentrations of air-borne pollutants, equipment shall be used to remove pollutants from the air blown across or through the product.

5.2 Requirements related to sanitary facilities and controls

5.2.1 Separation of processes

5.2.1.1 Raw material handling areas

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

5.2.1.2 Processing and storage areas

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

5.2.2 Water supply

An ample supply of cold and hot water shall be available where necessary. The water supply shall be of potable quality. Standards of potability shall not be less than those stipulated US EAS 12

5.2.3 Ice

Where ice is used, it shall be made from water of potable quality and shall be manufactured, handled, stored and used, so as to protect it from contamination.

5.2.4 Auxiliary water supply

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

5.2.5 Plumbing and waste disposal

5.2.5.1 All plumbing and waste disposal lines (including sewer systems) shall be large enough to carry peak loads. All lines shall be watertight and have adequate traps and vents.

5.2.5.2 Disposal of waste shall be effected in such a manner as not to permit contamination of potable water supplies. The plumbing and the manner of waste disposal shall be approved by the official agency having jurisdiction.

5.2.6 Lighting and ventilation

5.2.6.1 Premises shall be well lit and ventilated. Light bulbs and fixtures suspended over food in any step of preparation shall be of the safety type or otherwise protected to prevent food contamination in the case of breakage.

5.2.6.2 Special attention shall 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.

5.2.7 Toilet-rooms and facilities

5.2.7.1 Adequate and convenient toilets shall be provided and toilet areas shall be equipped with self-closing doors;

5.2.7.2 Toilet rooms shall be well lit and ventilated and shall not open directly into a food handling area. They shall be kept in a sanitary condition at all times.

5.2.7.3 There shall be associated hand-washing facilities within the toilet area and the notices shall be posted requiring personnel to wash their hands after using the toilet.

5.2.8 Hand-washing facilities

5.2.8.1 Adequate and convenient facilities for employees to wash and dry their hands shall be provided wherever the process demands. They shall be in full view of the processing floor.

5.2.8.2 Single-use towels are recommended, where practicable, but otherwise the method of drying shall be approved by the official agency having jurisdiction. The facilities should be kept in a sanitary condition at all times.

5.3 Requirements for equipment and utensils

5.3.1 Materials

All food contact surfaces should be smooth; free from pits, crevices and loose scale; nontoxic; unaffected by food products; and capable of withstanding repeated exposure to normal cleaning; and non-absorbent unless the nature of a particular and otherwise acceptable process renders the use of a surface, such as wood, necessary.

5.3.2 Sanitary design, construction and installation

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

5.3.3 Equipment and utensils

Equipment and utensils used for inedible or contaminating materials shall be so identified and shall not be used for handling edible products. Colour codes may be used for ease of identification of equipment.

5.3.4 Drying equipment

Equipment used for drying shall be so constructed and operated that the product cannot be adversely affected by the drying medium.

6 Plant facilities and operating requirements — Environmental hygiene

6.1 General

Buildings and equipment shall be designed, constructed, maintained and cleaned to standards that ensure the safety and quality of the ingredients and finished product throughout the entire process.

Staff shall be trained to work tidily and operate a "clean as you go" regime.

6.2 Floors

6.2.1 The design of the floors shall permit easy cleaning and junctions between floors and walls shall be rounded and continuous.

6.2.2 The floors shall be smooth and free from cracks including open joints. They shall have adequate drainage slopes to direct any water towards drainage channels. There shall be no back flow from the drainage to the production areas.

6.3 Walls, doors and windows

6.3.1 Walls

All walls shall be impermeable, smooth, and easy to clean. All finishes shall be properly applied and maintained. Painted surfaces shall not be allowed to deteriorate or flake. Paint used shall be designed for food production areas. Tiles if used shall be sound and in good repair. Loose or damaged tiles are unacceptable.

6.3.2 Windows

Mesh screens shall be put on all windows to avoid insects. Glass shall not be used on the windows in the production areas, only shutter-proof materials are required.

6.3.3 Doors

The doors opening from the production areas to the outside shall have self locking devises to ensure doors remain closed at all times. Hanging strip doors shall cover the doors opening from the production to the outside, to avoid entry of dust or insects when the doors opened. The doors shall be sealed at the bottom completely to avoid entry of or insects to the production areas. Rubber may be used or any suitable material.

