



# Good Practices for Food - Manufacturing Businesses

MANUAL



# Manual

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## Good Practices for Food-Manufacturing Businesses

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## List of Abbreviations

ADI	Acceptable daily intake
$a_w$	Water activity
CAC	Codex Alimentarius Commission
CIP	Clean in place
CP	Control point
DGHS	Director General of Health Services
EFSA	European Food Safety Authority
EHP	Environmental health practitioner
ERH	Equilibrium relative humidity
EU	European Union
FAC	Food Advisory Committee
FCAU	Food Control Administration Unit
FAO	Food and Agricultural Organization of the United Nations
FALPCA	Food Allergen Labelling and Consumer Protection Act
FDI	Food and drug inspector
FI	Food inspector
FSANZ	Food Standards Australia New Zealand
GMP	Good manufacturing practices
GRAS	Generally recognized as safe
HACCP	Hazard analysis and critical control points
HTST	High temperature short time
IBD	Inflammatory bowel disease
IgE	Immunoglobulin E
IPM	Integrated pest management
INS	Identification numbering system
ISO	International Organization for Standardization
JECFA	Joint FAO/WHO Expert Committee on Food Additives
LTLT	Low temperature long time
MAP	Modified atmosphere packaging
MOH	Medical officers of health
NSB	National standards body
pH	Power of hydrogen
PHI	Public health inspector

QIT	Quality improvement team
QIP	Quality improvement plan
RASFF	Rapid Alert System for Food and Feed
SLAB	Sri Lanka Accreditation Board
SLS	Sri Lanka Standard
SLSI	Sri Lanka Standards Institution
SOP	Standard operating procedure
TDI	Tolerable daily intake
UHT	Ultra-high temperature
US FDA	United States Food and Drug Administration
UV light	Ultraviolet light
WHO	World Health Organization

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## Foreword by PTB

Today's competitive global trade environment demands that small and medium-sized enterprises (SMEs) invest in productivity and quality. Having goods and services that can compete in international markets requires attention to standards and respective technical requirements. For many SMEs, however, this can be a challenge – especially in view of the growing demand for conformity assessment for the improved quality of products.

This manual “Good practices for food-manufacturing businesses” is directed at food-processing industries in Sri Lanka. It seeks to provide background as well as hands-on information for owners, managers and staff of food companies on safe food handling practices according to national and international regulations. Safe food handling has many benefits: It reduces the incidence of food-borne diseases and creates opportunities for companies to enter domestic supply chains and to export. In the end, it will increase the well-being of the population of Sri Lanka, raise the number of jobs, enhance the income of those involved in the industry, contribute to increasing taxes for the government and to earning foreign exchange.

We take pride in having contributed to the development of this manual which we believe is an ideal companion for any training on the subject matter and serves as a reference book to guide everyday company operations. And we wish to thank the University of Vavuniya for incorporating topics relating to quality infrastructure into its academic and community outreach programmes. We are confident that this manual will be a useful resource tool for SMEs in Sri Lanka and support the University of Vavuniya in its efforts to improve the competitiveness of the Sri Lankan food industry.



**Dr. Marion Stoldt**

Physikalisch-Technische Bundesanstalt PTB

Head of International Cooperation

Braunschweig

Germany

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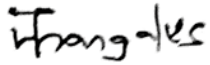
One of the objectives pursued by the project was to guide Small and Medium-sized Enterprises (SME) engaged in the handling and manufacturing of food towards certification according to good manufacturing practices (GMP). Inspired by the tremendous success of these initiatives and the relevance of food safety for the country, the University of Vavuniya, Department of Bio-science of the Faculty of Applied Science, decided to engage into cooperation with PTB. As a result, two courses for training owners, managers, and staff of SMEs in the food industry in good practices of food-handling and manufacturing were established. These courses are part of the university’s community outreach programme. In addition, the University of Vavuniya also established an academic course on metrology. This manual is equally fruit of the cooperation with PTB.

Many stakeholders from Sri Lanka and Germany have graciously devoted time, energy and passion towards the development of this manual. We would like to thank all stakeholders involved. Special thanks go to the following organizations and individuals:

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- Mr. Rolf Speit, International Senior Expert on behalf of PTB, for the overall coordination of the manual development process

We sincerely hope that the manual will play its part in taking the Sri Lankan food industry, especially the small and medium-sized enterprises, to another level.



**Prof. T. Mangaleswaran**

Vice-Chancellor

University of Vavuniya

Vavuniya

Sri Lanka



**Chapter 1 -  
Introduction**





# Chapter 1 - Introduction

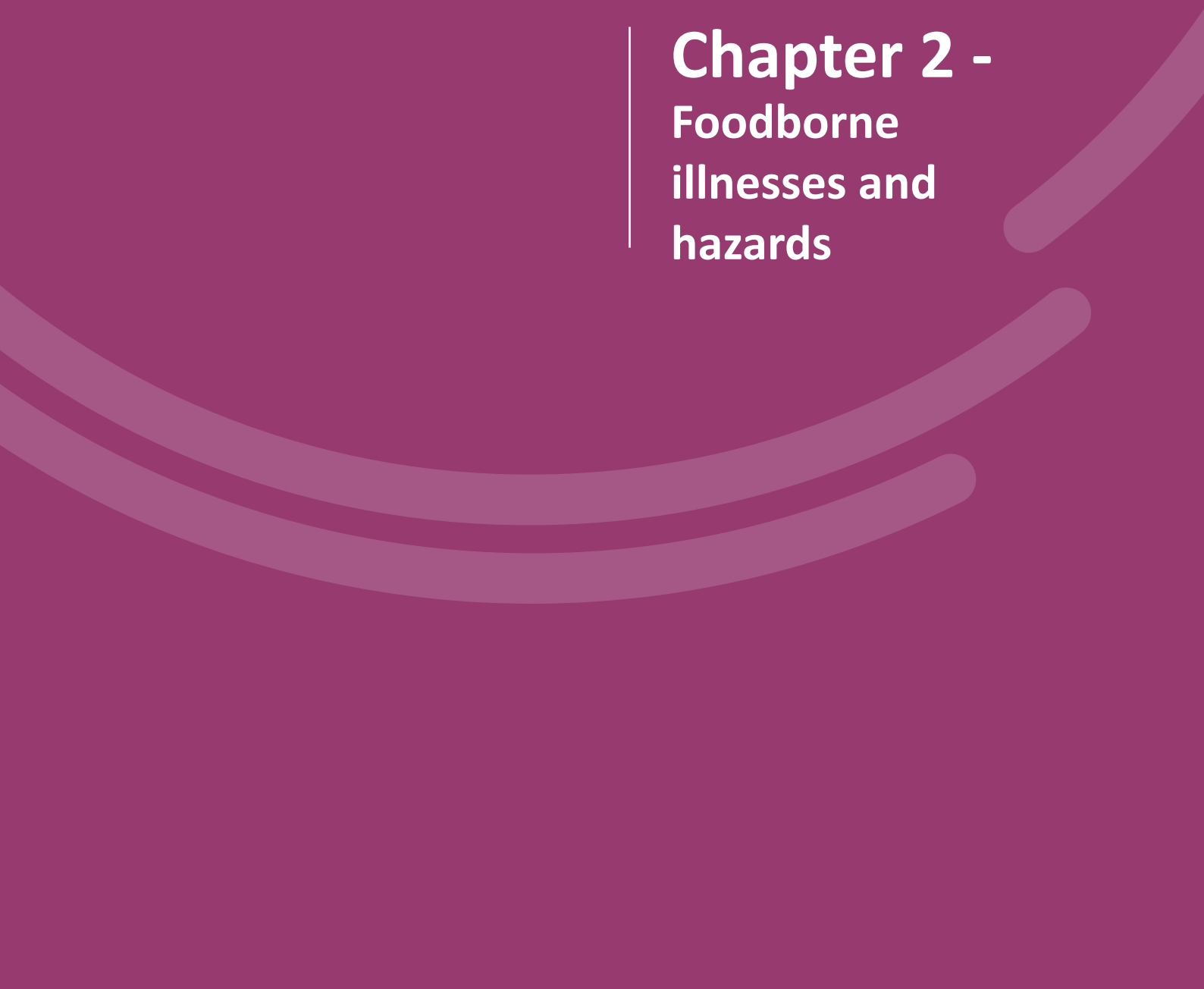
Human beings have three essential needs in their lives, namely food, shelter and clothing. Food is a primary need as it serves as a source of the nutrients that human beings require to obtain energy and to survive. With urbanization and changing lifestyles, people are depending more on food made and prepared outside the home. As large-scale manufacturing of food becomes more widespread to meet the rising demand, food safety is becoming more important to prevent food poisoning, foodborne disease and illnesses. There are many factors that can cause foodborne diseases. Therefore, food manufacturers have a moral and regulatory responsibility to ensure that the food delivered to their customers is safe. Many laws and regulations have been enacted by the regulatory bodies in Sri Lanka to ensure the safety of food sold to consumers. The Food Act and food regulations imposed by the Director General of Health Services play a key role among them.

Food-producing companies benefit greatly from following existing good practices to make food safe for consumption. These benefits are avoiding foodborne diseases, increasing customer confidence and satisfaction, reducing unnecessary waste from food spoilage, keeping the premises clean, preventing litigation for violation of regulatory requirements and reducing costs of insurance.

The safety of food can be assured through different approaches such as applying good manufacturing practices (GMP), the Hazard Analysis and Critical Control Points (HACCP) management system and the ISO 22000 Food Safety Management System. Consumer confidence can be further strengthened by obtaining certification for the applied system from a certification body which is accredited through the Sri Lanka Accreditation Board (SLAB).

The purpose of the manual titled “Good Practices for Food Manufacturing Businesses” is to make food-processing companies aware of the factors they need to control to ensure food safety in their operations and to know how they can implement good manufacturing practices (GMP) and obtain the respective certification. Furthermore, the manual describes the existing food hygiene regulations published under Food Act No. 26 of 1980 which has been published based on international guidelines provided by the Codex Alimentarius Commission for consumer health protection and fair-trade practices. These regulations are applicable to any food establishment that needs to comply with GMP, HACCP and ISO 22000 requirements.





# Chapter 2 - Foodborne illnesses and hazards



# Chapter 2 - Foodborne illnesses and hazards

## 2.1 Foodborne illnesses

### 2.1.1 Definition of food

The Sri Lanka Food Act defines food as “...any article manufactured, sold or represented for use as food or drink for human beings and includes any article which ordinarily enters into or is used in the composition or preparation of food”.<sup>1</sup> According to the definition of ISO 22000:2018, it can be either processed, semi-processed or raw. It is usually made of plant, animal or fungal origin, and it contains essential nutrients such as carbohydrates, fats, proteins, vitamins and minerals required to sustain life and provide energy. Food does **not** include cosmetics, tobacco or substances (ingredients) that are categorized as drugs.

### 2.1.2 What are foodborne illnesses?

Foodborne illnesses are defined as diseases, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food or water. Those agents are of biological and chemical nature. Examples of commonly identified biological agents are *Campylobacter spp.*, *E.coli O157:H7*, *Listeria monocytogenes*, certain serotypes of *Salmonella enterica*, *Shigella spp.*, *Clostridium botulinum*, *Staphylococcus aureus*, norovirus, *Toxoplasma gondii*, *Entamoeba histolytica* and foodborne trematodes.

In addition, chemical substances entering the body through contaminated food or water pose a high health risk to the consumers. Examples of the most common food chemical agents are pesticide residues, persistent organic pollutants, acrylamides, natural toxins, excessively used chemical ingredients in food additives and heavy metals. Exposing water in PET bottles to extreme heat can lead to the chemicals that are used to produce the bottles leaching and being absorbed by the water in hazardous doses.<sup>2</sup> Chemical contamination can lead to acute poisoning or long-term diseases, such as cancer.

Foodborne diseases may lead to long-lasting disability and death. Unsafe food such as uncooked foods of animal origin, fruits and vegetables contaminated with faecal matter and raw shellfish containing marine biotoxins and foodborne pathogens can cause severe diarrhoea or deadly infections such as meningitis.

### 2.1.3 Symptoms

Symptoms of foodborne illnesses depend on the cause. Common symptoms include pain in the stomach and abdominal areas, severe vomiting and loose motions that may cause dehydration, fever, chills, headache, nausea, weakness or more severe conditions such as organ failure.

<sup>1</sup> Socialist Republic of Sri Lanka: Food Act, No. 26 of 1980, paragraph 33, (b).

<sup>2</sup> Paul Westerhoff, Panjai Prapaipong, Everett Shock, Alice Hillaireau; Antimony leaching from polyethylene terephthalate (PET) plastic used for bottled drinking water, February 2008: <https://www.sciencedirect.com/science/article/abs/pii/S0043135407005246?via=ihub#!>

Generally, symptoms begin within two to six hours. The gap between the consumption of the suspected food or beverage and the onset of symptoms depends on the agent factors (e.g. incubation period, toxicity), type of food, the consumed amount and the victim's factors (age, health status, etc.).<sup>3</sup>

Anyone can be affected by food poisoning or foodborne illness, but some people are affected more severely than others. If these people become ill it can be very dangerous and even fatal.

People belonging to this "at risk" group are:

- Young children
- Elderly persons
- Pregnant and lactating (nursing) mothers
- People with weakened immune systems, for instance, due to chronic diseases

## FOOD POISONING



Illustration 1: Common symptoms of food poisoning

## PEOPLE AT HIGH RISK OF GETTING A FOODBORNE ILLNESS BY FOOD POISONING

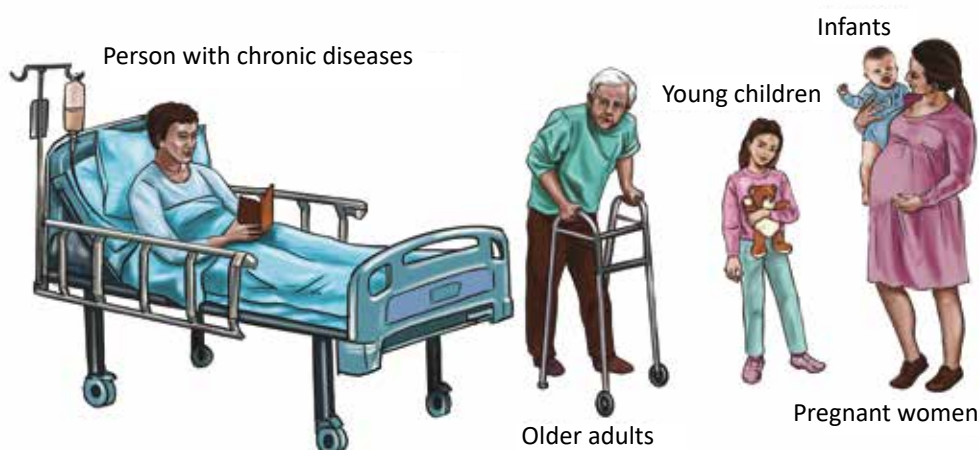


Illustration 2: People at high risk for food poisoning

<sup>3</sup> See: Ministry of Health, Nutrition and Indigenous Medicine of Sri Lanka, Epidemiology Unit: Weekly epidemiological report - Vol. 44, No. 51, 16th– 22nd December 2017

### 2.1.4 Foodborne illnesses in Sri Lanka

Foodborne diseases have been a common problem in Sri Lanka for many years. Numerous outbreaks, frequent hospitalizations and even deaths due to food contamination and poisoning are often reported. Due to the alarming number of people falling victim to outbreaks, foodborne illnesses have become a major public health concern. Therefore, foodborne illnesses have become a public health concern with an alarming amount of people falling victim to repeated outbreaks.

Sri Lankan health statistics reveal that seriously high numbers of citizens are hospitalized each year as a result of foodborne diseases.<sup>4</sup> Between 2010 and 2017, 513 to 732 persons per 100,000 were hospitalized due to having contracted foodborne diseases. This means that each year approximately 108,000 to 148,000 Sri Lankans needed to be treated in hospital after consuming contaminated food. Hence, the related costs for the Sri Lankan health system and economy are enormous. These costs can be avoided by following the good practices described in this manual.

The following reports of food poisoning published in the media show typical food poisoning incidences in Sri Lanka.

## Over 300 hospitalized from food poisoning

72 September 2018 05:21 pm A A A



Over 300 workers attached to a private garment factory in Yakahaluwa in Minuwangoda, had been admitted to the Minuwangoda Base Hospital and Gampaha District General Hospital due to suspected food poisoning, police said.

They said that the employees had been hospitalised after they fell sick soon after having their breakfast today.

A total of 104 female employees and 52 male employees are undergoing treatment at the Gampaha District General Hospital while 99 female employees and 51 male employees are being treated for their complications at the Minuwangoda Base Hospital.

Police said most of the victims were suffering from diarrhoea. **(Thilanka Kanakarathna)**

Source: <https://www.dailymirror.lk/Breaking-News/Over-hospitalized-from-food-poisoning/108-155889>

## Ninety-five hospitalised due to suspected food poisoning in Ampara

May 04, 2014 admin Local News Ticker 0

Ninety five people have been hospitalised following food poisoning at an event at the Central Camp in Ampara. According to the police there are 65 women among the hospitalised,

The food poisoning is reported to have occurred at an event held on Saturday night while those suffering from food poisoning have been admitted to the Kalmunai and Ampara hospitals.

The Central Camp police has commenced further investigations into the incident.

Source: <https://www.newsfirst.lk/2014/05/04/food-poisoning-central-camp-ampara-95-hospitalized/>

<sup>4</sup> Ministry of Health, Nutrition and Indigenous Medicine, Epidemiology Unit: Weekly Epidemiological Report- Vol. 48, No. 14, 27 April – 2 May 2021



## Over 200 hospitalized from food poisoning

12 October 2017 11:37 am 3 4151

A A A



About 200 workers attached to a private garment factory in Haragama, Kandy have been admitted to the Kandy Teaching Hospital due to suspected food poisoning, Hospital sources said.

They said the employees had been hospitalised after they fell sick soon after having their breakfast, today.

The Hospital director said they were out of danger. **(J.A.L. Jayasinghe)**

Source: [https://www.dailymirror.lk/breaking\\_news/Over-hospitalized-from-food-poisoning/108-138316](https://www.dailymirror.lk/breaking_news/Over-hospitalized-from-food-poisoning/108-138316)

## Katunayake garment factory workers faint - second incident reported

Sep 09, 2014 News 1st Local , News Ticker , Top Slider 0

Eight (8) employees of a garment factory in Katunayake, who took ill on Tuesday morning, were admitted to the Negombo District General hospital.

The Police Media Unit stated that the incident took place in the same garment factory where over 150 workers were hospitalised for food poisoning last week.

Source: <https://www.newsfirst.lk/2014/09/09/employees-katunayake-garment-factory-starts-fainting-mysteriously-video/>

In addition to the instances reported by the media, there were several studies conducted in Sri Lanka showing how food was contaminated by bacteria, heavy metals and pesticides. A summary of three of these studies can be found in Annex 1 of Chapter 2.

A key tool to ensure the flow of information to enable swift action when risks to public health are detected in the food chain is the Rapid Alert System for Food and Feed (RASFF) used by the European Union. It detects all food safety outbreaks in the EU either from imported or domestically produced food products. In the data for 2021 ( <https://webgate.ec.europa.eu/rasff-window/screen/list>), a possible food poisoning after the consumption of tuna from Sri Lanka imported into the Netherlands was recorded.

### A) Leading questions and recommendations

- Why is it important to follow food safety regulations?
- What is foodborne illness? What are the symptoms? What are the implications

for businesses and why? What are so-called high-risk groups? Search for other foodborne outbreaks in Sri Lanka on the internet.

- What is the difference between supplying products to a hospital or to a supermarket?
- List down the groups of customers to whom you deliver your products. Are any risk groups included?
- Which foods are you producing? Do you know the specifications and the origin of your raw materials?
- Do you follow news on food poisoning? Has any occurred in your area? Do you use similar products?

## **B) Further reading and references** (Please also refer to the Annex of Chapter 2)

### **International sources**

US Food and Drug Administration, Bad Bug Book Handbook of Foodborne Pathogenic Microorganisms and Natural Toxins: <https://www.fda.gov/files/food/published/Bad-Bug-Book-2nd-Edition-%28PDF%29.pdf>

### **National sources**

The Epidemiological Unit of the Ministry of Health of Sri Lanka publishes the “Weekly Epidemiological Report” which also covers foodborne diseases. Their reports are available on the internet. The following link leads to a report that provides a very good introduction to the major foodborne illnesses and their causes:

[http://www.epid.gov.lk/web/images/pdf/wer/2015/vol\\_42\\_no\\_20-english.pdf](http://www.epid.gov.lk/web/images/pdf/wer/2015/vol_42_no_20-english.pdf)

### **Regulations and standards**

SLS-143-1-15 General Principles of Food Hygiene, Food (Hygiene) Regulation 2011, 1742-26, Thursday, January 26, 2012.

## **C) THINGS TO REMEMBER**

- When producing food, stick to regulations regarding food safety to produce safe food.
- As a food processor, you are responsible for preparing safe food. Be aware of food safety hazards.
- Do not sell products that pose a risk to the health of your consumers. Violations are severely punished by law.
- Train employees in food safety matters appropriate to their work activity.
- Appraise potential food safety risks and take necessary action.
- Clean production sites thoroughly and regularly.



## 2.2 Types of food safety hazards

Generally, food safety hazards are defined as agents and conditions of food with the potential to cause an adverse health effect to its consumers. Many hazards can be associated with food products. It is essential to identify these hazards to avoid potential dangers to consumers, such as foodborne illnesses, food poisoning or injuries. These food safety hazards can enter the food through the raw materials, ingredients, food-contact material, equipment, process, food handlers and the environment where food is produced, transported and stored. Food safety hazards can be mainly classified as chemical, physical and biological.

### 2.2.1 Chemical hazards

Chemical hazards are chemical substances that have the potential to cause adverse health effects in humans. Some chemicals are added to food for commercial purposes (intentionally added). For example, if veterinary drugs are used for food-producing animals inappropriately or just prior to slaughter, drug residues can be present in the food. Other chemical hazards can get into food by accident through cross-contamination (unintentionally added). For instance, there is a probability of contamination if cleaning chemicals are spilled on a food-handling surface and not properly cleaned off. A further food hazard may occur if producers use food colourants excessively in order to create a better appearance of the product, and this may cause negative effects on human health.

#### Chemical contamination may occur if:

- Raw food is treated at the farm stage with excessive levels of pesticides, preservatives or mould inhibitors.
- Veterinary drugs contain residuals at levels exceeding human tolerance (e.g. antibiotics).
- Food is stored with cleaning chemicals.
- Food additives exceed the permitted levels.
- Pest-control chemicals are improperly handled.
- Non-food grade grease and lubricants are used for food-processing machines and equipment.
- Chemical reactions occur between metals like alumina, iron and acids in food.

### CHEMICAL HAZARDS



*Illustration 3: Potentially hazardous chemical products*

- Cooking oil for frying is repeatedly used far beyond recommended usage.
- Histamines are produced due to mishandling of fish products and abuse of temperature.
- Chemicals used for the production of PET bottles and containers may leach and migrate into the beverages they contain (water, for instance) if exposed to heat.

### 2.2.2 Physical hazards

Physical contamination is anything which is foreign to a particular food. Those contaminants are usually non-toxic but are associated with unsanitary conditions at any stage in the food chain that can affect human health and can cause internal injuries. Physical hazards can be caused by accidental contamination and/or poor food-handling practices. Examples are hair, nails, metal fragments, wood splinters, glass, bones, paddy husk, sand and stones.

### 2.2.3 Microbiological hazards

Microbiological hazards can enter the food from the environment, inadequate sanitation practices and cross-contamination at any stage in the food chain. Microbiological hazards are the main cause of food poisoning, and most cases of foodborne illnesses are caused by bacteria. Bacteria exist everywhere. The places where food is prepared, served and sold provide ideal conditions for bacteria to multiply because Sri Lanka is a country with high temperature and high humidity levels. As a food handler, it is mandatory to prevent contamination, multiplication and survival of hazardous bacteria. Other biological hazards include viruses, parasites and poisonous toxins produced by hazardous bacteria from fish, shellfish, plants and fungi.

#### A) Leading questions and recommendations

- What are the three types of food hazards?
- How can food additives become a food hazard?
- How can chemicals enter the food unintentionally?
- Have you ever experienced a food hazard in your company? What type of food hazard was it?

#### B) Further reading and references (Please also refer to the Annex of Chapter 2)

Government of Canada, "Food Safety Hazards", Imported and Manufactured Food Program Inspection Manual. (Source: <https://inspection.canada.ca/food-safety-for-industry/archived-food-guidance/non-federally-registered/product-inspection/inspection-manual/eng/1393949957029/1393950086417?chap=0>)

#### Regulations and standards

CXC 1-1969, General Principles of Food Hygiene.

## THINGS TO REMEMBER

- As a food handler, you are responsible for producing safe food. Be aware of these food safety hazards!
- Microbiological hazards include bacteria, fungi, yeasts and moulds.
- Chemical hazards can contaminate food through cleaning chemicals, pesticides and excessive use of food additives.
- Physical hazards are things found in food that are not meant to be there.



## 2.3 Chemical hazards and their causes (intentionally added)

### 2.3.1 Prohibited substances

Prohibited substances in food are banned by regulatory authorities such as the Health Ministry and the Consumer Affairs Authority in Sri Lanka.

The numerous food safety incidents that occurred on a global scale in recent years have been caused by the addition of non-food substances such as paddy husk, saw dust, powdered bricks or the use of prohibited drugs in animal husbandry and agriculture. These substances pose significant hazards with both short-term and long-term effects on human health.

Synthetic food colours have been increasingly used by food manufacturers instead of their natural counterparts due to the low cost of the materials and their abilities to improve the food's appearance as well as to ensure colour intensity, stability and uniformity. Banned synthetic colours and overuse of permitted synthetic colours in food and beverages are very common and can cause serious health issues.

### 2.3.2 Permitted substances

There is a limited number of food additives, including food colouring, flavours, preservatives, sweeteners and emulsifiers, which are permitted substances in the food industry.

“Food additive” means any safe substance that is intentionally introduced into or on food in small quantities in order to affect the food's keeping quality, texture, consistency, appearance, odour, taste, alkalinity or acidity as well as to serve any other technological function in the manufacturing processing, preparation, treatment, packing, packaging, transport or storage of food.

Food additives are continually evaluated and monitored by independent international bodies. One of these is the Joint FAO/WHO Expert Committee on Food Additives (JECFA).

JECFA serves as an independent scientific expert committee which performs risk assessments and provides advice to FAO, WHO and the member countries of both organizations, as well as to the Codex Alimentarius Commission (CAC). JECFA members are prominent scientists from around the world, of recognized scientific excellence and have competencies spreading across disciplines within JECFA. JECFA's tasks include:

- Risk assessments/safety evaluations of food additives, processing aids, residues of veterinary drugs in animal products, contaminants and natural toxins.
- Exposure assessments to chemicals.
- Guidelines for the safety assessment of chemicals in foods consistent with current thinking on risk assessment in toxicology and other relevant sciences.

One of the important criteria continuously discussed and implemented by JECFA is the so-called "acceptable daily intake".

### **Acceptable daily intake (ADI)**

For food additives or food contact additives, the acceptable daily intake is used to determine the maximum amount of a chemical, including food additives, that can be ingested daily to before being dangerous to human health. ADI is also called the tolerable daily intake (TDI).

Another popular approval criterion which indicates the safety of a substance as a food additive is the so-called "generally recognized as safe" (GRAS) concept which was introduced by the Food and Drug Administration (FDA) in the United States.

### **Generally recognized as safe (GRAS)**

What does GRAS mean? It is a classification of individual chemicals or substances added to food products that experts deem safe.

Only food additives that are GRAS, have an ADI and are continuously monitored by JECFA are discussed.

Adverse effects on health are only deemed as dangerous if indicated maximum levels are exceeded.

#### **2.3.2.1 Definition and selection of important food additives according to the Sri Lankan regulation**

The uncontrolled use of food additives is deemed as a threat to public health. Most modern food additives that are used by many food manufacturers are synthetically derived chemicals.

Food additives are uniquely classified using an internationally recognized identification number that is part of the Identification Numbering System (INS).

The INS list is in numerical order and is set out in four columns giving the identification number, name of the food additive, functional class and technological purposes. The identification number usually consists of three or four digits. The INS is intended to be a harmonized naming system for food additives as an alternative to the use of the specific name, which may be lengthy. It is important to uniquely identify a food additive.

Uncontrolled use of food additives, including food preservatives, is deemed to pose a danger to public health (see GRAS, ADI and JECFA above).

Maximum use levels for food additives must not be exceeded.

**Example:** Sorbic acid is a popular food additive which is used to extend the shelf life of a variety of products, e.g. dairy-based desserts (for example, pudding, fruit or flavoured yoghurt), cheese or flavoured milk drinks. As stated in the codex standard CAC/GL 36-1989, the INS of sorbic acid is 200 and the technological purpose of this food additive is to preserve food.

### 2.3.2.2 Food colourings

Colourants are among the commonly used food additives, and they are added by the food producers to colour food or to adjust the colour to the desired level.

The following table provides an overview of important (permitted) food colourings.

INS No.	Name of food additive	Functional class	Technological purpose
100	Curcumin	Colour	Colouring
120	Cochineal (carminic acid)	Colour	Colouring
140	Chlorophyll	Colour	Colouring
150b	Caramel	Colour	Colouring

*Source: CAC/GL 36-1989, Class Names and the International Numbering System for Food Additives. Sri Lankan Ministry of Health: Food (Colouring Substances) Regulations 2006-1, No. 472/19 and Food (Colouring Substances) Amendment Regulations 2011 - No. 1688/28.*

The following table shows the maximum level of chlorophyll allowed in selected food products.

Food category	Maximum level
Vegetable	100 mg/kg
Fermented fruit products	100 mg/kg
Fruit preparations, including pulp, purees, fruit toppings and coconut milk	100 mg/kg
Jams, jellies, marmalades	200 mg/kg

*Source: CODEX STAN 192-1995, General Standard for Food Additives.*

**Example:** Chlorophyll is a permitted food additive for jams, jellies or marmalades. The maximum use level for chlorophyll for these types of commodities is 200 mg/kg. Thus, for a 250 g jar of product, the maximum level of chlorophyll that can be added is 50 mg. Exceeding this level would lead to food safety risks for the consumer.

Table 3 provides some examples of food safety risks that can occur when critical limits of food colourants are exceeded.

<b>Colour</b>	<b>Where it is found</b>	<b>Possible negative effects</b>
Erythrosine FD&C (Red No. 3)	Fruit cocktail, canned fruits, salads, confection, dairy products, snack foods	Cancer
Tartrazine (E102) FD&C (Yellow No. 5)	Ice cream, carbonated drinks, fish sticks	Hyperactivity, asthma, skin rashes, migraine headaches

Source: Sunday N. Okafor, Wilfred Obonga, Mercy A. Ezeokonkwo: *Assessment of the Health Implications of Synthetic and Natural Food Colorants – A Critical Review*, in: *UK Journal of Pharmaceutical and Biosciences* Vo. 4 (4), 01-11. 2016.

### 2.3.2.3 Food preservatives

A food preservative is a class of food additive which prolong the shelf life of food by preventing deterioration due to microorganisms. Food preservatives can slow down decomposition caused by moulds, air, bacteria or yeast. In addition to maintaining the quality of the food, preservatives help control contamination that can cause foodborne illness, including life-threatening botulism.

Table 4 shows a selection of commonly used preservatives.

<b>INS No.</b>	<b>Name of food additive</b>	<b>Functional class</b>	<b>Technological purpose</b>
220	Sulphur dioxide	Flour treatment agent Preservative	
230	Diphenyl	Preservative	
231	Orthophenyl phenol	Preservative Antioxidant	
234	Nisin	Preservative	
251	Sodium nitrite	Preservative Colour retention agent	

Source: CAC/GL 36-1989, *Class Names and the International Numbering System for Food Additives*. Sri Lankan Ministry of Health: *Food (Preservatives) Regulations 2019 – No. 2113/16*.



The following table presents the use and limits of the selected food preservative nisin.

<b>Table 5: Selected use of the food preservative nisin (INS 234) and its maximum concentration in food</b>	
<b>Food category</b>	<b>Maximum level</b>
Flavoured milk drink	12.5 mg/kg
Clotted cream	10 mg/kg
Unripe cheese	12.5 mg/kg
Ripened cheese	12.5 mg/kg
Processed cheese	12.5 mg/kg
Dairy-based desserts (e.g. pudding, flavoured yoghurt)	12.5 mg/kg
Cereal and starch-based desserts (e.g. rice pudding)	3 mg/kg
Whey protein cheese	12.5 mg/kg

Source: CODEX STAN 192-1995, General Standard for Food Additives. Sri Lankan Ministry of Health: Food (Preservatives) Regulations 2019 - No. 2113/16.

**Example:** Nisin is a permitted food additive to prolong the shelf life of flavoured milk drinks. The maximum use level for the food preservative nisin is 12.5 mg/kg product. Thus, for a 10-litre product, the maximum level of nisin that can be added is 125 mg. Exceeding this level would lead to food safety risks for the consumer.

Note that the Food (Preservatives) Regulations, 2019 of Sri Lanka contain a comprehensive list of products with accepted food preservatives and their maximum levels.<sup>5</sup>

#### **Adverse effects of food preservatives if safe levels are exceeded**

1. Sulphites are common preservatives used in various fruits. They may cause side effects in the form of headaches, palpitations and allergies, and they can even cause cancer.
2. Nitrates and nitrites: These additives are used as curing agents in meat products. Nitrites in food (and the nitrates that are converted to nitrites in the body) may contribute to the formation of a group of compounds known as nitrosamines, some of which are carcinogenic.
3. Benzoates are used in foods as antimicrobial preservatives. They have been suspected to cause allergies, asthma and skin rashes.
4. After the consumption of processed foods, some people develop the symptoms of symptoms of an allergy only a day or two or two later, so it is difficult to trace the real cause of the problem.

