

**CODE OF HYGIENIC PRACTICE FOR DESICCATED COCONUT  
(CXC 4-1971)**

**SECTION I - SCOPE**

The following code of hygienic practice applies to desiccated coconut, the dried product prepared for human consumption without requiring further processing which is obtained by shredding or otherwise comminuting the pared kernel of coconuts, the fruit of the palm, *Cocos nucifera*.

**SECTION II - DEFINITIONS**

- A. **Coconuts** - coconuts consist of an outer skin (green or brown when harvested) enclosing a thick fibrous coating or husk; inside the husk is a woody shell which encloses the kernel and which is separated from it by a brown skin. The pared kernel consists of a solid white layer enclosing an aqueous liquid known as coconut water.
- B. **Coconut meat** - white solid layer of the kernel.
- C. **Dehusking** - the removal of the husk, leaving the shell intact.
- D. **Hatcheting** - the removal of the shell.
- E. **Paring** - the removal of the brown skin around the kernel.

**SECTION III - RAW MATERIAL REQUIREMENTS**

- A. **Environmental Sanitation in Growing and Food Production Areas**
  - (1) **Sanitary disposal of human and animal wastes.** Adequate precaution should 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 products from contamination with these wastes, particularly those products that may be consumed without heat treatment.
  - (2) **Animal, plant pest and disease control.** 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 crop.
- B. **Sanitary Harvesting and Food Production**
  - (1) **Sanitary techniques.** Harvesting and production operations, methods and procedures should be clean and sanitary.
  - (2) **Protection of product from contamination.** After harvesting, clean and sanitary methods should be observed to protect against contamination of the nuts during the process of ripening and dehusking. Following dehusking, special precautions are necessary to ensure that contamination does not occur.
- C. **Transportation**
  - (1) **Facilities.** Conveyances for transporting the harvested crop, which may have the husk removed on the plantation, should be adequate for the purpose and should be of such 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 nuts.

- (2) **Handling procedures.** All handling procedures should be such as will prevent the product from being contaminated. Extreme care should be taken in transporting dehusked coconuts to prevent spoilage or deterioration.

## SECTION IV - PLANT FACILITIES AND OPERATING REQUIREMENTS

### A. Plant Construction and Layout

- (1) **Location, size and sanitary design.** The buildings 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, birds or vermin;
  - should be so designed as to permit easy and adequate cleaning.

Special precautions should be taken in the shredding, desiccating, and packing sections to protect against the entry of birds, insects and vermin and for this purpose all openings should be covered with perforated metal gauze or other suitable protective covering.

Separate and adequate space should be provided for the storage of nuts awaiting manufacture, shell awaiting disposal, rejected nuts, firewood, etc.

Floors should be constructed of material which is not capable of supporting microbial growth, and should be hard surfaced. They should be designed and so drained as to facilitate effective cleaning.

### (2) Sanitary facilities and controls

- (a) **Separation of processes.** The husk, if it is not removed in the growing area, should be removed in a place separate from the factory. Dehusked nuts should be received into the factory buildings, and the processes of hatcheting, paring, and washing of the coconut meat should be carried out in a separate section from the subsequent processes. There should be no direct access from the hatcheting, paring, and washing sections to the other sections.

The sections should be so arranged that the coconut passes from the hatcheting, paring, and washing sections through to the packing room without retracing its path or passing through an area used for ancillary activities. Precautions should be taken to prevent contamination of shredding, desiccating, and packing sections of the factory with dust.

Separate rooms or compartments should be provided for the storage of inedible materials such as fuel and lubricants. The food handling area should be completely separated from any of the premises used as living quarters.

- (b) **Water supply.** An ample supply of hot and cold water should be available and an adequate supply of hot water where necessary. The water supply should be of potable quality. Standards of potability shall not be less than those contained in the "International Standards for Drinking

Water", World Health Organization, 1971. No husk pit for the retting of husks should be located within 100 metres (300 feet) of any well from which water is drawn for use in the factory.

- (c) **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.
- (d) **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 water-tight 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.
- (e) **Lighting and ventilation.** Premises should be well lit and ventilated. 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.
- (f) **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.
- (g) **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, but otherwise the method of drying should be approved by the official agency having jurisdiction.

In addition, where applicable, foot baths containing a suitable bactericidal solution should be provided at all appropriate entrances to the factory.

The facilities should be kept in a sanitary condition at all times.

## B. Equipment and Utensils

- (1) **Materials.** All food contact surfaces should be smooth; free from pits, crevices and loose scale; non-toxic; unaffected by coconut meat and milk; 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.
- (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.
- (3) **Equipment and Utensils.** Equipment and utensils used for inedible or contaminating materials should be so identified and should be used only for handling such products. Suitable containers should be provided for the collection of coconut shell and parings, and for rejected kernels.

Desiccators used for the coconut meat must not under any circumstances be used for the drying of coconut parings.

**C. Hygienic Operating Requirements**

- (1) **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.

All equipment in the shredding, desiccating, and packing sections coming into direct contact with the coconut should be cleaned, washed, and disinfected after each period of work and at least twice daily by means approved by the official agency. Detergents and disinfectants employed should be appropriate to the purpose and should be so used as to present no hazard to public health.