The walls, doors and windows shall be cleaned regularly.

6.4 Ceilings and overhead

6.4.1 Ceilings

They shall have a smooth, impermeable surface kept in good repair. They shall be regularly cleaned and the joints shall be sealed.

6.4.2 Overhead structures

The number of overhead structures shall be minimized in production. If required, they shall be of a circular cross-section to aid cleaning and shall be frequently inspected.

6.5 Potability of water

6.5.1 Water quality

The water used for cleaning or rinsing shall be of potable quality and its microbiological suitability shall be checked regularly, at least twice a year.

6.5.2 Water treatment

In case the water is not potable, chlorination of cleaning water by use of hypochlorite, to achieve 10 ppm free chlorine may be done. Other permitted disinfectants may be used at the required levels

6.6 Solar dryers

6.6.1 The cabin where the trays for drying are placed shall be enclosed, if in a building or enclosure, to prevent exposing the inside of dryers to dust, insects and other contaminants. The cabin shall also have wire mesh at appropriate places to avoid the entry of rodents.

6.6.2 The inside of the solar dryer shall be wiped with a clean dry cloth dipped in a sanitizing solution for disinfection, when the dryer is empty.

6.6.3 The solar panels shall be wiped regularly to avoid accumulation of dust, according to the instructions by the supplier of the solar panels.

6.7 Factory perimeters

6.7.1 Outside areas shall be maintained in a sound condition with adequate drainage. Areas shall be kept clean and tidy at all times and debris, old equipment, pallets etc. shall not be allowed to accumulate.

6.7.2 Rubbish bins shall be covered, emptied regularly, and maintained in a clean condition.

7 Good Manufacturing Practices

7.1 General

Good manufacturing practices (GMP) encompass many aspects of procurement, manufacture, distribution and sale, which potentially affect quality and integrity. Personnel hygiene and environmental hygiene shall be controlled. The following defines GMP in key areas.

7.2 Management of personnel health and hygiene

7.2.1 Personnel health

7.2.1.1 Plant management shall ensure that that any person afflicted with infected wounds, sores, or any illness, notably diarrhoea, immediately report to management.

7.2.1.2 Management shall 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.

7.2.2 Personnel hygiene and personal hygiene standards

7.2.2.1 Plant management shall ensure that everyone entering the production area present himself or herself in a clean and tidy manner and maintain a high standard of personal hygiene.

7.2.2.2 With respect to the personal hygiene standards the following issues shall be noted.

a) all personnel are expected to bathe daily before entering the factory so as to avoid body odour.

b) fingernails shall be short and clean. nail varnishes and false nails shall be not permitted.

c) the excessive use of cosmetics e.g perfume, aftershave and make up shall not be allowed. False eyelashes shall not be worn.

d) no jewellery except a plain wedding band is permitted. Ear clips shall not be worn. Nose studs are unacceptable. Wristwatches and cufflinks shall not be worn.

e) Suitable and approved secure storage areas shall be provided. for personnel's belongings such as purses, handbags

f) all sores, cuts, grazes, infected areas and other wounds shall be covered by a suitably coloured waterproof dressing, incorporating a metal strip, by the company and applied by the company medical representative who is responsible for providing first aid.

g) any dressing applied shall be accounted for at the end of the shift. The loss of any dressing shall be reported immediately to the management. Where possible, dressings shall be covered by rubber gloves. Staff arriving at work with an unprescribed wound dressing shall have it checked and, if, necessary replaced.

h) The officer responsible for Quality Assurance shall check personnel hygiene daily and record. Anyone not complying with the regulations on personnel should be requested to leave production areas.

7.2.2.3 Medical facilities shall have the following characteristics:

a) appropriate room with first aid kit and trained nurse, but if there is no trained nurse there should be a trained first aid personnel to handle basic medical issues

b) Basic first aid facilities shall be available to all the working areas and these should be agreed on by the Company Medical Advisor. All treatment shall be documented.

c) All personnel shall be made aware of their responsibility for health and safety. Each person shall have a certificate from public health authorities that permit him/her to work in a food-processing establishment.

