

**SRI LANKA STANDARD 1004 : 1993**

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**CODE OF HYGIENIC PRACTICE FOR  
MOLLUSCAN SHELLFISH**

**SRI LANKA STANDARDS INSTITUTION**



# CODE OF HYGIENIC PRACTICE FOR MOLLUSCAN SHELLFISH

SLS 1004 : 1993

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SRI LANKA STANDARDS INSTITUTION

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Sri Lanka.

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This standard does not purport to include all the necessary provisions of a contract.

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## SRI LANKA STANDARD CODE OF HYGIENIC PRACTICE FOR MOLLUSCAN SHELLFISH

### FOREWORD

This standard was finalized by the Sectoral Committee on Fish and Fishery Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 1993-12-26.

This standard is an adoption of Codex Alimentarius Commission/Recommended International Code of Hygienic Practice for Molluscan shell fish CAC/RCP-18-1978. The text of CAC/RCP-18-1978 was considered suitable for adoption as a Sri Lanka Standard without major changes.

This standard is intended to provide useful guidelines to assist those concerned with processing of molluscan shellfish.

During the formulation of this standard due consideration has been given to the relevant provisions made under the Sri Lanka Food Act, No. 26 of 1980 and the regulations framed thereunder.

### 1 SCOPE

1.1 This code applies to those bivalve molluscan shellfish such as oysters (*Ostreidae*), clams (*Veneridae*, *Maotridae*, *Cooperellidae* and *Aroidae*), mussels (*Mytilidae*), and cockles (*Cardiidae*), which are filter feeders, may be eaten raw or partially cooked and are normally consumed whole including the viscera.

1.2 The code is concerned with hygiene requirements for those species of shellfish intended for human consumption whether in the raw condition or destined for further processing.

### 2 REFERENCES

- SLS 143 General principles of food hygiene.
- SLS 614 Potable water.
- SLS 910 Limits for pesticide residues in food.

### 3 DEFINITIONS

For the purposes of this code the following definitions should apply :

- 3.1 **accepted** : Accepted by the official agency having jurisdiction.
- 3.2 **adequate** : Sufficient to accomplish the intended purpose of this code.

3.3 **clean sea water** : Estuarine or marine waters which are free of pollution and toxic marine algae in amounts which will adversely affect the quality and/or safety of shellfish.

3.4 **cleaning** : The removal of soil, food residues, dirt, grease or other objectionable matter.

3.5 **conditioning** : Placing non-contaminated shellfish, harvested from acceptable areas, in tanks or floats to remove sand, mud or slime and to improve product acceptability.

3.6 **contamination** : The occurrence of any objectionable matter in the product.

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

3.8 **establishment** : Any building(s) or area(s) in which food is handled after harvesting and the surrounding under the control of the same management.

3.9 **food handling** : Any operation in the growing and harvesting, preparation, processing, packaging, storage, transport, distribution and sale of food.

3.10 **food hygiene** : All measures necessary to ensure the safety, soundness and wholesomeness of food at all stages from its growth, production or manufacture until its final consumption.

3.11 **growing areas** : All estuarine and marine areas used for the commercial production or the sports harvesting of shellfish either by natural growth or by aquaculture.

3.12 **heat shucking** : The process of subjecting shellfish in the shell to any form of heat treatment, such as steam, hot water, or dry heat for a short period of time prior to shucking, to facilitate rapid removal of meat from the shell. Such treatment should not be considered as any part of a cooking process.

3.13 **packaging material** : Any containers such as cans, bottles, cartons, boxes, cases and sacks, or wrapping and covering material such as foil, film, metal, paper, wax-paper and cloth.

3.14 **pests** : Any animals capable of directly or indirectly contaminating food.

3.15 **pollutants** : Agricultural, domestic, industrial and naturally occurring contaminants adversely affecting sea water quality. Thermal changes in sea water quality may also be considered as pollution.

3.16 **processed shellfish** : Shellfish which have been subjected to heat treatment and/or preservation by salt, acid, smoking, pickling, jellifying or canning.



**3.17 purification (depuration)** : The process of holding live, initially polluted shellstock for a period of time under approved, controlled conditions in natural or artificial sea water, which may be treated or untreated, in tanks, floats or rafts, thereby rendering the shellfish suitable for human consumption without further treatment.

**3.18 relaying** : The removal of shellfish from a polluted growing area to an acceptable growing or holding area under the supervision of the agency having jurisdiction.

**3.19 molluscan shellfish** : Only those bivalve molluscs such as oysters, clams, mussels and cockles which are filter feeders, may be eaten raw or partially cooked and are normally consumed whole including the viscera.

**3.20 shellstock** : Live shellfish in the shell after harvesting.

**3.21 shucked shellfish** : Fresh or fresh frozen shellfish, which have not been subjected to any form of processing other than removal of the meat from the shell, sorting, washing, packing and/or freezing before shipment to market.

**3.22 unfit for human consumption** : An article that would normally be edible, but is inedible because of disease, decomposition or any other reason.