#### **2.3.2.4 Sweeteners**

Sweeteners are food additives other than a mono- or disaccharide sugar (e.g. common sugar) which impart a sweet taste to a food.

<sup>5</sup> Here is the link to the regulation: <https://eohfs.health.gov.lk/food/images/pdf/regulations/preservative-english.pdf>

The following table provides an overview of the important (permitted) food sweeteners used in Sri Lanka.

INS No.	Name of food additive	Functional class	Technological purpose
951	Aspartame	Sweetener flavour enhancer	Sweetener
950	Acesulfame potassium	Sweetener flavour enhancer	Flavour enhancer sweetener
955	Sucralose	Sweetener	Sweetener
961	Neotame	Sweetener	Sweetener

Source: CAC/GL 36-1989, Class Names and The International Numbering System for Food Additives. Sri Lankan Ministry of Health: Food (Sweeteners) Regulations 2014 – No. 1905/36.

The following table shows the maximum level allowed for the food sweetener aspartame in selected food products.

Food category	Maximum level
Fruit juice-based drinks	600 mg/litre
Fruit and vegetable-based desserts	1000 mg/kg
Confectionery with no added sugar	1000 mg/kg
Canned or bottled fruit	1000 mg/kg

Source: Sri Lankan Ministry of Health: Food (Sweeteners) Regulations 2014 - No. 1905/36.

## Adverse effects of food sweeteners if safe levels are exceeded

1. Artificial sweeteners can increase body weight as well as causing diabetes and cancer.
2. They can affect the blood-brain barrier and disrupt hippocampal function.<sup>6</sup>
3. They can retrain taste buds.
4. They can affect the normal gut microbiota.<sup>7</sup> This can lead to obesity and metabolic syndrome.
5. They can lead to an abnormal mix of bacteria in the gut that increases the risk of insulin insensitivity (the precursor of diabetes) and weight gain.

<sup>6</sup> The hippocampus is a complex brain structure embedded deep into the temporal lobe. It plays a major role in learning and memory (source: <https://www.ncbi.nlm.nih.gov/pmc/articles>).

<sup>7</sup> Microbiota refers to microorganisms that are found within a specific environment (source: <https://www.fiosgenomics.com/microbiome-vs-microbiota/>).

6. They can lead to gut dysbiosis,<sup>8</sup> which is often associated with irritable bowel syndrome (IBS). This is very common and not only leads to abdominal bloating and pain, but also decreases the body's ability to absorb most nutrients from food, which affects the strength of the immune system. Furthermore, it may increase the risk of a host of chronic inflammatory disorders.
7. They can increase the risk for heart disease.

### 2.3.2.5 Flavour enhancers

A food flavour enhancer is a food additive which enhances the existing taste and/or odour of a food.

Table 8 shows a selection of the most commonly used flavour enhancers.

INS No.	Name of food additive	Functional class	Technological purpose
364	Monosodium succinate	Flavour enhancer	Flavour enhancer
518	Magnesium sulphate	Flavour enhancer Firming agent	Flavour enhancer Firming agent
620	Glutamic acid, l(+)-	Flavour enhancer	Flavour enhancer
621	Monosodium l-glutamate	Flavour enhancer	Flavour enhancer

Source: CAC/GL 36-1989, *Class Names and the International Numbering System for Food Additives*.

According to the Sri Lankan Food (Flavouring Substances and Flavour Enhancers) Regulations 2013 - No. 1795/51, Monosodium I may be added to foods subject to observance of GMP and where the label carries clearly a declaration as to the particular substance or substances used. However, it must **not** be added to any food for infants or young children below three years of age: Furthermore, the regulation specifies a wide range of other foods where Monosodium I glutamate is **not** permitted. A selection of these is presented in table 9

<sup>8</sup> A dysbiosis can be defined as a reduction of microbial diversity and a combination of the loss of beneficial bacteria (source: <https://www.sciencedirect.com/topics/medicine-and-dentistry/dysbiosis>).

The following table shows the maximum level allowed for the food flavour enhancer Monosodium l-glutamate in selected food products.

<b>Table 9: Selected foods for which the use of the food flavour enhancer monosodium L-glutamate (INS 621) is prohibited</b>	
Dried pastas, noodles and pasta-like products	
Fresh meat, poultry and game	
Fresh fish and molluscs, crustaceans and echinoderms	

Source: Sri Lankan Ministry of Health: Food (Flavouring Substances and Flavour Enhancers) Regulations 2013 - No. 1795/51.

### **Adverse effects of food flavour enhancers if safe levels are exceeded<sup>9</sup>**

1. The process of smoking foods creates several toxic, mutagenic and carcinogenic components including polycyclic aromatic hydrocarbons and nitrogen oxides.
2. Because the smoke contains nitrogen oxides, the formation of nitrosamines may take place in smoked fish and meats. Nitrosamines are extremely carcinogenic.
3. Phenols and some of the carbonylic compounds (e.g. formaldehyde) in smoked food have also been shown to be carcinogenic in animals.
4. Other health risks related to the consumption of artificial food flavourings include:
  - a. Worsening of asthmatic symptoms
  - b. Development of allergies or food sensitivities and the appearance of hives (urticaria)
  - c. Dizziness, abdominal pain, diarrhoea and vomiting
  - d. Breathing difficulty
  - e. Severe reactions can result in anaphylactic shock and even death

#### **2.3.2.6 Emulsifiers**

Emulsifiers are food additives which form or maintain a uniform emulsion of two or more phases in a food.

<sup>9</sup> Source: Bateson-Koch, Carolee (1994); Allergies, Disease in Disguise: How to Heal Your Allergic Condition Permanently and Naturally, Books Alive

The next table shows a selection of the most common food emulsifiers.

INS No.	Name of food additive	Functional class	Technological purpose
403	Ammonium alginate	Emulsifier Carrier Foaming agent Gelling agent Glazing agent Humectant Sequestrant Stabilizer Thickener	Emulsifier Carrier Foaming agent Gelling agent Glazing agent Humectant Sequestrant Stabilizer Thickener
407	Carrageenan	Emulsifier Stabilizer Thickener Humectant	Emulsifier Stabilizer Thickener Humectant
440	Pectin	Emulsifier Gelling agent Stabilizer Thickener	Emulsifier Gelling agent Stabilizer Thickener

Source: CAC/GL 36-1989, *Class Names and The International Numbering System for Food Additives*.

Table 11 shows the maximum level allowed for the food emulsifier carrageenan in selected food products.

Food category	Maximum level
Liquid egg products	GMP
Smoked, dried, fermented and/or salted fish and fish products, including molluscs, crustaceans and echinoderms	GMP
Infant formulae	300 mg/kg
Formulae for special medical purposes for infants	1000 mg/kg

Source: CODEX STAN 192-1995, *General Standard for Food Additives*

### Adverse effect of food emulsifiers if safe levels are exceeded

1. Emulsifiers, which are added to most processed foods to aid texture and extend shelf life, can alter the gut microbiota composition and localization to induce intestinal inflammation that promotes the development of inflammatory bowel disease (IBD)
2. Inflammatory bowel disease, which comprises Crohn's disease<sup>10</sup> and ulcerative colitis, affects many people and is often severe and devastating.

<sup>10</sup> Crohn's disease is a type of inflammatory bowel disease (IBD) that causes symptoms such as persistent diarrhoea, rectal bleeding, urgent need to have a bowel movement, abdominal pain that feels like cramping, feeling of incomplete bowel evacuation and constipation.

3. Metabolic syndrome is a group of very common obesity-related disorders that can lead to type 2 diabetes, cardiovascular and/or liver diseases.

### A) Leading questions and recommendations

- What kind of food additives do you use in your production? List them down and indicate the type, production step, concentration, monitoring and control measures.
- Do you use the same food additives for different purposes, e.g. as food preservatives, emulsifiers, thickeners or flavour enhancers?
- Do you have a corresponding INS number for all of the food additives you use?
- Collect all information concerning the maximum level of each food additive being used in your company's products.

### B) Further reading and references (Please also refer to the Annex of Chapter 2)

World Health Organization (WHO), <https://www.who.int/news-room/fact-sheets/detail/food-additives>

#### Regulations and Standards

CODEX STAN 192-1995, General Standard for Food Additives

Sri Lankan Ministry of Health: Food (Colouring Substances) Regulations, 2006 –1, No. 472/19

Sri Lankan Ministry of Health: Food (Colouring Substances) Amendment Regulations 2011 - No.1688/28

Sri Lankan Ministry of Health: Food (Preservatives) Regulations, 2019 – No. 2113/16

Sri Lankan Ministry of Health: Food (Sweeteners) Regulations, 2014 – No. 1905/36

Sri Lankan Ministry of Health: Food (Flavouring Substances and Flavour Enhancers) Regulations, 2013 – No. 1795/51

## C) THINGS TO REMEMBER

- Use only permitted food additives. If you do not know if something is permitted, refer to national or international guidelines. If you cannot find information about the food additive, do not use it.
- Maximum use levels of food additives for different food products, as stipulated by regulations, must not be exceeded, otherwise adverse health effects pose a risk to the consumer.
- Collect all necessary information about each food additive used in your production and document it (e.g. process step, control measure).
- Train personnel about appropriate use of food additives for production.



## 2.4 Chemical hazard entry areas in a food-handling business (unintentional)

### 2.4.1 Cleaning agents for the processing area

Cleaning agents are used to remove food residues, soil, dirt, grease and other objectionable matter. Those agents include water, detergents, degreasers, abrasives and acids.

Disinfection agents are used to reduce pathogenic bacteria to levels that are neither harmful to human health nor to the quality of food. Disinfection can be carried out using chemicals, heat and steam (see Chapter 3 for further details).

#### CLEANING AGENTS

##### Amphoteric surfactants

Amphoteric surfactants are a key ingredient in cleaning products. Due to their superior properties, they are used for many applications in cleaning. These properties include high efficiency at low concentrations, easy biodegradation, strong anti-electrolytes, cleansing power, low toxicity and high detoxification. Amphoteric surfactants are also used in dish soaps because of their strong foaming properties. Furthermore, they are applied as mild surfactants in dishwashing liquids, cosmetics and toiletries.

##### Acids and alkalis

Acids are used to clean and disinfect surfaces. They range from very mild to very strong acids. Very strong acids are toxic and corrosive. Therefore, it is important to read the product label and follow the directions for safe use.

- **Very mild acids**

Acetic acids serve to remove rust stains from sinks and hard water deposits from glassware. Citric acid removes browning, discolouration and hard water build-up on dishes and glassware as well as coffee and tea stains.

- **Very strong acids**

Hydrochloric acid removes rust from metals and other surfaces. It also eliminates dirt and grime on toilet bowls. Oxalic acid acts as a bleaching agent and rust remover.

#### CLEANING



Illustration 4: Cleaning

Alkalis have detergent properties, and they are used for cleaning purposes. Alkalis range from mild alkaline, to moderate alkaline and to strong alkaline. Strong alkalis are corrosive and cause chemical burns on human skin. Therefore, it is important to read the product label and follow the directions for safe use.

- **Mild alkalis**

They clean glass and wall tiles and erase coffee and tea stains. An example of a mild alkaline is sodium bicarbonate.

- **Moderate alkalis**

Ammonia cleans glass, ovens, windows and shiny surfaces. Borax acts as a cleaner and disinfectant.

- **Strong alkalis**

Sodium carbonate is the building block of powdered detergents which are used to remove fat. Sodium metasilicate solution is a highly effective cleaner to remove dirt.

It can be highly dangerous if food is contaminated by detergents. Therefore, final rinsing is essential (see Chapter 3 for more details).

## COMMON DISINFECTION AGENTS

### Chlorine and chlorine-based products (hypochlorite)

Chlorine and chlorine-based substances are used as disinfectants because they rapidly take effect against a wide range of microorganisms. They are relatively inexpensive. Disinfecting food-contact surfaces, washing fruits and vegetables, cleaning foodplants and washing vehicles are usually done using chlorine-based products.

High concentrations can pose a food safety risk.

### Iodophors

Iodophors are used as disinfectants against bacteria, fungi, protozoa and viruses. They are widely applied for the disinfection of hands, smooth surfaces including fiberglass, plastics and in footbaths. They rapidly destroy microorganisms but do not pose significant health risks to humans. Colour changes give a visual indication of their effectiveness. They generate little taste and smell. If iodophors enter food, they can cause taints. Disinfection of clean surfaces requires a concentration of 25 milligrams per litre to 50 milligrams per litre of available iodine at pH < 4.

Iodophors pose a risk to food safety if not used correctly.

### Quaternary ammonium compound

Among the various detergents on the market, quaternary ammonium compounds are highly effective disinfection agents which are colourless as well as odourless. In addition, they are non-corrosive to metal and non-toxic. The solution tends to adhere to surfaces. Therefore, thorough rinsing is essential. A solution with a concentration of approximately 200-1200 milligrams per litre for disinfection of clean food-contact surfaces are commonly used (per instruction).

Quaternary ammonium compounds are highly effective but must be used correctly per instruction. Incorrect use poses a risk to food safety.



### **2.4.2 Control of incoming raw materials**

All sources of raw materials taken to the production area are by themselves potential sources of contamination for the final product. Ingredients such as fruits, vegetables or raw meat can contain dangerous bacteria that may ultimately contaminate the end-product if not stored properly and controlled. Therefore, raw materials must be checked and controlled before using them for production.

Non-food items used for production – such as chemicals for cleaning – must be strictly stored away from food items. This will ensure that cross-contamination to food items is minimized.

Chapter 3 will provide more details about proper handling and control of incoming raw materials.

### **2.4.3 Food-contact surfaces**

Food-contact surfaces are surfaces that come in contact with food. Examples include cutting boards, utensils, conveyor belts, tabletops, storage vessels and the inside of pipes for liquids such as water, milk, fruit juice, etc. Food-contact surfaces can become a chemical hazard if they were exposed to chemicals that are harmful to human health (pesticides, for instance) or to otherwise innocuous chemicals in excessive concentrations.

Chapter 3 will describe what needs to be done to keep food-contact surfaces free from chemical hazards.

### **2.4.4 Pest-control products**

There are various types of pest-control products. Rodenticides serve the purpose of controlling the advent of rodents such as rats or mice. Insecticides minimize the occurrence of insects such as cockroaches, flies or mosquitoes. When pest-control products are applied inappropriately, for instance, when insecticides are sprayed over food or raw materials, they may contaminate food unintentionally. If pest-control products are stored side by side with food, they may also contaminate food and pose a health hazard.

Chapter 3 will explain how pest-control products are stored in an appropriate manner.

### **2.4.5 Processing equipment**

In a food-handling business, equipment and containers regularly come into contact with food. Processing equipment can become an entry area of chemical hazards, for instance when oil and grease from processing equipment enter the food unintentionally. Also, detergents or disinfectants remaining on the surface of the equipment after cleaning may spill over to food. In addition, food additives remaining on surfaces may enter the food in excessive doses.

Equipment that is not properly calibrated may also constitute a chemical hazard. For example, it may lead to more than acceptable amounts of food colourings being added to the food item because the balance does not measure the amount of chemical liquids properly.

What needs to be done in order to ensure that processing equipment is free of hazardous chemical substances is shown in Chapter 3.

### 2.4.6 Water from contaminated sources

Water is a key ingredient in most food-handling businesses. If water used in food-processing is contaminated by chemical substances, it may become a chemical hazard entry area. These contaminants may be naturally occurring or man-made. Examples of chemical contaminants in water include nitrogen, bleach, salts, pesticides, metals, toxins produced by bacteria and human or animal drugs.

How to ensure that water is fit for human consumption and for use as a safe ingredient in your business is explained in Chapter 3.

#### A) Leading questions and recommendations

- How can chemical hazards enter your food establishment?
- What is the difference between cleaning and disinfection?
- How can pesticides pose a risk to the safety of food?
- Why it is important to select equipment which suits the operation?
- Why should water used in the production be checked regularly to prevent contamination of food?
- List down steps in production where chemical contamination can occur. Which potential chemical contaminants do you use during the time of production?

#### B) Further reading and references (Please also refer to the Annex of Chapter 2)

##### International sources

Sue Stevenson and Claire Nash, Revised by Alan Brereton. Chartered Institute of Environmental Health. "Food Safety for Supervisors": pp. 94.

Codex Alimentarius FAO-WHO

##### Regulations and standards

U.S. Food and Drug Administration, Code of Federal Regulations. "Current Good Manufacturing Practice in Manufacturing, Packing, or Holding Human Food"  
<https://www.ecfr.gov/>

## C) THINGS TO REMEMBER

- Food can be contaminated with chemicals at any step from the processing up to the dispatching of the products.
- Proper application of cleaning and disinfection agents should be followed as per instruction given by supplier/ manufacturer and effective post-rinsing of the chemical is required to avoid the contamination of food with chemicals.
- Food-contact surfaces and processing equipment must be suitable for the purpose. They must be food-grade.
- As water is one of the main sources of contaminants, it is important to use clean water.
- There may be many sources of chemical hazards, such as oils & grease, ink, paint, fumes, workers, etc.
- Repeated use of certain food products can turn these foods themselves into chemical hazards.



## 2.5 Physical hazards

### 2.5.1 Sources of physical hazards

Physical hazards are either foreign material that is unintentionally introduced to food products (example: metal fragments in ground meat) or naturally occurring objects (example: bones in fish) that are hazardous to the consumer. It can be introduced into food products accidentally during harvesting or at any point during processing due to poor procedural practices anywhere in the food chain, including manufacturing, storage and transportation. Food processors should take adequate measures to avoid physical hazards because they could also transport microbiological hazards into the food. Physical hazards can cause internal injuries, distress, choking or broken teeth.

The 12 most common foreign material contaminants in food are glass, wood, stones, metal, jewellery, insects/filth, insulation, bone, plastic, personal effects, bullets and needles. They are called the “dirty dozen”.

Common sources of physical hazards include:

- Glass: light bulbs, glass containers, windows, fixtures, utensils, gauge covers.
- Metal: fragments from equipment such as splinters, nuts and bolts, blades, needles, utensils, staples, etc.
- Plastics: material used for packaging and fragments of utensils used for cleaning equipment.
- Stones: incorporated in field crops (rice, tea, peas, beans), during harvesting, during renovations and cleanings of buildings.
- Wood: splinters from wood structures and wooden crates and pallets used to store or transport ingredients or food products, from the field and harvesting.
- Natural components of food: hard or sharp parts of food (e.g. shells in nut products).
- Hair, fingernails, buttons, badges, pen tops, plasters, parts of jewellery due to poor hygiene practices.
- Dead insect bodies, eggs, droppings and nesting materials due to an ineffective system of pest control in place.

In addition, smoking, the consumption of alcohol and the chewing of betelnuts by employees during work hours may cause physical hazards, for instance, if tobacco and betelnuts enter the food unintentionally.

### 2.5.2 Control of physical hazards in food-handling businesses

There are many ways food processors can control physical hazards in food-handling business.

- Inspect raw materials and food ingredients for field contaminants, such as stones in cereals that were not found upon arrival.
- Handle food according to good manufacturing practices (GMPs) (e.g. not wearing jewellery or false fingernails and adhering to proper personnel hygiene practices.)
- Eliminate potential sources of physical hazards in processing and storage areas (e.g. use protective bulbs or lamp covers to prevent contamination with breakable glass.)

- Remove food waste and rubbish from food areas frequently throughout the day and dispose of it safely and hygienically.
- Report any sign of pests in the buildings.
- The company must implement a glass policy, jewellery policy and metal policy in order to prevent contamination with physical food safety hazards.

More practical recommendations for avoiding physical hazards are presented in Chapter 3.

### **A) Leading questions and recommendations**

- What is a physical hazard?
- What are sources of physical hazards in production?
- What are potential physical hazards and the “dirty dozen”?
- How do physical hazards gain access to your food products?
- How can you get rid of harmful physical hazards?

### **B) Further reading and references (Please also refer to the Annex of Chapter 2)**

Province of Manitoba Government, Canada, source:

[https://www.gov.mb.ca/agriculture/food-safety/at-the-food-processor/food-safety-program/pubs/fs\\_16.pdf](https://www.gov.mb.ca/agriculture/food-safety/at-the-food-processor/food-safety-program/pubs/fs_16.pdf)

## **C) THINGS TO REMEMBER**

- Food processors should take adequate measures to avoid physical hazards in food.
- Hard or sharp objects are potential physical hazards and can cause:
  - o Cuts to the mouth or throat
  - o Damage to the intestines
  - o Damage to teeth or gums
- The presence of physical hazards in food can trigger a food recall, affecting the brand name of your company and product.
- For physical hazard prevention, frequent inspection, awareness and maintaining good manufacturing practices (GMP) are very important.



## 2.6 Microbiological hazards

### 2.6.1 Sources of biological hazards

There are four potential sources of biological hazards, namely bacteria, viruses, moulds and parasites. This section will explain which of these sources can become harmful to human health and how they can become hazardous.

#### 2.6.1.1 Bacteria

Bacteria are single-celled microorganisms which are too small to see without the aid of a powerful microscope. Even if food is heavily contaminated, it is usually impossible to detect bacteria by sight, smell or taste.

Bacteria are found throughout the natural world and survive under many conditions. Although they are responsible for most cases of food poisoning, it is important to remember that not all types of bacteria are harmful. Indeed, most types are beneficial, and humans would find it difficult to survive without them.

Good bacteria help us to grow crops; make foods such as yoghurt, cheese and fizzy drinks; digest food; treat sewage to make it safe; and create medicines. On the other hand, a very small portion of bacteria can cause a great deal of harm. They include pathogenic bacteria that cause illness and spoilage bacteria that make food perish rapidly.

#### Pathogenic bacteria

Pathogenic means “disease-causing”, and these types of bacteria are responsible for most cases of food-processing and foodborne illness.

#### Where pathogenic bacteria come from

There are many sources of bacterial contamination.

- **Raw food**

Vegetables and foods of animal origin – meat, poultry, fish, shellfish and eggs – are significant sources of contamination. Bacteria are naturally present in animal intestines. When animals are slaughtered, the skin and flesh may be accidentally contaminated by these bacteria. If the meat is then minced, for burgers, for instance, the bacteria can spread throughout the food.

- **Water**

Untreated and incorrectly treated sources of drinking water, such as rivers, lakes and reservoirs, can carry pathogenic microorganisms that cause foodborne illness. Therefore, water used in food preparation, be it added directly to prepare food or used for washing raw materials, must be potable.

- **Pests and animals**

Pests such as cockroaches, flies and rats as well as animals such as rats, dogs and toads may be carriers of pathogenic bacteria. If they enter the food-processing area, the pathogenic bacteria may enter the food.

- **Soil**

There are many bacteria living in soil. They can cause illness if raw food is not washed thoroughly before being eaten.

- **People**

Pathogenic bacteria can be found on human skin and in the ears, nose, throat and hair. They are also in cuts, pimples and boils. Food handlers can spread bacteria by touching their faces, hair or other parts of their bodies before handling food; by unwashed hands after going to the bathroom; or by coughing or sneezing near food.

- **Air, dust, dirt and food waste**

The air carries dust and dirt containing millions of microscopic particles of dead skin, food and other debris covered in pathogenic bacteria that can settle on uncovered food. Bacteria from food waste can contaminate food if the waste is not disposed of properly.

### 2.6.1.2 Viruses

Viruses are microorganisms that are even smaller than bacteria. They are carried on food and water but do not need the food or moisture for their own survival. The main sources of viruses are sewage and polluted water. Although they can contaminate any type of food, they are usually associated with:

- Water
- Food from water, such as shellfish
- Raw food, such as salad leaves and raw vegetables

Viruses can spread by vehicles of contamination, such as hands. For example, food handlers can spread viruses to food if they do not wash their hands thoroughly after going to the toilet (e.g. rotaviruses, hepatitis A, norovirus and protozoa) or after contact with animals or raw products.

### 2.6.1.3 Moulds

Moulds are needed for some foods, like making cheese. The blue in blue cheese, the flavour and sweetness of some rare white wines and the power of penicillin to fight disease all come from different kinds of moulds. But the moulds found in kitchens are the slimy, rotten, fuzzy or unpleasant coloured kind that spoils food.

Single mould cells are usually very tiny, but mould colonies may be visible as fuzzy growths on food. Some moulds make toxins called mycotoxins that can cause serious illness or infections. You cannot tell just by looking whether or not the mould is one of the toxin-producing types.

Examples of moulds that produce poisonous toxins are:

- Aflatoxin – often found in nuts, peanuts, peanut butter, coconuts and chillies (*Aspergillus sp.*)
- Ochratoxin A – often found in grain (*Aspergillus* and *Penicillium*)

**Table 12: Occurrence of different key mycotoxins**

<b>Mycotoxin</b>	<b>Source</b>	<b>Associated Food</b>
Aflatoxins	<i>Aspergillus flavus</i> and <i>A. parasiticus</i>	Corn, peanuts, tree nuts, milk, chilli peppers, palmyra products and coconuts
Trichothecenes	Mainly <i>fusarium</i>	Cereals and other foods
Ochratoxin A	<i>Penicillium verrucosum</i> <i>A. ochraceus</i>	Wheat, barley, corn
Ergot alkaloids	<i>Claviceps purpurea</i>	Rye, barley, wheat
Fumonisin	<i>Fusarium moniliforme</i>	Corn
Patulin	<i>P. expansum</i>	Apples, pears
Zearalenone	<i>Fusarium spp.</i>	Cereals, oil, starch

Source: Osama O. Ibrahim, Mirjana Menkovska – The Nature, Sources, Detections and Regulations of Mycotoxins that Contaminate Foods and Feeds Causing Health Hazards for Both Human and Animals, in: Journal of Agricultural Chemistry and Environment 08(01):33-57, January 2019.

#### 2.6.1.4 Parasites

Parasites are organisms that live on or in other organisms, such as fleas on dogs and mites on chickens. Many parasites are not harmful for human beings. Parasites that indeed cause illness from food include:

- Microscopic types living in water.
- Roundworms, flatworms and flukes affecting foods of animal origin, such as pork, beef and fish.
- *Trichinella spiralis*, *Taenia solium* and *Toxoplasma gondii* are parasites associated with pork and pork products.

#### 2.6.2 Factors affecting the growth of microorganisms in foods

When microorganisms grow in food, they cause varying degrees of change in the food's characteristics as a result of metabolic activity. Some of these changes, like those taking place during fermentation, are desirable, while others, like those resulting in food spoilage and food poisoning, are undesirable.

A bacterial population grows in direct relation to the presence of favourable conditions. These conditions or factors can be divided into two groups, intrinsic or extrinsic.

Intrinsic factors are inherent in the food and include:

- Nutrient content of the food
- Moisture content expressed as water activity ( $a_w$ )
- Acidity or alkalinity, expressed as the pH-value

Extrinsic factors are conditions of the environment and include:

- Temperature
- Humidity
- Time
- Atmosphere



The most important factors that affect microbial growth in foods are nutrients, temperature, time, moisture content, pH and oxygen.

### 2.6.2.1 Nutrients

Foodborne microbes show a marked preference for foods that are rich in protein and high in moisture. Such foods, which are known as high-risk foods, are particularly vulnerable to microbial multiplication and need to be refrigerated. They include meats and meat products (such as pies, sausages, poultry, stocks, gravies, stew, sauces), all kinds of seafood (fish and shellfish), milk, dairy products, eggs and egg products. The smallest quantities of these foods can support very large bacterial populations.

All microorganisms utilize glucose or other monosaccharides as a source of carbon and energy. Very few microbes can utilize complex polysaccharides such as starch and pectin. In the absence of monosaccharides, a limited number of species of moulds and bacteria can hydrolyse pectin, which results in growth in the skin of fruits and causes spoilage.

Proteolytic bacteria like *Clostridium* and *Bacillus* can utilize protein as a source of carbon and energy if carbohydrates are not available. Therefore, foods which are deficient in carbohydrates and rich in protein (for instance meat and eggs) are mainly spoiled by proteolytic bacteria. Some depend on the presence of certain vitamins; *Staphylococcus aureus* needs thiamine (part of the vitamin B group), for example.

### 2.6.2.2 Temperature

Storage temperature is an important extrinsic parameter that affects the growth and activity of microbes in food. Each species has a limited temperature range within which it can grow. Within this range, there is an optimal (most favourable) temperature for multiplication (see Table 13 and illustration below). At temperatures above the maximum for their growth range, bacteria experience thermal injury and die. Most microorganisms easily grow at temperatures between 5 °C and 60 °C.<sup>11</sup> The temperature range between 5 °C and 60 °C is known as the **temperature danger zone**. According to their temperature requirements, there are three groups:

1. Psychrophiles (Greek for “love of the cold”).
2. Mesophiles (Greek for “love of an intermediate temperature”).
3. Thermophiles (Greek for “love of heat”).

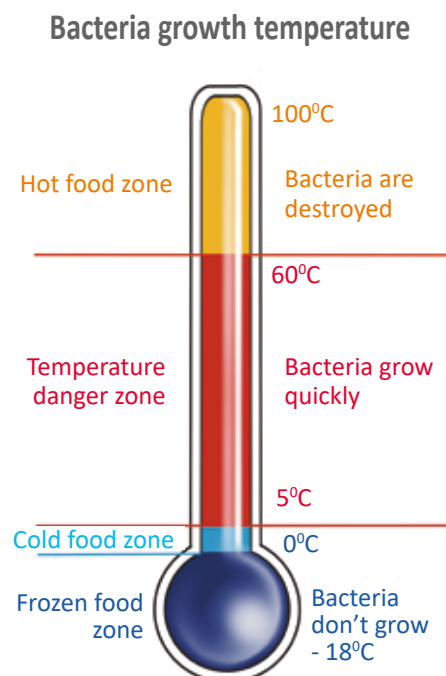


Illustration 5: The danger zone – the growth of bacteria at different temperatures

<sup>11</sup> Sources: Food Hygiene Company: <https://www.foodhygienecompany.co.uk/blog/food-hygiene/food-temperature-guidelines/> and Food Safety Authority of Ireland: [https://www.fsai.ie/faqs/temperature\\_control.html](https://www.fsai.ie/faqs/temperature_control.html)

Very few species of bacteria can grow in psychrophilic (e.g. *Pseudomonas fluorescense*) and thermophilic (e.g. *Clostridium* and *Bacillus species*) ranges, and most bacteria grow best in mesophilic temperatures.

Similarly, except for a few exceptions, most mould and yeast grow in the mesophilic range, which means that food stored at room temperature spoils faster than the food stored at a very high or very low temperature.

Some psychrophilic organisms like *Pseudomonas fluorescense*, *Cladosporium* and *Aspergillus* species cause spoilage of refrigerated food like eggs and meat. The selection of an appropriate storage temperature is very important to preserve food.

As mentioned above, bacteria multiply best at temperature ranges between 5 °C and 60°C (which is also defined in current national regulation). Bacteria multiply more slowly if it is cold and become dormant in very cold conditions. At a temperature above 60 °C, most food poisoning bacteria die (given that they are exposed long enough to this temperature). Some, more heat-resistant bacteria form spores for survival.

**Table 13: Temperature range for growth of pathogenic bacteria**

Type of bacteria	Temperature °C		
	Min.	Opt.	Max.
	<i>Salmonella</i>	5	35-37
<i>Campylobacter</i>	30	42	47
<i>Escherichia coli</i>	10	37	48
<i>Staphylococcus aureus</i>	6.5	37-40	48
<i>Clostridium botulinum</i> (proteolytic)	10		50
<i>Clostridium botulinum</i> (non – proteolytic)	3.3		25-37
<i>Bacillus cereus</i>	4	30-35	48-50 <sup>1</sup> 43 <sup>2</sup>
Mesophilic=1 Psychotropic=2			

Source: <https://www.food-safety.com/articles/4722-the-danger-zone-reevaluated>

### 2.6.2.3 Time

The control of time is more crucial when it is difficult to control temperatures, particularly during thawing and cooling. If these processes are allowed to take too long, bacteria will multiply in the food.

The control of time is also very important during heat treatment. For example, food may reach a safe temperature on the outside. However, if it is not cooked long enough, the core temperature may not be high enough to kill pathogens. The rule of thumb is that bacteria provided with sufficient food, moisture and warmth divide every 20 minutes, a process called “binary fission” (see illustration on the right-hand side). Some species multiply faster than average.

*Clostridium perfringens* can multiply every 9.5 minutes under favourable conditions, while *Vibrio parahaemolyticus* need only 7 minutes.

In raw products, the number of pathogens is usually not high enough to be a direct threat to human health. The danger emerges when food conditions allow bacteria to multiply to high concentrations.

### 2.6.2.4 Moisture

Microorganisms require sufficient moisture. Bacteria prefer foods such as meat and fish as well as liquids and semi-liquid products.

Items such as bread and biscuits may contain enough water to support bacterial growth. On the other hand, some foods such as jam seem to be very moist but are actually not high-risk foods because the water is bound by dissolved agents.

The water requirement of microbes in food is expressed in terms of water activity or available water ( $a_w$ ).

The water activity ( $a_w$ ) of food is the ratio between the vapour pressure of the food itself, compared to the vapour pressure of distilled water under identical undisturbed conditions. A water activity of 0.80 means the vapour pressure is 80 percent of that of pure water. The water activity increases with temperature. The moisture condition of a product can be measured as the equilibrium relative humidity (ERH) expressed in percentage or as the water activity expressed as a decimal.