7.2.2.4 Handling of accidents or illnesses includes the characteristics below

a) All accidents at work, however minor, shall be reported.

b) In case of cuts leading to bleeding, blue waterproof plasters, with a strip, shall be issued by the first aid supervisor to the individual. Checks shall be done at the end of the shift to that the plaster is still in place on the individual and has not been lost. If the plaster is lost after being issued then all the product packed that day shall be put under quarantine unless the plaster is found.

c) In case the bleeding has affected the product, the entire product shall be rejected. The working area and equipment should be cleaned thoroughly and disinfected.

d) All members of staff shall report to management when suffering from, being in contact with, or being a carrier of, any infectious diseases like in case of stomach upsets, nausea, vomiting, skin breakages, boils, discharging ear or skin infections, cholera etc, individuals shall be assigned duties away from production areas or in severe cases to rest until they are confirmed okay.

7.3 Management of hygienic operating practices

7.3.1 Sanitary maintenance of plant, facilities and premises

7.3.1.1 The building, equipment, utensils and all other physical facilities of the plant shall be kept in good repair and shall be kept clean and maintained in an orderly, sanitary condition.

7.3.1.2 Waste materials shall be frequently removed from the working area during plant operation and adequate waste receptacles shall be provided.

7.3.1.3 Detergents and disinfectants employed shall be appropriate to the purpose and shall be so used as to present no hazard to public health.

7.3.2 Management of cleaning and cleaning programmes

7.3.2.1 Cleaning and use of sanitizers

During cleaning, detergents and disinfectants shall be used appropriately. The manufacturers usually indicate instructions for usage of the sanitizer on the label. These shall be translated for use by the workers. Cleaning schedules and use of sanitizers shall be established and should specific to all areas, surfaces and equipment.

7.3.2.2 Cleaning programmes and routines

7.3.2.2.1 The production areas, floors, tables, knives, slicers, gloves, and sinks shall be cleaned before beginning a shift and at the end of the shift everyday. All these areas need to be cleaned by use of detergents, and then rinsing is done using sanitizers as recommended by the manufacturer of the sanitizer.

7.3.2.2.2 Trays shall be cleaned immediately after emptying the dried product. They shall be cleaned with detergent, rinsed with water and then sanitized. Cleaning may also be done as need be during the shift.

a) Walls, windows, doors, and ceilings shall be cleaned at least once a week.

b) Toilets and changing rooms shall be cleaned at least twice a day.

c) The compound shall be cleaned at least once a day.

d) Uniforms shall be changed at least once a day

7.4 Management of metals and metal control

7.4.1 General requirements

Every precaution shall be taken to prevent the contamination of final products with metal. It is essential that metal contamination risks be controlled. To ensure effective metal management attention should be given to the following:

a) fabric and equipment that is likely to rust and corrode shall be avoided;

b) metal to metal contacts, where wear may occur shall be avoided;

c) self locking nuts shall be used to replace conventional ones;

d) nails, staples shall not be allowed to come into contact with produce or with the packaging materials; and

e) there shall be control procedures during maintenance, repair, alteration or routine cleaning.

7.4.2 Requirements related to knife control

These requirements include the following:

a) knives shall be made of stainless steel with plastic handles;

b) knives shall be numbered on the handles;

c) knives shall be inspected before issuing out to ensure that all the blades are intact;

d) before being issued and the end of each shift, the knives shall be recorded by the person responsible for quality assurance;

e) at the end of the shift, the knives shall be inspected paying particular attention to the blades;.

f) if any blades are noted to be damaged, the produce cut on the day shall be placed under quarantine. If the blades were damaged during cutting, then the produce cut during that shift should be rejected, without further processing. It is dumped and considered as unfit for consumption.

7.5 Management of glass

7.5.1 Glass shall be eliminated completely from the food processing areas, all storage areas and packaging materials stores.

7.5.2 Perspex is recommended on windows instead of glass.

7.5.3 Lighting fixtures, including insectrocutor tubes, in all production and storage areas shall be guarded or sealed with unbreakable enclosures to glass in case of any glass breakage. This shall be kept clean at all times and not allowed to accumulate dust, debris etc.

7.5.4 Glassware, glass bottles including soft drink (soda) or beer bottles shall not be allowed in the production areas.

7.5.5 Personal watches are not allowed in the production areas.

7.5.6 A glass register shall be maintained listing every piece of glass in the production and storage areas. Regular inspection and records by the controller on a weekly basis is essential to ensure that breakage has not occurred.