#### **4 RAW MATERIAL REQUIREMENTS**

##### **4.1 Environmental Hygiene in growing areas**

###### **4.1.1 Hygienic disposal of human and animal wastes**

In moderately sewage polluted zones shellfish may be grown and harvested for subsequent purification according to the standards of the official agency having jurisdiction. Adequate precautions should be taken to ensure that shellfish growing areas are free from pollutants capable of causing pollution of the shellfish and extreme care should be taken to protect the shellfish from contamination by any wastes. A clean area surrounding the shellfish growing areas should be established and the dumping of all wastes of agricultural, domestic or industrial origin, including wastes from private residences or boats, should be prohibited. Precautions of this kind should be particularly strict when protecting from such sources of contamination shellfish which are not intended for purification or heat processing.

#### 4.1.2 *Determination of pollution types and sources*

Surveys of the shoreline should be conducted to determine sources of both domestic and industrial pollution. Sources may include municipal sewage outfalls, industrial outfalls, mine wastes, geophysical contaminants, domestic animal holding pens, nuclear power plants, refineries or other sources. The need to reschedule hygiene surveys will be determined by changes in population shifts caused by commercial development of the shoreline or other factors affecting local population stability.

#### 4.1.3 *Classification of growing areas*

When pollution sources have been identified and evaluated, sampling stations for water, shellfish and/or bottom muds should be established and studies conducted to determine the effects of the pollutants on water and shellfish quality. The data should be evaluated by the official agency having jurisdiction and growing areas classified or designated according to official standards and criteria. When interpreting growing area data, the official agency having jurisdiction should take into account variations which may affect the level of pollution during the most favourable hydrographic and climatic conditions as influenced by rainfall, tides, winds, methods of sewage treatment, population variations and other local factors, since shellfish respond rapidly to an increase in the number of bacteria or viruses in their environment by accumulating these agents. The agency should also consider that shellfish have the ability to accumulate toxic chemicals in their tissue in concentrations greater than the levels found in the surrounding water. Food and Agricultural Organization, World Health Organization or other international or national food standards may be used as a guide to acceptable levels.

#### 4.1.4 *Growing area control*

Designated growing areas should be routinely monitored for changes in water quality, and sub-standard areas patrolled to prevent harvesting for purposes other than that established by the official agency. Tests for suitable indicator bacteria such as faecal coliforms or *Escherichia coli* should be used to determine the degree of faecal contamination.

4.1.5 Areas known to be affected by blooms of toxic dinoflagellates should be monitored at appropriate seasons for the presence of marine biotoxins such as paralytic shellfish poison. The official agency having jurisdiction should close immediately and effectively patrol affected areas when acceptable levels are exceeded in edible portions of shellfish meats.

#### 4.1.6 *Reclassification of growing areas*

When pollution conditions are modified as indicated by routine monitoring programmes or resurveys and water quality either improves or no longer meets designated water quality criteria, the official agency having jurisdiction should reclassify the area accordingly.

#### 4.1.7 *Pest and disease control*

Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health, particularly those which may arise from residues in the food. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

### 4.2 **Hygienic harvesting and food protection**

#### 4.2.1 *Handling techniques*

4.2.1.1 Shellstock to be stored in sea water tanks, floats or rafts should be harvested from and stored in an area acceptable to the official agency having jurisdiction.

4.2.1.2 Shellstock should be freed from excessive mud and weed soon after being harvested by washing it with clean sea water or approved fresh water under suitable pressure. Wash water should not be allowed to flow over shellfish already cleaned. The water should not be re-circulated.

4.2.1.3 Shellstock held on boats should not come into contact with accumulated wash-down water, bilge water or shell fluid.

4.2.1.4 On removal from water, shellstock should not be subjected to extremes of heat or cold, nor should it be damaged as a result of excessive abrasion. This is particularly important for those shellstock which are to be subjected to purification. Whenever possible, storage at temperatures above 10 °C or below 2 °C and direct contact with ice or other cold surfaces should be avoided.

4.2.1.5 Shellstock should be protected from excessive abrasion to prevent damage.

4.2.1.6 If shellstock is to be re-immersed after harvest, the sea water quality should comply with the standards of the official agency having jurisdiction.

4.2.1.7 Sea water or fresh water if used for washing shellstock, equipment, decks, holds and containers should comply with standards of the official agency having jurisdiction.

4.2.2 *Equipment and product containers*

4.2.2.1 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.

4.2.2.2 Dredges and other harvesting equipment, decks, holds and containers which come into contact with shellstock should be capable of being well drained and easily cleaned.

4.2.2.3 Dredges and other harvesting equipment, decks, holds and containers which are contaminated from use in a polluted area should be cleaned and if applicable disinfected (sanitized) as recommended by the official agency having jurisdiction before being used for shellfish from an unpolluted area.

4.2.2.4 Holds for washed shellstock should be well ventilated. Containers (i.e. baskets, barrels and boxes) made of properly treated wood, plastic or metal should be in sound condition and not constitute a source of contamination. Wood if used should be so treated as to be rendered impermeable.

4.2.2.5 Holds in which shellstock is held or containers should be so constructed that the shellstock is held above the floor level and drained so that the shellstock is not in contact with wash-down or bilge water, or shell fluid.