Food can be safer if the amount of water available to bacteria is lowered by freezing, dehydrating or cooking. Adding solutes like salt, sugar and preservatives can also decrease the available water in food and can reduce the microbial growth rates.

Some important groups of food and their corresponding  $a_w$  values are depicted in Table 14.

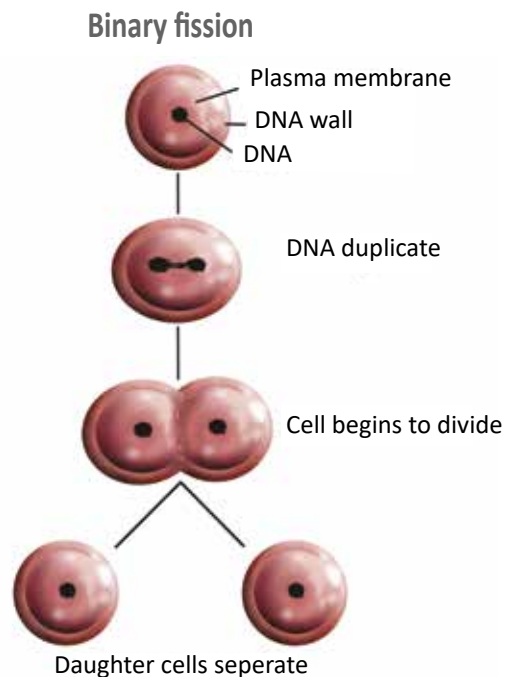


Illustration 6: Binary fission

Table 14: Water activity limits for common bacteria and fungi in food products		
Water activity ( $A_w$ )	Microorganisms grow at this $a_w$ and above	Examples of food products
0.95	<i>Pseudomonas, Escheria, Proteus, Shigella, Klebsiella, Bacillus, Clostridium perfringens</i> , some yeasts	Highly perishable foods (fresh and canned fruits, vegetables, meat, fish), milk, cooked sausages, breads, foods with up to 0.11 kg sucrose or 7 % NaCl
0.91	<i>Salmonella, Vibrio parabaemolyticus, C. Botulinum, Lactobacillus</i> , some moulds	Some cheese (for instance cheddar and provolone), cured meat, fruit juice concentrates with 5 % sucrose or 12 % NaCl
0.87	Many yeasts, <i>Candida, Torulopsis, Hansenula, Micrococcus</i>	Fermented sausage, sponge cakes, dry cheese, margarine, foods with 65 % sucrose or 15 % NaCl
0.80	Most moulds, most <i>Saccharomyces app., Debaryomyces, S. aureus</i>	Most fruit juice concentrates, condensed milk, syrup, flour, high-sugar cakes, pulses containing 15-17 % moisture
0.75	Most halophilic bacteria, <i>Mycotoxigenic aspergilli</i>	Jam, marmalade, glace fruits, marzipan, marshmallows
0.6	Osmophilic yeasts, small number of moulds	Dried fruits with 15-20 % moisture, caramel, toffee, honey

Sources: L. Beuchat (1981): *Microbial stability as affected by water ability*. In: *Cereal Foods World*. Augustine, Robin; Abraham, Ann; Kalarikkal, Nandakumar; Thomas, Sabu (2016). *Monitoring and separation of food-borne pathogens using magnetic nanoparticles*. In: *Novel Approaches of Nanotechnology in Food*.

The minimum water activity most bacteria require for growth is 0.91. Therefore, food with a  $a_w$  lower than 0.91 (e.g. flour) are not spoiled by bacteria. However, *Staphylococcus aureus* can grow starting at an  $a_w$  of 0.86.<sup>12</sup>

Most yeasts grow starting at an  $a_w$  of 0.88 while the number for most moulds is 0.80. Therefore, relatively dry food like bread is spoiled by mould and yeast but not by bacteria. Foods with a very low  $a_w$  (e.g., honey) are microbiologically more stable because most microbes cannot grow at this  $a_w$ .

**Example:** The most common method of controlling water activity is by dehydration (oven drying, sun drying, solar drying, etc.) or adding ingredients to the main food product such as salt or sugar that will interact with the water and bind it. Other ways of preserving food are freezing, vacuum packing, frying before processing, etc.

### 2.6.2.5 pH

pH is a measure of how acidic or alkaline a substance is. The pH scale ranges from 0 to 14, with 7 being neutral. Pure water ( $CO_2$ -free) has a pH of 7. Any number below 7 is acidic, and any number above 7 is alkaline.

<sup>12</sup> Source: <https://www.onlinebiologynotes.com/factor-affecting-growth-of-microorganisms-in-food/>

Microbes can grow in a wide pH range. Most bacteria can grow optimally at a pH level of 6–7.5. However, acidophiles are a group of bacteria that display optimal growth at acidic pH levels whereas the alkaliphiles group of bacteria grows at a higher pH level. Generally, fungi grow at lower pH levels in comparison to bacteria.

**Table 15: Optimal pH levels for microbial growth in various food groups:**

Food	pH	Microorganisms
Citrus fruits	2.0-5.0	<i>Acetobacter, Lactobacillus, Leuconostoc</i>
Apples	2.9-3.3	<i>Rhizopus, Erwinia, Botrytis, A. niger</i>
Bananas	4.5-4.7	<i>Lactobacillus, Leuconostoc</i>
Soft drinks	2.5-4.0	<i>Acetobacter, Lactobacillus, Leuconostoc</i>
Beer	3.5-4.5	<i>Acetobacter, Lactobacillus, Leuconostoc</i>
Meat	5.6-6.2	<i>Rizopus, Aspergillus, Penicillium</i>
Vegetables	4.0-6.5	<i>Pseudomonas, Micrococcus</i>
Fish	6.6-6.8	<i>Lactobacillus, Leuconostoc</i>
Milk	6.5-6.8	<i>Alcaligenes viscolactis, Micrococcus, Enterobacter, Lactobacillus, Streptococcus, Bacillus</i>
Wheat flour	6.2-6.8	Xerophilic moulds: <i>Aspergillus chevalieri, Aspergillus candidus, Wallemia sebi, Saccharomyces bisporus</i>
Egg white	8.5-9.5	<i>Alcaligenes, Proteus, Pseudomonas, P. Fluorescens</i>

Source: Majumdar, Arnab; Pradhan, Neha; Sadasivan, Jibin; Acharya, Ananya; Ojha, Nupur; Babu, Swathy; Bose, Sutapa. (2018). *Food Degradation and Foodborne Diseases: A Microbial Approach*.

**Example:** The most common way to lower the pH is through fermentation. Fermentation relies on good bacteria to produce lactic acid, which then lowers the pH of the product and prevents the growth of other types of organisms. Pickles, sauerkraut and fermented sausages are all made using this strategy.

### 2.6.2.6 Oxygen

Bacteria that need oxygen to grow are called aerobic bacteria (e.g. *Pseudomonas aeruginosa*). Like water, oxygen may be either in food or bound to other molecules. Aerobic bacteria need free oxygen (O<sub>2</sub>) to survive, something that is present in most unprocessed foods. Bacteria that grow where there is no oxygen are called anaerobic bacteria (e.g. *Clostridium botulinum*).

Foodborne illness can be caused by either of these. Salmonella, often found in poultry products like chicken, turkey or eggs, needs oxygen to grow. *Clostridium botulinum*, in unsterilized cans or jars, only grows where there is no oxygen.

Preservation techniques such as canning and packing have the effect of reducing free oxygen.

### 2.6.3 Control and prevention of biological hazards

The most advisable method of controlling biological hazards is prevention from contamination. Effective implementation of good manufacturing practices ensures

the minimization of microbiological hazards associated with personnel, the work environmental and raw materials.

Potable water (see also Sri Lankan standard SLS 614) which is microbiologically safe should be used as a product ingredient and also for ice or steam that comes into contact with products or product surfaces. It should also be used for cleaning or in applications where there is a risk of indirect product contact (e.g. jacketed vessels or heat exchangers). Non-potable water should have a separate supply line. It should be possible to disinfect the potable water line.

Air that is used as an ingredient or that has direct contact during production should be filtered. The quality of the supply of air in rooms must be controlled to minimize risks from airborne microbiological contamination. Ventilation systems need to be designed and constructed in such a way that air does not flow from dirty to clean areas. Specified air pressure differentials shall be maintained. More information related to air quality is available in subchapter 3.1.

Validated cleaning and sanitizing programmes need to be established. The effectiveness of each cleaning and sanitizing programme should be evaluated in specified frequencies through microbiological tests (e.g. swab testing). Using high-pressure washers will make the cleaning programme more effective, and different disinfection methods (chemical, by hot water and by steam) may be devised. More details about cleaning and sanitization are found in subchapter 3.8.

Processing strategies also need to be designed in such a way that they can control biological hazards. Food sterilization is one of these strategies. There are two common types of food sterilization: sterilization by heating (thermal processing) and sterilization without heating (non-thermal processing).

Thermal processing is applied in many food industries such as the dairy and fruit juice industries. Thermal processing is used to preserve and ensure the safety of food through microbial destruction.

Even though blanching (heating to a temperature of 60°C – 100°C) is mainly used for the purpose of destroying the enzyme activity of fruit and vegetables, it is also applied as pre-treatment step prior to freezing, drying and canning to reduce surface microbial load.

Pasteurization is used to destroy relatively heat-sensitive microorganisms (e.g. non-spore-forming bacteria, yeast and moulds) and is expected to extend shelf life by several days. Pasteurization at low temperatures (low temperature long time – LTLT) works by heating foods at a minimum temperature of 60°C for at least 30 minutes, while pasteurization at high temperatures and short time (HTST) heats foods at a minimum temperature of 72 °C for at least 15 seconds. Milk pasteurization is sufficient to destroy all yeasts, moulds, gram-negative bacteria and many gram-positive bacteria.

Generally, sterilization methods use higher temperature ranges to destroy more heat-resistant bacteria and to extend the shelf life even further. The following table summarizes the common thermal sterilization methods.

**Table 16: Temperature and time of sterilization by type**

Type of sterilization	Temperature	Time
Moist heat	110 °C to 120 °C	20-40 minutes
Dry heat	160 °C to 180 °C	Up to 2 hours
Ultra-high-temperature (UHT) processing	140 °C (135 °C–150 °C)	A few seconds

Source: *Operations in Food Processing - the Web Edition*, R. L. Earle, 1983

Non-thermal sterilization technology increases shelf life while creating foods and beverages with nearly the same taste, feel, appearance and nutritional profile of unsterilized fresh foods and beverages. The most widely used non-thermal processing techniques are high-pressure processing, pulsed electric fields, ultrasound, pulsed light, ultraviolet light, irradiation and oscillating magnetic fields.

There are many more methods applied in the food industry to control the effect of microbiological hazards. Freezing and refrigeration minimize the activity of microorganisms and extend the shelf life of the product. However, freezing and refrigeration do not kill any microbes. Certain pathogenic microbes such as *Listeria monocytogenes* grow even at temperatures below zero. Modified atmosphere packaging (MAP) extends the shelf life of fresh products by reducing the oxygen content and increasing the carbon dioxide content of the atmosphere. This can greatly inhibit the growth rate of some microorganisms while having little stimulatory effects on others. N<sub>2</sub> is flushed into dried food packages (e.g. milk powder) to control the growth of microbes. Certain preservatives (e.g. sodium metabisulphite) are used to control the activity of fungus.

**Example:** A yoghurt manufacturer wants to pasteurize milk to reduce the microbial load in the product and to make milk safe to drink. The company heats the milk for at least 30 minutes at a minimum temperature of 65 °C. However, the manufacturer realizes that he can get the same effect using a different time and temperature range. Consequently, the manufacturer heats the milk for at least 15 seconds at a minimum temperature of 72 °C.<sup>13</sup> The manufacturer prefers this method because he has the same effect using less electricity and the milk tastes more natural.

### A) Leading questions and recommendations

- What types of microbial hazards exist?
- Where could bacteria, viruses, moulds and parasites be found at your food business?
- What do microbes need for growth?
- How can we control biological hazards?

### B) Further reading and references (Please also refer to the Annex of Chapter 2.)

Rajeev Bhat, A. K. (2012). Progress in food preservation (source: <https://digilib.bppt.go.id/sampul/9781119962045.pdf>)

13 Source: *Frontiers in Microbiology*, Pasteurization: <https://www.frontiersin.org/articles/10.3389/fmicb.2018.00926/full>

## C) THINGS TO REMEMBER

- The goal of microbial control is to identify food safety risks due to pathogenic microorganisms present in food manufacturing.
- There are four types of biological hazards: bacteria, viruses, moulds and parasites.
- It is important to know the conditions that will help microorganisms to be introduced, to grow and to survive on your food products.
- Growth of microbes is supported by nutrients, water activity and the pH of the food as well as the temperature, amount of time and oxygen around the microbes.
- By controlling the above-mentioned factors, we can control the activity of the microbes so that they do not become harmful.



## 2.7 Cross-contaminations of hazards

### 2.7.1 What does cross-contamination mean?

Cross-contamination is the unintentional transfer of chemical contaminants, microorganisms or other foreign substances from people to food products. This can occur at any stage “from farm-to-fork”.

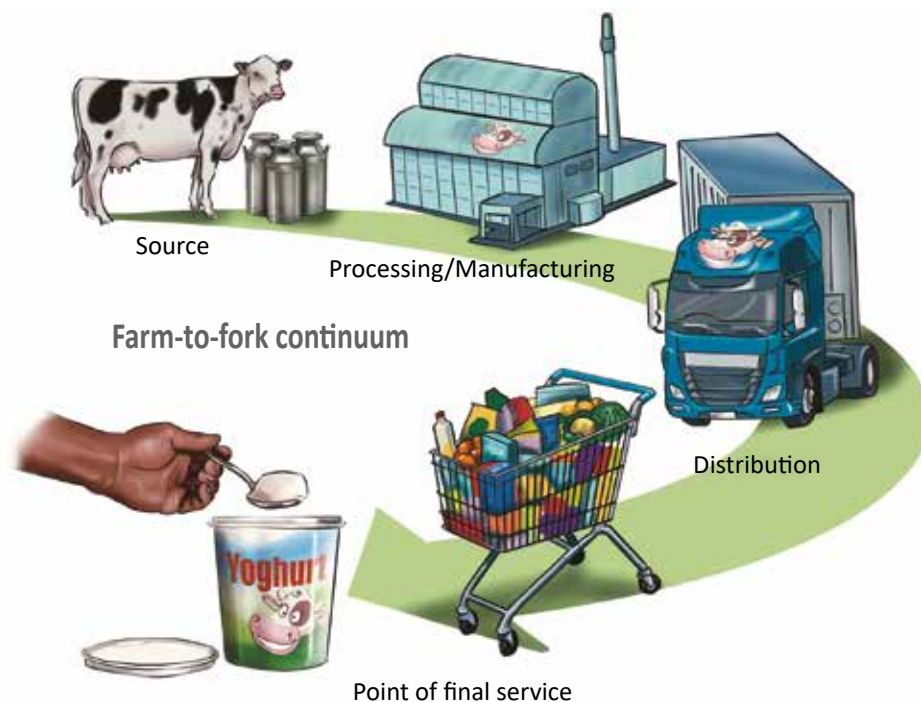


Illustration 7: Farm-to-fork continuum



Most of food contamination occurs through naturally occurring toxins and environmental pollutants or during the processing, packaging, preparing, storage and transportation of food products. A hazardous contaminant is any hazardous substance whose presence in an environment is undesirable and poses a risk to food in that environment. There are four main types of contamination that can compromise the safety of food and food products: chemical, microbial, physical and allergenic.

High-risk foods can be defined as “any ready-to-eat food that will support the growth of pathogenic bacteria easily and does not require any further heat treatment or cooking”. Such foods are usually high in protein and require strict temperature control and protection from contamination.

Examples include:

- Cooked meat and poultry such as:
  - o Beef, pork, ham, lamb, chicken, turkey, duck
  - o Meat pies & pasties, pate, meat stock and gravy and cook-chill meals
- Dairy products such as milk, cream, artificial cream, custards, products containing unpasteurized milk, ripened soft and moulded cheeses and ice cream

Low-risk foods are ambient-stable, such as bread, biscuits, cereals, crisps and cakes (not cream cakes). Such foods are unlikely to be implicated in food poisoning.

Examples include:

- Foods that have been preserved, for example smoked or salted fish
- Dry foods, those that contain minimal amounts of moisture, such as bread, flour, biscuits
- Acidic foods, for example, pickled foods, vinegar, fruit

### 2.7.2 To prevent cross-contamination – Dos and don'ts

Here are important tips for preventing cross-contamination in your operation (more good practices will be presented in Chapter 3):

- Maintain high standards of personal hygiene, including washing hands regularly and implementing a procedure for reporting sickness/illness, etc.
- To make cross-contamination visible, the Glo Germ™ test is an effective tool to demonstrate hand washing, surface cleaning, hygiene and containment techniques. The Glo Germ™ liquid is rubbed on the hands like a lotion. For the floor, Glo Germ™ powder is used. Then it is rinsed off as normal. One's hands and the surface may appear clean. However, when UV light is directed at the rinsed off parts, the remaining germs on the hand are illuminated. If germs still appear, it means that the cleaning was not effective. Implementing such tools will be effective to enhance awareness on the need to wash hands and clean facilities as well as equipment thoroughly.
- Cooked food may contain bacterial spores. If it is kept at a temperature in the danger zone, the spores may germinate, and bacteria may then multiply.

**Example:** As a common practice, a company produces sandwiches with lettuce, cheese and ham. The different ingredients are sliced and chopped on different tables in the production area using colour-coded chopping boards (e.g. meat: red, lettuce: green, cheese: yellow). This way, every employee is aware of the risk of cross-contamination and how to prevent it.

Contaminated food is a real danger – and one that can have deadly consequences. In the following we are presenting some examples of cross-contaminations worldwide and in Sri Lanka:

Year	Country	Cause	Incident
1974–1976	Afghanistan	Wheat contaminated with weed seeds known as charmac ( <i>Heliotropium popovii</i> . H Riedl) that contain pyrrolizidine alkaloids	Widespread poisoning (an estimated 7800 people affected with hepatic veno-occlusive disease [liver damage] and about 1600 deaths)
1998	India	Edible mustard oil adulterated with <i>Argemone mexicana</i> seed oil	<i>Argemone mexicana</i> seed oil contains the toxic alkaloids sanguinarine and dihydrosanguinarine. Over 60 people died and more than 3000 were hospitalized in the 1998 incident.
2004	Kenya	Contaminated maize causing aflatoxin	Resulted in 317 cases of hepatic failure and 125 deaths
2008	China	Baby milk scandal caused by adulteration with melamine	300,000 babies affected, 51,900 hospitalizations and 6 infant deaths
2016 February - March	China	Mars chocolate contamination	Plastic found in candy bars lead to a recall affecting 55 countries.
2018	Australia	Strawberry contamination	Strawberries were found to contain needles
August 2013	Sri Lanka	Fonterra milk powder contamination	Detection of agricultural chemicals resulted in recall from the international market
April 2021	Sri Lanka	Coconut oil contamination	Aflatoxin found in coconut oil

Source: <http://www.besthealthsciencedegree.com/10-worst-food-contamination-incidents-ever>. Examples after the year 2013 are found here: [https://en.wikipedia.org/wiki/List\\_of\\_food\\_contamination\\_incidents](https://en.wikipedia.org/wiki/List_of_food_contamination_incidents)

### A) Leading questions and recommendations

- How can you avoid cross-contamination in your production?
- What are the areas of your production where cross-contamination can happen?
- Which category is your food production in – high-risk or low-risk food?

- List down all possible sources of cross-contamination by process line.
- What are the best practices that should be implemented throughout the process line to minimize the identified source/s of cross-contamination?
- Which control measures can be implemented for the identified sources of cross-contamination?

## **B) Further reading and references (Please also refer to the Annex of Chapter 2.)**

CXC 80-2020, Code of Practice on Food Allergen Management for Food Business Operators

For further understanding of control of chemical, physical and biological contaminations, please refer to subchapters and sections 2.4, 2.5.2 and 2.6.3.

## **C) THINGS TO REMEMBER**

- Clean and wash hands, utensils and surfaces frequently.
- Have hygienic procedures in place.
- Separate: Don't cross-contaminate.
- Conduct a risk assessment for all the processes, suppliers, raw materials, packing materials, etc., to identify sources of contamination.
- Follow the basic good manufacturing practices and good handling practices.



## 2.8 Food allergens

### 2.8.1 Introduction to food allergies

A food allergy is an inappropriate immune response to an otherwise harmless food. Food allergens are substances in food which trigger food allergies. An allergic reaction occurs when the immune system of the human body mistakenly considers an allergen as something harmful to the body. Most allergens are proteins. Allergenic proteins are usually not denatured under food-processing conditions and are relatively resistant to digestion. When the allergen is detected by an antibody, this leads to a series of immune responses. Allergic reactions to foods are characterized by the rapid release of powerful cellular chemicals, which can occur within minutes or up to four hours after ingestion. Food allergies are usually mediated by immunoglobulin E (IgE) antibodies.

Food allergy symptoms vary in nature and severity between individuals and may include:

- Respiratory problems (rhinitis, asthma, throat swelling)
- Gastrointestinal problems (nausea, vomiting, diarrhoea, abdominal cramping)
- Skin problems (hives, itching, dermatitis, eczema).

A severe reaction (anaphylaxis) can occur after contact/ingestion with allergens in foods. This can result in a rapid loss of blood pressure, severe obstruction of the airways, a generalized shock reaction and multiple organ failure. This can be fatal if not treated within minutes.

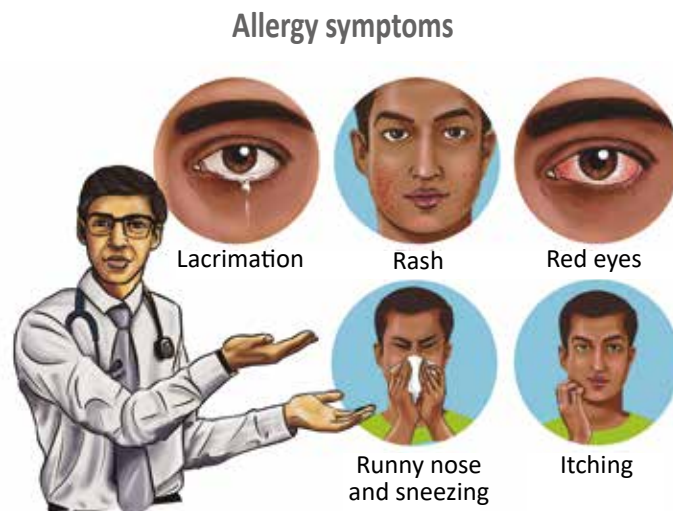


Illustration 8: Allergy symptoms

According to a study of school children, in Sri Lanka most allergic reactions are caused by fruits (42.34 %). Among these fruits, adverse reactions are especially found to pineapples. The second frequent problematic food group is fish and sea foods (37.98 %). Vegetables (29.19%), the “other food” category (21.16 %), meat & eggs (17.5 %), milk (4.37 %) and spices (1.46 %) were found to cause hypersensitivity in the study population.<sup>14</sup>

Histamine intolerance can create the same symptoms as food allergies but differ from the latter. Histamine is a chemical found naturally in the bodies of human beings. Among others, it helps communicate messages to the brain and triggers the release of stomach acid for digestion. When histamine levels get too high or when it cannot be broken down

<sup>14</sup> This section is taken from Y. Sarangee, G. Wimalasiri: Food allergy and anaphylaxis- Identification of foods causing hypersensitivity/allergy among school children in two sub-urban schools in Colombo District, Sri Lanka; in: World Allergy Organization Journal 6, P146 (2013).

properly, it can result in the symptoms mentioned above. There can be several causes of high histamine levels, for instance, medications that block the development of enzymes necessary for breaking down histamine in the body, gastrointestinal disorders and histamine-rich foods. Histamine-rich foods are alcohol, yogurt, dried fruits, avocados, eggplant, spinach, processed or smoked meats, shellfish and aged cheese.<sup>15</sup> Persons with histamine intolerance need to undergo medical tests to identify the source of the high levels of histamine, follow medical advice and avoid histamine-rich foods. Food-manufacturing businesses producing foods with high histamine levels are **not** required to issue any warnings on the products' labels.

Subchapter 3.15, "Control of Food Allergens", will provide detailed information about the types of food that commonly cause allergic reactions and how food companies can control food allergens in food manufacturing.

## 2.8.2 International regulation on food allergies

The current recommendations in international guidelines are used since no standard guideline has been developed in Sri Lanka.

A list of ingredients that must be declared on products was made available in 1999 through the "Codex General Standard for the Labelling of Pre-packaged Foods" (CODEX STAN 1-1985 (Rev. 1-1991)). The publication was a follow-up to a technical consultation report on food allergens published by the Food and Agriculture Organization of the United Nations (FAO, 1995).

The U.S. Food Allergen Labelling and Consumer Protection Act of 2004 (FALCPA) stated that the "Big 8" group of foods and ingredients account for 90 % of food allergies, but that the allergenic hazards originating from them were not sufficiently declared in many foods on the market.<sup>16</sup> Therefore, the act made it mandatory to state potentially allergenic ingredients explicitly on the respective product's label. The U.S. Food and Drug Administration also provides guidance to the food industry, consumers and other stakeholders on the best ways to assess and manage allergen hazards in food.

Considering an estimated 1-2 % of the Australian population suffers from food allergies, Food Standards Australia New Zealand (FSANZ) issued the Australia New Zealand Food Standards Code - Standard 1.2.3 "Mandatory Warning and Advisory Statements and Declarations" in 2010 - which specifies requirements for the mandatory declaration of certain substances and their products.<sup>17</sup>

### A) Leading questions and recommendations

- Which substances in food are considered as the most common food allergens?
- How much of a food allergen does it take to cause a reaction?
- Which are common allergy symptoms?
- What is an anaphylactic shock?
- Which fruit accounts for most of the allergic reactions in Sri Lanka?
- Why is food allergen management important for food producers?

15 <https://www.healthline.com/health/histamine-intolerance#diet>

16 <https://www.fda.gov/food/food-allergens/gluten-free-guidance-documents-regulatory-information/food-allergen-labeling-and-consumer-protection-act-2004-falcpa>

17 <https://allergenbureau.net/wp-content/uploads/2021/02/User-Guide-to-Standard-1.2.3.-Warning-and-advisory-statements.pdf>

## **B) Further reading and references (Please also refer to the Annex of Chapter 2)**

Codex general standard for the labelling of pre-packaged foods  
(codex stan 1-1985 (rev. 1-1991))

## **C) THINGS TO REMEMBER**

- A food allergy is an adverse reaction to food involving an immune response.
- Ensure clarity and readability of food labels, listing possible food allergens, and provide education on how to read them, especially to the allergic population.
- Allergen information could be provided on the labels as a “contains” statement, for example, “Chicken salad (contains chicken, milk, nuts [almonds])”.
- Be aware of possible allergens in the food that you produce and implement measures to control them (e.g. allergen management programme).



## Annex 1 of Chapter 2

### Summary of studies on food poisoning in Sri Lanka

- In a study conducted in 2012, it has been found that the prevalence of *Bacillus cereus* was 56 % in samples of Chinese-style fried rice that was available in Colombo city. The organism was responsible for causing the symptoms of diarrhoea and vomiting. The identified risk factors in that study were storage of boiled rice at room temperature for more than forty-eight hours and the cooking frequency. Toxigenic *Aspergillus* species, aflatoxin B1 and aflatoxin G1 have also been identified in parboiled rice and raw milled rice due to the increased storage time and the storage method.
- In a study, fish which were collected from the Negombo area and distributed to the suburbs of Colombo have tested positive for the presence of *Escherichia coli*, *Salmonella spp.* and *Listeria monocytogenes* along the different steps of the supply chain such as at the boat, the ice manufacturing plant and at post-harvest handling. Fish is important in the context of contamination as it is highly perishable. *Salmonella* species have been identified in both captured and cultured shrimp at a prevalence of 12.8 % in a study conducted in 2008. A *Salmonella* infection could result in nausea, vomiting and abdominal cramps. In dried fish from the markets in the Kandy area, the presence of different fungal isolates including *Aspergillus niger* and *Aspergillus flavus* was shown. Traces of heavy metals such as Cd, Cu, and Hg have also been found in tilapia reared in the water reservoirs. However, these levels were below the internationally accepted levels during the year 2009.
- A study conducted on groundwater quality in one region of Valigamam has identified a large proportion of wells as having high levels of nitrates which exceed the WHO standard due to intensive agriculture practices through high inputs of artificial and natural fertilizers. However, this water is also used for different farming practices as well as in farmers' houses.

## Annex 2 of Chapter 2

### Further reading and references related to Chapter 2

This annex provides further reading materials on the topics discussed in Chapter 2. Links are provided for those materials that can be accessed through the internet. The materials compile facts, analyses and guidelines on each topic as well as the relevant standards. Most of the materials are drawn from international sources. Sources from Sri Lanka are listed separately under “*Standards from Sri Lanka*”; the remaining standards are listed under “*International standards*”.