7.5.7 In case of glass breakage, production shall stop immediately. Any affected produce shall be isolated, rejected and dumped and such an incidence recorded. Production should only resume if there is no further risk of contamination by glass.

7.6 Management of pests and toxic substances

7.6.1 Effective measures shall be taken to protect against the entrance into the premises and the harbourage on the premises of insects, rodents, birds or other vermin.

7.6.2 Pest control is not just the control of rodents, flies, and birds: It includes all living creatures whether walking, crawling or flying which contaminate the product or environment. The policy shall be one of prevention by the maintenance of good hygiene and housekeeping standards plus adequate screening and proofing of premises to exclude pests, supported by an effective inspection programme.

7.6.3 Rodent monitoring systems include the following**.**

a) non-toxic baits shall be used whenever possible based on infestation history.

b) depending on the level of infestation, toxic baits can be used. Granular baits and contact pesticide dusts shall not be used. Solid blocks are highly recommended.

c) the position of all baits shall be indicated on a layout map of the premises.

d) the bait position shall be numbered and recorded on a checklist. The date of inspection shall be recorded on the checklist and on the bait container.

e) the bait boxes shall be designed to allow locking to avoid accidental poisoning of human beings and other animals.

f) the keys to the bait boxes shall be kept by the responsible personnel

7.6.4 Electric insect knockdown devices include the following.

a) these are positioned at each door opening from the factory to the outside.

b) they shall be permanently operational and the U.V tubes shall be changed at the frequency recommended by the manufacturer.

c) catch trays shall be fitted and emptied and cleaned weekly. The contents of each tray shall be monitored and recorded, to help identify unusual increases in insect numbers or types..

7.6.5 Birds shall be prevented from gaining access to the factory buildings. Birds can also be excluded from the external roosting sites on buildings ledges, undersides of canopies etc by use of anti-perching devices.

7.6.6 All types of domestic animals such as dogs and cats shall be excluded from areas where food is processed or stored and they are unacceptable in any part of the factory exterior areas. Staff shall not feed, or otherwise encourage stray animals.

7.6.7 Among the requirements for the storage of toxic substances, the following points shall be observed.

a) all rodenticides, fumigants, insecticides or other toxic substances shall be stored in separate locked rooms or cabinets and handled only by properly trained personnel.

b) they shall 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.

c) records shall be kept on their regular application.

7.7 Management of toilets and cloakrooms

7.7.1 The facilities shall be adequate for the number of personnel employed. The facilities shall function properly as well as being kept in a clean condition.

7.6.2 Hand washing facilities shall be provided next to the toilets.

7.6.3 **"Now Wash Your Hands"** notices shall be clearly displayed in bold type on all doors, above urinals, and above washbasins to remind staff of this.

7.8 Management of hand washing and hand drying facilities

Hand washing facilities shall be provided in toilets and at entrance points of the production areas

7.8.1 All personnel entering production areas shall wash their hands. Washing/ troughs shall be sufficient to allow proper cleansing of hands forearms for all the staff entering or leaving the area.

7.8.2 "Now Wash Your Hands" notices shall be clearly displayed in bold type in appropriate places to be a constant reminder to personnel on their responsibility to wash their hands at expected times and also when deemed necessary.

7.8.3 Only unperfumed, liquid, bactericidal soap shall be provided at all washing locations. Dispensers shall be easy to clean and designed to contact during use. A synthetic nailbrush shall be provided at the facility.

7.8.4 Further disinfection or alcohol rinses, is necessary after hand washing as an extra measure to ensure high standards of hygiene.

7.8.5 Foot or knee operated hand washing facilities are most preferred in high-risk areas.

7.8.6 Only disposable paper towels are acceptable and suitable dedicated towel dustbins should be provided and emptied and cleaned regularly. The lids of these bins shall be foot operated**.**

7.8.7 Alcohol rinses or disinfection are essential after use of the paper towels.

7.9 Management of personnel habits

7.9.1 Personnel shall not eat food, spit, smoke, or use tobacco or snuff in production areas.

7.9.2 Designated places shall be provided where smoking may be done, away from the production places.

7.9.3 Signs for "**No Smoking", "No spitting", "No eating"** shall be put up in the production places.

7.10 Management of refreshments areas or canteens

7.10.1 Eating and drinking shall not allowed in the production areas including the eating of sweets or chewing gum.

7.10.2 Signs or notices shall be put up prohibiting eating and drinking in the production areas.

7.10.3 All meals, food or drink shall be taken in the canteen or in the place set aside for this purpose away from the production areas. The canteen or recreating place shall be kept very clean at all times. Failure to do this leads to rodents, cockroaches and other contaminants inhabiting the place and eventually getting to the production areas.