- (2) **Vermin Control.** Effective measures should be taken to protect against the entrance of insects, rodents, birds or other vermin into the plant, and especially into the shredding, desiccating, packing and storage sections, and against the harbourage of these pests on the premises.
- (3) **Exclusion of domestic animals.** Dogs, cats and other domestic animals, should be excluded from areas where coconut or coconut products are processed or stored.
- (4) **Personnel health.** 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.
- (5) **Toxic substances.** 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.
- (6) **Personnel hygiene and food handling practices**
- (a) All persons working in a food plant should maintain a high degree of personal cleanliness while on duty. Clothing including suitable headdress should be appropriate to the duties being performed and should be kept clean.
- (b) Hands should be washed as often as necessary to conform to hygienic operating practices.
- (c) Spitting, eating and the use of tobacco, betel nut or chewing gum should be prohibited in food handling areas.
- (d) All necessary precautions should be taken to prevent the contamination of the food product or ingredients with any foreign substance.
- (e) 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.
- (f) 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.

**D. Operating Practices and Production Requirements****(1) Raw material handling**

- (a) **Acceptance criteria.** The raw material should not be accepted by the plant if known to contain decomposed, toxic or extraneous substances which will not be removed to acceptable levels by normal plant procedures of sorting or preparation.
- (b) **Storage.** Coconuts stored on the plant premises should be maintained under conditions that will protect against contamination and infestation and minimize deterioration.

(2) **Inspection and sorting.** At the paring and washing stage, all kernels should be inspected and any unfit, including germinated kernels, rejected. Such operations should be carried out in a clean and sanitary manner. Only clean, sound coconut meat should be permitted for further processing.

(3) **Washing.** Water used for washing the kernels should be clean and of potable quality. It should be so frequently changed that the possibility of contamination is kept to a minimum and the water should not be recirculated unless suitably treated, for example by filtration and chlorination, to maintain it in a condition as will not constitute a public health hazard.

**(4) Preparation and processing**

- (a) **Preparatory operations.** 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.
- (b) **Processing.** After washing and before shredding, the coconut meat should be subjected to an effective process to eliminate pathogenic organisms from the surface of the meat, such as immersion in an adequate quantity of boiling water for a period of not less than one and a half minutes.
- (c) **Handling.** After this process, the coconut meat should not be manually handled in any way, but mechanical devices, or containers and scoops or rakes or other implements constructed of impervious materials, should be used to prevent contamination. Such implements should be cleaned, washed, and disinfected after each period of work and at least twice daily, by means approved by the official agency, and suitable racks or other places provided for their placing when not in use, such that they do not become contaminated.
- (d) **Desiccating.** Shredded coconut should be dried in a current of clean hot air free from chemical contamination until the moisture content reaches a safe level for storage. There should be thin layering of shredded coconut on the desiccator trays, and effective methods for the breaking up of the mat should be used. After drying, the desiccated coconut should be cooled before packaging.
- (e) **Bulk Storage.** If desiccated coconut is not packed at the factory into the containers in which it will be shipped, it should be transported to the packing plant in non-absorbent containers capable of being cleaned and which are disinfected before filling at the factory. The same hygienic precautions should be taken in the packing plant as are appropriate to the packing section of the factory.

**(5) Packaging of finished product**

- (a) **Materials.** Packaging materials should be stored in a clean and sanitary manner, should not transmit to the product objectionable substances beyond limits acceptable to the official agency having jurisdiction and should provide appropriate protection from contamination. The packaging material should be approved by the official agency and, for example, may comprise multi-wall

paper sacks with appropriate fat- and moisture-resistant layers of aluminium lined cases.

- (b) **Techniques.** Packaging should be done in a separate clean room. Precautions such as the use of magnets or metal detectors should be taken to eliminate any metallic contamination. Packaging should be done under conditions that preclude the introduction of contamination into the product, and mechanical rams or vibrators should be used so as to eliminate manual handling of the desiccated coconut.
- (c) **Information on label.** All containers should be so marked as to identify the factory at which the desiccated coconut has been manufactured or packed.

#### (6) **Storage and transport of finished product**

The finished product should be stored and transported under such conditions as will preclude the contamination with, or development of pathogenic or toxigenic microorganisms or infestation and protect against deterioration of the product or of the container.

#### E. **Sanitation Control Programme**

It is desirable that each plant in its own interest designate a single individual, whose duties are preferably divorced from production, to be held responsible for the cleanliness of the plant. His staff should 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. Critical areas, equipment and materials should be designated for specific attention as part of a permanent sanitation schedule.

#### F. **Laboratory Control Procedures**

Regular and frequent samples of desiccated coconut should be taken from the packing section and examined for:

- (1) contamination with any objectionable matter
- (2) microorganisms
- (3) fat content and free fatty acids
- (4) moisture content

### **SECTION V - END PRODUCT SPECIFICATIONS**

Desiccated coconut should be the clean, sound, wholesome product of the pared kernel of sound mature coconuts.

Appropriate methods should be used for sampling, analysis, and determination to meet the following specifications.

- A. To the extent possible in good manufacturing practice the product should be free from objectionable matter.
- B. The product should not contain pathogenic microorganisms such as salmonellae or any toxic substance originating from microorganisms.
- C. The product should be such that the acidity of the oil extracted by the solvent process should not exceed 0.3% m/m of free fatty acids calculated as lauric acid.
- D. The moisture content of the product should not exceed 3% m/m.