#### Foodborne illness

- US FDA, Bad Bug Book Handbook of Foodborne Pathogenic Microorganisms and Natural Toxins. <https://www.fda.gov/files/food/published/Bad-Bug-Book-2nd-Edition-%28PDF%29.pdf>
- European Commission: Rapid Alert System for Food and Feed – Fact Sheets, [https://ec.europa.eu/food/safety/rasff-food-and-feed-safety-alerts/country-fact-sheets\\_en](https://ec.europa.eu/food/safety/rasff-food-and-feed-safety-alerts/country-fact-sheets_en)
- Weekly Epidemiological Report, 2015. EUMH, 42 (20), [http://www.epid.gov.lk/web/images/pdf/wer/2015/vol\\_42\\_no\\_20-english.pdf](http://www.epid.gov.lk/web/images/pdf/wer/2015/vol_42_no_20-english.pdf)

#### *Standards from Sri Lanka:*

- SLS-143-1-15 General Principles of Food Hygiene
- Food (Hygiene) Regulations 2011

#### Types of food safety hazards

- Local Public Health Institute of Massachusetts, [www.masslocalinstitute.org](http://www.masslocalinstitute.org)
- Government of Canada, “Food Safety Hazards”, Imported and Manufactured Food Program Inspection Manual, <https://inspection.canada.ca/food-safety-for-industry/archived-food-guidance/non-federally-registered/product-inspection/inspection-manual/eng/1393949957029/1393950086417?chap=0>

#### *International standards:*

- CXC 1-1969, General Principles of Food Hygiene

#### Chemical hazards and their causes

- World Health Organization (WHO), <https://www.who.int/news-room/fact-sheets/detail/food-additives>
- European Food Safety Authority (EFSA), [https://www.efsa.europa.eu/sites/default/files/corporate\\_publications/files/nitrates-nitrites-170614.pdf](https://www.efsa.europa.eu/sites/default/files/corporate_publications/files/nitrates-nitrites-170614.pdf)
- Assessment of the Health implications of Synthetic and Natural Food Colorants – A Critical Review - Sunday et al., 2016

#### *International standards:*

- CODEX STAN 107-1981, Codex General Standard for The Labelling of Food Additives when sold as such
- CODEX STAN 192-1995, General Standard for Food Additives
- CAC/GL 36-1989, Class Names and the International Numbering System for Food Additives



*Standards from Sri Lanka:*

- Food (Preservatives) Regulation 2019
- Food (Additives – General) Regulations 2019
- Food (Sweeteners) Regulations 2014 – 1905/36
- Food (Antioxidants) Regulations 2009
- Food (Antioxidants) Amended Regulations 2013 – 1809/4
- Food (Flavouring Substances and Flavour Enhancers) Regulations 2013 – No. 1795/5
- Food (Colouring Substances) Regulations 2006 – 1, 472/19
- Food (Colouring Substances) Amendment Regulations 2011 – 1688/28

**Chemical hazards entry areas in a food-handling business (unintentional)**

- Sue Stevenson and Claire Nash, revised by Alan Brereton. Chartered Institute of Environmental Health. “Food Safety for Supervisors”: pp. 94

*International standards:*

- Codex Alimentarius FAO-WHO, CXC 1-1969, General Principles of Food Hygiene
- U.S. Food and Drug Administration, Code of Federal Regulations. “Current Good Manufacturing Practice in Manufacturing, Packing, or Holding Human Food”, <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?CFRPart=110&showFR=1>

*Standards from Sri Lanka:*

- Food Hygiene Regulation 2012

**Physical hazards**

- Food Safety Knowledge Center, [https://www.gov.mb.ca/agriculture/food-safety/at-the-food-processor/food-safety-program/pubs/fs\\_16.pdf](https://www.gov.mb.ca/agriculture/food-safety/at-the-food-processor/food-safety-program/pubs/fs_16.pdf)
- Food Safety Magazine, <https://www.food-safety.com/articles/5846-investigation-and-identification-of-physical-contaminants-in-food>
- Food Safety Magazine, <https://www.food-safety.com/articles/4797-the-dirty-dozen-ways-to-reduce-the-12-biggest-foreign-materials-problems>

**Microbiological hazards**

- Rajeev Bhat, A. K. (2012). Progress in food preservation.
- Online Biology, <https://www.onlinebiologynotes.com/factor-affecting-growth-of-microorganisms-in-food/>
- Brown, H. L., 2021. Microbial Growth. Science Direct, <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/microbial-growth>
- US FDA Inspection Technical Guide (Water Activity), <https://www.fda.gov/inspections-compliance-enforcement-and-criminal-investigations/inspection-technical-guides/water-activity-aw-foods>
- <https://courses.lumenlearning.com/microbiology/chapter/temperature-and-microbial-growth>
- US FDA Factsheet Outbreaks, <https://www.fda.gov/files/food/published/Recent-Prominent-Foodborne-Illness-Outbreaks-%28PDF%29.pdf>

- Mossel, D.A.A., Ingram, M., 1955. The physiology of the microbial spoilage of foods. J. Appl. Bacteriol. 18 (2), 232–268.
- Food Microbiology: An Introduction by Matthews, Karl R., Kniel, Kalmia E., Montville, Thomas J. 2012. Food Microbiology: An Introduction, <https://books.google.lk/>
- Government of Manitoba, Canada Webpage, <https://www.gov.mb.ca/agriculture/food-safety/>
- Pharma State, <https://pharmastate.blog/d-value-z-value-and-f-value>
- Frontiers in Microbiology, <https://www.frontiersin.org/journals/microbiology/sections/food-microbiology#articles>
- USDA FSIS, <https://www.fsis.usda.gov/>

### Cross-contaminations of hazards

- Glo Germ – The original visual tool for teaching proper hand washing, aseptic techniques, and general infection control, <https://www.glogerm.com/>
- <https://www.fda.gov/food/buy-store-serve-safe-food/safe-food-handling>

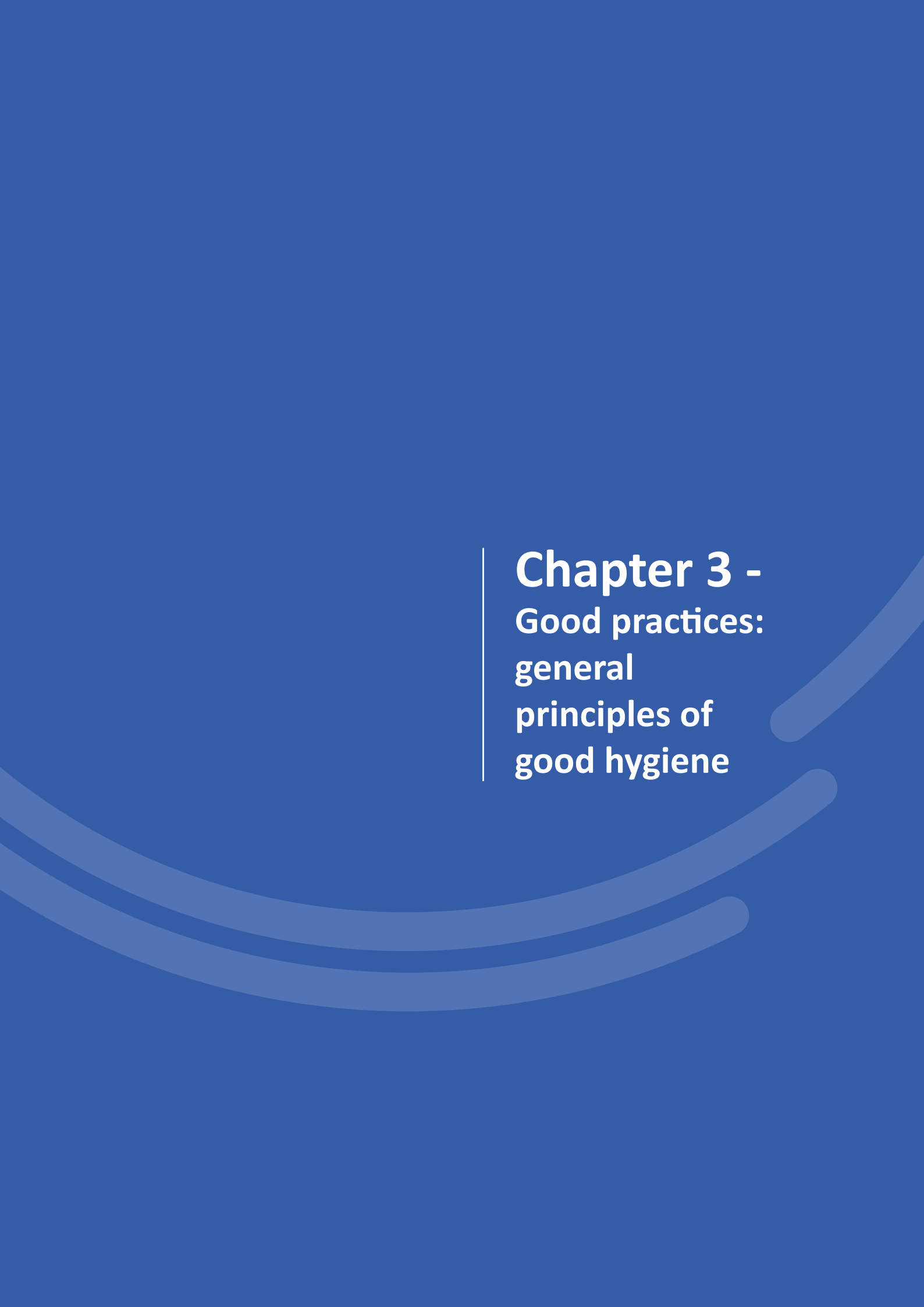
### Food allergens

- International Allergens. Available at: [https://farrp.unl.edu/documents/Regulatory/International\\_%20Allergens\\_061021.pdf](https://farrp.unl.edu/documents/Regulatory/International_%20Allergens_061021.pdf)
- INFOSAN Information Note No. 3/2006 – Food Allergies (9 June 2006)
- Australian Food and Grocery Council. Food Industry Guide to Allergen Management and Labelling. Available at: <https://www.foodstandards.gov.au/consumer/labelling/Pages/allergen-labelling.aspx>
- Swedish Food Sector guidelines for the "Management and labelling of food products with reference to allergy and intolerance", English version, August 2005. Available at: <https://www.fooddiagnostics.dk/seekings/uploads/management-and-labelling-allergy-2005.pdf>
- Australian Food and Grocery Council. Food Industry Guide to Allergen Management and labelling, 2007. Available at: <https://www.afgc.org.au/wp-content/uploads/2019/06/AFGC-Allergen-Management-and-Labelling-Guide.pdf>
- US FDA Food Allergies, <https://www.fda.gov/food/food-labeling-nutrition/food-allergies>
- Food Standards Agency, <https://www.food.gov.uk/document/food-allergen-labelling-and-information-technical-guidance>
- World Health Organization (WHO), [https://www.who.int/features/factfiles/food\\_safety/facts/en/](https://www.who.int/features/factfiles/food_safety/facts/en/)

### *International standards:*

- Codex general standard for the labelling of pre-packaged foods (CODEX STAN 1-1985 (rev. 1-1991))
- ISO 22000:2018, <https://www.iso.org/iso-22000-food-safety-management.html>
- CXC 80-2020, Code of Practice on Food Allergen Management for Food Business Operators.



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# **Chapter 3 - Good practices: general principles of good hygiene**



# Chapter 3 -

## Good practices: general principles of good hygiene

This chapter describes how manufacturers can apply good manufacturing practices (GMP) in their food establishments to comply with Sri Lanka Standard (SLS) 143:1999 Code of Practices for General Principles of Food Hygiene and the requirements under the Food Hygiene Regulation (2011). These requirements have been specified with reference to the Codex Alimentarius Commission Guidelines to ensure the safety of consumers.

### 3.1 Establishment (location, building design)

The factors to be considered when selecting the location or business premises depend on the nature of the business. Those factors include the secure supply of potable water, gas and electricity. Potential risks for pollution and contamination risks from the environment, for instance, through smoke, dust, odour, chemicals, pests or flooding, must be reduced to a minimum. Waste disposal must easily be established.

Every building in which food establishments are located must conform to the following requirements:

- The building needs to be of sound construction and maintained in good condition.
- All construction materials must be such that they do not harbour living organisms or transmit any undesirable substances to the food and do not emit any toxic vapours on completion of the construction.
- Moreover, the building must ensure partition of different operations to avoid cross-contamination.
- Food premises must also be free of animals.

Furthermore, the building needs to be designed to facilitate hygienic operations by means of a regulated flow in the process from the arrival of the raw materials at the premises to the finished product. To avoid environmental contaminations, back or cross-contamination (see subchapter 2.7), the different work activities must be separated from each other to make it easy for cleaning of equipment and separation of each process step. It is essential to have:

- Segregated areas
- Ventilation systems
- Airlocks
- Separate changing rooms
- Closed processing systems
- Storage areas for cleaning and decontamination materials

The following chart shows an example of the layout of a smoked fish processing plant which complies with the above-mentioned requirements:

## An example of a smoked fish processing plant

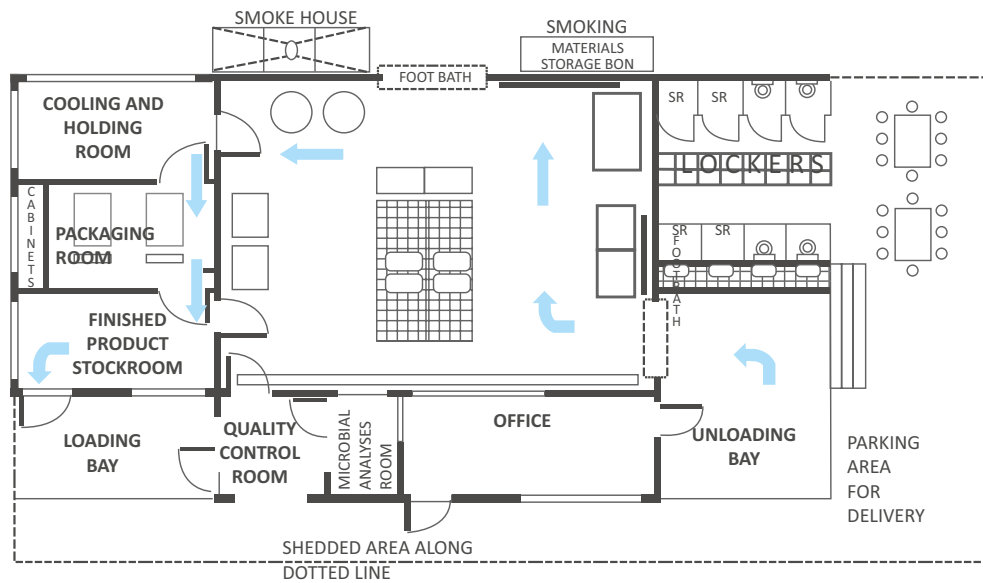


Illustration 9: Example of the layout of a fish processing plant

### Floor

The floor must be even, not have cracks and be made of durable and food-safe materials.

It must be:

- Easy to clean and disinfect
- Non-absorbent
- Resistant to water, acids, bases, cleaning materials and chemicals
- Non-slippery (ceramic, quarry tiles, epoxy resin, vinyl floor covers, cement floor)
- Sloped towards the drainage

Note: Any damage to the floor needs to be repaired to avoid collection of water and contamination.



Photo 1: Example of a non-absorbent factory floor

### Walls, corners and joints

The surface of walls should be:

- Smooth
- Non-absorbent
- Made from washable material, sealed and free of insects
- Easy to clean and disinfect
- Non-flaking, not cracked
- Light coloured
- Resistant to spills, chemicals, grease, heat
- Free of toxic effects on the foods



Photo 2: Light-coloured wall, washable, non-absorbent, easy to clean and disinfect

All pipes, cables, etc., must be adequately sealed. Surfaces, e.g. splashbacks behind sinks and worktops, need to be covered with inert materials such as glazed tiles, plastic sheeting, stainless steel or any other suitable materials which are food safe.

## Windows

Windows should be constructed in a way that ensures ideal conditions. They must be:

- Closed
- Covered with insect-proof screens
- Constructed in a way that minimizes accumulation of dirt (in corners, for instance)
- Covered with glass protection foil to prevent glass splinters in the production
- Easy to clean



Photo 3: Windows with insect-proof screens

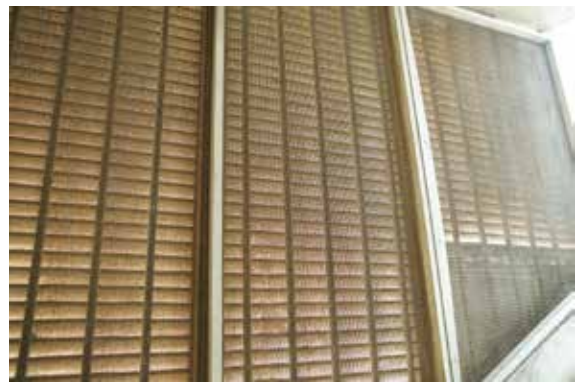


Photo 4: Windows with insect-proof screens

## Ceilings

Ceilings and overhead fixtures need to be constructed and finished in a sound manner. They must be:

- Solid, non-flaking, crack-free, robust to damage



Photo 5: Ceiling with round edges for easy cleaning



Photo 6: Solid, light-coloured and easy-to-clean ceiling

- Resistant to mould growth
- Made from materials which are easy to clean
- Light coloured
- Resistant to condensation
- Accessible for inspection if the ceiling has been lowered



## Doors

All doors need to be kept tightly closed and they should be self-closing. Doors should have smooth, non-absorbent surfaces which are easy to clean and disinfect when required. Doors opening to the outside should be tight fitting and pest-proof.



Photo 7: Door with self-closing hinge and non-absorbent surface



Photo 8: Drainage with slope



Photo 9: Drainage with rat-proof entry

## Drainage and sewage system

Separate drainage and sewage lines must meet the following criteria:

- They must be constructed with appropriate slopes to ensure there is no accumulation and backflow into the building, even with rainwater or during heavy cleaning operations
- They must be regularly cleaned and monitored
- They must have entry and exit points into the building which are pest-proof
- They must be covered (preferably with a grease separator)

## Air quality and ventilation

Exhaust fans should:

- Ensure that adequate ventilation and air exchange throughout the building are removing the condensates and smells as well as reducing the humidity.
- Be installed in such a way that the direction of air flow cannot cause contamination or cross-contaminations in the company (from clean to dirty areas).
- Be adequate to control temperature, humidity, smoke, aerosol, fumes and dust accumulation.
- Have ventilation openings with a screen or other protective enclosures.
- Have screens that are easily removable for cleaning.



Photo 10: Ventilation with screens

## Lighting

There must be suitable and sufficient lighting to help staff to maintain a clean, safe working environment without eye strain. It should have:

- Natural or artificial lighting with an illuminance of about 750 lux
- Fluorescent tubes that are fitted with diffusers to prevent glare
- Unbreakable bulbs, e.g. covered to prevent glass contamination



Photo 11: Lighting with a covered bulb

## Personnel hygiene facilities and toilets

Food-processing companies need to have changing facilities for staff and flushable water-seal toilets. Toilets must conform to sanitary requirements to ensure the hygienic removal of waste matter. The toilets must be well lit, ventilated and may not open directly onto food-handling areas. Hand-washing facilities with warm or cold water, a suitable hand-cleaning station and with suitable hygienic means of drying hands must be provided adjacent to the toilet.

Processing areas must be provided with adequate and conveniently located facilities for hand washing and drying as well as facilities for the disinfection of hands, where appropriate.

## Waste disposal facilities

Facilities to store waste and inedible materials prior to removal from the establishment are required. These facilities must be designed to prevent access to waste or inedible materials by pests and to avoid cross-contamination of food, potable water or equipment. These areas should be marked as waste disposal areas.

## Storing cleaning materials, equipment and pesticides

Cleaning materials, cleaning equipment and pesticides must be stored in locked rooms or in cabinets away from food-processing and handling areas and must be used and handled only by authorized and properly trained persons. Designated washing areas shall also be provided for equipment and food contact materials, for protective garments and for non-food contact materials such as dirty boots and cleaning materials.



Photo 12: Cleaning material stored in a separate room and fully labelled

## 3.2 Facilities

### Water supply

The premises must have an adequate supply of potable water. Water must be stored in clean containers and be free of hazardous substances and contaminants.

Potable water is water that is safe enough to be consumed by humans. There are standards and regulations that cover potable water and the water provided for drinking purposes. Food-handling establishments need to conform to the microbiological, chemical, physical and other parameters prescribed under the standards and regulations (see SLS 614). It is the function of the authorized officers to occasionally monitor the quality of water provided. Water of the required quality should be available in a sufficient quantity to meet production requirements. It should be stored in clean containers made of materials that are free of substances that are hazardous to consumers.



*Photo 13: Clean stainless-steel sinks*



*Photo 14: Stainless-steel container filled with clean water*

### **Ice must be manufactured from potable water and protected from contamination.**

Ice used in the preparation and processing of food, including the storage of fish, should be made of potable water. There is a misconception that ice may be made from any source of water. Ice made from unsafe water has the potential to contaminate food. Ice used for storage must therefore be made with potable water.

### **Steam used in direct contact with food or food-contact surfaces must be free from hazardous substances or contaminants.**

Steam emanating from water containing impurities, particularly hazardous chemical substances, could contaminate food even if such steam is only used in the process of cleaning equipment and utensils.

Non-potable water used for steam production, refrigeration, fire control and other similar purposes not connected with food must be carried in separate lines, identifiable preferably by colour and have no cross-contamination with or back-siphonage into the system carrying potable water.



*Photo 15: Application of steam during food production*

## Storage

### The aim of storage

Correct storage helps to:

- Prevent illness linked to food
- Preserve the food's taste, appearance and nutritional value
- Provide adequate supplies when they are needed
- Avoid spoilage and wasted food
- Stay within the budget
- Keep within the law and avoid prosecution for selling unfit food

### Types of storage

Typical storage areas include:

- Dry goods stores: for short and long-term storage, for example, canned and bottled food, cereals, grains, tea, coffee, spices



*Photo 16: Separate store for dry goods on shelves that are 15 cm off the ground*



*Photo 17: Temporary storage of wheat flour at a bakery on a stainless-steel rack that is 15 cm above the ground*

- Refrigerators and cold stores: for storing high-risk and perishable foods for short periods



*Photo 18: Cold store of an ice-cream factory*

- Chiller cabinets and refrigerated vending machines: for displaying temperature-sensitive foods until the expiry date.



Photo 19: Refrigerated food on display for sale

- Freezers: for longer-term storage of frozen food



Photo 20: Freezer with semi-processed items stating date of manufacture for further processing

Proper functioning of storage equipment such as freezers, refrigerators and storage tanks must be controlled with:

- Indicating thermometers
- Temperature-measuring devices
- Temperature-recording devices



Photo 21: Control panel of a cold room with temperature indicator

They must be cleaned and maintained regularly to prevent decomposition or contamination of food products.

### 3.3 Equipment for processing, temperature control and cleaning

All built-in or movable equipment and contact surfaces, such as utensils, knives, tables, cutting boards, conveyor belts, ice makers, ice storage bins and gloves, must be:

- Made from food-safe materials
- Non-toxic
- Non-absorbent
- Resistant to corrosion
- Inert to cleaning and sanitizing chemicals

The equipment must:

- Be easy to clean and disinfect on the surface and under the equipment
- Have enough room for maintenance
- Have space underneath for easy cleaning
- Provide space for inspection and monitoring
- Have space for pest control



*Photo 22: Ice-cream-making equipment made of stainless steel*

The following materials must be **avoided**:

- Wood (microbial and physical concerns)
- Ferrous metals (corrosion concerns)
- Aluminium
- Brass (variable corrosion resistance and product quality concerns, chemical contamination and accelerated oxidation)
- Galvanized metal (corrosion and chemical leaching concerns)

**Recommended** materials are:

- Stainless steel
- Melamine
- Ceramics
- Enamel
- Glass
- Plastics with food-grade symbols.



*Photo 23: Non-corrosive equipment for edible oil processing*

Fabricated materials must be easy to clean and sanitize. It must be ensured that the surfaces including seams, corners and edges are smooth.

Containers for collection of inedible materials and waste must be:

- Leak-proof
- Constructed of metal or other impervious materials
- Easy to clean and close securely

Equipment and utensils used for collection of waste must:

- Be identifiable
- Not be used for edible products

All facilities for refrigeration and freezing must be equipped with calibrated temperature measurement or recording devices.

### **Control and monitoring of equipment**

All devices/instruments/equipment which have a direct effect on the production process, safety and quality of the products must:

- Be regularly calibrated against a national standard
- Have calibration certificates which need to be controlled and stored
- Have standard operating procedures on hand to describe the use of the equipment
- Have statements to correct non-conformities immediately
- Be checked on a regular basis to ensure that the measuring equipment performs as expected between the calibrations



*Photo 24: Refractometer*



*Photo 25: Lactometer*



*Photo 26: pH meter*

## Temperature-control equipment in food-processing operations

### Devices:

There is a wide range of temperature-measuring devices. They include scanners, probe thermometers and integrated equipment such as in refrigerators. Some integrated thermometers can be monitored and recorded automatically. The temperature may be given as a numerical scale on a dial, printed record or digital display.

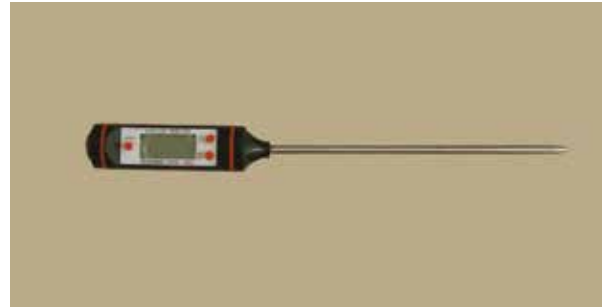


Photo 27: Probe thermometer

### Calibration:

Calibration is the process of checking (and, if requested by the customer, adjusting equipment) so that it measures accurately. Some devices are calibrated by accredited calibration laboratories or the (accredited) in-house calibration laboratory of the manufacturer.



Photo 28: Probe thermometer with calibration report issued by a conformity assessment body

All devices must be calibrated according to the manufacturer's instructions:

- Before they are first used
- Internally, in regular intervals, as a matter of course
- When there is damage to a device or an inaccurate reading is suspected
- According to your supervisor's instructions

There are three main ways to carry out an in-house calibration of a probe thermometer: **comparing it against a reference thermometer** that is confirmed to be accurate, the **ice method** or the **boiling point method**. The ice method involves inserting the probe into a small container of crushed ice topped up with cold water. When the indicator has stabilized, the calibration nut may be turned until the indicator shows 0°C. The boiling point method involves inserting the probe part of the thermometer into boiling water and, once the indicator has stabilized, adjusting it to show 100 °C. If a temperature difference is found, the thermometer has to be marked to indicate the error. The error needs to be considered when the thermometer is used for further measurements.



## Cleaning equipment

There are many types of cleaning equipment and cleaning systems including:

- Sinks and tanks for cleaning working implements and equipment. These facilities must be constructed of corrosion-resistant materials, capable of being easily cleaned and should be fitted with suitable means of supplying hot (where appropriate) and cold water in sufficient quantities.
- Clothes, brushes, mops and buckets (identification of such equipment is widely used to clearly identify which equipment should be used in certain areas – for example, sanitary areas and for high and low-risk storage, production or preparation areas – thereby reducing the risk of cross-contamination)
- Mechanical aids, such as vacuum cleaners, dishwashers and low-pressure jet washers that may be used in combination with foam for cleaning walls and other surfaces in high-risk areas
- Clean-in-place (CIP) systems for certain types of equipment – such as beer lines in a pub or pipe work and tanks in a dairy – where it is not practicable to dismantle the equipment for cleaning and disinfection

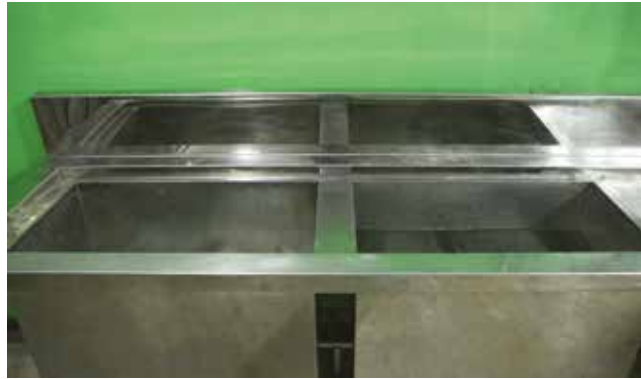


Photo 29: Two-compartment sink made of stainless steel material for cleaning and sanitizing utensils and containers



Photo 30: Mop and brooms for exclusive use inside the factory



Photo 31: Brooms to be used only outside the factory

## 3.4 Control of operations<sup>18</sup>

There are numerous practices and technologies which can be used to effectively manage hazards in the process of food production. This relates specifically to potentially

<sup>18</sup> Subchapter 3.4 is largely based on Food Standards Australia New Zealand: Safe Food Australia – A Guide to Food Safety Standards, Standard 3.2.2 Food Safety Practices and General Requirements, p. 24-51, 3rd Edition, November 2016.

hazardous foods which are generally moist and nutrient rich with a neutral pH (see section 2.6.2 for more information). The key practices are control of incoming foods, control by temperature and time, ensuring adequate storage of foods, thawing frozen food correctly, ensuring safe practices during the processing of food as well as packing food appropriately. To control operations adequately, it is strongly recommended to develop a process flow chart for each product and identify control points for avoidance of hazards. An example of an ice-cream production flow chart is provided at the end of this subchapter.

### Controlling incoming raw materials

A food business must take all practicable measures to ensure it only accepts safe raw materials. These are the measures to avoid contamination:

- Sourcing from suppliers which are certified according to good manufacturing practices (GMP) or the Hazard Analysis and Critical Control Point (HACCP) management system. This ensures a minimum level of control of food operations.
- Having specific, agreed instructions in place with the supplier to ensure quality inputs are received, for example:
  - Suppliers of animal products such as meat, eggs and milk may be requested to provide written proof that animals have been vaccinated according to the recommendations of the veterinary authorities. Vaccinations help keep the animals free from microorganisms that are potentially harmful for human beings.
  - A supplier of milk for an ice-cream processing plant may be requested to supply milk at a specific temperature (usually below 4 °C), a minimum milk fat percentage of 3.5 % and a specific gravity of 1.026 – 1.032 g/ml or a lactometer reading range of 26.0-32.0 °L
  - Additionally, written assurance may be requested to ensure that food has been appropriately handled and transported to prevent contamination (for instance, the supplier has a proper cleaning programme for conveyance and adheres to a proper storage temperature).
- Ensuring that food is only delivered when there is someone at the business to receive and assess it, or that a suitable alternative system is in place (for instance, providing access to a suitable, secure, cool room)
- Inspecting selected delivered food items (according to an inspection plan) for visible signs of:
  - Contamination, damage or deterioration of the food
  - Contamination, damage or deterioration of the food's packaging
  - Compliance with the specifications given
  - Basic chemical or physical parameters

If a raw material is found to be contaminated or not sufficiently protected from potential contamination, it should be rejected. It should be returned to the supplier, indicating the reason(s) for rejection. Alternatively, the rejected raw material might be destroyed with the supplier's consent. Rejected raw materials stored on the premises must be identified and kept separate from other food and raw materials to ensure they cannot cause cross-

contamination or be sold. The food business may find it useful to keep records of when and why raw materials have been rejected. A raw material specification list is a useful document to control the different batches of incoming raw materials.

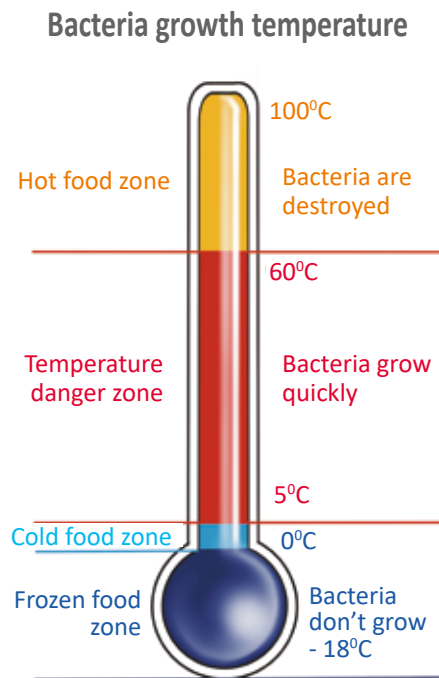
### Control by temperature and time

Controlling temperatures and times is essential to avoid the growth of pathogens in potentially hazardous foods.

In general terms, food must be kept at or below 5 °C, or at or above 60 °C. The temperature range between 5 °C and 60 °C is often referred to as the “temperature danger zone” because food poisoning bacteria can grow rapidly in this range (see also subsection 2.6.2.2).

However, short periods in this temperature range are unlikely to allow foodborne pathogens to grow (or produce) toxins to unsafe levels. Considering the generally high ambient temperatures in Sri Lanka, these short periods should never exceed 15 minutes.

The following table provides an overview of generally recommended safe temperatures by stage of food handling.



*Illustration 10: The danger zone – the growth of bacteria at different temperatures*

<b>Table 18: Overview of generally recommended safe temperatures</b>		
<b>Stage of food handling</b>	<b>When to check the temperature</b>	<b>Recommended safe temperatures</b>
Delivery	Every time perishable food is delivered	0 °C to 5 °C is ideal for refrigerated food -22 °C to -18 °C is ideal for frozen food
Storage refrigerator or cold store	Daily, at least	0 °C to 5 °C is ideal
Refrigerated storage counter or display	Daily, at least	0 °C to 5 °C is ideal
Deep freezer	Daily, at least	-18 °C or below
Thawing frozen meat and poultry	Whenever food is thawed	0 °C to 5 °C
Cooking e.g. joints of meat and poultry	Whenever food is cooled	Minimum core temperature of 70 °C for 2 minutes
Cooling	Whenever food is cooked	5 °C or cooler, ideally within 1 to 2 hours
Reheating	Whenever food is reheated	Minimum recommended core temperature of 70 °C for 2 minutes
Hot holding	Frequently throughout the holding period	Minimum core temperature of 60 °C
Cold holding	Frequently throughout the holding period	0 °C to 5 °C is recommended

*\*Note: Exact temperature ranges for food safety depend on the specific food commodity.*

Food manufacturers using water in PET bottles also need to control the temperature of the bottled water. Exposed to extreme heat of 60 °C and above, the chemical antimony, which is used for producing the plastic containers, releases and migrates into the water, thus causing a chemical health hazard. Hence, water in PET containers must never be exposed to direct sunlight but rather be kept under cool conditions.<sup>19</sup>

<sup>19</sup> Paul Westerhoff, Panjai Prapaipong, Everett Shock, Alice Hillaireau: Antimony leaching from polyethylene terephthalate (PET) plastic used for bottled drinking water, February 2008: <https://www.sciencedirect.com/science/article/abs/pii/S0043135407005246?via=ihub#!>



Photo 32: Storing food in cold storage below -18 °C

### Storing foodstuffs

Foodstuffs are “stored” if they are not being processed, displayed, packaged, transported or identified for disposal.

While all foodstuffs should be stored in a way that keeps them safe and suitable, extra care should be taken with the following:

- Unpackaged foodstuffs because it is generally more vulnerable to exposure to hazards and environmental conditions
- Potentially hazardous foodstuffs because if it is contaminated with pathogenic microorganisms, these could grow to dangerous levels during storage.

Examples of general best practice for food storage are listed below.

- Foodstuffs should be stored in containers or other wrapping that is food grade to prevent the entry of pests and physical matter.
- Packaged food should be regularly inspected to make sure it remains intact and is protecting the food properly. Any food that might be contaminated due to unsuitable or damaged packaging should be disposed of.
- Raw food such as raw meat and seafood should be stored separately from or below ready-to-eat foods, to avoid contamination from the raw food (for instance, meat juices) being transferred to the ready-to-eat food.



Photo 33: A shelf keeping foodstuffs 15 cm off the ground

- Foodstuffs should be stored separately from chemicals (for instance, cleaning agents and pest-control poisons).
- Foodstuffs should be stored 15 centimetres off the ground on shelves and 15 centimetres away from the wall to help keep premises clean, discourage pests and avoid water damage or contamination in areas where floors are wet cleaned.
- Storage areas should be kept clean and dry to prevent the accumulation of dirt, food waste, etc.
- Storage time and ambient conditions such as temperature, humidity and light must be appropriate to the food's characteristics. Potentially hazardous food must be stored at 5 °C or below or 60 °C or above.
- Stocks of raw materials and ingredients should be subject to effective stock rotation. The first item going in should be the first one to go out (first in/first out).

### Processing of fish and meat-based products

- All meat and fish must be stored, as soon as practicable after delivery and when not being processed, at a minimum temperature below 4 °C in a room or cabinet and must at all times be protected from spoilage and contamination.
- All surfaces of tables, benches or shelves that are liable to come into direct contact with meat or fish must have an impervious, smooth surface that is free from imperfections.
- Bones, fish offal and waste matter must be kept in a closed bin. It may not be allowed to accumulate and must be removed from the premises at least once daily.

### Cooling cooked food

Depending on the type of business, food-manufacturing companies may want to cook food, cool it, deep freeze it and then thaw it for further processing. For instance, the process applies for meat, fish and vegetable fillings in savoury pastry products, or for French fries, which are partially cooked before selling to the end consumer.

For the cooling and deep-freezing of cooked food, food processors must obey the following rules:

- Cooked food must be cooled from the cooking temperature to 21°C within two hours and
- The temperature must be reduced from 21°C to 5 °C within the next four hours.  
The cooling of cooked food needs to be as quick as possible to prevent the growth of pathogenic bacteria to unsafe levels. The less time that cooked food remains at temperatures between 5 °C and 60 °C during the cooling process, the less opportunity there will be for pathogenic bacteria to grow.

It is important to note that large amounts of cooked food will cool slower than small amounts. Cooling will also be fastest on the surface and slower towards the centre. Also, dense, solid food (for instance meat) will cool slower than less solid food. Finally, some cooling equipment will have the capacity to cool fast, other equipment will need more time.