7.10.4 Glass or soda bottles shall not be taken into production areas.

7.11 Management of protective clothing

7.11.1 All personnel including management and visitors shall wear protective clothing before the production areas for whatever purpose.

7.11.2 The clothing shall be clean and conform to the following:

a) long sleeved white coats are highly recommended;

b) all pockets shall be secure and on the inside; and

c) buttons are unacceptable. Fastening may be done by use of studs on the inside or by use of Velcro.

7.11.3 No personal clothing shall be allowed on top of the protective clothing

7.11.4 Personnel leaving production areas to visit the canteen, toilets, or any non-production environment, shall leave the protective clothing in changing room.

7.11.5 Washing of the protective clothing shall be done within the company. Home laundering is not acceptable.

7.11.6 Suitable foot wear shall be worn and shall be used only in the production areas. Personnel should wear their own shoes away from the production areas and shall change the shoes before entering the production area.

7.11.7 All personnel shall dip their footwear into a footbath before entering the production areas. The foot dip shall have a sponge and a disinfectant.

7.12 Personnel hygiene and food handling practices

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

7.12.2 Hands shall be washed as often as necessary to conform to hygienic operating practices.

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

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

7.12.5 Minor cuts and abrasions on the hands shall be appropriately treated and covered with a suitable waterproof dressing. Adequate first-aid facilities shall be provided to meet these contingencies so that there is no contamination of the food.

7.12.6 Gloves used in food handling shall be maintained in a sound, clean and sanitary condition; gloves shall be made of an impermeable material except where their usage would be inappropriate or incompatible with the work involved.

8 Operating practices, raw materials and production requirements

8.1 Raw material handling

8.1.1 Acceptance criteria

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

8.1.2 Storage

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

8.1.3 Water

Water used for conveying raw materials into the plant shall be from such a source or suitably treated as not to constitute a public health hazard and shall be used only by permission of the official agency having jurisdiction.

8.2 Inspection and sorting

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

8.3 Washing or other preparation

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

8.4 Preparation and processing

Preparatory operations leading to the finished product and the packaging operations shall 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.

8.5 Packaging of finished product

8.5.1 Materials

Packaging materials shall be stored in a clean and sanitary manner and shall not transmit to the product objectionable substances beyond limits acceptable to the official agency having jurisdiction and shall provide appropriate protection from contamination.

8.5.2 Techniques for packaging

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

8.5.3 Preservation of finished product

The following should be noted.

a) Methods of preservation or treatment of the finished product shall be such as to kill any insects or mites remaining after processing and to result in protection against contamination, deterioration, or development of a public health hazard.

b) The finished product shall be of such moisture content that it can be held in the localities of origin and distribution under any normally foreseeable conditions for those localities without significant deterioration by decay, mould, enzymatic changes, or other causes.

c) In addition to applicable drying, the finished product may be treated with chemical preservatives at levels approved by the Codex Alimentarius Commission, as referenced in the Codex Commodity standards, heat processed and/or packed in hermetically sealed containers so that the product shall remain safe and shall not spoil under normal non-refrigerated storage conditions.

8.6 Storage and transport of finished products.

8.6.1 The finished products shall be stored and transported under such conditions as shall 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.

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

8.6.3 Where dried fruits are stored under conditions in which they may become infested by insects and mites, appropriate methods of protection shall be used regularly. Dried fruits shall 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 may 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

8.7 Sanitation control programme

8.7.1 It is desirable that each plant in its own interest designates a single individual, whose duties are preferably divorced from production, to be held responsible for the cleanliness of the plant. This staff shall be a permanent part of the organization and 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.

8.7.2 Critical areas, equipment for cleaning and materials shall be designated for specific attention as part of a permanent sanitation schedule.

9 Laboratory control procedures

In addition to any control by the official agency having jurisdiction, it is desirable that each plant in its own interest shall have its own or access to laboratory control of the sanitary quality of the products processed. The amount and type of such control shall vary with the fruit as well as the needs of management. Such control shall reject all fruits that are unfit for human consumption.