4.2.3 *Removal of obviously unfit materials*

4.2.3.1 Shellfish which are dead, dying permanently gaping with broken shells or tainted should not be passed for human consumption.

4.2.3.2 Shellfish which do not conform to acceptable hygiene standards and shellfish which are found in areas where the water quality does not conform to these standards should be segregated and condemned as unfit for human consumption unless they can be subjected to a process which renders them fit for human consumption to the satisfaction of the official agency.

4.2.4 *Protection of product from contamination*

4.2.4.1 Suitable precautions should be taken to protect shellstock and those parts of the harvesting boat, harvesting equipment, containers and other equipment likely to come into contact with shellstock from being contaminated by polluted water, droppings from sea birds, footwear which has been in contact with faecal matter or by other polluted material.

4.2.4.2 No animals should be permitted to live on any harvesting boats or to enter any part of any establishment where shellstock is prepared, handled, packed or stored.

4.2.4.3 Fuel, lubricating oils, chemicals used for the control of pests and other noxious chemicals should not be stored near shellstock or containers and equipment likely to come into contact with shellstock.

4.2.4.4 Wash-down pumps should draw water only from non-contaminated sea water and should not be connected directly or indirectly to the bilge or the toilet facilities.

4.2.4.5 Effective measures should be taken to protect against the entrance of rodents and other vermin into harvesting boats.

### 4.3 Transportation

#### 4.3.1 *Conveyances*

Conveyances for transporting the harvested shellstock from the growing area, place of harvest or storage should be adequate for the purpose intended and should be of such material and construction as will permit proper drainage and thorough cleaning. They should be so cleaned and maintained as not to constitute a source of contamination to the shellstock.

#### 4.3.2 *Handling procedures*

##### 4.3.2.1 General

4.3.2.1.a) During handling and transportation, shellstock should be held under hygienic conditions and should not come into contact with substances which may render the meats unfit for human consumption. Shell washings should be drained from the shellstock containers.

4.3.2.1.b) During handling and transportation, shellstock should not be subjected to extremes of heat or cold or sudden excessive variations in temperature. Special equipment, such as insulated containers and refrigeration equipment, should be used of prevailing temperatures and the time involved so require. For shipping over extended periods of time, shellstock should be cooled to temperature around 10 °C; at no time should the temperature fall below 2 °C. Shellstock should not be exposed to full sun or surfaces heated by the sun or come into direct contact with ice and other freezing surfaces, nor should it be held in closed containers with solid carbon dioxide.

#### 4.3.2.2 Shellstock for relaying, storage in water and purification

4.3.2.2.a) At all times shellstock should be handled and transported carefully to avoid damage to the shells and under conditions which will prevent death of the shellfish. Containers should not be dropped or subjected to excessive weights where there is a danger of damage occurring to the shells in the course of normal handling. The use of shallow rigid boxes, trays or baskets will minimize damage. The handling of shellstock in large bulk containers should be avoided.

4.3.2.2.b) The interval between harvesting and immersion in water for relaying, storage or purification should be kept as short as possible.

#### 4.2.2.3 Shellstock for processing (excluding relaying, storage in water and purification)

The interval between final harvesting and processing should be kept as short as possible.

## 5 ESTABLISHMENT, DESIGN AND FACILITIES

### 5.1 Location

Establishments should be located in areas which are free from objectionable odours, smoke, dust or other contaminants and are not subject to flooding.

### 5.2 Roadways and areas used by wheeled traffic

Such roadways and areas serving the establishment which are within its boundaries or in its immediate vicinity should have a hard paved surface suitable for wheeled traffic. There should be adequate drainage and provision should be made to allow for cleaning.

### 5.3 Buildings and facilities

#### 5.3.1 Construction

Buildings and facilities should be of sound construction and maintained in good repair. Where appropriate, establishments should be so designed that access can be controlled.

#### 5.3.2 Working space

Adequate working space should be provided to allow for satisfactory performance of all operations.

5.3.3 *Design : cleaning*

The design should be such as to permit easy and adequate cleaning and to facilitate proper supervision of food hygiene.

5.3.4 *Design : pests*

The buildings and facilities should be designed to prevent the entrance and harbouring of pests and the entry of environmental contaminants such as smoke, dust, etc.

5.3.5 *Design : cross-contamination*

Buildings and facilities should be designed to provide separation, by partition, location or other effective means, between those operations which may cause cross-contamination. The shucking area should be physically separated from other processing areas.

5.3.6 *Design : operation flow*

Buildings and facilities should be designed to facilitate hygienic operations by means of a regulated flow in the process from the arrival of the raw material at the premises to the finished product, and should for appropriate temperature conditions for the process and the product.

5.3.7 *Design in food handling areas*

5.3.7.1 Floors, where appropriate, should be of water-proof, non-absorbent, washable, non-slip and non-toxic materials, without crevices, and should be easy to clean and disinfect. Where appropriate, floors should slope sufficiently for liquids to drain to trapped outlets.