With these factors in mind, cooling times can be reduced by:

- Cooking and cooling smaller amounts or portions of food
- Placing the food into large shallow containers (e.g. 5 cm deep) to cool
- Using rapid-cooling equipment (e.g. blast chillers)
- Stirring liquid foods frequently (ensuring that the stirring utensil has been cleaned and sanitized)
- Using water or ice water baths
- Allowing cool air to circulate around the container of food to be cooled — this method should be avoided as it is potentially hazardous
- Food should be cooled on racks and not on the floor of a cool room
- Adding ice as an ingredient

### **Thawing food**

When thawing food, businesses will need to ensure that:

- The thawed portion of the food is kept only for a minimum time at “danger zone” temperatures
- The food is completely thawed before cooking to allow even heating
- Juices resulting from the thawing of raw meat, poultry and seafood do not contaminate other food during the thawing process

There are several ways that potentially hazardous frozen food can be thawed (see Table 19). The choice depends on the type of food, the size of the portions to be thawed, the available equipment, ambient temperature and the available thawing time.

Table 19 shows different thawing types during food production.

<b>Table 19: Thawing types</b>	
<b>Thawing type</b>	<b>Description</b>
Refrigeration	Thawing food under refrigeration maintains it at 5 °C and below, minimizing the potential for the growth of pathogenic microorganisms. It may take several days for large food items to thaw completely at this temperature, requiring forward planning and adequate refrigeration space.
Running water	Food may be thawed more quickly by submerging it under cool running water. This method requires adequate sink space and sufficient water flow to ensure thawing is as rapid as possible. It is important to monitor the food and remove it as soon as it is thawed to ensure it is not kept at temperatures above 5 °C.
Microwave	Thawing in a microwave oven is the fastest option; however, the suitability of this method will depend on the size and nature of the food item to be thawed. It may be difficult, for example, to achieve complete thawing of certain meats without partial cooking and reduction in food quality.
As part of the cooking process	Thawing foods as part of the cooking process is appropriate where thorough and timely cooking can be ensured. Foods typically cooked from the frozen state include single-portion foods such as meat patties and chicken nuggets as well as pizzas and vegetables.
Room temperature	Thawing food at room temperature is faster than under refrigeration; however, there is a greater likelihood that the thawed portion of the food will reach temperatures greater than 5 °C. The thawing process should be closely monitored.

### Processing food

During the processing of food, the contamination of food must be avoided. The following essential measures listed here keep food safe:

- Ensure staff has the appropriate skills and knowledge on product processing and the correct use of food-processing equipment.
- Keeping food-processing areas clean, well maintained, and free of pests (see also subchapters 3.10 and 3.11)
- Prevent contamination from food-processing equipment and utensils by ensuring utensils and food-contact surfaces of equipment are cleaned and sanitized before use (see also subchapter 3.10).





*Photo 34: A factory employee wearing protective clothing when adding milk to the container. The equipment allows for continuous temperature control (see signboard to the left).*

- Clean and sanitize probe thermometers between uses.
- Keep food-processing equipment in good working order.
- Ensure measuring of ingredients according to the standard recipes in order to avoid, for instance, excessive use of food additives.
- Processed and unprocessed food must be stored in separate, defined areas with suitable labelling.
- By-products must be stored separately to avoid contamination of food.
- Waste materials must not be allowed to accumulate in food-handling areas and must be kept in closed bins outside the food-processing area.
- Measuring equipment must be calibrated at defined intervals.

### **Packing food**

Packing is another important processing step where food quality and safety aspects need to be considered.

- Packing and wrapping materials must be kept in a separate store. Once the covers of the packing and wrapping materials are opened, they need to be covered after use to avoid contamination of the materials.
- The packing materials must be suitable to maintain the consistency, quality and durability of the foodstuffs stored.
- The material used for packing must be food-grade and non-toxic.



Photo 35: Food-grade material is used for packing this ice cream



Photo 36: Sliced bread packed using food-grade packing material

- The packaging should also be easy to use for the consumer. It should be designed in a way that the product maintains its quality after each use and prevents contamination.



Photo 37: Bottled fruit juice stored in a clean store where only finished products are kept. The pallet is made of corrosion-free material (plastic) and keeps the products 15 cm off the ground

### Process flow chart – An example of ice-cream production

An important step for controlling operations effectively is the development of a flow chart. Each step needs to be recorded. The process flow varies from product to product, which means that such a chart must be available for each product and at the site of the process. The flow chart helps to:

- Identify key processing steps for each product. The main steps may be heating, cooling, freezing, dehydrating, deep-frying, vacuuming, mixing and others, depending on the product's characteristics. Time and temperature management is essential to control operations.
- Identify points in the process where hazards can occur (for instance, when water is added to the process or when processing equipment is used for operation).
- Define the necessary actions to ensure that hazards will be avoided (for instance, checking water quality and ensuring proper cleaning/sanitization of the equipment).
- Identify the appropriate measuring instruments (for instance, thermometers, pH meters and refractometers) that are essential for controlling operations.

Hence, visualizing the process flow is ideal for developing a comprehensive programme for hazard control within the company. It is important that all employees understand the process flow thoroughly so that it will be easy for them to follow the necessary control measures.

Attachment A below shows a sample flow chart for ice-cream manufacturing based on milk powder. It also displays the various control points (CP 1 to CP 7). As the name suggests, the company needs to control these points regularly for safe food handling. What exactly needs to be controlled differs from control point to control point:

*Control point 1: water*

Ensure that potable water is used that meets Sri Lanka standard 614

*Control point 2: strainer*

Removal of foreign materials

*Control point 3: pasteurization*

Ensure pathogenic microorganisms are destroyed through heat treatment.

*Control point 4: cooling and aging*

Holding the ice-cream mix at a lower temperature (4 °C) for a certain period of time before freezing. During the aging, fat solidifies, stabilizers swell and combine with water and viscosity increases. In the end, aging maximizes the overrun.<sup>20</sup>

*Control point 5: homogenization*

Blend diverse elements into one consistent, well-mixed product.

*Control point 6: storage*

Checks must ensure that the manufactured ice cream is consistently stored at temperatures between -18 °C and -30 °C.

*Control point 7: serving and distribution*

Maintain the temperature at below -10 °C for quality and food safety reasons.

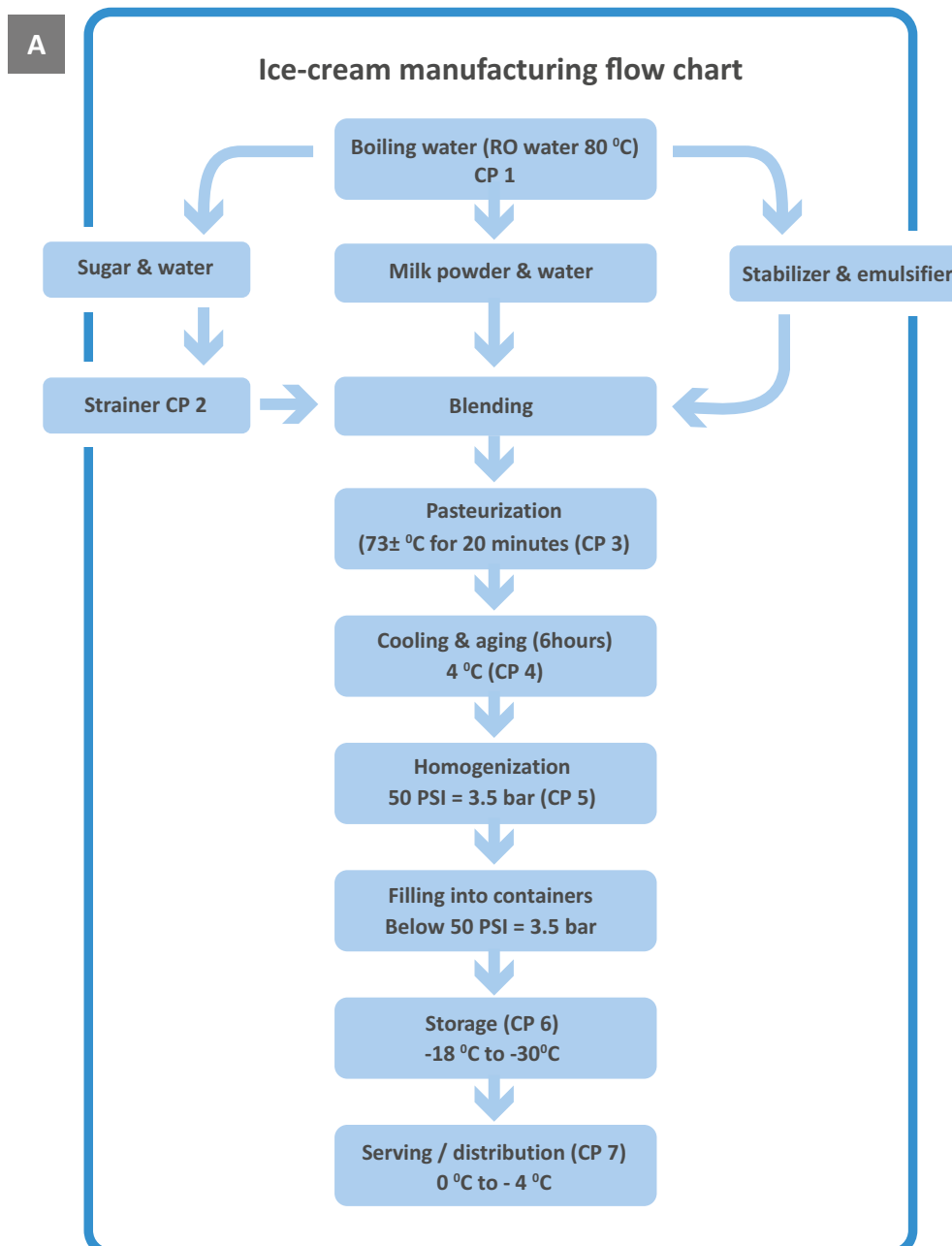
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<sup>20</sup> Overrun is a common term in the ice-cream trade. It describes the percentage of the expansion of ice cream achieved from the amount of air incorporated into the product during processing. The amount of air incorporated into the mix influences the sensory attributes of the ice cream. If a high amount of air is applied, the resulting ice cream is fluffy, feels lighter and seems less cold while eating it.

**Attachments:**

Please note: The operations in a food-handling company differ from product to product. It is impossible to outline the operations of all relevant products in the Sri Lankan food industry. An example of ice-cream manufacturing is presented below. The respective SOP and checklists have to be adjusted to the specific products.

- A) Example of an ice-cream manufacturing process flow chart
- B) Example of standard operating procedures (SOPs)
  - Control of operation in ice-cream manufacturing
- C) Examples of checklists/forms
  - Process-control checklist – Batch processing in ice-cream manufacturing
  - Manufacturing record – Batch processing in ice-cream manufacturing



B

<b>Name of the Company:</b> Additional information is required	
<b>Standard operating procedure</b>	Identification
Control of operation for Ice-Cream Manufacture	Issue Date:

<b>Purpose</b>	To ensure correct processing and hygiene procedures are adopted during the production of ice cream
<b>Scope</b>	This procedure applies to all food-handling employees who handle, manufacture and store ice cream.
<b>Responsible</b>	Quality manager
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Train food-handling employees on using the procedures in this SOP.</li> <li>2. Follow SOP on personal hygiene</li> <li>3. Follow SOP on cleaning &amp; sanitizing food contact surfaces.</li> <li>4. Follow the approved recipes.</li> <li>5. Organize the raw materials required for the production</li> <li>6. Check the quality of the raw materials received.</li> <li>7. Use potable water for cleaning, washing, cooking and processing purposes.</li> <li>8. Clean and sterilize the containers.</li> <li>9. Follow the following steps during processing: <ol style="list-style-type: none"> <li>a) Boil potable water for 80 °C.</li> <li>b) Measure the quantity of water required for the batch in a separate clean container.</li> <li>c) Mix the pre-measured sugar with the boiled water.</li> <li>d) Filter the sugar syrup using the micro filter. Pour the sugar syrup, the pre-measured milk</li> <li>e) powder and stabilizer &amp; emulsifier into the blender. Blend until evenly mixed.</li> <li>f) Transfer the mixture to the pasteurization tank. Heat the mixture at 75 °C for 20 minutes.</li> <li>g) Allow the mixture to cool down to 4 °C and allow the mixture to age for six hours.</li> <li>h) Homogenize the mixture at 50 PSI (3.5 bar).</li> <li>i) Fill into containers and store below -18 °C.</li> <li>j) Distribute under frozen conditions.</li> </ol> </li> </ol>

<b>Monitoring</b>	<p>Daily, according to form No. XXX: Process control checklist and No. YYY: Manufacturing record, during the working day.</p> <p>Quality assurance manager inspects areas during the manufacturing process to be sure that each employee is following this SOP.</p> <p>All monitoring activities are documented in form No. XXX: Process control checklist and No. YYY: Manufacturing record</p>
<b>Training</b>	<p>Every three months</p> <p>Training sessions are documented</p>
<b>Corrective actions</b>	<ol style="list-style-type: none"> <li>1. Training will be provided to any food-service employee who does not follow the procedures in this SOP.</li> <li>2. Discard affected food</li> </ol>
<b>Record keeping</b>	<p>Records are kept in the office of the quality manager</p> <p>They have to be stored at least 5 years</p>
<b>Related documents</b>	<p>Form No XXX: Hygiene checklist</p> <p>Format No YYY: Cleaning &amp; sanitizing food-contact surfaces</p> <p>SOP No. ZZZ: Hand washing</p>
<b>Literature/references</b>	<p>Food Hygiene regulation 2012</p> <p>SLS 143:1999 clause 6</p>

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

C

**Name of the Company:** Additional information is required

<b>Process control checklist</b>	Identification	
Manufacturing record – Ice-cream manufacture- Batch processing	Issue No: 001	Issue Date:

Date →	Name of the operator					
<b>Batch No. →</b>						
<b>Process control points ↓</b>						
a) Boiling potable water for 80 °C						
b) Measuring the quantity of water required for the batch in a separate clean container						
c) Mixing the measured sugar with the boiled water						
d) Filtering the sugar syrup using the microfilter						
e) Pouring the sugar syrup, measured milk powder and stabilizer & emulsifier into the blender and blending until mixture is evenly mixed						
Start time - blending→						
End time →						
f) Transferring the mixture to the pasteurization tank. Heating the mixture at 75 °C for 20 minutes						
Start time at 75 °C →						
End time →						
g) Allowing the mixture to cool down to 4 °C and allowing the mixture to age for 6 hours						
Start time and temperature→						
End time and temperature →						
h) Homogenizing the mixture at 50 PSI						
Start time→						
End time →						
Operating pressure →						
i) Filling into containers and storing below -18 °C in cool room						
Cool room temperature observed						
Time of monitoring→						

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

<b>Name of the Company:</b> Additional information is required		
<b>Monitoring Checklist</b>	Identification	
Manufacturing record – Ice-cream manufacture- Batch processing	Issue No: 001	Issue Date:

<b>Date of manufacture</b>		
<b>Batch No.</b>		
<b>Date of expiry</b>		
<b>Commencement of processing time</b>		
<b>Completion of task – time</b>		
<b>Description of item</b>	<b>Unit of measurement</b>	<b>No. of units</b>
Ingredients		
1. Water		
2. Sugar		
3. Milk powder		
4. Emulsifier		
5. Stabilizer		
6. Flavour		
7. Colour		
8.		
9.		
10.		
<b>Total weight after blending</b>	<b>Kilos</b>	
<b>Total volume after blending</b>	<b>Litres</b>	
<b>Total weight after aging</b>	<b>Kilos</b>	
<b>Total volume after homogenizing</b>	<b>Litres</b>	
<b>No. of units produced-</b>		
<b>Container size-</b> 100 ml		
250 ml		
500 ml		
1000 ml		
10,000 ml		
25,000 ml		
<b>Name of the person in charge</b>		
<b>Signature</b>		

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:



### 3.5 Management and supervision of the process

The type of control and supervision needed in a food-processing company will depend on the size of the business, the nature of its activities and the types of food involved. Larger companies typically will have several managers and supervisors with varying degrees of responsibility in assuring food safety in the company's operations. However, also small, family-owned food-handling businesses need to assign roles clearly in food safety management. In the following, the minimum requirements, which are also applicable for small food-handling companies, are listed:

- **Knowledge on food hygiene**

**principles:** According to the relevant Sri Lankan food regulation,<sup>21</sup> managers and supervisors of food establishments must have the necessary knowledge of food hygiene principles and practices to be able to judge potential risks and take necessary action to remedy deficiencies. This manual contributes to building the necessary knowledge for supervisors and handlers.

- **Food safety manager:** All food-handling SMEs must have at least one food safety manager who is responsible for supervising staff and processes. Larger companies may opt to install a quality assurance department with several staff members executing various functions in food safety management. The food safety manager or quality assurance department should be independent from the operations departments and report directly to the company owner/management.

- **Training employees:** Training and re-training is essential for ensuring compliance with good practices in food handling. The management of the company needs to assign resources for regular training sessions. Chapter 3.14, "Training of Employees", provides information on the content of the training sessions. It is a management task to identify suitable trainers. SLSI is offering a wide array of training courses in quality management. Its website provides more information on the type of training offered (for further details, please refer to Sri Lanka Standards Institution, [https://www.slsi.lk/index.php?option=com\\_content&view=article&id=28&Itemid=278&lang=en](https://www.slsi.lk/index.php?option=com_content&view=article&id=28&Itemid=278&lang=en)).
- **Formation of quality improvement teams:** An initial training course may be followed by forming a team of representatives of the company's management and staff in the operations process in order to identify gaps in food safety management and actions to overcome them. Chapter 4 of this manual describes how these "quality improvement teams" function and how food-handling companies can upgrade their operations through collaboration between employers and employees.

Food safety manager



Illustration 11: Food safety manager

21 Sri Lankan Food (Hygiene) Regulations 2012, clause 16 (2).

- **Use of Standard operating procedures and checklists:** The employees need to have clear instructions on how to handle food in each production step. These instructions are called “standard operating procedures” (SOPs). The SOPs need to be complemented by checklists and other forms that help to supervise operations. In this chapter, examples of SOPs, checklists and other forms are provided. These documents can easily be tailored to the company’s management system. Before using the SOPs, checklists and other forms, it is important to thoroughly introduce the staff to these documents.

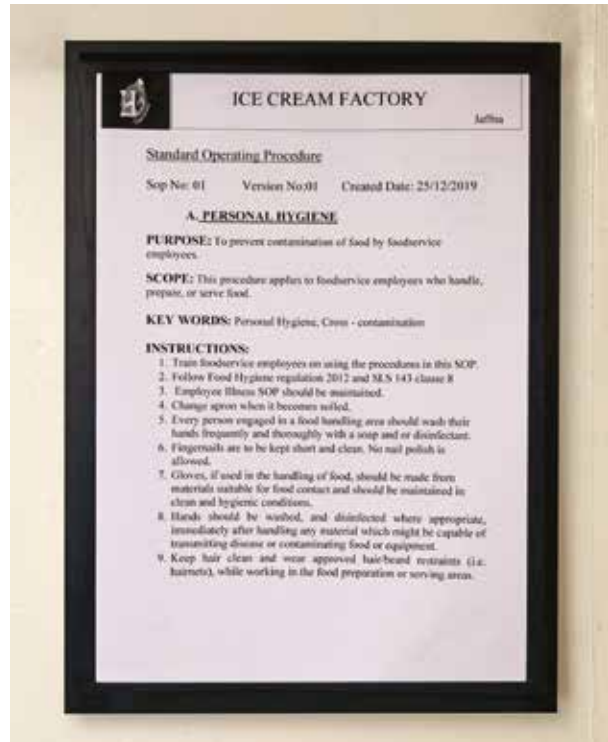


Photo 38: Standard operating procedures (SOPs) on personal hygiene in an ice-cream factory

- **Good manufacturing processes (GMP) certification:** It is also advisable that the management of food-handling companies pursue certification in GMP. GMP certification has various advantages:
  - i) It certifies that the company has adopted safe food-handling practices, which builds consumer confidence and thus helps the business grow.
  - ii) Larger companies normally require suppliers to be GMP-compliant. Hence, GMP certification helps smaller SMEs to enter into business agreements with larger companies.



Photo 39: Example of a certificate of conformity with the GMP standard

- It is worth mentioning that this manual is a perfect guide towards GMP certification. As an ensuing step, food-handling SMEs may opt for certification according to the HACCP and/or ISO 22000:2018 standards. The latter are requirements for export.

#### A) Standard operating procedures (SOPs)

All SOPs as well as checklists/forms presented in this manual may be adapted to the company's specific needs and compiled into a manual for use in the company.

#### B) Checklists/forms

See above.

## 3.6 Documentation and records of processing

The objective of documentation is to establish, monitor and record "quality" for all aspects of the production, quality control and quality assurance.

"It does not exist if it is not written down". This means that procedures must be developed, and records must be kept to show compliance to GMP.

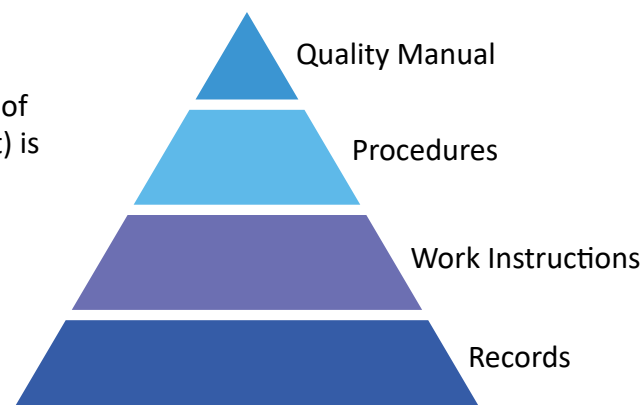
**The documentation system applies to all activities related to good manufacturing practices of food products. The following aspects are key:**

- Clearly written documentation prevents errors.
- It provides assurance that GMP-related activities are carried out exactly the way they have been planned and approved.
- Employees know what to do.
- Responsibilities are listed and authorities are identified.
- It forms the basis for continual improvement.

Documentation of the system and record keeping are important factors of success.

- Documentation is the key to operating a food company that is in compliance with GMP requirements.
- It should be written in detail and in simple language that can be understood by the user.
- Documents should be developed, prepared, approved, reviewed and distributed in a controlled manner. Therefore, a written procedure that describes how to control documents and records is mandatory for GMP.

The following structure of documentation (at right) is recommended:



*Illustration 12: Structure of documentation*

**Quality manual:**

- Describes how the company is implementing GMP for its production
- Provides an overview of all SOPs, work instructions and forms/records

**Procedures (SOPs):**

- Description of the general procedures in the company
- What the process is and its purpose – *scope & objective*
- Where activity is taking place
- Who is responsible for each activity – *responsibility*
- When activity is completed, sequence of the activities, frequency, etc.
- How the activity can be finished following the work instruction design or other reference documents - *procedure*
- Reference to the other relevant work instructions

**Work instructions:**

- Give detailed instructions on how to implement processes
- It is an instruction document and/or step-by-step guideline to execute the daily activity or operation for personnel in every function.

**Records (e.g. checklists):**

- Are kept to show evidence that procedures are accomplished as planned
- Show the effectiveness of GMP implementation

Quality manual, procedures, work instructions and records must be controlled. For this purpose, a control of documents and records procedure has to be developed.

**Document and records control:**

- Documents must be dated and authorized.
- Document must have a version.
- The distribution list of documents must be recorded.
- Obsolete documents must be taken back from users, based on distribution list.
- A list of current documents must be created.
- Only updated documents must be used.

The documentation system must be able to record the complete history of each batch of finished manufactured products. It must be able to record executed activities in production, quality control, maintenance, storage, distribution and other specific matters linked to GMP. It must be adequate to permit investigation and tracing of defective products.

Documentation must contain all necessary, but not superfluous, data and to be kept up to date. Any amendments must be formally authorized. Batch-related documents and records as well as reference samples of finished products and starting materials must be retained at the establishment for a time period.

Examples of documents in manufacturing:

**1. Specifications and standard documents:**

- a) Raw material specifications
- b) Packaging material specifications
- c) Bulk product and finished product specifications
- d) Assay and test methods
- e) Expiration of raw materials
- f) Expiration of finished products

**2. Production documents:**

- a) Master production document
- b) Master processing procedures
- c) Master packaging procedures
- d) Batch processing records
- e) Batch packaging records

Please find examples of production documents in the annex of subsection 3.4 “Control of operations” under C) “Examples of checklists/forms”.

**3. Quality control documents:**

- a) Records for testing or assay results; release or rejection of starting materials, intermediate, bulk and finished products
- b) Standard procedure for sampling and inspection
- c) Certificate of analysis for finished products
- d) Record of stability tests

**4. Other supporting documents:**

- a) Inventory card
- b) Operating procedure for specific equipment
- c) Standard procedures and records of maintenance and cleaning equipment
- d) Standard calibration procedures and record for specific instruments
- e) Record of personnel training on GMP
- f) Self-inspection record
- g) Standard procedures for product recall of any batch or lot

**Attachments:**

A) Standard operating procedures

- Control of documents and records

Please note that the parts in red colour font must be adjusted to the specific situation of the company.

B) Checklists/forms

- Master lists of documents and records
- Document change request

<b>Name of the Company</b>	
<b>Standard operating procedure</b>	Identification
Control of Documents and Records	Issue No: 001 Issue Date:

<b>Purpose</b>	To prevent the use of unauthorized and obsolete documents and records
<b>Scope</b>	This procedure applies to all documents and records in the company.
<b>Responsible</b>	<ul style="list-style-type: none"> <li>• The management is responsible for assigning authors to documents.</li> <li>• The author is responsible for writing the document, creating related forms, determining a document number and submitting the document to the department manager for review.</li> <li>• Department managers are responsible for approving documents for their area of responsibility.</li> <li>• The document control coordinator is responsible for assigning document numbers, maintaining the master list, posting new and revised documents on the network, distributing hard copies of documents and revising documents.</li> <li>• All employees are responsible for reviewing the documents as they use them and for submitting document change requests to update documents as necessary.</li> <li>• The network administrator is responsible for backing up the network daily.</li> <li>• Production engineers are responsible for maintaining programmes that control equipment. If there are machine programmes, controllers with programmes or other software monitoring the processes, the programmes must be controlled.</li> </ul>
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Document creation             <ol style="list-style-type: none"> <li>1.1. When the need for a document is identified, the management assigns an author for the document. Any employee may be assigned as an author for documents in their area of expertise.</li> </ol> </li> </ol>

	<ol style="list-style-type: none"><li>1.2. The author writes the document and prepares the related forms. Documents include:<ul style="list-style-type: none"><li>- GMP manual</li><li>- Procedures</li><li>- Work instructions</li><li>- Attachments</li><li>- Forms</li><li>- References</li><li>- Templates</li></ul></li><li>2. Approval<ol style="list-style-type: none"><li>2.1 The author submits the documents together with the document change request (DCR) (form YYY) to the department manager for review and approval; the manager signs and approves the DCR as a record of approval.</li><li>2.2 The document control coordinator (DCC) inserts the approver's initials into the electronic copies when posting approved documents to the network.</li></ol></li><li>3. Document identification and distribution<ol style="list-style-type: none"><li>3.1 All documents contain the following information:<ul style="list-style-type: none"><li>Company name</li><li>Title</li><li>Document number</li><li>Current version and date</li><li>Signatories</li></ul></li></ol></li><li>4. Document numbering<ol style="list-style-type: none"><li>4.1 Procedures, work instructions, forms and attachments are numbered using the following number scheme:<p><b>For example: P-Q-500-001</b></p><p>P = procedure, Q = quality Assurance Department, 500 – 500th procedure carried out by the quality assurance department, 001- version number. The current revision level and date are also recorded on the master list of documents and records.</p></li><li>4.2 The following departments prepare, issue and maintain QMS documentation as required</li></ol></li></ol>
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	<p>E = engineering: design engineering and all related functions</p> <p>M = manufacturing: production, service, warehousing and inventory control.</p> <p>S = sales: marketing, sales and customer service</p> <p>A = administration: management, human resources, accounting and purchasing</p> <p>Q = quality assurance: quality assurance and quality control, inspection and document and data control</p> <p>Work instructions (WI) are numbered WI-Q-XXX-YYY-, where XXX is the related procedure number, and YYY is a number assigned sequentially as work instructions for that procedure are added, and A for the department that oversees the procedure</p> <p>For example: WI-Q-500-001 is the work instruction for maintaining the master list, the first work instruction related to procedure 500.</p> <p>Forms and attachments are numbered using the same format as the work instructions but using F and A, respectively, in place of the WI. Authors obtain the document number from the document control coordinator.</p> <p>4.3 The document control coordinator enters the approved documents on the master list. Approved documents containing original signatures are the “master” copies and are kept in the master document file.</p> <p>4.4 The document control coordinator posts new and revised documents on the network and distributes hard copies to points of use according to the master List</p> <p>4.5 Hard copies are controlled by listing the copyholders’ distribution of the document on the master list and stamping the document according to the copyholder number.</p> <p>Example: Controlled copy No. ____.</p>
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	<ul style="list-style-type: none"><li>4.6 The document templates include an auto print date. Electronic copies of procedures, work instructions and attachments that are printed for use are controlled by this print date. Printed copies are only valid for 24 hours from the print date unless stamped “controlled copy”.</li><li>4.7 Documents of external origin and other references are listed on the master list with a prefix of “R”. The external document or reference is numbered with a label or other convenient method.</li><li>5. Document revisions<ul style="list-style-type: none"><li>5.1 Documents are reviewed during regular use and during internal audits. Documents are updated as found necessary during these reviews.</li><li>5.2 Documents are revised to update or clarify information using the document change request form (form YYY).</li><li>5.3 Revisions are made electronically, and changes are indicated in the document using the Microsoft Word revision tool. (Select “tools” and then “track changes” to mark all changes to the document .)</li><li>5.4 The document control coordinator ensures that all steps are completed.</li><li>5.5 Revisions to documents go through the preceding document approval, identification and distribution steps. Document changes are approved by an individual in the same function who performed the original review and signed the original document indicating approval.</li></ul></li><li>6. Obsolete document disposition<ul style="list-style-type: none"><li>6.1 One hard copy of the obsolete document is retained and marked “Archive copy”. The document change request form (form YYY) is retained with the archived copy.</li><li>6.2 The electronic archive copy is maintained in a file in the document control area.</li><li>6.3 Electronic versions of obsolete documents are marked “Archive copy” and moved to an electronic archive folder.</li></ul></li></ul>
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	<p>7. <b>Electronic backup</b> Company documentation is stored on the company network. An electronic backup is made daily by the network administrator.</p> <p>8. <b>Control of data</b></p> <p>8.1 All programmes used for control of production equipment, calculations or analysis are controlled. They are listed on the software spreadsheet with the revision date and the location of the programme.</p> <p>8.2 Production engineers maintain protected files of equipment-controlling programmes. Operators use read-only copies of the programmes.</p> <p>9. <b>Quality records are maintained as listed in the Master list of documents and records. It contains the following information:</b></p> <p>9.1 Document number: the document of the quality system to which the record is related</p> <p>9.2 Record identification: a description of the record</p> <p>9.3 Responsibility: the position responsible for collecting and maintaining the record</p> <p>9.4 Index: the manner in which the record is filed</p> <p>9.5 Location: work area where the record is stored. When necessary, records are moved to the record archives.</p> <p>9.6 Retention period: minimal period for which the record is kept</p> <p>9.7 Disposition: what is done with the record after the retention period expires</p> <p>10. <b>Facilities</b></p> <p>10.1 Access to the company records is limited to employees and authorized visitors.</p> <p>10.2 Records are readily retrievable by referring to the records table for location and indexing</p> <p>10.3 All employees have access to the quality records that they need for carrying out responsibilities.</p>
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	<p>10.4 Records are stored in such a way that damage, deterioration or loss is prevented. Records may be stored in files, drawers, boxes or other designated storage.</p> <p>11. Where contractually agreed, provide quality records for evaluation by the client or the client's representative.</p> <p>12. After records are no longer needed and the retention period has been reached, the records are archived or disposed of.</p>
<b>Monitoring</b>	Monthly. Document control coordinator conducts random check of actual documents and records and compares these with the details in the master list
<b>Training</b>	All staff must be trained by the document control coordinator on how to create, revise, maintain and dispose of documents and records.
<b>Corrective actions</b>	Update the documents and records. Retrain affected staff for new and revised documents. Keep records on the assigned location.
<b>Record keeping</b>	Records are kept in the office of the respective departments. They have to be stored at least five years
<b>Related documents</b>	Form XXX: Master list of documents and records Form YYY: Document change request form
<b>Literature/references</b>	Food Hygiene regulation 2012 SLS 143: 1999

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

<b>Name of the Company</b>	
<b>MASTER LIST</b>	Identification
Master list of Documents and Records	Issue No: 001 Issue Date:

DOCUMENT CODE	TITLE	Process Owner/ LOCATION	Revision No/ Revision Date	Copy Holders
ML - 001	Master List of Documents and Records	Document Control Coordinator	Rev. 0 20 Mar 2022	Master Copy – DCCC
P-Q-500-001	Quality Check of Raw Material and Product	Quality Assurance	Rev. 1 22 Mar 2022	Master Copy – DC Copy 1 - QA
WI- Q - 500-001	Acceptance of Materials: Raw Material Specification	Quality Assurance	Rev. 1 22 Mar 2022	Master Copy - DC Copy 1 - QA Copy 2 - Production
RECORD CODE	TITLE	Process Owner/ LOCATION	22 Mar 2022	Copy 2 - Production
WI- Q - 500-001 -F1	Assay Test: Raw Material	Quality Assurance File Cabinet 1 File Folder 1	10 years	Soft Copies Archived Paper Shredded and Disposed

<b>Name of the Company</b>	
<b>FORM</b>	Identification
<b>Document Change Request</b>	Issue No: 001 Issue Date:

Date				
Document code				
	New	Revision	Obsolete	Others
Reason for request				
Requested by:			Approved by:	
Remarks, if any				

## 3.7 Recall procedure

A product recall is a process conducted by the firm responsible for placing the product on the market to remove or withdraw a particular food product from all distribution channels.