10 End product specifications

Appropriate methods shall be used for sampling, analysis, and determination in the following specifications.

a) to the extent possible in good manufacturing practice the products shall be free from objectionable matter.

b) the products shall not contain any pathogen microorganisms or any toxic substance originating from microorganisms.

c) the products shall comply with the requirements on Pesticide Residues and Food Additives as contained in permitted lists or Codex commodity standards.

11 Record keeping

11.1 Records shall be available and be supplied on demand as evidence to establish food safety. These records shall be legible, permanent, accurate and be signed and dated by the individual(s) responsible.

11.2 They shall include procedures, controls, limits, and subsequent follow-up documents. They shall be retained for at least one year after the expiration of the durable life date (best before date) or, at least two years after the food has been released to the consumer.

11.3 The necessary records shall include:

a) raw material quality control record;

b) grower/supplier agreements;

c) drying control record;

d) stock control record;

e) company induction for all staff;

f) training programme;

g) daily personnel check list;

h) sanitation record;

i) water analysis checks;

j) knife control record;

k) glass control record;

l) accident and illnesses record;

m) rodent control record;

n) chemicals records (additives, sanitizers);

o) insects control record;

p) foreign matter control record;

q) finished product control record, lots records including distribution; and

r) customer complaints register.

Annex A
(normative)

Materials required for processing dried fruits

A.1 The provisions detailed below are required for processing of all dried fruit.

A.1.1 Preparation rooms including:

room for storage of raw materials;

– processing rooms for cutting and slicing;

– sorting/packing/labelling room;

– storage room for packing material;

– changing rooms;

– washrooms away from the processing facility; and

– storage room for cleaning materials detergents/disinfectants.

A.1.2 Other facilities include

– insectrocutors or electric fly killers for each exit of processing room;

– solar driers; and

– first aid box.

A.2 Basic utilities and consumables for use in processing of fruits include the following:

– trays, (these shall be enough to ensure continuous drying);

– protective clothing or uniforms, preferably white colour including headgear or covers;

– comfortable closed shoes, white rubber shoes or gumboots;

– gloves;

–hand washing liquid soap (non-perfumed);

– paper towels;

– disinfectant (non-perfumed), for example, 95 % ethyl alcohol for final, hand disinfection;

– detergent for cleaning floors, tables, trays, uniforms etc;

– chlorine powder;

– polythene bags for finished dried products;

– pallets for storage;

– dustbins with lids, foot operated for inside pack house; and

–contents of the first aid box.

A.3 Specific requirements are found below.

A.3.1 For processing pineapples the following are required:

– stainless steel knives;

– kitchen vegetable slicer; and

– decoring machine.

A.3.2 For processing bananas the following are required:

– stainless steel knives;

– egg slicer;

– ripening box; and

– blankets.

Annex B
(normative)
General relationship between the weight of the final solar dried product and the weight of the starting material

Product type	Target weight (kg)	Raw material requirement (kg)
Pineapples	1	15
Bananas	1	4
Dried pawpaw	1	15
Mango slices	1	12

NOTE 1 The above fresh, dried fruit ratios are approximate figures, and may depend on the type of dryer used for drying and on final moisture content of the dried fruit.

NOTE 2 Dried fruit processing unit should collect their own data to the fresh: dried fruit or fresh: dried vegetable ratio in their own processing units.

Annex C
(normative)
Quality control procedures

C.1 General

A system of control in processing, quality and safety, shall be in place so as to achieve maximum efficiency, while consistently producing products that conform to customer expectations. The system shall among others cover the aspects found below.

C.2 Inspection and storage of raw materials

C.2.1 **T**he raw materials shall always be off-loaded in a covered place and transferred to their appropriate storage area.

C.2.2 The raw materials for organic production shall be stored separately from conventionally produced materials. Similarly materials for organic production shall be only obtained from the farmers that have been certified for organic certification.

C.2.3 The details of all supplied raw materials shall include details of the farmer's code, date of harvest to allow lot numbering and traceability.

C.2.4 The person responsible for quality shall keep record of the date the raw material was harvested and received, the quantity received, the assigned lot number, defects, etc.

Where a lot supplied contains many defects this shall be communicated back to farmer so that necessary production adjustments could be made with a view to improve quality.