5.3.7.2 Walls, where appropriate, should be of water-proof, non-absorbent, washable and non-toxic materials and should be light coloured. Up to a height appropriate for the operation they should be smooth and without crevices, and should be easy to clean and disinfect. Where appropriate angles between walls, between walls and floors, and between walls and ceilings should be sealed and coved to facilitate cleaning.

5.3.7.3 Ceilings, should be designed, constructed and finished as to prevent the accumulation of dirt and minimize condensation, mould development and flaking, and should be easy to clean.

5.3.7.4 Windows, and other openings should be so constructed so as to avoid accumulation of dirt and those which open should be fitted with screens. Screens should be easily movable for cleaning and kept in good repair. Internal window sills, if present, should be sloped to prevent use as shelves.

5.3.7.5 Doors, should have smooth, non-absorbent surfaces and, where appropriate, be self-cleaning and close fitting.

5.3.7.6 Stairs, lift cages and auxiliary structures such as platforms, ladders chutes, should be so situated and constructed as not to cause contamination to food. Chutes should be constructed with inspection and cleaning hatches.

#### 5.3.8 *Overhead structures*

In food handling areas all overhead structures and fittings should be installed in such a manner as to avoid contamination directly or indirectly of food and raw materials by condensation and drip, and should not hamper cleaning operations. They should be insulated where appropriate and be so designed and finished as to prevent the accumulation of dirt and to minimize condensation, mould development and flaking. They should be easy to clean.

#### 5.3.9 *Living quarters, etc.*

Living quarters, toilets and areas where animals are kept should be completely separated from, and should not open directly on to, food handling areas.

#### 5.3.10 *Materials*

The use of materials which cannot be adequately cleaned and disinfected, such as wood, should be avoided unless its use would clearly not be a source of contamination.

#### 5.3.11 *Storage tanks*

The establishment, and particularly clean storage tanks and purification tanks, should be located above the level of normally expected extremes of tide and storm and against expected run-off.

### 5.4 **Sanitary facilities**

#### 5.4.1 *Water supply*

5.4.1.1 An ample supply of potable water conforming to SLS 614 under adequate pressure and of suitable temperature should be available with adequate facilities for its storage, where necessary, and distribution, and with adequate protection against contamination.



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

5.4.1.3 Steam used in direct contact with food or food contact surfaces should contain no substances which may be hazardous to health or may contaminate the food.

5.4.1.4 Non-potable water used for steam production, refrigeration, fire control and other similar purposes not connected with food should be carried in completely separate lines, identifiable preferably by colour, and with non cross-connection with, or back-siphonage into, the system carrying potable water (see also 8.8.2).

#### 5.4.2 *Effluent and waste disposal*

Establishments should have an efficient effluent and waste disposal system which should at all times be maintained in good order and repair. All effluent lines (including sewer systems) should be large enough to carry peak loads and should be so constructed as to avoid contamination of potable water supplies.

#### 5.4.3 *Changing facilities and toilets*

Adequate, suitable, and conveniently located changing facilities and toilets should be provided in all establishments. Toilets should be so designed as to ensure hygienic removal of waste matter. These areas should be well lit, ventilated and, where appropriate, heated and should not open directly on to food handling areas. Hand washing facilities with warm or hot and cold water, a suitable hand-cleaning preparation, and with suitable hygienic means of drying hands, should be provided adjacent to toilets and in such a position that the employee must pass them when returning to the processing area. Where hot and cold water are available mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided neat to each washing facility. Taps of a non-hand operable type are desirable. Notices should be posted directing personnel to wash their hands after using the toilet.

#### 5.4.4 *Hand washing facilities in processing areas*

Adequate and conveniently located facilities for hand washing and drying should be provided wherever the process demands. Where appropriate, facilities for hand disinfection should also be provided. Warm or hot and cold water and a suitable hand-cleaning preparation should be provided. Where hot and cold water are available mixing taps should be provided. There should be suitable hygienic means of drying hands. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided adjacent to each washing facility. Taps of a non-hand operable type are desirable. The facilities should be furnished with properly trapped waste pipes leading to drains.

#### 5.4.5 *Disinfection facilities*

Where appropriate, 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.

#### 5.4.6 *Lighting*

Adequate natural or artificial lighting should be provided throughout the establishment. Where appropriate, the lighting should not alter colours and the intensity should not be less than :

540 lux at all inspection points;  
220 lux in work rooms; and  
110 lux in other areas.

Light bulbs and fixtures suspended over food materials in any stage of production should be of a safety type and protected to prevent contamination of food in case of breakage.

#### 5.4.7 *Ventilation*

Adequate ventilation should be provided to prevent excessive heat, steam condensation and dust and to remove contaminated air. The direction of the air flow should never be from a dirty area to a clean area. Ventilation openings should be provided with a screen or other protecting enclosure of non-corrodible material. Screens should be easily removable for cleaning.

#### 5.4.8 *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.

5.4.9 Establishments used only for receiving, packing, and shipping shellstock may not need all of the requirements listed in 5.4.1 through 5.4.8; however, such establishments should meet the requirements of the official agency having jurisdiction.