**The reasons for a product recall are:**

- The product presents a threat to the health and safety of the consumer.
- It is found to be unwholesome.
- Quality or safety failure after release, e.g. microbial tests indicate failure to meet performance specifications.
- Stability test failure
- Result of an inspection
- Tampering, e.g. adulterated ingredients
- It does not conform with product quality and safety requirements.
- There is a gross deception to the general public, e.g. labelling requirement is not met/unfounded claims are made.

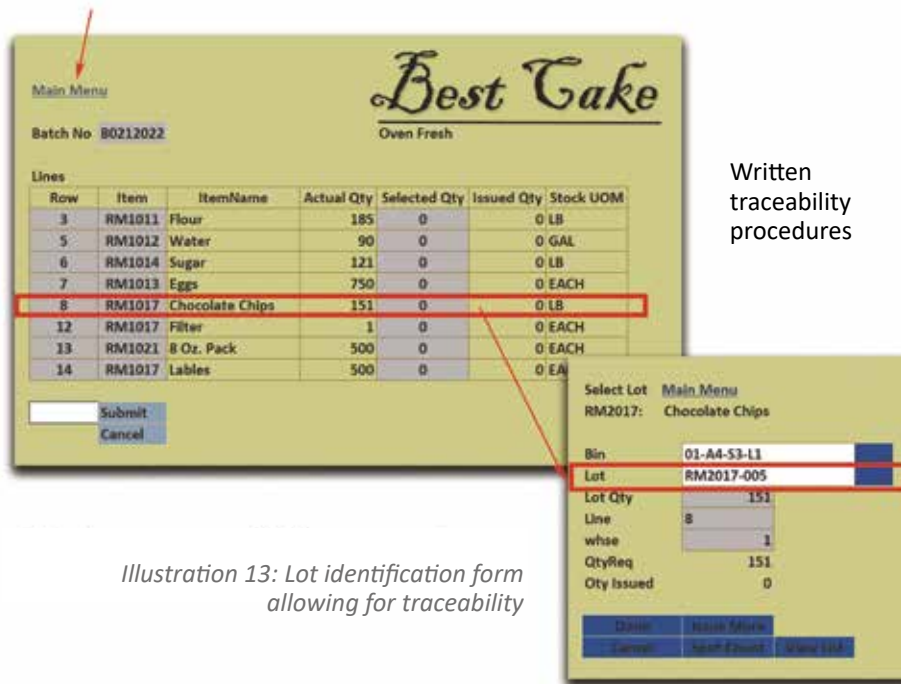
**To be able to do so, each company has to establish recall procedures that help the company to identify and remove the products from the market.**

All processing facilities, regardless of size, should have a recall programme in place:

- Document all complaints.
- Establish written procedures.
- Inform concerned local and national authorities and seek advice.
- Have records for traceability from the raw materials and packaging material, to processing data and laboratory results.

**Parts of a written recall procedure:**

- Designate responsible person
  - Recall coordinator
  - Media spokesperson, if public needs to be informed
  - Other responsible persons (e.g. recall team)
- Develop written traceability procedures to locate shipped products
  - Lot identification number
  - If available, use an automated lot and batch ID generator or a complete traceability system. Refer to the GS1 office in the respective country for information about signing a global identification (barcode) of the products.



Written traceability procedures

Illustration 13: Lot identification form allowing for traceability

- Check the system on a regular basis to ensure that traceability can be determined from raw materials to finished products and vice versa (forward and backward traceability).
- Traceability: tracking and tracing
 

A small processor must establish procedures to locate the product. There are two forms of traceability: forward and backward. Forward traceability allows processors to determine the number of cases produced on a given date and where those cases were shipped. Backward traceability allows managers to determine the supplier and lot numbers of all ingredients included in a finished product code.
- Make a simple test: get a sample of a finished product and trace it back to the raw materials that were used to produce it. Then, vice versa: get the list of raw materials of a previous batch and determine which product was produced and where and to which customers it was shipped.
- Establish procedures for how and whom to contact at the appropriate regulatory agency
  - Potential scope of the recall
  - Adulteration issues
  - Steps that the company is taking to recall the product including the necessary logistical arrangements
- Prepare sample statements for the media if public has to be informed
  - Should attend to the concerns and steps being taken to protect consumers' safety
  - Includes instructions for consumers who may have purchased the recalled product
- Prepare formal letters to notify retailers that have received a recalled product or to notify suppliers who have been involved in a recalled product, if necessary.

### Recall files to keep must include but are not limited to:

- Records of recalled product (e.g. production and QA records, laboratory results)
- Progress report
- Recall report
- Other pertinent correspondence (e.g. press releases)

### Evaluating the recall programme

The product recall and product withdrawal procedures must be regularly tested in a manner that is appropriate to ensure their effective operation.

- WHAT: Conduct mock recalls
- WHY: To test and evaluate the written recall programme
- WHY: To highlight areas of improvement
- HOW OFTEN: At least once a year or as often as needed
- WHO: Recall team headed by recall coordinator
- HOW: Pick a particular product/product lot and recapture all

### What a food producer must do in case of a recall

- Set up a collection centre for all recalled products
- Check that all data (e.g. quantity and nature of products) is complete and kept by the collection centre
- Choose appropriate and effective mode of transportation of recalled products
- Store recalled products separately
- Decide on the disposition of the recalled products
- Destroy recalled products after the recall process is concluded
- Make recall report indicate delivered and recovered quantities



*Illustration 14: Recall steps and coordination*

### The difference between recall and withdrawal

A recall is when unsafe food is removed from the supply chain and consumers are advised to take appropriate action, for example, to return or dispose of the unsafe food (see Food Standard Agency, <https://www.food.gov.uk/>).

A withdrawal is when unsafe food is removed from the supply chain before it has reached consumers.

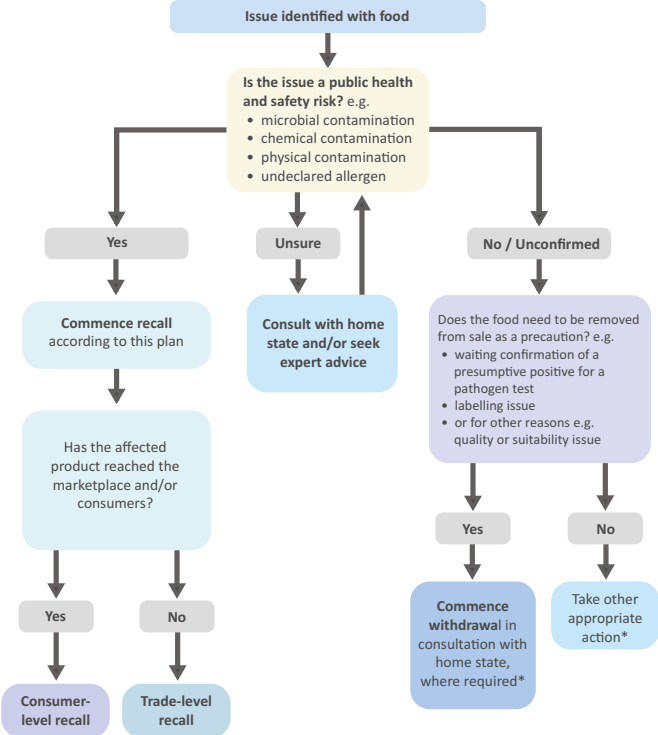
### Attachments:

- A) Standard operating procedures
- Recall procedure

B) Checklists/forms

- Contact lists (Please note that the contact lists must be adjusted to the specific situation of the company.)
- Scope of recall
- Recall checklist
- Recall letter template (Please note that the recall letter must be adjusted to the specific situation of the company.)

<b>Name of the Company</b> Additional information is required	
<b>Standard operating procedure</b>	Identification
Recall Procedures	Issue No: 001 Issue Date:

<b>Purpose</b>	To ensure that systems are in place to recall and withdraw products from the market effectively and efficiently
<b>Scope</b>	This procedure applies to all food items that are deemed risky to food quality and safety.
<b>Responsible</b>	Recall team: assigned by the management to maintain and implement the recall plan
<b>Procedure</b>	<p>1. Identify, notify and assess the food safety issue</p> <p>1.1 Notify the recall coordinator and the food safety team immediately of a potential food safety issue. Refer to form AAA. Keep this recall contact list updated.</p> <p>1.2. Gather information and assess the incident.</p>  <pre> graph TD     Start([Issue identified with food]) --&gt; Q1{Is the issue a public health and safety risk? e.g. • microbial contamination • chemical contamination • physical contamination • undeclared allergen}     Q1 -- Yes --&gt; A1[Commence recall according to this plan]     Q1 -- Unsure --&gt; A2[Consult with home state and/or seek expert advice]     A2 --&gt; Q1     Q1 -- No / Unconfirmed --&gt; Q2{Does the food need to be removed from sale as a precaution? e.g. • waiting confirmation of a presumptive positive for a pathogen test • labelling issue • or for other reasons e.g. quality or suitability issue}     Q2 -- Yes --&gt; A3[Commence withdrawal in consultation with home state, where required*]     Q2 -- No --&gt; A4[Take other appropriate action*]     A1 --&gt; Q3{Has the affected product reached the marketplace and/or consumers?}     Q3 -- Yes --&gt; A5[Consumer-level recall]     Q3 -- No --&gt; A6[Trade-level recall]             </pre> <p>*If a product is withdrawn from sale and then the business receives confirmation of the presence of a pathogen in their product/s, this decision tree should be re-started from the beginning i.e. "Is the issue a public health and safety risk?"&gt; Yes &gt; Commence recall according to this plan.</p>



	<p>2. Decide if a food recall or withdrawal will be employed or other appropriate actions will be taken.</p> <p>2.1. No recall or withdrawal – other appropriate actions to be taken</p> <p>2.2. Food withdrawal – as a precaution (pending further investigation of the potential food safety risk) or due to a food suitability issue</p> <p>2.3. Food recall – the food poses a public health and safety risk</p> <p>3. If a decision is made to do a recall or food withdrawal, decide on the scope of the recall. Use form XXX and form YYY:</p> <ul style="list-style-type: none"> <li>• Brand name and product name</li> <li>• Package sizes</li> <li>• Batch numbers or date markings of the same product</li> <li>• Other affected products that were processed on the same line or in the same plant</li> <li>• Same or similar food products packaged under a generic label</li> <li>• Quantity</li> <li>• Food safety issue/reason for recall</li> <li>• Other relevant information</li> <li>• Distribution locally and abroad (if applicable)</li> </ul> <p>4. Inform the relevant agencies, business stakeholders and customers. Use the information gathered (form XXX).</p> <p>4.1. Notify the relevant government agency and provide the following details:</p> <ul style="list-style-type: none"> <li>• Company's contact details</li> <li>• Product manufacturer's details</li> <li>• Product details including the name (as it appears on the product packaging), date marking, package size and description as well as any other identifying markings available (e.g. lot/APN/EAN code)</li> <li>• Nature of the problem, the results of any testing</li> <li>• Quantity of the manufactured batch and the date and amount released</li> <li>• Quantity of the recalled food product that can be accounted for</li> <li>• Distribution locally and abroad (if applicable)</li> <li>• Any import/export information (if applicable) including overseas distribution and/or importer details</li> <li>• For a consumer-level recall, a photo that clearly shows the product labels and sizes</li> </ul> <p>4.2. Notify all affected customers (including distributors, wholesalers, food service, retailers and exporters, as applicable) by phone and fax or email. Use the template in form ZZZ.</p> <p>4.3. Keep all records of notifications.</p>
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	<p>4.4. In the case of a recall, notify the consumers in consultation with the relevant government agencies. Make a communication plan (form ZZZ) that includes:</p> <ul style="list-style-type: none"> <li>• The urgency of the food safety issue (e.g. associated with illness)</li> <li>• How widely the product has been distributed (locally or nationally)</li> <li>• The customer base of the product (e.g. specific cultural or age group)</li> </ul> <p>4.5. Notify the consumers via the following modes of communication:</p> <ul style="list-style-type: none"> <li>• Point-of-sale notification (in-store recall notices)</li> <li>• Paid press advertisements</li> <li>• Media release (recommended if the product poses a high safety risk)</li> <li>• Radio announcements</li> <li>• Direct notification to consumers via email or SMS (e.g. via customer loyalty programmes)</li> <li>• Website notification</li> <li>• Social media (e.g. Facebook, Twitter, blogs)</li> </ul> <p>5. Dispose of the recalled product unless the nature of the food safety hazard allows for it to be reprocessed or relabelled. The food safety team may choose to retrieve and dispose of the product or ask the partner customers to dispose of it on-site.</p> <p>5.1. Advise the customers (retailers, distributors, wholesalers, exporters, other, as applicable) what to do with recalled products, including to:</p> <ul style="list-style-type: none"> <li>• Separate recalled products from other food and identify it as subject to recall AND</li> <li>• Count and return the product for disposal OR</li> <li>• Count and dispose of the product themselves</li> </ul> <p>5.2. Separate the retrieved products being held for disposal from other food and clearly label them as being subject to recall.</p> <p>5.3. Account for all recalled products by recording what stock is retrieved and what stock (if any) is disposed of by customers. Use form YYY.</p> <p>5.4. Employ appropriate method of disposal:</p> <ul style="list-style-type: none"> <li>• Destroy or treat the product in another way (e.g. denature) so that it cannot be used for human consumption and dispose it.</li> <li>• Process the product further to ensure that it is safe and suitable for human consumption (e.g. by relabelling or reprocessing).</li> </ul>
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	<ul style="list-style-type: none"> <li>• Use for purposes other than human consumption (e.g. animal feed, if appropriate).</li> <li>• Return to the supplier</li> </ul> <p>6. In cases of complaints or replacement and refund requests, compensate for loss or damage suffered as a result of supplying defective goods.</p> <p>7. Monitor and document the recall at each stage of the process. Complete form YYY and record updates in the incident logbook. If further actions are deemed necessary to protect public health and safety, make recommendations to management during the recall process.</p> <p>8. Terminate the recall once it has been deemed successful if:</p> <p>8.1. The risk to the public is judged to be minimal.</p> <p>8.2. The business has taken all reasonable steps to ensure the effective recall of product including:</p> <ul style="list-style-type: none"> <li>• Identifying all affected batches in the supply chain</li> <li>• Notifying affected customers</li> <li>• Disposing of all affected batches in the supply chain by destroying, reprocessing/relabelling, etc. (as applicable)</li> <li>• Communicating the recall to the public (for a consumer-level recall)</li> <li>• Taking corrective action (as needed)</li> <li>• Accounting for all recalled products</li> </ul> <p>9. Meet with the team once the recall is terminated to:</p> <ul style="list-style-type: none"> <li>• Review the effectiveness of the recall</li> <li>• Decide what corrective actions are needed to prevent a similar issue from happening again</li> <li>• Assign accountable staff and timelines for the corrective actions (if needed)</li> <li>• Agree on a future date to review the corrective actions</li> </ul> <p>10. After a food recall, submit interim and final post-recall reports to the relevant authorities within the requested timeframes.</p>
<p><b>Monitoring</b></p>	<p>Monitor every stage of the process during the actual recall by logging the incident in a logbook. The entries should consist of a list of communications including phone calls, the time, date, who made them and brief details of the communication. This must be reviewed and approved daily by the recall coordinator.</p> <p>Complete form YYY and update it from time to time until all stocks are accounted for.</p>

<b>Training</b>	Test the recall procedure once a year by doing a mock recall. Document the results of mock recalls and training sessions of the recall team.
<b>Corrective actions</b>	Review the procedure and identify the steps that were not followed during the actual recall. Update the procedures, if necessary. Retrain the staff on the recall procedures. Document the corrective actions taken.
<b>Record keeping</b>	Records are kept in the office of the quality manager. They have to be stored for at least five years.
<b>Related documents</b>	Form No. XXX: Recall report Form No. YYY: Recall checklist Form No. ZZZ: Recall notification Form No. AAA: Recall contact lists Incident logbook
<b>Literature/ references</b>	Food Hygiene regulation 2012 SLS 143: 1999

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

<b>Name of the Company</b> Additional information is required	
<b>Recall Plan</b>	Identification
Contact Lists	Issue No: 001 Issue Date:

<b>Recall team and management</b>	<b>Name &amp; designation</b>	<b>Contact phone number &amp; email address</b>
Coordinator	Production/	
Member	Food safety team leader	
Member	Quality	
Member	Purchasing/supply	
Member	Marketing	
Member	Sales	
Member	Legal services	
Member	Distribution and supply chain	
Adviser	Consumer affairs / public relations	

Adviser	Manager	
	CEO / owner	

Sample form for lists of organizations to be informed in case of a recall:

<b>7. Form - List of regulatory organizations to be informed in case of a recall -</b>		
<b>Regulatory office, consultants, laboratory</b>	<b>Contact person/ designation</b>	<b>Contact phone number &amp; email address</b>

<b>Customer/ company name</b>	<b>Contact person/ designation</b>	<b>Contact phone number &amp; email address</b>

<b>Supplier/ company name</b>	<b>Contact person/ designation</b>	<b>Contact phone number &amp; email address</b>

Prepared by:

Reviewed and approved by:

<b>Name of the Company</b>	
<b>RECALL NOTIFICATION</b>	Identification
Information Form for Customers	Issue No: 001 Issuing Date:

Recall No. \_\_\_\_\_

Date: \_\_\_\_\_

Company's contact details	
Product manufacturer's details	
Product details including the name (as it appears on the product packaging), date marking, package size and description as well as any other identifying markings available (e.g. lot/APN/EAN code)	
For a consumer-level recall, a photo that clearly shows the product labels and sizes	
Nature of the problem, the results of any testing	
Quantity of the manufactured batch and the date and amount released	
Quantity of the recalled food product that can be accounted for	
Distribution list, local and overseas (if applicable)	
Any import/export information (if applicable) including overseas distribution and/or importer details	
Other relevant information about the case	

Prepared by:

Reviewed and approved by:

<b>Name of the Company</b>	
<b>Distribution List and Returned Products</b>	
<b>Recall Checklist</b>	Identification
Distribution List and Returned Products	Issue No: 001 Issue Date:

Recall No. \_\_\_\_\_

Date: \_\_\_\_\_

Product name:	
<b>Total quantity manufactured/imported (in units or kg)</b>	
<b>Total quantity distributed (in units or kg)</b>	
<b>Total quantity remaining in warehouse (in units or kg)</b>	

<b>Business name</b>	<b>Address</b>	<b>Contact person</b>	<b>Contact phone numbers</b>	<b>Units distributed</b>	<b>Units returned or accounted for</b>	<b>Remarks</b>

Prepared by/date:

Reviewed and approved by/date:

<b>Name of the Company</b> Additional information is required	
<b>RECALL NOTIFICATION</b>	Identification
Recall Letter Template	Issue No: 001 Issue Date:

**Example of a form for a standard letter to customers:**

***Template for customers***

Distributor’s name

Distributor’s address

**URGENT: FOOD RECALL**

Customers are advised that [name of the business recalling the product] is conducting a food recall due to [the reason for the recall].

The food involved is [name of the food product, package size, date marking, batch code and all other information that will identify the food].

We are recalling all supplies of the food with the above identification.

[For consumer-level recalls, insert the following sentence]

Consumers have been advised of the recall and asked to return the purchased food. They will receive a refund of the purchase price.

If you have distributed any of the recalled stock to other distributors or retailers, please immediately inform those distributors or retailers of the recall.

If you have re-packaged or re-processed the recalled food under another brand name, you, or the business you supply the repackaged or re-processed food to, may need to conduct a separate trade or consumer food recall. If this is the case, please immediately contact [relevant authority] at this number [insert number] and your state or territory health department].

Please hold the recalled food in an isolated and secure area until we provide further instructions.

We apologize for any inconvenience.

[The name of the sponsor, address and contact numbers]

[Date]

Prepared by/date:

Reviewed and approved by/date:



# **W A R N I N G**

## **Food Product Recall**

Company name:

Product name description:

Pack size:

Batch identification:

Product  
photograph or  
illustration

Details of what is wrong with the products

Actions the consumer should take

We apologize for any inconvenience

Company address and contact details

## 3.8 Establishment maintenance, cleaning and sanitization

Maintaining a clean work environment is critical in foodborne illness prevention. Microorganisms can grow on unsanitary surfaces and then contaminate food. Just because a work surface looks clean does not mean that it is sanitary. Always ensure that the work area is cleaned and sanitized before starting the production process. Note: The cleaning equipment to be used is described in subchapter 3.3

### Cleaning procedure

Cleaning can be carried out by the separate or the combined use of physical methods, such as heat, scrubbing, turbulent flow, vacuum cleaning or other methods that avoid the use of water and chemical methods using detergents, alkalis or acids.

The sanitation programme should be carried out in such a manner that food or packaging materials are not contaminated (e.g., by aerosols or chemical residues) during or subsequent to cleaning and sanitizing.

The specific cleaning procedure and the substances involved may vary depending on what surface/equipment is being cleaned, but there are generally six stages of cleaning that are important to completely disinfect contaminated surfaces.

The six stages of cleaning are:

1. Pre-clean – The first stage of cleaning is to remove loose debris and substances from the contaminated surface. This is done by wiping with a disposable towel, sweeping or rinsing.
2. Main clean – The second stage of cleaning is to loosen any substances, dirt, grease and debris that were not removed during the pre-clean stage. This involves using hot water and a detergent. Wipe away the loosened substances right away with something suitable or allow the disinfectant to do its work for a certain amount of contact time before doing so. Note: The most recommended way is to use a squeegee to remove surplus water from the surface. In case cloth, mops or sponges are utilized, they need to be sterilized on a regular basis.
3. Rinse – The third stage of cleaning is to remove all the loosened substances, dirt and debris as well as the detergent that was present in the second stage. This is done using clean, hot water with a cloth, mop, squeegee, etc.
4. Disinfection – The fourth stage of cleaning is to disinfect the surface, which will destroy bacteria and other microorganisms. For example, heat or a chemical disinfectant is used for an adequate contact time. Follow the instructions for any products or equipment used.
5. Final rinse – The fifth stage of cleaning is to remove any disinfectants from the previous stage using clean, hot water. This step may not always be carried out, depending on the disinfectant and surface to be cleaned. As stated in the previous stage, follow the manufacturer's guidance and seek further advice, if needed.
6. Drying – The sixth and final stage of cleaning is to dry the surface, and it is recommended to air dry where possible. Use drying cloths if needed, but they should be single use especially in a commercial setting. Avoid reusing air-dried cloths that are damp from use, as bacteria could grow on the cloths and pose a contamination risk.

## The use of common cleaning agents

The following table gives an overview of when to use common cleaning agents:

	Water	Detergents	Degreasers	Abrasives	Acids
When to use them	Rinsing and for diluting other cleaning agents	Used for a wide range of cleaning purposes	Removing grease from surfaces such as oven tops and counters	Rubbing/scrubbing dirt from hard surfaces such as floors and pots	Removing scaling, rust and grime
What to consider			Try to use non-toxic and non-fuming degreasers.	Abrasives may scratch certain types of materials such as plastic or stainless steel.	Acids need to be diluted correctly. Otherwise, they can be poisonous and corrosive.
	For food-contact surfaces, potable water must be used (SLS 614).	For food-contact surfaces, food-grade agents must be used. Always check the manufacturer's instructions.			

Source: Canadian Institute for Food Safety, <https://www.foodsafety.ca/blog/4-types-cleaning-agents-and-when-use-them>

## Effective cleaning

Effective cleaning of the processing environment needs to consider the following aspects:

- Warm to hot water is generally needed. A temperature of 54 °C to 60 °C is recommended. Higher temperatures tend to bake on food residues.
- Cleaning agents should be appropriate for the task. Specialized detergents may be needed depending on the residue to be removed and the equipment being used.



Photo 40: An employee wearing protective clothes while cleaning the factory floor

- Check the dosage on the label of the cleaning agents. Do not exceed the prescribed limits as this may create an unintentional hazard.
- The use of a mechanical washer for large volumes of washing up is recommended. Mechanical washing is consistently more effective than washing up by hand.

### **Disinfection methods**

Disinfection agents are used to reduce pathogenic bacteria to levels that are neither harmful to human health nor to the quality of food. Disinfection can be carried out using chemicals, heat and steam. Disinfection is always done after cleaning.

### **Chemical disinfection**

Chemical disinfection consists of adding a disinfectant (usually a strong oxidant) to the water which reacts with the organic matter and microbial organisms. Subsection 2.4.1 introduces various types of chemical sanitizers.

The ideal chemical sanitizer should:

- Be approved for food contact surface application
- Have a wide range or scope of activity
- Destroy microorganisms rapidly
- Be stable under all types of conditions
- Be tolerant of a broad range of environmental conditions
- Be readily solubilized and possess some detergency
- Be low in toxicity and corrosivity
- Be inexpensive

No available disinfectant meets all of the above criteria. Therefore, it is important to evaluate the properties, advantages and disadvantages of the available disinfectants for each specific application.

### **Disinfection by hot water**

Sanitation using hot water can be achieved manually (for instance, in a sink) or mechanically (for example, with a dishwasher). The decision to use hot water should consider whether the items to be sanitized can withstand the sanitation temperature and whether the equipment used can produce the intended outcome. If operated manually, food-contact surfaces need to be immersed in water at a minimum temperature of 80 °C for at least two minutes for effective disinfection according to SLS 143.

### **Disinfection by steam**

A steam cleaner is basically an appliance meant to clean dirty surfaces using hot vapour released at high pressure. It is an effective and environmentally friendly way of cleaning dirty surfaces without having to incur the extra cost of buying cleaning agents. Steam is basically water that has been heated at very high temperature until it turns into vapour which is released at high pressure during cleaning. The high temperature of the steam also helps to destroy bacteria and other external agents that may be health hazards.

### **What needs to be disinfected?**

All areas that need to be disinfected in a food operation should be clearly identified on the cleaning schedule. Any surfaces coming into direct contact with raw or high-risk foods must be cleaned and disinfected after every use. This also applies to items that are

frequently handled such as knives, containers or other utensils. Hand-contact surfaces, such as handles and taps, also need to be cleaned and disinfected on a regular basis.

#### Food-contact surfaces

- Food preparation surfaces, such as chopping boards
- Knives, small utensils, dishes, containers
- Food machinery ranging from parts of a production line or a conveyor to mixing bowls, slicers, mincers

#### Hand-contact surfaces:

- Handles on doors, cupboards, drawers, ovens, refrigerators, freezers
- Taps
- Light switches, controls, levers
- Clothes, brushes, mops used for cleaning
- Waste bin lids
- Telephones
- Toilet seats, flush handles, door handles
- Nail brushes

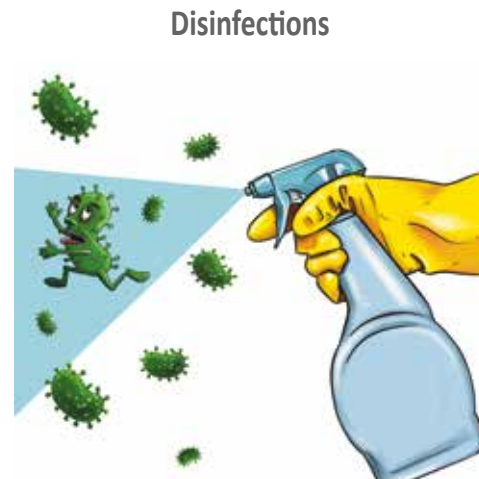


Illustration 15: Disinfection

For **effective sanitation**,<sup>22</sup> the following aspects need to be observed:

- All surfaces to be sanitized must be clean, since sanitizers generally do not work well in the presence of food residues or dirt.
- Sanitizers should be used at the correct concentration (too low or too high is not effective) and temperature and for the correct contact time. Ideally, details will be specified by the sanitizer's manufacturer. Using products with informative labels or product specification sheets will enable details of use to be easily checked.
- Some sanitizers require extended contact time to ensure pathogens are reduced to a safe level.
- Diluted sanitizers often have a shorter shelf life than the concentrated form, so this should be checked before use, and a fresh batch should be made if needed.
- All surfaces to be sanitized should be completely covered with the sanitizing solution using a dip or spray. Special attention should be given to equipment with surfaces that are difficult to get at.
- After sanitizing, utensils and surfaces should be thoroughly dried. If used while still wet, there is a greater chance that they could pick up dirt or other contaminants. Air drying is preferable.
- Care should be taken not to re-contaminate sanitized utensils and equipment. For example, by ensuring they are packed away with clean hands and stored in a clean and sanitary place.

<sup>22</sup> Food standards Australia and New Zealand, <https://www.foodstandards.gov.au/publications/pages/safefoodaustralia3rd16.aspx>, Appendix 6- Cleaning and sanitizing surfaces and utensils; retrieved on 1 March 2022.

### Cleaning programme

To ensure that cleaning is conducted correctly, a cleaning programme needs to be in place.

A typical cleaning programme includes the following:

- Areas, items of equipment and utensils to be cleaned
- Cleaning method
- Standards
- Frequency
- Chemicals used
- Equipment used

#### 1. Time and temperature specifications

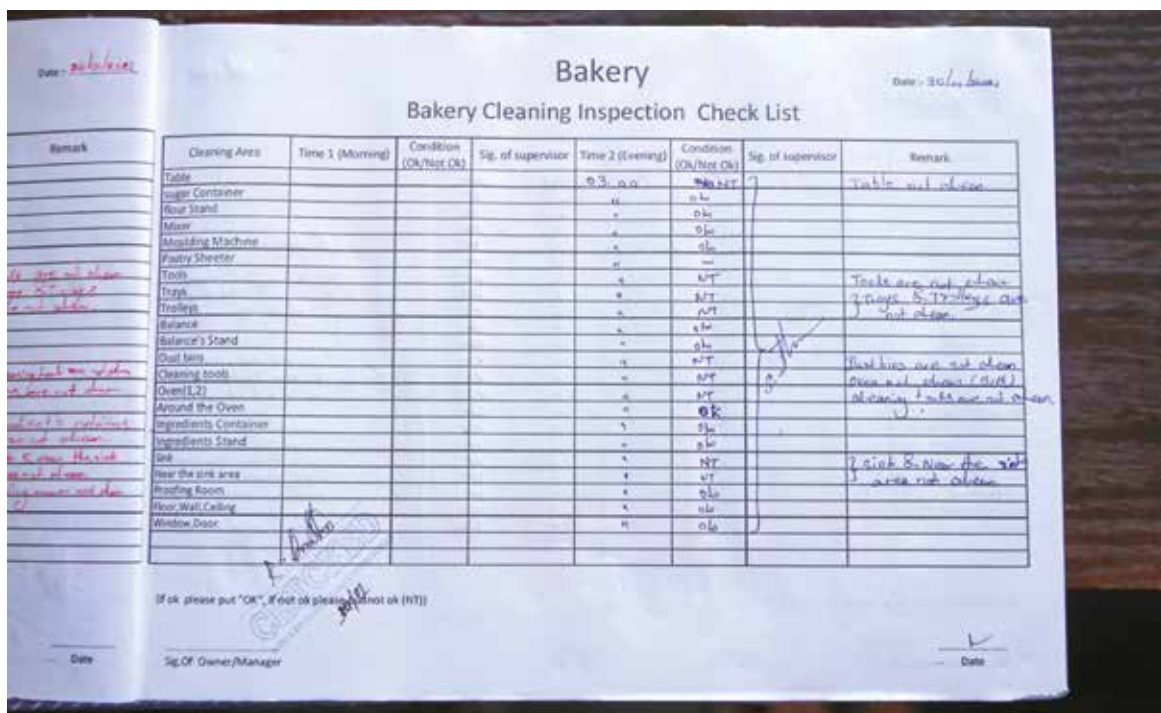


Photo 41: Example of a cleaning checklist

These procedures may be collected into a cleaning manual which should be available to those responsible for cleaning. The cleaning plan may also be summarized in a table, and records should be maintained of all completed cleaning activities.

### Monitoring and checking the effectiveness of cleaning programmes

A monitoring programme provides verification that surfaces are in fact clean and addresses the identified hazards of a particular food plant.

A typical monitoring programme may include one or more of the following:

- Visual inspection
- Microbiological testing
- Rapid testing

Templates for a cleaning programme and monitoring of cleaning programmes are found below.