C.3 Drying process control

C.3.1 The drying process shall be monitored and records kept at regular intervals and reference should always be made to the expected Fresh: Dried fruit ratio.

C.3.2 Daily analysis results on the quantity of produce and the expected grade 1 quality versus the actual grade1 quality obtained.

C.4 Product identification and traceability

C.4.1 For purposes of product identification and traceability, each of the approved farmers, or any other approved supplier, shall be assigned a unique code identification number.

At the farm level, the produce shall be labelled with the farmer's code. Produce delivered to the processing unit shall have a farmer's delivery list bearing the following information:

a) the farmers code,

b) date of delivery,

c) the produce,

d) organic quality for organic produce, and

e) signature of the farmer.

All produce arriving at the processing unit, shall be labelled with the lot number indicating the farmer's code and the date of harvesting produce. The same lot number shall be kept together with the produce during storage.

During drying, the dryer and the trays shall be tagged with same lot number to enable the easy identification of the product that was supplied by a particular farmer.

The same lot number shall be retained during sorting, grading and packing of the product. It shall appear on the outer box when the product has finally been packed and is ready for despatch.

C.5 Packaging and labelling

C.5.1 The packaging shall adequately protect the product during the expected life under specified. It shall also not have any significant adverse interaction with the product.

C.5.2 Where dried fruits are vacuum packed the sealing has to be neat and intact without any hole that can allow entrance of air.

C.5.3 The following information shall be indicated on each bag by the dried product:

a) product name;

b) lot number; and

c) the words **"Organic"** in case of an organic product.

C.5.4 The following information shall be indicated by the exporter on each bag:

a) product type;

b) lot number;

c) sell by date;

d) name and details of exporter;

e) country of origin;

f) net weight; and

g) certifying body, (the EU regulation clause, in case of organic produce).

C.6 Net weight control

C.6.1 Each individual bag shall be accurately weighed on a calibrated balance. Tare weight of the empty bags shall be taken and recorded. The gross weight shall then be taken of the individual.

Net weight = Gross weight - Tare weight.

C.6.2 Sample at least five bags every hour during and packing, and determine the net weight and record the result.

C.6.3 In case some bags are found to contain less or more the required net weight, such bags shall be rejected and sent back for repacking.

C.6.4 In calibrating the measuring equipment the following shall be observed:

a) all measuring instruments used shall be having known accuracy. Such instruments include thermometers, weighing scales, relative humidity gauges etc.;

b) where possible, calibration of these instruments shall be done by the Metrology Division of the Uganda National Bureau of Standards or any other competent calibration laboratory recognized by the Uganda National Bureau of Standards. Most instruments require calibration by these laboratories once a year. The issued calibration certificates shall be kept; and

c) scales shall be calibrated every time before use by a person responsible for quality assurance using stamped weight.

C.6.5 To ensure conformance to the customer specification the quality of dried fruits shall be monitored during sorting, packing, weighing, and labelling. Monitoring records shall be kept. The monitoring may include the following:

a) levels of defects observed. If the defect levels are higher than the limit, then the entire product shall be re-sorted again and the sorting team cautioned to sort carefully;

b) monitoring of the quality of seals. In case of poor seals the bags shall be re-sealed; and

c) proper labelling especially the lot number and words organic quality when the production is organic in origin.

Final confirmation of batch shall be made when the batch conforms to customer requirements.

Bibliography

[1] US 640:2006, *Code of Practice for the production, handling and processing of solar dried fruits*

[2] CXC 3-1969, *Code of Hygienic Practice for Dried Fruits*

[3] CXC 5-1971, *Code of Hygienic Practice for Dehydrated Fruits and Vegetables including Edible Fungi*

Certification marking

Products that conform to Uganda standards may be marked with Uganda National Bureau of Standards (UNBS) Certification Mark shown in the figure below.

The use of the UNBS Certification Mark is governed by the Standards Act, and the Regulations made thereunder. This mark can be used only by those licensed under the certification mark scheme operated by the Uganda National Bureau of Standards and in conjunction with the relevant Uganda Standard. The presence of this mark on a product or in relation to a product is an assurance that the goods comply with the requirements of that standard under a system of supervision, control and testing in accordance with the certification mark scheme of the Uganda National Bureau of Standards. UNBS marked products are continually checked by UNBS for conformity to that standard.

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