## 5.5 Equipment and utensils

### 5.5.1 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, odour or taste, is non-absorbent, is resistant to corrosion and is capable of withstanding repeated cleaning and disinfection. Surface 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. Equipment in contact with sea water, including tanks, pumps, and circulatory systems, should be constructed of non-corrodible and non-toxic materials.

### 5.5.2 Hygienic design, construction and installation

- a) All equipment and utensils should be so designed and constructed as to prevent hygienic hazards and permit easy and thorough cleaning and disinfection and, where practicable, be visible for inspection. Stationary equipment should be installed in such a manner as to permit easy access and thorough cleaning.
- b) Containers for inedible material and waste should be leak-proof, constructed of metal or other suitable impervious materials which should be easy to clean or disposable and able to be closed securely.
- c) All refrigerated spaces should be equipped with temperature measurement or recording devices.

### 5.5.3 Equipment identification

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

## 6 ESTABLISHMENT : HYGIENE REQUIREMENTS

### 6.1 Maintenance

The buildings, equipment, utensils and all physical facilities of the establishment, including drains, should be maintained in good repair and in an orderly condition. As far as practicable, rooms be kept free from steam, vapour and surplus water.

## 6.2 Cleaning and disinfection

6.2.1 Cleaning and disinfection should meet the requirements of this code. For further information on cleaning and disinfection procedures see Appendix A of the SLS 143.

6.2.2 To prevent contamination of food, all equipment and utensils should be cleaned as frequently as necessary and disinfected whenever circumstances demand.

6.2.3 Adequate precautions should be taken to prevent food from being contaminated during cleaning or disinfection of rooms, equipment or utensils by water and detergents or by disinfectants and their solutions. Detergents and disinfectants should be suitable for the purpose intended and should be acceptable to the official agency having jurisdiction. Any residues of these agents on a surface which may come in contact with food should be removed by thorough rinsing with potable water before the area or equipment is again used for handling food.

6.2.4 Either immediately after cessation of work for the day or at such other times as may be appropriate, floors, including drains, auxiliary structures and walls of food handling areas should be thoroughly cleaned.

6.2.5 Changing facilities and toilets should be kept clean at all times.

6.2.6 Roadways and yards in the immediate vicinity of and serving the premises should be kept clean.

## 6.3 Hygiene control programme

6.3.1 A permanent cleaning and disinfection schedule should be drawn up for each establishment to ensure that all areas are appropriately cleaned and that critical areas, equipment and material are designated for special attention. A single individual, who should preferably be a permanent member of the staff of the establishment and whose duties should be independent of production, should be appointed to be responsible for the cleanliness of the establishment. He/she should have a thorough understanding of the significance of contamination and the hazards involved. All cleaning personnel should be well-trained in cleaning techniques.

6.3.2 Tables, bowls, mincers, scales and other equipment used in the process of extracting and preparing the meats from shellfish should be scrub-washed or cleaned by an efficient mechanical process, with hot water containing a suitable cleaning agent, rinsed with potable hot water and disinfected (sanitized) with a suitable disinfectant.

#### **6.4 By-products**

By-products should be stored in such a manner as to avoid contamination of food. They should be removed from the working areas as often as necessary and at least daily.

#### **6.5 Storage and disposal of waste**

Waste material should be handled in such a manner as to avoid contamination of food or potable water. Care should be taken to prevent access to waste by pests. Waste should be removed from the food handling and other working areas as often as necessary and at least daily. Immediately after disposal of the waste, receptacles used for storage and any equipment which has come into contact with the waste should be cleaned and disinfected. The waste storage area should also be cleaned and disinfected.

#### **6.6 Exclusion of domestic animals**

Animals that are uncontrolled or that could be a hazard to health should be excluded from establishments.

#### **6.7 Pest control**

6.7.1 There should be an effective and continuous programme for the control of pests. Establishments and surrounding areas should be regularly examined for evidence of infestation.

6.7.2 Should pests gain entrance to the establishment, eradication measures should be instituted. Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health resulting from the use of these agents, including those which may arise from residues retained in the product. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

6.7.3 Pesticides should only be used if other precautionary measures cannot be used effectively. Before pesticides are applied, care should be taken to safeguard all food, equipment and utensils from contamination. After application, contaminated equipment and utensils should be thoroughly cleaned to remove residues prior to being used again.

## 6.8 Storage of hazardous substances

6.8.1 Pesticides or other substances which may represent a hazard to health should be suitably labelled with a warning about their toxicity and use. They should be stored in locked rooms or cabinets used only for that purpose and dispensed and handled only by authorized and properly trained personnel or by persons under strict supervision of trained personnel. Extreme care should be taken to avoid contaminating food.

6.8.2 Except when necessary for hygienic or processing purposes, no substance which could contaminate food should be used or stored in food handling areas.

## 6.9 Personal effects and clothing

Personal effects and clothing should not be deposited in food handling areas.