**Attachments:**

- A) Example of a cleaning schedule
- B) Standard operating procedures (SOPs):
  - a. Maintenance and cleaning – floor surfaces and facility
  - b. Cleaning & sanitizing food-contact surfaces
- C) Checklists/forms:
  - a. Maintenance, cleaning and sanitizing floor, surfaces, facility and equipment

**Example of a cleaning schedule**

Item	Who	When	How	What is used
1. Processing area		1. After spillages	1. Sweep entire area, especially where the floors meet the walls and coving 2. Mop with hot water and detergent 3. Mop with sanitizer 4. Allow to air dry	Broom, dustpan, vacuum, mop, wringer bucket, detergent sanitizer
2. Preparation Table		1. Start of day 2. After spillages 3. End of day	1. Remove loose debris with a clean cloth 2. Wash in hot water and detergent 3. Apply sanitizer 4. Allow to air dry	Hand scraper Clean cloth Detergent Double-sided bucket

<b>Name of the Company</b> Additional information is required	
<b>Standard operating procedure</b>	Identification
Maintenance and Cleaning Floor surfaces and Facility	Issue No: 001 Issue Date:

<b>Purpose</b>	To prevent cross-contamination of food from the floor surfaces, the facility and equipment
<b>Scope</b>	This procedure applies to food-handling employees involved in cleaning various floor surfaces, the facility and equipment.
<b>Responsible</b>	Quality manager
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Train food-handling employees on using the procedures in this SOP.</li> <li>2. Cleaning and disinfection programmes must ensure that all parts of the establishment are appropriately cleaned and must include the cleaning of cleaning equipment.</li> <li>3. Cleaning is defined as physically removing visible food residues or soil, which may be a source of contamination from surfaces, with the aid of a detergent, water and some muscle power followed by disinfection after cleaning.</li> <li>4. Systematically maintain and clean facility to prevent contamination of food from fall of metal shards, flaking plaster, cobwebs, debris and chemicals from roofing and walls.</li> <li>5. Cleaning must be carried out with the separate or combined use of physical methods, such as heat, scrubbing, turbulent flow, vacuum cleaning or other methods that avoid the use of water, and chemical methods using alkalis or acids in detergents.</li> <li>6. Follow manufacturer’s instructions regarding the use of chemicals and disinfectant for cleaning various floor surfaces.</li> <li>7. Clean walls and floors (including drains) thoroughly.</li> <li>8. Any spills on floors must be cleaned immediately.</li> <li>9. Equipment used to clean floors is to be kept clean and stored in well-lit areas away from food and food preparation.</li> <li>10. Wet floor signs must be used wherever floors are being cleaned or mopped.</li> <li>11. Cleaning procedures must follow these steps:             <ol style="list-style-type: none"> <li>a. Removing gross debris from surfaces</li> <li>b. Applying a detergent solution to loosen dirt and bacterial film and holding them in a solution or suspension</li> </ol> </li> </ol>



	<ul style="list-style-type: none"> <li>c. Rinsing with water which complies with SLS 614 to remove loosened soil and residues of detergent</li> <li>d. Dry cleaning or other appropriate methods for removing and collecting residues and debris</li> <li>e. When necessary, disinfecting</li> </ul> <p>12. Cleaning and disinfection programmes must be in written form, continually and effectively monitored for their suitability and effectiveness and documented.</p> <p>13. Written cleaning programmes should specify:</p> <ul style="list-style-type: none"> <li>a. Areas, items of equipment and utensils to be cleaned</li> <li>b. Responsibility for tasks</li> <li>c. Method and frequency of cleaning</li> <li>d. Monitoring arrangements</li> </ul> <p>14. Cleaning and disinfection programmes may not be performed by any means while food is being prepared in the establishment, other than a dustless method of floor cleaning.</p> <p>15. Always use a designated utility sink for filling buckets, cleaning tools and dumping dirty water. Never clean mops, brushes or other tools in sinks designated for hand washing, food preparation or dishwashing.</p>
<b>Monitoring</b>	<p>Daily, according to form No. XXX: Maintenance and cleaning – Floor surfaces and facility checklist – random, during the working day</p> <ul style="list-style-type: none"> <li>1. Quality assurance manager visually and physically inspects floor surfaces and facility to ensure that the surfaces are clean during all hours of operation.</li> <li>2. Quality assurance manager monitors that all food-handling employees are adhering to the above-stated floor surfaces and facility policy during all hours of operation.</li> </ul> <p>All monitoring activities are documented in form No. XXX: Maintenance and cleaning – Floor surfaces and facility checklist</p>
<b>Training</b>	<p>Every three months Training sessions are documented</p>
<b>Corrective Actions</b>	<ul style="list-style-type: none"> <li>1. Training will be provided to any food-service employee who does not follow the procedures in this SOP.</li> <li>2. Wash, rinse and sanitize dirty floor surfaces and facilities.</li> <li>3. Sanitize floor surfaces and facilities if it is discovered that the surfaces were not properly sanitized.</li> </ul>

	4. Discard food that is contaminated by fall of metal shards, flaking plaster, cobwebs, debris and chemicals.
<b>Record keeping</b>	Records are kept in the office of the quality manager. They must be stored at least five years.
<b>Related documents</b>	Form No. XXX: Cleaning and sanitization checklist Form No. ZZZ: Floor surfaces, facility and equipment maintenance checklist SOP No. YYY: Cleaning & sanitizing food contact surfaces
<b>Literature/ references</b>	Food Hygiene regulation 2012 SLS 143: 1999 clauses 7.1 and 7.2; and Appendix A on cleaning and disinfection

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

<b>Name of the Company</b> Additional information is required	
<b>Standard operating procedure</b>	Identification
Cleaning & Sanitizing Food Contact Surfaces	Issue No: 001 Issue Date:

<b>Purpose</b>	To prevent contamination of food from all food-contact surfaces
<b>Scope</b>	This procedure applies to food-handling employees involved in cleaning and sanitizing food-contact surfaces.
<b>Responsible</b>	Quality manager
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Train food-handling employees on using the procedures in this SOP.</li> <li>2. Cleaning is defined as physically removing visible food or soil from surfaces with the aid of a detergent, water and some muscle power.</li> <li>3. Sanitizing is the process of reducing the number of bacteria and other microorganisms on a surface to safe levels.</li> <li>4. Follow manufacturer’s instructions regarding the use and maintenance of equipment as well as the use of chemicals for cleaning and sanitizing food-contact surfaces.</li> <li>5. Properly labelled cleaning and sanitizing buckets are to be used in all concepts.</li> </ol>

	<ol style="list-style-type: none"> <li>6. Cleaning/sanitizing cloths are to be stored in labelled buckets with separate cleaning and sanitizing solution.</li> <li>7. Wash, rinse and sanitize food-contact surfaces of sinks, tables, equipment, utensils, thermometers, carts and equipment:       <ol style="list-style-type: none"> <li>a. Before each use</li> <li>b. Between uses when preparing different types of food items</li> <li>c. Between uses when preparing ready-to-eat foods and raw animal foods, such as eggs, fish, meat and poultry</li> <li>d. Any time contamination occurs or is suspected</li> </ol> </li> <li>8. Wash, rinse and sanitize food-contact surfaces of sinks, tables, equipment, utensils, thermometers, carts and equipment using the following procedure: Between uses when preparing different types of food items       <ol style="list-style-type: none"> <li>a. Wash surface with detergent solution.</li> <li>b. Rinse surface with clean water.</li> <li>c. Sanitize surface using a sanitizing solution mixed at a concentration specified on the manufacturer's label.</li> <li>d. Place wet items in a manner that allows air drying.</li> </ol> </li> <li>9. If a three-compartment sink is used, setup and use the sink in the following manner:       <ol style="list-style-type: none"> <li>a. In the first compartment, wash with a clean detergent solution at or above 45 °C or at the temperature specified by the detergent manufacturer.</li> <li>b. In the second compartment, rinse with clean water.</li> <li>c. In the third compartment, sanitize with a sanitizing solution mixed at a concentration specified on the manufacturer's label or by immersing in hot water at or above 80 °C for two minutes. Test the chemical sanitizer concentration by using an appropriate test kit.</li> </ol> </li> </ol>
<b>Monitoring</b>	<p>Daily, according to form No. XXX: Cleaning and sanitization checklist – random, during the working day</p> <ol style="list-style-type: none"> <li>1. Quality assurance manager visually and physically inspects food-contact surfaces of equipment and utensils during all hours to ensure that the surfaces are clean.</li> </ol>

	<ol style="list-style-type: none"> <li>2. Quality assurance manager monitors that all food-handling employees are adhering to the above-stated cleaning and sanitization policy during all hours of operation.</li> </ol>
	All monitoring activities are documented in form No. XXX: Cleaning and sanitization checklist
<b>Training</b>	Every three months Training sessions are documented
<b>Corrective Actions</b>	<ol style="list-style-type: none"> <li>1. Training will be provided to any food-service employee who does not follow the procedures in this SOP</li> <li>2. Wash, rinse, and sanitize dirty food-contact surfaces.</li> <li>3. Sanitize food-contact surfaces if it is discovered that the surfaces were not properly sanitized.</li> <li>4. Discard food that has come into contact with food-contact surfaces that have not been sanitized properly.</li> </ol>
<b>Record keeping</b>	Records are kept in the office of the quality manager. They must be stored at least five years.
<b>Related documents</b>	Form No. XXX: Cleaning and sanitizing of food-contact surfaces checklist Form No. ZZZ: Maintenance and Cleaning Floor surfaces and Facility Checklist SOP No. YYY: Maintenance and cleaning – Floor surfaces and facility
<b>Literature/ references</b>	Food Hygiene regulation 2012 SLS 143: 1999 clauses 7.1 and 7.2; and Appendix A on cleaning and disinfection

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

<b>Name of the Company</b> <b>Additional information is required</b>	
<b>Monitoring Checklist</b>	Identification
Maintenance, Cleaning & Sanitizing Floor, surfaces, facility, and equipment	Issue No: 001 Issue Date:

For the week of →.....	Sun	Mon	Tue	Wed	Thu	Fri	Sat
<b>Date</b> →.....							
<b>What to verify</b> ↓							
1. Walls, floors and drains thoroughly cleaned							
2. Where “CIP <sup>23</sup> ”method of cleaning <sup>24</sup> utilized, production lines effectively cleaned and disinfected							
3. Utensils, equipment, floor, surfaces, facility effectively cleaned and disinfected. <sup>25</sup>							
4. Spills of food and other contaminants <sup>26</sup> not observed on floor, utensils, tools and equipment							
5. Did not detect contamination <sup>27</sup> of food during cleaning and disinfection of rooms, equipment and utensils							
6. Metal fragments, accumulation of dirt, development of fungus, flaking plaster, cobwebs, debris and chemicals not spotted on ceiling, roofing or walls							
7. Cleaned and disinfected by use of recommended physical methods <sup>28</sup>							
8. While floors cleaned or mopped, wet floor signs displayed							
9. Equipment used to clean floors cleaned and kept away from food and food-processing area							

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

<sup>23</sup> Clean in place

<sup>24</sup> Removal of soil, food residue, dirt, grease or other objectionable matter

<sup>25</sup> Reduction, by means of chemical agents and/or physical methods, of the microorganisms in the environment to a level that does not compromise food safety or suitability

<sup>26</sup> Biological or chemical agent, foreign matter or other substances not intentionally added to food which may compromise food safety or suitability

<sup>27</sup> The introduction or occurrence of a contaminant in food or food environment

<sup>28</sup> Such as heat, scrubbing, turbulent flow, vacuum cleaning or other methods that avoid the use of water and chemical methods using alkalis or acids of detergent

### 3.9 Pest-control system

Pests are a major threat to the safety and suitability of food. They can contaminate food, spread disease, destroy food and damage premises. Pest infestations can occur where there are breeding sites and a supply of food. Good hygiene practices should be employed to avoid creating an environment conducive to pests. There are strictly no pests allowed in the production area.

Pests are, for example:

- Cockroaches, flies, ants
- Mice, rats, bats, gecko lizards
- Birds, including hens and fighting cocks
- Dogs, cats, pigs

They can transmit bacteria and viruses:

- Flies and cockroaches may transmit *Salmonella*, *Staphylococcus*, *C. perfringens*, *C. botulinum*, *Shigella*
- Rodents are sources of *Salmonella* and parasites
- Birds can spread a variety of bacteria, e.g., *Salmonella*, *Listeria*, and others

Pests



Illustration 16: Common pests

#### Pest prevention

Pests are attracted to places where food is stored, prepared, sold, served or thrown away.

They can enter buildings through open windows and doors, or through the tiniest cracks in walls and around windows and pipes. Food premises are attractive to pests because they contain everything most pests need to survive.

**The best pest control is to exclude them by taking the following measures:**

- Remove unnecessary items from the premises
- Keep waste containers clean and tidy
- Use pest-proof containers
- Keep waste bins as far away from production as possible
- Clean up food and beverage spills immediately
- Use clean tools and supplies
- Reduce moisture in the production plant
- Remove shelters for pests



Photo 42: Ingredients stored in pest-proof containers

Several strategies are necessary to prevent pests gaining access or to eliminate pests.

- Doors are tight fitting and are kept closed unless in use.
- Seal cavities and holes, e.g. around pipes.
- Windows must have insect screens, and air bricks shall have a wire mesh behind them.
- Inspect and clean ceilings, check for internal access points.
- No animals may be kept on site.
- Design, write, distribute, train, implement and monitor pest control programme.
- Processed and unprocessed food must be stored in separate define areas with suitable labelling.
- By-products must be stored separately and monitored.
- Waste materials must not accumulate in food-handling areas.
- Remove or modify bird attractants.
- Toxicants, shooting and trapping may be used if legal.

### Pest control

According to the Environmental Protection Agency (EPA) of the United States, “integrated pest management (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programmes use current, comprehensive information on the life cycles of pests and their interaction with the environment” (see also Environmental Protection Agency/EPA), <https://www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles>).

An integrated pest management (IPM) programme works well and:

- Uses prevention measures to keep pests from entering the establishment.
- Uses control measures to eliminate any pests that get into the establishment.
- Will be successful if you work closely with a licensed pest-control operator.

It is possible to establish:

- In-house pest-control programmes with trained personnel.
- A contracted pest-control programme together with a contracted, licensed pest-control company.

Whether pest control will be carried out in-house or by external service providers, several steps still have to be taken

- Prepare a floor plan with the location of each pest trap.
- Have a checklist for each trap and monitor the findings.
- Document servicing and cleaning record of each rodent-control device.
- Prepare a list of chemicals used with a safety data sheet (SDS) and concentration of treatments.
- Write down cleaning procedures.
- Train the staff.



*Photo 43: Pest traps should be part of any integrated pest-management plan*

## Monitoring and detection of pests

The establishment and its surrounding areas should be regularly examined for evidence of infestation.

Do so regularly according to the schedule below and document the results. The main signs are:

- Dead pests (mainly insects, rodents and birds)
- Droppings
- Nests
- Unusual smells
- Scratching, pecking or gnawing sounds (mainly rodents and birds)
- Gnawed pipes, cables and fittings (mainly rodents)
- Torn or damaged sacks or packaging, sometimes surrounded by spilled food
- Eggs, larvae, pupae, feathers, fur, nesting material
- Paw or claw prints
- Smears and rat runs (rodent)

Findings must be immediately reported to the supervisor.

## Pest removal

If a pest infestation is discovered, immediate action must be taken. These steps even can lead to closing the premises. They include:

- Finding the cause of the infestation and ensuring that it will not recur
- Ensuring that contaminated food is removed and destroyed
- Arranging for the premises and outside to be cleaned thoroughly
- Checking that surfaces and equipment are cleaned after treatment and before being re-used so food does not become tainted.
- Organizing the treatment and any necessary repeated treatment of the premises by competent pest-control operatives.
- Inspecting the premises for maintenance defects and ensuring that effective repairs are carried out promptly
- Liaison with an environmental health practitioner (EHP) and/ or a pest-control contractor
- Removal of unused equipment, vegetation and other harbourage areas from the site
- Moving and regularly checking unused equipment and packaging
- Keeping all food in rodent-proof containers and always replacing lids
- Checking all raw materials – on arrival and before they are stored

## Attachments:

- A) Standard operating procedures
  - Control of pests
- B) Checklists/forms
  - Control of pests



<b>Name of the Company</b> Additional information is required	
<b>Standard operating procedure</b>	Identification
Control of Pest	Issue No: 001 Issue Date:

<b>Purpose</b>	To prevent contamination of food by pests and insects
<b>Scope</b>	This procedure applies to food-handling employees.
<b>Responsible</b>	Quality manager
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Train food-handling employees on using the procedures in this SOP.</li> <li>2. Employees must report sightings of pests and insects to managers.</li> <li>3. Report any openings, cracks, broken seals or other opportunities for pest infestation to managers.</li> <li>4. Doors and windows are to be kept closed tightly if they don't have screens.</li> <li>5. Inspect and, if necessary, sanitize incoming materials to prevent infiltration of pests.</li> <li>6. Foods should always be kept covered to prevent contamination.</li> <li>7. Store all food and supplies as quickly as possible. Keep all food and supplies at least six inches off the floor and six inches away from walls.</li> <li>8. Areas both inside and outside food premises must be kept clean.</li> <li>9. Clean and sanitize the facility thoroughly.</li> <li>10. Dispose of garbage quickly and correctly.</li> <li>11. Empty garbage cans more often than needed to prevent the pile-up of garbage and possibility of cross-contamination.</li> <li>12. Cardboard boxes are to be disassembled and disposed of in the appropriate container as they are emptied.</li> <li>13. Recyclable product (cans, plastic, etc.) are to be placed in their appropriate bins for recycling.</li> <li>14. Garbage bins need to be cleaned and sanitized inside and out once a week or more often as needed.</li> <li>15. Drainage must be cleaned daily.</li> <li>16. All openings, holes, drains and other places where pests are likely to gain access must be kept sealed.</li> <li>17. Animals must be banned from the grounds of factories and food-processing plants.</li> </ol>

<b>Monitoring</b>	Daily, according to form No. XXX: Pest-control checklist – random, during the working day
	<ol style="list-style-type: none"> <li>1. Quality assurance manager inspects possible pest breeding areas to ensure that each employee is following this SOP.</li> <li>2. Quality assurance manager monitors:             <ol style="list-style-type: none"> <li>i. The effectiveness of cleaning and sanitation of garbage bins</li> <li>ii. The effectiveness of cleaning of drainage</li> <li>iii. The effectiveness of cleaning the environment</li> <li>iv. All openings, holes, drains and other places where pests are likely to gain access</li> </ol> </li> </ol>
<b>Training</b>	Every three months Training sessions are documented
<b>Corrective actions</b>	<ol style="list-style-type: none"> <li>1. Training will be provided to any food-service employee who does not follow the procedures in this SOP.</li> <li>2. Discard affected food.</li> </ol>
<b>Record keeping</b>	Records are kept in the office of the quality manager. They must be stored at least five years.
<b>Related documents</b>	Form No. XXX: Pest-control checklist
<b>Literature/References</b>	Food Hygiene regulation 2012 SLS 143:1999 clause No. 7.3

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

<b>Name of the Company Additional information is required</b>		
<b>Monitoring Checklist</b>	Identification	
Control of Pest	Issue No: 001	Issue Date:

Date	Processing Area	Storage Area	Washing Area	Control Method	Remarks	Signature

Pests to be checked

- 1- Rodents
- 2- Cockroach
- 3- Gecko
- 4- Ants
- 5- House flies
- 6- Spider/Cobweb

If Satisfactory-"S"  
 If Not Satisfactory-"NS"  
 Check for possible way of entry and harbouring of pest

1. Garbage bins emptied and cleaned
2. Cardboard boxes disposed
3. Check for any openings, cracks, broken seals
4. Doors and windows without screens/net
5. Any unused machine, equipment, goods

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

### 3.10 Waste management

Waste management is essential in hygienic production. Waste is often the starting point of any chemical, biological or physical contamination of food. Therefore, the waste in all areas of the food-processing facility must:

- Be removed as quickly as possible and only be stored for the allowable time
- Be deposited in closable containers that are easy to clean and disinfect
- Be stored in areas that are separated from the production site. These areas must be kept clean, free of animals and pests and must be labelled accordingly

If waste is not effectively controlled – both inside and outside food premises – it can attract pests.

Waste must be collected in adequate numbers of special bins which must:

- Have tight-fitting lids
- Be lined with disposal polythene sacks
- Ideally be foot-operated to minimize any hand contact
- Have different colours for each kind of waste according to the national Sri Lankan colour code (waste separation)

The figure to the right-hand side provides an overview of the national colour code on solid waste management in Sri Lanka:

In general, these containers should:

- Be located close to working areas
- Never be allowed to overflow
- Always be emptied at the end of a work period or at the end of the day
- Be easy to clean and disinfect on a regular basis, which should be monitored

Ideally, routes for taking waste out of food premises should not cross routes taken by food products within. Once food waste has been removed from a food preparation area, it should be placed in a specially labelled area with sealed containers to await disposal.



Photo 44: Foot-operated waste bin to minimize contact of hands with waste in the bin

#### National code on solid waste management



Illustration 17: National code on solid waste management



Photo 45: A waste container closely located to the working area. It is easy to clean because it is made from non-absorbent plastic and has a closed lid.

This area must be:

- Easy to access and easy to clean
- Tidy, no bags leaving outside a bin
- Equipped with bins with closed lids

The waste disposal place and the bins must be cleaned regularly, and the activity should be monitored.

Waste such as cardboard, clean packaging materials and paper does not necessarily have to be stored in closed containers. However, it must be stored in such a way that it cannot pose any contamination risk to food.

### Attachments:

A) Standard operating procedures (SOPs)

- Waste management

B) Checklists/forms

The checklist “Control of pests” in subchapter 3.9, “Pest-control system”, covers the cleaning of garbage containers.

<b>Name of the Company</b> Additional information is required	
<b>Standard operating procedure</b>	Identification
Waste Management	Issue No: 001 Issue Date:

<b>Purpose</b>	To prevent cross-contamination of food, odour and breeding of pests from the garbage
<b>Scope</b>	This procedure applies to food service employees who are utility handlers.
<b>Responsible</b>	Quality manager
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Train food service employees on using the procedures in this SOP.</li> <li>2. The utility handlers should empty the garbage bins as soon as possible, or more often as needed, to prevent the pile-up of garbage and possibility of cross-contamination.</li> <li>3. Cardboard boxes should be disassembled and disposed of in the appropriate container as they are emptied.</li> <li>4. Recyclable products (cans, plastic, etc.) should be placed in their appropriate bins for recycling.</li> <li>5. Garbage bins should be cleaned and sanitized inside and out once a week or more often as needed.</li> <li>6. Waste must not be allowed to accumulate in food handling, food storage and other working areas and the adjoining environment.</li> <li>7. The garbage room must be kept appropriately clean.</li> </ol>

	8. Every person engaged in the disposal of garbage should wear personal protective clothing and wash their hands thoroughly with soap and/or disinfectant after disposing of the garbage.
<b>Monitoring</b>	Daily, according to form No. XXX: Pest-control checklist and No. YYY: Checklist on the maintenance, cleaning and sanitizing – Floor, surfaces, facility and equipment Random, during the working day  1. Quality assurance manager monitors the adherence of all food-service employees to the above-stated policy during all hours of operation
<b>Training</b>	Every three months Training sessions are documented
<b>Corrective actions</b>	1. Training will be provided to any food-service employee who does not follow the procedures in this SOP. 2. Discard affected food
<b>Record keeping</b>	Records are kept in the office of the quality manager. They have to be stored at least five years.
<b>Related documents</b>	Form No. XXX: Pest-control checklist Form No. YYY: Maintenance, cleaning and sanitizing – Floor, surfaces, facility and equipment checklist SOP No. ZZZ: Hand washing
<b>Literature/ references</b>	Food Hygiene regulation 2012 SLS 143: 1999 clause 7.4

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

### 3.11 Maintaining personal hygiene in handling areas

#### Hand washing

Even perfectly healthy people have potentially harmful microbes living on and in their bodies. These organisms can easily be transferred from hands to the food and cause illness.

There are many things that can be done to avoid touching food with bare hands – using tongs or wearing disposable gloves, also when touching equipment, utensils and other food-contact surfaces while working. Cross-contamination is avoided by ensuring that hands are scrupulously clean at all times.

Hand washing helps to:

- Remove pathogens (such as bacteria and viruses) and other harmful substances (such as dirt) from hands
- Prevent direct food contamination and cross-contamination by your hands

## **When to wash your hands:**

Always wash your hands:

Before

- Starting work
- Handling raw food
- Touching raw food or high-risk food during any work with food
- As often as necessary to keep your hands clean
- When switching between handling raw and cooked food
- During any work with food
- Re-entering the food preparation area

After

- Handling raw food
- After using the restroom
- Carrying out cleaning jobs or touching containers of cleaning chemicals
- Dealing with rubbish/waste and bins
- Eating, drinking or smoking (in an area set aside for these activities)
- Touching the hair, face or body
- Sneezing, coughing or using a tissue
- Touching anything else that may contaminate the hands, such as unsanitized equipment, work surfaces, cleaning clothes, garbage or money

## **Hand-washing procedure**

### STEP 1

- Wet hands with hot running potable water.
- The water should be as hot as the hands can comfortably stand.
- Approximately 43 °C

### STEP 2

- Apply enough soap to build up a good lather.
- Soap may be liquid, powder or bar soap.

### STEP 3

- Rub hands together for at least 20 seconds.
- One fun way to teach this is to have the employee sing “Happy Birthday” while lathering their hands.
- Ensure that both sides of hands are washed.

### STEP 4

- Clean under fingernails and between fingers and fingertips.
- Ensure that both sides of hands are washed.
- A nail brush is recommended, but avoid splashing.

### STEP 5

- Rinse hands thoroughly under running water.

### STEP 6

- Dry hands.
- Hands should be dried with clean, single-use, disposable paper towels or a hot air blow dryer.
- Hand sanitizers should be used after washing the hands to reduce the number of microorganisms on the skin surface.
- Sanitizers should never be used in lieu of proper hand washing.

### Hand-washing Station

To allow proper hand washing, employers should provide:

- Hand wash basins
- Hot (> 43 °C) and cold running water
- Liquid soap
- Hand drying facilities (paper towels, hot air)
- Sanitizer
- The location must be convenient and accessible by the employees.
- Stations must be functional, used only for hand washing, stocked and maintained.
- Stations are required in food preparation, service, equipment washing and restroom areas.
- Never use a sink designated for washing food for other purposes.
- Hand-washing procedure should be displayed at each location.



Photo 46: After proper hand washing, hands are dried using hot air or paper towels

### Other hand issues

- Fingernails must be kept short and clean.
- Nail polish, false nails and acrylic nails are not allowed while handling food.
- Cuts and sores must be treated and kept covered with clean bandages.
- If hands or fingers are bandaged, gloves or finger cots must be used to protect the bandage and prevent it from falling into the foods.
- It may be necessary to move an employee to an area where food will not be handled.

The figure below shows the steps to wash hands with soap and water:

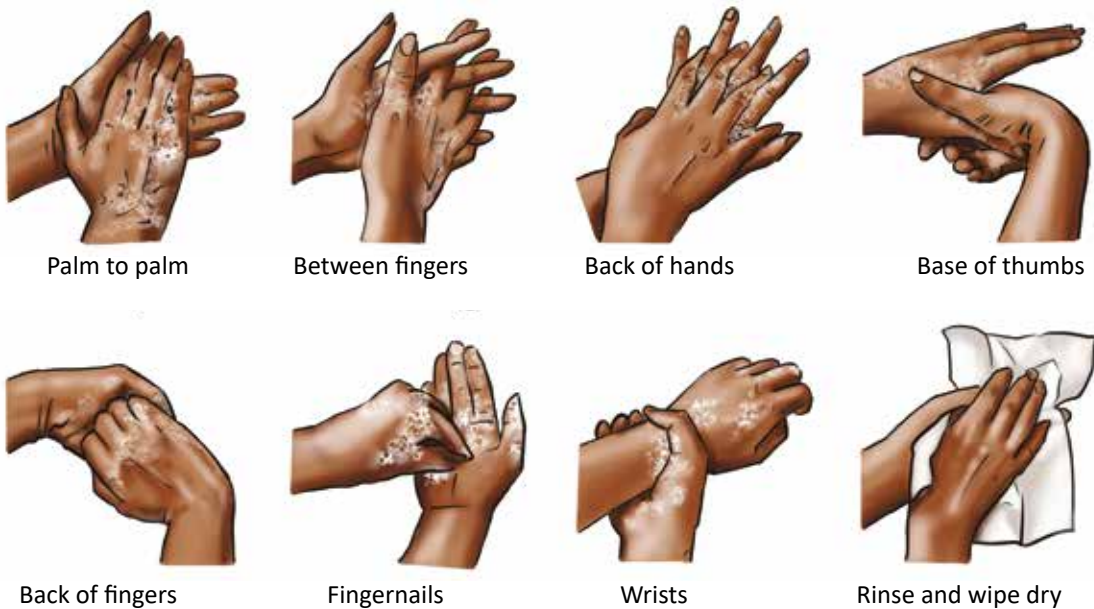


Illustration 18: Proper hand washing



## Protective clothing

Special protective clothing, including hats, is worn to safeguard food from contamination. Although the clothing may protect the staff's own clothes, this is incidental to the main purpose – the protection of food. Everyone working in a food-handling area must wear clean clothing and, where appropriate, protective clothing.

Protective clothing may include additional items such as overalls, disposable or washable aprons, suitable boots or shoe covers, rubber, metal gloves, hair nets, masks or disposable gloves. All selected materials must be food safe.

- Disposable gloves should be changed as often as hands should be washed.
- If non-disposable rubber gloves are used in the facility, they should be washed as frequently as bare hands.
- Remember to wash hands before and after the usage of gloves.



*Photo 47: Staff wearing disposable gloves*

Protective clothing should cover the food handlers' own clothes and should be:

- Clean
- Washable or disposable
- Light coloured
- Without external pockets and buttons

Note: Cloth towels are forbidden in the production area.

Clothing should have press studs or strips. Outdoor clothing may not be used in food areas. These items need to be stored in a locker or cloakroom provided for the purpose. Protective clothing may not be worn outside the food premises or for travelling to and from work. If staff is leaving the food-processing area with protective clothing on, it needs to be changed before re-entering the food area. This requires preparing a stock of disposable protective clothing for either staff or customers.



*Photo 48: Staff wearing protective clothing*

In food premises where specific low and high-risk areas are physically separated, areas are provided for changing into completely different protective clothing and footwear, which may be a different colour, if moving from one area to another.

Protective clothing must be worn appropriately by anyone who enters the production areas, namely:

- Employees
- Food handlers and engineers
- Truck drivers
- Management personnel
- Other casual visitors

### **Health status and medical examination of employees**

Regular health checks are necessary and must be carried out routinely. The company must ensure that medical screening procedures are in place for all employees and visitors in places where product safety could be compromised. It is necessary to carry out:

- Pre-employment health checks for new applicants
- Annual medical examinations for employees by the medical officer of health of the area, certifying that the food handler is medically fit
- Medical examinations when staff members return from illness

### **Reporting illness:**

A sick person is often loaded with pathogenic bacteria and/or viruses that could easily spread to food, food-packaging material and food-contact surfaces. Such an employee should be assigned to other duties outside the production site or should stay home.

The supervisor must be informed if an employee has symptoms from food poisoning or any illness with similar signs. This is because:

- It is not allowed to work with food if you have certain illnesses or symptoms because there is a high risk of food contamination. Even if family members are suffering from those symptoms, the employer needs to be informed.
- It is a legal requirement to report certain illnesses to the health authorities. The employer is responsible for that.
- Medical attention may be necessary.
- Doctor's approval before re-starting work with food is mandatory.

These are the symptoms that should be reported to the supervisor:

- Diarrhoea
- Vomiting
- Nausea
- Ear, eye and nose discharges
- A septic cut, wound or other skin condition that leaves an open wound or broken skin, or any other skin condition or infection.

### Reporting cuts, boils, septic spots and skin infection:

A person with an injury, cut or burn should use gloves to protect the food and the injury, or be assigned tasks that will not contaminate food.

Staff with septic cuts or boils, especially if they cannot be adequately covered with an appropriate waterproof dressing, must be excluded from food-handling areas as they are likely to be carrying *Staphylococcus aureus*.

Uninfected cuts should be covered by a clean, easy-to-detect, waterproof dressing. All dressings must be waterproof to prevent blood and bacteria from the cut contaminating food and also to prevent bacteria, especially from raw food, from infecting the cut and making it septic. Dressings should also be highly visible – they are usually blue, a non-food colour – so that they may be seen and recovered if accidentally dropped into the food.

Waterproof dressings designed especially for food use contain a thin metal strip, allowing detection of lost dressings in food production where metal detectors are used. Lost dressings must be reported immediately.

Water-proof dressings used for wounds or cuts must be accounted for at the end of each shift and must be replaced before the start of each shift.

Staff must have access to adequate first-aid facilities, including detectable waterproof dressings. A first-aid box is part of first-aid facilities.

Skin infections such as dermatitis, eczema and psoriasis may increase the possibility of food contamination. People with these conditions may need to be excluded from food-handling duties (see figure 20)

**First aid**<sup>29</sup> is the preliminary and immediate assistance given to any person suffering from either a minor or serious illness or injury, with care provided to preserve life, prevent the condition from worsening or to promote recovery. It includes initial intervention in a serious condition prior to professional medical help being available, such as performing cardiopulmonary resuscitation (CPR)<sup>30</sup> while waiting for an ambulance, as well as the complete treatment of minor conditions, such as applying a plaster to a cut. **First aid is generally performed by someone with basic medical training.**

A person wearing a clean, blue-coloured dressing after a cut



Illustration 19: A cut covered by a clean, easy-to-detect (blue), waterproof dressing

29 Source: [https://en.wikipedia.org/wiki/First\\_aid](https://en.wikipedia.org/wiki/First_aid)

30 See [https://en.wikipedia.org/wiki/Cardiopulmonary\\_resuscitation](https://en.wikipedia.org/wiki/Cardiopulmonary_resuscitation) for an explanation of CPR.

First aid can include cleaning minor cuts, scrapes or scratches; treating a minor burn; and applying bandages and dressings.