# 7 PERSONNEL HYGIENE AND HEALTH REQUIREMENTS

## 7.1 Hygiene training

Managers of establishments should arrange for adequate and continuing training of every food handler in hygienic handling of food and in personal hygiene so that they understand the precautions necessary to prevent contamination of food. Instructions for hygienic handling of food and in personal hygiene should include relevant parts of this Code.

## 7.2 Medical examination

Persons who come in contact with food in the course of their work should have a medical examination prior to their employment if the official agency having jurisdiction, acting on medical advice, considers that this is necessary, whether because of epidemiological considerations, the nature of the food prepared in a particular establishment or the medical history of the prospective food handler. Medical examination of a food handler should be carried out at other times when clinically or epidemiologically indicated.

## 7.3 Communicable diseases

The management should take care to ensure that no person, while known or suspected to be suffering from, or to be a carrier of a disease likely to be transmitted through food or while afflicted with infected wounds, skin infections, sores or with diarrhoea, is permitted to work in any food handling area in any capacity in which there is any likelihood of such a person directly or indirectly contaminating food with pathogenic microorganisms. Any person so affected should immediately report to the management that he/she is ill.

#### **7.4 Injuries**

Any person who has a cut or wound should not continue to handle food or food contact surfaces until the injury is completely protected by a waterproof covering which is firmly secured, and which is conspicuous in colour. Adequate first-aid facilities should be provided for this purpose.

#### **7.5 Washing of hands**

Every person engaged in a food handling area should wash his hands frequently and thoroughly with a suitable hand cleaning preparation under running warm, potable water while on duty. Hands should always be washed before commencing work, immediately after using the toilet, after handling contaminated material and whenever else necessary. After handling any material which might be capable of transmitting disease, hands should be washed and disinfected immediately. Notices requiring hand-washing should be displayed. There should be adequate supervision to ensure compliance with this requirement.

#### **7.6 Personal cleanliness**

Every person engaged in a food handling area should maintain a high degree of personal cleanliness while on duty, and should at all times while so engaged wear suitable protective clothing including head covering and footwear, all of which articles should be cleanable unless designed to be disposed of and should be maintained in a clean condition consistent with the nature of the work in which the person is engaged. Aprons and similar items should not be washed on the floor. During periods where food is manipulated by hand, any jewellery that cannot be adequately disinfected should be removed from the hands. Personnel should not wear any insecure jewellery when engaged in food handling.

#### **7.7 Personal behaviour**

Any behaviour which could result in contamination of food, such as eating, use of tobacco, chewing for example : gum, sticks, betel nuts, etc. or unhygienic practices such as spitting, should be prohibited in food handling areas.

#### **7.8 Gloves**

Gloves, if used in the handling of food products, should be maintained in a sound, clean and sanitary condition. The wearing of gloves does not exempt the operator from having thoroughly washed hands.

#### **7.9 Visitors**

Precautions should be taken to prevent visitors to food handling areas from contaminating food. These may include the use of protective clothing. Visitors should observe the provisions recommended in 6.9, 7.3, 7.4 and 7.7.

### 7.10 Supervision

Responsibility for ensuring compliance by all personnel with all requirements of 7.1 to 7.9 inclusive should be specifically allocated to competent supervisory personnel.

## 8 OPERATING PRACTICES AND PRODUCTION REQUIREMENTS

### 8.1 Acceptance criteria

Shellstock should not be accepted if they are contaminated with microorganisms or substances not removed by normal plant procedure.

### 8.2 Relaying and purification of shellstock in tanks, floats and rafts.

8.2.1 Shellstock subjected to the purification process should not contain metallic ions, pesticides, industrial wastes or marine biotoxins in such quantities that it presents a health hazard to the consumer. A low rate of removal of these substances makes purification impracticable.

8.2.2 The process and the equipment used for purification should be acceptable to the official agency having jurisdiction.

8.2.3 Sea water for the tanks, or sea water where floats or rafts are used in purification should be clean and of a salinity acceptable to the official agency having jurisdiction. Where clean sea water is not available, a method of disinfecting (sanitizing) the water, which should be approved by the official agency having jurisdiction, should be employed. Water used in purification tanks should be changed continuously or at suitable intervals.

8.2.4 Weak or dead shellfish should be removed before the purification process. Surfaces of shells should be free from mud and soft commensal organisms.

8.2.5 Shellstock should be laid out at a density which will permit them to open and undergo natural purification. There should be no toxic substances in the water at levels that will prevent the shellfish from functioning properly.

8.2.6 The oxygen content of the water should be maintained at an adequate level by aeration, or by intermittent or continuous replacement.



8.2.7 During the process of purification, the water temperatures should not be allowed to fall below the minimum at which shellfish remain physiologically active; high water temperature which adversely affects the pumping rate and the purification process should be avoided; tanks should be protected from the direct rays of the sun when necessary.

8.2.8 Equipment in contact with water, i.e. tanks, pumps, pipes or piping, and other equipment should be constructed of non-porous, non-toxic materials. Copper, zinc, lead and their alloys should preferably not be used in tanks, pumps or piping systems used in purification processing.

8.2.9 To avoid recontamination of shellstock undergoing purification, unpurified shellstock should not be placed in the same tank as shellstock which are already undergoing purification.

8.2.10 Shellstock undergoing purification should remain immersed in approved, clean sea water until it satisfies the sanitary requirements of the official agency having jurisdiction.

8.2.11 On removal from the purification system, shellstock should be washed with running fresh water or sea water meeting the standards of the official agency having jurisdiction, and handled in the same manner as living shellstock taken directly from a non-polluted area. Dead, dying, permanently gaping, with broken shells or otherwise unwholesome shellfish should be removed.

8.2.12 Tanks should be drained, cleaned and disinfected at suitable intervals as determined by the official agency having jurisdiction.

### 8.3 Relaying

When biologically feasible (some species such as the soft shell clam *Mya arenaria* cannot be relayed) shellstock may be relayed from polluted growing areas to areas approved for harvesting. Relaying operations should be strictly supervised by the official agency having jurisdiction to prevent contaminated shellstock from being diverted directly to the consumer market. Holding time in the accepted area prior to harvest will be determined by the official agency according to species involved and local geographic or hydrographic conditions.

### 8.4 Storage of shellstock in sea water

8.4.1 The process of storing shellstock in sea water tanks, basins, floats or rafts can be used if it is acceptable to the official agency having jurisdiction. A record of the origin of each lot of shellstock should be maintained.

8.4.2 Sea water in the tanks, floats or rafts should be of a hygienic quality acceptable to the official agency having jurisdiction and should be of an adequate salinity to permit the shellfish to function normally. Optimum salinity will vary with species.

8.4.3 During storage shellstock should be laid out at such a density and under such conditions that will permit them to open and function normally.

8.4.4 The oxygen content in sea water tanks should be maintained at an adequate level at all times.

8.4.5 The temperature of the water in storage tanks should not be allowed to rise to such levels as to cause weakness of the shellstock. If ambient temperatures are excessively high, tanks should be placed in a well-ventilated building or away from the direct rays of the sun.

8.4.6 Shellfish should be stored in sea water only for such time as they remain sound and active.

## 8.5 Washing, grading and packing of shellstock

8.5.1 When strength of shell permits, the outsides of the shells should be washed free of mud, and all soft adhering organisms should be removed. Hard adhering organisms should also be removed when possible, care being taken not to chip lips of shells by vigorous washing.

8.5.2 Bivalve shellfish having one cupped shell should, when packed in wooden or other rigid containers, be placed with the concave shell downwards and the flat surface at top to prevent dehydration from loss of shell liquor.

8.5.3 Shellfish to be eaten raw on the shell should be landed and packed for onward transmission as quickly as possible, so permitting them to reach the consumer in a sound and live condition.

8.5.4 Shellfish which are dead, dying, permanently gaping, with broken shells, or otherwise unwholesome should not be passed for human consumption.

8.5.5 Containers used for packing shellstock should be free from any materials which may contaminate the product. They should be cleaned and disinfected as recommended by the official agency having jurisdiction.

## 8.6 Washing, heat-shucking and packing shellstock

8.6.1 Shellstock intended for heat-shucking should be sound and practically free from adhering organisms; the outside of the shell should be thoroughly washed free from mud before processing.

8.6.2 After heat-shucking, the removal of the shells and the washing of the meats should be carried out under hygienic conditions. Washing should be conducted under conditions which avoid soaking of the meats, minimizing water uptake. Consequently, washing or flowing time should not exceed the maximum time needed to cleanse adequately the shellfish meats. Unnecessary addition of water to the finished product reduces flavour and quality and should be avoided. Immediately after heat-shucking the meats should be cooled rapidly to prevent spoilage. The water used for this purpose should be of potable quality, flowing continuously or frequently changed to maintain the meats at the lowest possible temperature.

8.6.3 To prevent subsequent spoilage, washed meats should be refrigerated, preserved in salt, pickled, or immediately canned. Meats intended for human consumption soon after heat-shucking should be held under cool conditions suitable for the period between processing and consumption; meats not intended for early consumption should be stored at a temperature not exceeding 3 °C.

## 8.7 Prevention of cross-contamination

### 8.7.1 *General remarks*

Effective measures should be taken to prevent contamination of food material by direct or indirect contact with material at an earlier stage of the process.

### 8.7.2 *Personal behaviour*

Persons handling raw materials or semi-processed products capable of contaminating the end product should not come into contact with any end product unless and until they discard all protective clothing worn by them during the handling of raw materials or semi-processed products which have come into direct contact with or have been soiled by raw material or semi-processed products and have changed into clean protective clothing.

### 8.7.3 *Hand washing*

If there is a likelihood of contamination, hands should be washed thoroughly between handling products at different stages of processing.

#### 8.7.4 *Equipment*

All equipment which has been in contact with raw materials or contaminated material should be thoroughly cleaned and disinfected prior to being used for contact with end products.

### 8.8 Use of water

8.8.1 As a general principle only potable water, conforming to SLS 614 should be used in food handling.

8.8.2 Non-potable water may be used with the acceptance of the official agency having jurisdiction for steam production, refrigeration, fire control and other similar purposes not connected with food. However, non-potable water may, with specific acceptance by the official agency having jurisdiction, be used in certain food handling areas provided this does not constitute a hazard to health.

8.8.3 Water re-circulated for re-use within an establishment should be treated and maintained in a condition so that no health hazard can result from its use. The treatment process should be kept under constant surveillance. Alternatively, re-circulated water which has received no further treatment may be used in conditions where its use would not constitute a health hazard and will not contaminate either the raw material or the end product. Re-circulated water should have a separate distribution system which can be readily identified. The acceptance of the official agency having jurisdiction should be required for any treatment process and for the use of re-circulated water in any food process.

### 8.9 Processing

8.9.1 Processing should be supervised by technically competent personnel.

8.9.2 All steps in the production process, including packaging, should be performed without unnecessary delay and under conditions which will prevent the possibility of contamination, deterioration, or the development of pathogenic and spoilage microorganisms.

8.9.3 Rough treatment of containers should be avoided to prevent the possibility of contamination of the processed product.

8.9.4 Methods of preservation and necessary controls should be such as to protect against contamination or development of public health hazards and against deterioration within the limits of good commercial practice.

## **8.10 Packaging**

8.10.1 All packaging material should be stored in a clean and sanitary manner. The material should be appropriate for the product to be packed and for the expected conditions of storage and should not transmit to the product objectionable substances beyond the limits acceptable to the official agency having jurisdiction. The packaging material should be sound and should provide appropriate protection from contamination.

8.10.2 Product containers should not have been used for any purpose which may lead to contamination of the product. Where practicable containers should be inspected immediately before use to ensure that they are in satisfactory condition and where necessary cleaned and/or disinfected; when washed they should be well drained before filling. Only packaging material required for immediate use should be kept in the packing or filling area.

8.10.3 Packing should be done under conditions that preclude the introduction of contamination into the product.

### **8.10.4 *Processing and production records***

Permanent, legible and dated records of pertinent processing and production details should be kept concerning each lot. These records should be retained for a period that exceeds the shelf life of the product, but unless a specific need exists they need not be kept for more than two years. Records should also be kept of the initial distribution by lot.

## **8.11 Storage and transport of the end product**

The end product should be stored and transported under such conditions as will preclude the contamination with and/or proliferation of microorganisms and protect against deterioration of the product or damage to the container. During storage, periodic inspection of the end product should take place to ensure that only food which is fit for human consumption is dispatched and that end product specifications should be complied with when they exist. The product should be despatched in the sequence of the lot number.

## **8.12 Laboratory control procedures**

8.12.1 Laboratory facilities and technical personnel should be readily available to the official agency having jurisdiction for the hygienic control of the industry and should be able to provide adequate support to the control agency.

8.12.2 The official agency having jurisdiction should take water and shellfish samples from the growing area, relaying areas and purification plants, and samples of shellstock from purification plants and processed shellfish from processing plants whenever necessary. Tests should be performed to assure that water and shellfish samples conform to the standards of the official agency having jurisdiction.

8.12.3 Tests of the water from areas should, where necessary, include bacteriological, biological, physical and chemical tests for evidence of faecal and chemical pollutants. Tests should be carried out with such frequency as to provide adequate control.

8.12.4 Tests of shellfish should include microbiological tests for faecal pollution and, where applicable, for spoilage. Biological tests should be made for biotoxins and faecal parasites and chemical and physical tests for other pollutants.

8.12.5 Laboratory procedures should be developed and standardized and microbiological and other criteria promulgated to ensure that shellfish are free from pathogenic organisms and do not contain toxins or toxic chemicals at levels that constitute a hazard to health.

### 8.13 Lot identification

#### 8.13.1 *Shellstock*

Each container (bag, basket or box) should be labelled according to shipper or processor, purification plant, harvest area and date of harvest before shipment to market. Complete records of harvest area and date of harvest and length of time of relaying or purification of each lot should be maintained by the establishment for a period designated by the official agency having jurisdiction.

#### 8.13.2 *Shucked shellfish*

Each container should be embossed or otherwise permanently marked in code or in clear prior to shipment to market so that information regarding harvest area, date of harvest and shipper can be established if necessary.

## 9 END PRODUCT SPECIFICATIONS

Appropriate methods should be used for sampling and examination to determine the compliance with the following specifications :

9.1 The products should be, to the extent possible in good manufacturing practice, free from objectionable matter.

9.2 The product should be free from microorganisms in amounts harmful to humans and should not contain any substances originating from microorganisms in amounts which may represent a hazard to health.

9.3 The products should be free from chemical pollutants in amounts which may represent a hazard to health.

9.4 The products should comply with any requirements set forth by the SLS 910 on pesticide residues in food and food additives as contained in permitted lists of Codex commodity standards, or should comply with the requirements on pesticides residues and food additives of the country in which the products will be sold.

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## **SLS CERTIFICATION MARK**

*The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI which includes surveillance inspection of the factory, testing of both factory and market samples.*

*Further particulars of the terms and conditions of the permit may be obtained from the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*



## **SRI LANKA STANDARDS INSTITUTION**

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The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

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