### First-Aid Box

A first-aid box should contain a leaflet with general guidance on first aid (for example, basic advice on first aid at work). Further items recommended to be kept in the first-aid box are the following:

- Triangular pieces, adhesive plasters, compresses, medical gloves and emergency blankets
- A ready-to-use bandage set including eight rapid wound dressings (10 x 6 cm), four fingertip bandages, four finger bandages (12 x 2.0 cm), four smaller plaster strips (1.9 x 7.2 cm) and eight larger plaster strips (2.5 x 7.2 cm).
- Bandage packets: You will also need all three sizes of first-aid kits at the workplace.
- Dressing cloth: A dressing cloth of 60 cm x 80 cm, carefully packed
- Eye compresses and instant cold compresses: In addition to the usual compresses, you need compresses especially for the eyes and those that have a cooling effect in order to be able to treat injuries more specifically.
- Fixation bandages: Two of each type of elastic bandages should be included in the first-aid kit.
- First-aid box scissors: In the context of labour law, fabric scissors only need to have an overall length of 19 cm.
- Non-woven cloth wipes: Five non-woven cloth wipes (20 cm x 30 cm) that can be used as a mouth guard, cover a wound or be used to distribute disinfectant
- Sealable foil bags: Polyethylene bags (30 cm x 40 cm) are used to organize the first-aid kit and help to transport materials around more easily in an emergency.



*Photo 49: A properly equipped and easily accessible first-aid box*

### Personal cleanliness

It is good practice to start work in a clean and tidy condition every day. This will help you to feel good, give a favourable impression to any customers you meet and help to protect food from contamination.

A bath or shower every day is highly recommended. This will remove some of the bacteria that are naturally present on hair and skin, including those that thrive on stale perspiration and cause body odour. Using a deodorant can help to prevent unpleasant body smells from developing after washing, but strongly scented deodorants, perfumes, aftershaves and other toiletries or cosmetics should be avoided because they can taint some food.

In principle it is NOT allowed to:

- Smoke
- Eat, drink, chew gum and chew betel nuts
- Spit

- Bite nails
- Pick and scratch the nose
- Wear jewellery in production sites
- Bring and use cell phones in the production area

**Jewellery:**

Staff in food-processing areas are not allowed to wear any jewellery because it harbours dirt and bacteria and could cause physical contamination if jewellery or gemstones fall into food.

**Scented personal hygiene and grooming products:**

Strongly scented soap, perfume, aftershave and deodorants may taint food and, therefore, are not allowed to be used.



Do not smoke



Do not eat, drink or chew gum



Do not spit



Do not bite nails



Do not pick and scratch the nose



Do not wear jewellery in production sites



Do not bring and use cell phones in the production area

**Personal behaviour in a food-handling business**

*Illustration 20: Personal behaviour in a food-handling business*

**Food consumption and sleeping at the workplace:**

Employees are not permitted to consume food or to sleep in any premises intended for use in the preparation of food.

**Visitors:**

Visitors must obey the same rules as the company’s staff and there should be no exceptions.

- All visits must be documented.
- Visitors must sign the logbook, be oriented on house rules and be subjected to the same personal hygiene guidelines.
- Visitors must wear protective clothing which must be provided by the company.

**Attachments:**

- A) Standard operating procedures (SOPs)
  - Personal hygiene
- B) Checklists/forms
  - Employees’ personal hygiene
- C) Instructions to employees
  - When to wash hands
  - When to report illness

<b>Name of the Company</b> Additional information is required	
<b>Standard operating procedure</b>	Identification
Employees Personal Hygiene	Issue No: 001 Issue Date:

<b>Purpose</b>	To prevent contamination of food by food-handling employees
<b>Scope</b>	This procedure applies to all food-handling employees who handle, prepare or serve food or enter food-production premises.
<b>Responsible</b>	Quality manager
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Train food-handling employees on using the procedures in this SOP.</li> <li>2. Report to work in good health, clean and dressed in clean attire.</li> <li>3. Maintain a high degree of personal cleanliness and wear suitable protective clothing, head coverings, gloves, masks and footwear. Change protective clothing when it becomes soiled.</li> <li>4. Every person engaged in a food-handling area should wash their hands frequently and thoroughly with a soap and/or a disinfectant agent under running, potable water while on duty. Hands should always be washed before beginning work in food areas immediately after using the toilet, after handling contaminated material and whenever necessary.</li> <li>5. Fingernails are to be kept short and clean. Nail polish is not allowed.</li> <li>6. Gloves, if used in the handling of food, must be made of materials that are suitable for food contact and should be maintained in clean and hygienic conditions. Wearing gloves does not exempt the operator from needing to have thoroughly washed hands. Damaged or punctured gloves must be discarded.</li> <li>7. Hands must be washed – disinfected where appropriate – immediately after handling any material which might be capable of transmitting disease or contaminating food or equipment.</li> <li>8. Food-handling employees should wash their hands thoroughly at the different stages of food preparation and between one food-handling operation and another where risk of cross-contamination exists.</li> <li>9. Keep hair clean and wear approved hair, beard and head covering (i.e. hairnets) while working in the food preparation or serving areas.</li> </ol>

	<ol style="list-style-type: none"> <li>10. Adequate first-aid facilities must be provided in the premises.</li> <li>11. A person who has a cut or wound may not continue to handle food or food-contact surfaces until the injury is completely protected by a waterproof covering.</li> <li>12. Bathe daily.</li> <li>13. Personal effects such as jewellery, watches, pins or other items are not allowed to be worn or brought into food-handling areas if they pose a threat to the safety and suitability of food.</li> <li>14. The only jewellery that may be worn while working in the food preparation or service areas is wedding bands.</li> <li>15. No person may use any premises intended for use in the preparation of food as a sleeping place.</li> <li>16. Any behaviour which could result in contamination of food, such as eating, use of tobacco, chewing (e.g. gum, sticks, betel nuts), allowing contact with the hair, face, nose, etc. or unhygienic practices such as spitting are prohibited in food-handling areas.</li> <li>17. Visitors to food-manufacturing, processing, or handling areas must wear appropriate protective clothing and adhere to the other personal hygiene requirements.</li> <li>18. Report any illness to the manager on duty.</li> <li>19. Medical examination of a food handler is to be carried out periodically as determined by the medical officer of health of the area.</li> </ol>
<b>Monitoring</b>	<p>Daily, according to form No. XXX: Hygiene checklist – random, during the working day</p> <ol style="list-style-type: none"> <li>1. The quality assurance manager inspects employees when they report to work to be sure that each employee is following this SOP.</li> <li>2. The quality assurance manager monitors that all food-handling employees are adhering to the above-stated employee policy during all hours of operation</li> </ol> <p>All monitoring activities are documented in form No. XXX: Hygiene checklist</p>
<b>Training</b>	<p>Every three months Training sessions are documented</p>
<b>Corrective actions</b>	<ol style="list-style-type: none"> <li>1. Training will be provided to any food-service employee who does not follow the procedures in this SOP.</li> <li>2. Discard food handled in an unhygienic manner.</li> </ol>

<b>Record keeping</b>	Records are kept in the office of the quality manager. They have to be stored at least five years.
<b>Related documents</b>	Form No. XXX: Hygiene checklist Form No. YYY: Reporting of illness SOP No. ZZZ: Hand washing
<b>Literature/ references</b>	Food Hygiene regulation 2012 SLS 143:1999 clause 8

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:



<b>Name of the Company</b> Additional information is required	
<b>Monitoring Checklist</b>	Identification
Employees Personal Hygiene	Issue No: 001 Issue Date:

For the week of →.....	Sun	Mon	Tue	Wed	Thu	Fri	Sat
<b>Date</b> →.....							
<b>What to do ↓</b>							
1. Work in good health							
2. Dress in clean attire							
3. Wear washed apron							
4. Wash hands							
5. Fingernails cut short, clean, no nail polish							
6. Keep hair clean and wear a hairnet							
7. Not wearing jewellery, watches							
8. Not eating, using tobacco, chewing (gum, sticks, betel nuts) or spitting in food- handling areas							
9. Not touching hair, face, nose, etc.							
10. Cover cuts and wounds with waterproof dark plasters							
<b>Supply checklist ↓</b>							
1. Soap/hand wash							
2. Paper towels/clean towels							
3. Gloves							
4. Hairnets							

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

## INSTRUCTIONS TO FOOD HANDLERS

### When to wash your hands



Always wash your hands:

#### Before

- Starting work
- Touching raw food or high-risk food during any work with food
- As often as necessary to keep your hands clean
- When switching between handling raw and cooked food
- During any work with food

#### After

- Before and after handling raw food
- Using the toilet
- Handling raw eggs in their shell
- Coughing or sneezing into your hands or a handkerchief
- Touching your hair or face
- Carrying out cleaning jobs or touching containers of cleaning chemicals
- Dealing with rubbish waste and bins
- Eating, drinking, or smoking (in an area set aside for these activities)
- After using the restroom
- After touching the hair, face or body
- After sneezing, coughing, or using a tissue
- After touching anything else that may contaminate the hands, such as unsanitized equipment, work surfaces, cleaning clothes, garbage or money

## INSTRUCTIONS TO FOOD HANDLERS

### When to report illness



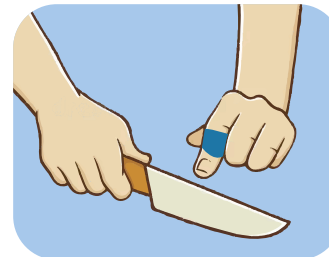
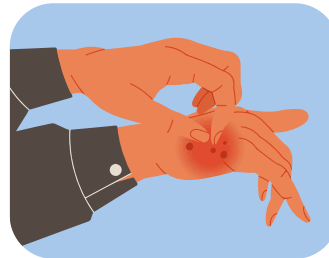
- **Inform to your supervisor:**

If you have any of the following symptoms:

- Vomiting
- Diarrheal
- Jaundice
- Sore throat with fever

A wound containing pus such as a boil or infected wound that is open or draining and is:

- On the hands or wrists, unless an impermeable cover such as a finger cot or stall protects the wound, and a single use glove is worn over the impermeable cover.
- On exposed portions of the arms, unless the wound is protected by an impermeable cover, or
- On other parts of the body, unless the wound is covered by a dry, durable, tight-fitting bandage.



You have an illness diagnosed by a health practitioner due to:

- Hepatitis A virus
- *Shigella*
- *E. coli*
- *Salmonella typhi*

### 3.12 Transportation of food items

Vehicles and containers used for transporting foodstuffs must be kept clean and maintained in good repair and conditions to protect foodstuffs from contamination and, where necessary, designed and constructed to permit adequate cleaning and/or disinfection.

Food must be adequately protected during transport. The type of conveyances or containers required depends on the nature of the food and the conditions under which it has to be transported.

Raw food and cooked food need to be transported separately.

Conveyances and bulk containers should be designed and constructed so that they:

- Do not contaminate food or packaging
- Can be cleaned effectively and disinfected where necessary
- Permit effective separation of different foods or foods from non-food items, where necessary, during transportation
- Provide effective protection from contamination, including dust and fumes
- Can effectively maintain the temperature, humidity, atmosphere and other conditions necessary to protect food from harmful or undesirable microbial growth as well as deterioration likely to render it undesirable for consumption
- Allow any necessary temperature, humidity and other conditions to be checked. In many instances, the use of a refrigerated vehicle might be necessary for maintaining the necessary temperature during transport.

**Attachments:**

- A) Standard operating procedures (SOPs)
  - Prevention of contamination during transport
- B) Checklists/forms
  - Transport conveyances

<b>Name of the Company</b> Additional information is required	
<b>Standard Operating Procedure</b>	Identification
<b>Prevention of contamination during transport</b>	Issue No: 001 Issue Date:

<b>Purpose</b>	Prevention of contamination during transport
<b>Scope</b>	This procedure applies to all food-handling employees who handle, dispatch and deliver raw materials, partially processed goods, and the final product
<b>Responsible</b>	Quality manager
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Train food-handling employees on using the procedures in this SOP.</li> <li>2. Employees engaged in transport must follow the standard operating procedure on personal hygiene practices.</li> <li>3. Protect foodstuffs adequately from contamination of various sources during conveyances or in containers.</li> </ol>

	<ol style="list-style-type: none"> <li>4. Conveyances or containers used for transporting foodstuffs must be kept clean and maintained in good repair and condition to protect foodstuffs from contamination.</li> <li>5. Conveyances or containers must be cleaned and disinfected as per the standard operating procedure on cleaning and sanitizing food-contact surfaces.</li> <li>6. Receptacles contained in vehicles or containers meant for the transport of food must not be used for transporting anything other than foodstuffs.</li> <li>7. Effectively clean and sanitize between loads if conveyances or containers have been used to transport anything other than foodstuffs or to transport different foodstuffs.</li> <li>8. Maintain foodstuffs at appropriate temperatures in the conveyances or containers used for transport.</li> <li>9. Conveyances or containers used for the transport of foodstuffs must be able to monitor and report temperatures.</li> <li>10. Transport contractors must obey the same rules.</li> <li>11. Cleanliness of the transport has to be checked and documented.</li> <li>12. Deviations must be documented and reported to the management.</li> </ol>
<b>Monitoring</b>	<p>Daily, according to the SOP above and the SOP “Cleaning &amp; sanitizing food-contact surfaces – random”, during the working day</p> <ol style="list-style-type: none"> <li>1. The quality assurance manager inspects conveyances or containers during loading and/transport to be sure that employees are following this SOP.</li> <li>2. The transport/logistics manager makes sure that all employees engaged in the transport of foodstuffs are adhering to the above-stated transport policy during all hours of operation.</li> </ol> <p>All monitoring activities are documented in form No. XXX: Checklist for transportation of food items</p>
<b>Training</b>	<p>Every three months Training sessions are documented</p>
<b>Corrective actions</b>	<ol style="list-style-type: none"> <li>1. Training will be provided to any food-service employee who does not follow the procedures in this SOP.</li> <li>2. Discard affected food.</li> </ol>
<b>Record keeping</b>	<p>Records are kept in the office of the quality manager. They must be stored at least five years.</p>
<b>Related documents</b>	<p>Form No. YYY: Cleaning &amp; sanitizing food-contact surfaces SOP No. ZZZ: Hand washing</p>
<b>Literature/ references</b>	<p>Food Hygiene regulation 2012 SLS 143:1999 clause 9</p>

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

<b>Name of the Company</b> Additional information is required	
<b>Monitoring Checklist</b>	Identification
Transport Conveyances	Issue No: 001 Issue Date:

<b>For the week of →.....</b>	<b>Sun</b>	<b>Mon</b>	<b>Tue</b>	<b>Wed</b>	<b>Thu</b>	<b>Fri</b>	<b>Sat</b>
<b>Date →.....</b>							
<b>What to do ↓</b>							
1. All walls and floors of the conveyances are thoroughly cleaned and, where necessary, disinfected.							
2. Spills of food and other contaminants <sup>31</sup> not observed on floor, utensils, tools and equipment.							
3. Metal fragments, accumulation of dirt, development of fungus, flaking plaster, cobwebs, debris and chemicals not spotted on ceiling, roofing or walls of the conveyances.							
4. Cleaned and disinfected by use of recommended physical methods. <sup>32</sup>							
5. Equipment used to clean floors is cleansed and kept away from foodstuffs and food-processing area.							
6. Conveyances not used for transporting anything other than foodstuffs.							
7. Conveyances maintain appropriate temperature <sup>33</sup> for the transport of the foodstuffs.							
8. Temperature-monitoring unit and the display unit in the conveyance are in order.							

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

31 Biological or chemical agents, foreign matter and/or other substances not intentionally added to food which may compromise food safety or suitability

32 Such as heat, scrubbing, turbulent flow, vacuum cleaning; other methods that avoid the use of water; and chemical methods using alkalis or acids in detergent

33 May vary by the type of foodstuffs

### 3.13 Product information and consumer awareness

Insufficient product information and inadequate knowledge of general food hygiene can lead to products being handled improperly at later stages in the food chain. Such poor handling can result in illness or products becoming unsuitable for consumption, even if adequate hygiene control measures were taken earlier in the food chain.

Therefore, food products should list appropriate information to ensure that:

- Adequate and accessible information is available to the next person in the food chain to enable them to handle, store, process, prepare and display the product safely and correctly.
- The lot or batch can be easily identified and recalled if necessary.

**Consumers should have enough knowledge about food hygiene to enable them to:**

- Understand the importance of product information
- Make informed choices appropriate to the individual
- Prevent contamination and growth or survival of foodborne pathogens by storing, preparing and using it correctly

Information for industry or trade users should be clearly distinguishable from consumer information, particularly on food labels. There are two principal information lines:

- a) Product information required for the producer
- b) Customer information documented on the final product

#### a) Product information for the internal use of the producer

At a minimum, product tracing systems with lot numbers need to be established at the company in a manner that allows the recording of the immediate sources of incoming raw materials and ingredients, as well as the subsequent recipients of finished food products. A software programme is recommended to collect, analyse and store the data.

Product records should follow a standardized format. The physical location of the firm that last handled the product, whether the manufacturer or not, and contact information for the broker who handled the transaction should be documented. Records must include:

- Incoming lot numbers of products received
- Amount of products that were manufactured, received or shipped
- Physical location of materials in the company
- Transport details of the incoming and outgoing products (including name of the transport company and time of pick-up or delivery)
- Lot numbers of each material
- Lot number of each manufactured product

All raw materials and ingredients used for production as well as products at any stage – including intermediate, semi-intermediate, semi-finished, pre-finished, finished, recycled, reworked, pre-packaged and packaged – must be identifiable at all times, and the identification needs to be recorded for each ingredient used in the product line. All those products need a lot number.

The following are the key data elements that have to be available for each material,

ingredient or finished product. The identification must include:

- The name
- The item number
- Intended target group of consumers
- The manufacturers
- Place of origin
- A description of the product
- Aggregate state
- A detailed list of ingredient(s), used in the greatest amount first, followed in descending order by those used in smaller amounts
- Product receipt
- Identification of allergens
- Analytical parameters
- Packaging and palletizing requirements
- Shipping conditions
- Storage conditions
- Shelf-life information
- Disposal information

#### **b) Main regulation on product information for customer use (labelling)**

The label of the product must provide adequate information and accurate identification of the pre-packaged food. It must be correct and not misleading, accurate and legible. Pre-packaged foods should be labelled with clear instructions to enable the next person in the food chain to handle, display food in a store and use the product safely.

According to the Food (Labelling and Advertising) Regulations, 2005 of Sri Lanka, the following declarations shall be on the main panel of the package or container.<sup>34</sup>

##### **Content:**

- The common name is mandatory information on the main panel.
- Brand name or trade name with a sufficient description of the food and its nature
- Net content as an expression of the weight or volume, measure or numerical count or a combination of numerical count and weight of the product in the package
- Drained weight, if applicable

The following can either be displayed on the main or information panels:

- Name and address of the manufacturer, packer or distributor
- Country of origin
- List of ingredients
  - o Declaration of ingredients.
  - o Descending order of predominance by weight.
  - o Ingredients shall be specific and not collective or generic.
  - o The common name or usual name of an added preservative shall be declared.

<sup>34</sup> This is the link to the labelling regulation (English version) [https://eohfs.health.gov.lk/food/images/pdf/regulations/food\\_labelling\\_and\\_advertising\\_regulations\\_2005\\_en.pdf](https://eohfs.health.gov.lk/food/images/pdf/regulations/food_labelling_and_advertising_regulations_2005_en.pdf)



- Food additives with respective identification numbers
- Description of allergens
- Batch number, code number or code marking
- Lot identification number
- Date of manufacturing
- Date of packing
- Date of expiry. According to Sri Lankan regulations, the terms “use before” or “best before” may also be used alongside “date of expiry”; all three terms equally express the same meaning.
- Instruction for storage and/or use
  - Condition or type of treatment
  - Irradiated foods
  - Nutrition facts

The figure below shows appropriate labelling of nutritional information on a food product:

### Nutrition information

**NUTRITION INFORMATION**

SERVING SIZE 200ml

SERVING PER CONTAINER 05

	Per serving	Per 100g
Energy	99.4 kcal	49.7 kcal
Fat	0.2g	0.1g
Carbohydrate	24.0g	12.0g
Protein	0.4g	0.2g
Sugar	20.8g	10.4g
Salt	0.30g	0.15g

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MFD 21/07/2022  
 EXP 20/07/2023  
 Batch No: CA18380

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INGREDIENTS: Water, Orange pulp, Sugar, Citric acid, (INS330), Salt

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Store in a Cool Dry Place

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Manufactured and Marketed by:  
 FruitZ Beverages (PVT) Ltd.,  
 17, Govinna Mawatha, Athurugiriya

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A PRODUCT OF SRI LANKA

This tells you the volume of one serving of this beverage

This tells you how many servings there are in the whole container

This tells you the nutrients in 100g. This is used to compare similar products with ease.

This tells you the nutrients in a single serving of this beverage. In this case it is 200ml.

*Illustration 21:  
Nutrition information panel*

**Language:**

The nutritional information should be declared in any one or more of the three official languages of Sri Lanka unless otherwise specified, namely, Sinhala, Tamil and English.



Illustration 22: Use of the three official languages of Sri Lanka on food labels

**Letter size:**

The common name of the food must appear in bold face type and be no less than one third of the size of the letters used for the brand name. The minimum height is 3 millimetres. If the common name consists of more than one word, such a word or words must be displayed in identical type and size.



Photo 50: Example of a product label. Note: Colour-coding of sugar, salt and fat is missing here (see information on the colour-coding regulation below).

**c) Regulation on consumer information regarding the content of sugar, salt and fat**

In 2019, the Sri Lankan government enacted another regulation concerning food labelling. It requires food companies to colour-code their products depending on their content of sugar, salt and fat. The red code means that the respective product contains high levels of sugar, salt and fat; the yellow code indicates medium levels; and the green code indicates low levels of sugar, salt and fat in the particular food product. If a person consumes a lot of sugar, salt or fat (or any combination of these), he or she stands a higher chance of contracting non-communicable diseases such as diabetes. Hence, the codes serve as an easily understandable guide to consumers. The main message is to use products with a green label, because their consumption will most likely not create health problems!

The levels of sugar, salt and fat and their corresponding colour-codes (green, yellow or red) are shown in the following table:

	<b>Green</b>	<b>Yellow</b>	<b>Red</b>
Sugar content per 100 g	Less than 5 g	5 to 22 g	More than 22 g
Salt content per 100 g	Less than 0.25 g	0.25 g to 1.25 g	More than 1.25 g
Fat content per 100 g	Less than 3 g	3 g to 17.5 g	More than 17.5 g

#### **Further reading and references:**

It is recommended to use the “Food (Labelling and Advertising) Regulations 2005 – 1376/9” as a checklist. Clauses 4 and 5 provide detailed information on the general requirements for labelling, while most of the following clauses provide product-specific regulations. The regulation can be accessed through this link: [https://eohfs.health.gov.lk/food/images/pdf/regulations/food\\_labelling\\_and\\_advertising\\_regulations\\_2005\\_en.pdf](https://eohfs.health.gov.lk/food/images/pdf/regulations/food_labelling_and_advertising_regulations_2005_en.pdf)

The Food (Colour-Coding for Sugar, Salt, and Fat) Regulation, 2019 can be accessed by following this link (English version):

<https://eohfs.health.gov.lk/food/images/pdf/regulations/Colour-coding-solids-English.pdf>.

## **3.14 Training of employees**

Food hygiene training is fundamentally important. Food handlers should have the necessary knowledge and skills to enable them to handle food hygienically.

The owners of food-manufacturing businesses must ensure that food handlers are supervised and instructed or trained in food hygiene matters commensurate with their work activity. They should also be regularly supervised.

Managers and supervisors of food-handling establishments need to be aware of the relevant hygiene principles of food handling and the acts and regulations governing their operations. They must be able to judge potential risks in food handling and take necessary and timely remedial action.

### **Training programmes**

Food handlers must be trained in the following aspects of hygienic food handling:

- Basic knowledge in food pathogens and contamination of food
- Nature of the food, in particular its ability to sustain growth of pathogenic or spoilage microorganisms
- The manner in which the food needs to be handled and packed
- The conditions under which the food will be stored
- The expected shelf life

- Personal hygiene including hand washing and its importance
- Protective clothing and its importance

Periodic assessments of the effectiveness of training and instruction programmes should be made, as well as routing supervision and checks to ensure that procedures are being carried out effectively. Training programmes should be routinely reviewed and updated.

**Attachments:**

- A) Standard operating procedures (SOPs)
  - Training of employees
- B) Checklists/forms
  - Employee training records

<b>Name of the Company</b> Additional information is required	
Standard operating procedure	Identification
Training of Employees	Issue No: 001 Issue Date:

<b>Purpose</b>	To make food-handling employees: <ol style="list-style-type: none"> <li>1. Aware of their role and responsibility in protecting food from contamination or deterioration</li> <li>2. Have the necessary knowledge and skills on food hygiene principles and practices to be able to judge potential risks and take necessary action to remedy deficiencies</li> <li>3. Refresh knowledge and skills which are relevant to food processing/manufacturing, packing, storing and serving</li> </ol>		
<b>Scope</b>	This procedure applies to all food-handling employees who handle, prepare or serve food or who enter the premises of the food production.		
<b>Responsible</b>	Quality manager		
<b>Procedure</b>	During the course of employment, food handlers must demonstrate sufficient skills on below-stated food safety skills		
	No.	Food safety skills	How the employee demonstrates these skills
	1.	Wearing and maintaining uniform/ protective clothing hygienically	<ul style="list-style-type: none"> <li>• Understand the reasons for wearing a uniform/protective clothing.</li> <li>• Wear a clean uniform/protective clothing as instructed.</li> <li>• Change protective clothing at least daily and more frequently when required.</li> </ul>

		<ul style="list-style-type: none"> <li>• Refrain from wearing protective clothing outside the premises or when travelling to/from work.</li> </ul>
	2 Maintaining a high standard of hand washing	<ul style="list-style-type: none"> <li>• Wash hands using the correct procedure.</li> <li>• Wash hands as frequently as necessary and always: <ul style="list-style-type: none"> <li>- Before starting or recommencing work</li> <li>- After using the toilet</li> <li>- Before handling cooked or ready-to-eat foods</li> <li>- After handling or preparing raw food</li> <li>- After handling rubbish</li> <li>- After smoking</li> <li>- After coughing, sneezing, using a handkerchief, blowing the nose, touching the skin, hair or face</li> <li>- After cleaning duties</li> <li>- After shaking hands</li> <li>- After handling money</li> </ul> </li> <li>• Take appropriate action if hot water, soap, etc., are not available.</li> </ul>
	3 Maintaining a high standard of personal hygiene	<ul style="list-style-type: none"> <li>• Keep hair neat, tidy and covered in the presence of food.</li> <li>• Wear suitable clean protective clothing.</li> <li>• Keep fingernails short, clean and free of nail varnish.</li> <li>• Refrain from wearing inappropriate jewellery.</li> <li>• Refrain from wearing excessive perfume, deodorant, after-shave and make-up.</li> <li>• Keep cuts, sores and grazes covered with clean, conspicuously coloured waterproof dressing.</li> <li>• When using gloves, use them in a hygienic manner as per relevant standard.</li> </ul>

	<p>4 Demonstrating correct hygienic practice if suffering from ailments and illnesses that may affect food safety</p>	<ul style="list-style-type: none"> <li>• Report to supervisor if employees:             <ul style="list-style-type: none"> <li>- Are suffering from any ailments/illness (in particular, diarrhoea or vomiting) which may affect the safety of food</li> <li>- Are absent from work due to any ailments/illnesses which may affect the safety of food</li> <li>- Suffered diarrhoea or vomiting while on holidays, especially overseas/out station</li> <li>- Employees have anyone living with them is suffering from ailments/illness that may affect the safety of food</li> </ul> </li> <li>• Avoid working near open food if suffering from any ailment or illness that may affect the safety of food, such as diarrhoea or vomiting</li> </ul>
	<p>5 Avoiding unhygienic practices in a food operation</p>	<ul style="list-style-type: none"> <li>• Never chew gum or consume food in a food operation.</li> <li>• Never spit or pick the nose in a food operation.</li> <li>• Never cough or sneeze over food.</li> <li>• Never taste food with fingers.</li> <li>• Never handle food after touching the face, nose or head.</li> </ul>
	<p>6 Demonstrating safe food-handling practices</p>	<ul style="list-style-type: none"> <li>• Handle food/utensils as little as possible. Store raw and ready-to-eat products separately and avoid direct contact between raw and ready-to-eat products.</li> <li>• Follow the procedure in place for the management of food allergens.</li> <li>• Correct use of colour-coding system were provided.</li> <li>• Store hot food as per relevant standard.</li> <li>• Store cold food as per relevant standard.</li> <li>• Store frozen food as per relevant standard.</li> <li>• Where appropriate to the job, package food as per relevant standard</li> </ul>

	7 Maintaining staff facilities in a hygienic condition	<ul style="list-style-type: none"> <li>• Keep locker rooms and other staff areas in a clean condition</li> </ul>
	8 Obeying food safety signs	<ul style="list-style-type: none"> <li>• Be aware of the food safety signs that exist in the workplace.</li> <li>• Adhere to the instructions on the food safety signs.</li> </ul>
	9 Keeping work area clean	<ul style="list-style-type: none"> <li>• Clean as you go.</li> <li>• Follow the cleaning programme as instructed.</li> <li>• Ensure that the food-contact surface is clean before commencing work.</li> <li>• Use cleaning agents and cleaning equipment as instructed.</li> <li>• Change water used for cleaning when it becomes cool or dirty.</li> <li>• Ensure food does not come in contact with cleaning agents.</li> <li>• Store cleaning agents in the designated storage area.</li> </ul>
	10 Demonstrating the legal responsibility of employees to ensure safe food for the consumer	<ul style="list-style-type: none"> <li>• Follow the food safety instructions from the supervisor/manager.</li> <li>• Use correct hygienic procedures when working in a food operation.</li> <li>• Act in accordance with legal requirements.</li> </ul>
	11 Recognizing how food can be made unsafe by biological, chemical, physical or food allergen hazards	<ul style="list-style-type: none"> <li>• Define a food-safety hazard.</li> <li>• List possible sources of biological hazards, e.g. bacteria and viruses.</li> <li>• State the conditions required for bacterial growth.</li> <li>• List possible sources of chemical and physical contaminants.</li> <li>• List possible sources of food allergens.</li> <li>• Demonstrate how hazards are controlled through following correct hygienic practices.</li> </ul>

	<p>12 Outlining the requirements necessary for bacterial growth</p>	<ul style="list-style-type: none"> <li>• Explain how time, temperature, moisture and the type of food influence bacterial growth.</li> </ul>
	<p>13 Using time-temperature controls to prevent and control bacterial growth</p>	<ul style="list-style-type: none"> <li>• Explain the need for time-temperature controls.</li> <li>• Outline the time-temperature controls in place for their particular work activity, e.g. processing, transport, delivery, storage, etc.</li> <li>• Record times and temperatures observed while carrying out tasks.</li> <li>• Ensure that probes are clean before use.</li> <li>• Maintain temperature probe calibration records where appropriate.</li> </ul>
	<p>14 Demonstrating an understanding of cross-contamination and the hygiene practices necessary to prevent it</p>	<ul style="list-style-type: none"> <li>• Explain what cross-contamination is and how it can occur. Give examples of what steps are taken to avoid cross-contamination during work activities.</li> <li>• Ensure raw and ready-to-eat/cooked products do not come in direct contact with each other during any stage of the food operation.</li> <li>• Use separate storage, preparation surfaces and equipment for raw and ready-to-eat/cooked foods.</li> <li>• Use the colour-coding system correctly to avoid cross-contamination.</li> </ul>
	<p>15 Explaining the difference between high and low-risk activities</p>	<ul style="list-style-type: none"> <li>• State whether they are involved in a high or low-risk activity.</li> <li>• Explain why their activity is high or low-risk</li> </ul>
	<p>16 Avoiding unnecessary handling of food, food utensils and surfaces</p>	<ul style="list-style-type: none"> <li>• Handle food as little as possible.</li> <li>• Use appropriate utensils when handling food.</li> <li>• Refrain from unnecessary handling of surfaces with which food comes in contact.</li> </ul>



	17 Recording the temperature of foods as required	<ul style="list-style-type: none"> <li>• Use a temperature probe correctly.</li> <li>• Know when to probe food products.</li> <li>• Know the temperature limits as per relevant standard/current legislation.</li> <li>• Record the temperature of foods probed.</li> <li>• Contact the supervisor if food is outside the required temperature specification.</li> </ul>
	18 Keeping appropriate food safety records	<ul style="list-style-type: none"> <li>• Complete food safety records as appropriate to the work area.</li> <li>• Contact supervisor if food is outside its specification.</li> <li>• Return food-safety records to their storage area.</li> </ul>
	19 Keeping pests out of the food operation and operating a satisfactory waste-disposal system	<ul style="list-style-type: none"> <li>• Report signs of infestation to the supervisor/manager.</li> <li>• Place waste into designated containers.</li> <li>• Keep waste bins clean.</li> <li>• Remove waste daily or more frequently if required.</li> <li>• Keep doors and windows closed/screened.</li> <li>• Keep waste which is outside the premises covered.</li> <li>• Maintain waste-storage areas in a hygienic condition.</li> <li>• Apply hygiene practices in the storage of food.</li> </ul>
	20 Applying pest control in the workplace	<ul style="list-style-type: none"> <li>• Outline the importance of pest control.</li> <li>• Adhere to the procedure to keep pests out of the premises.</li> <li>• Report any evidence of suspected or actual infestations to the manager or supervisor.</li> <li>• Ensure insect electrocutors are left on permanently.</li> <li>• Where appropriate, empty insect electrocutor trays</li> </ul>

21	Action to take when becoming aware of unhygienic practices that may put the safety of food at risk	<ul style="list-style-type: none"> <li>• Report to the supervisor when employees become aware of practices, signs and conditions that may put the safety of food at risk.</li> </ul>
22	Cooperating with authorized enforcement officers	<ul style="list-style-type: none"> <li>• Provide enforcement officers with all reasonable assistance.</li> <li>• Provide enforcement officers with the information they may reasonably require.</li> </ul>
23	Using hygienic procedures when receiving deliveries	<ul style="list-style-type: none"> <li>• Check deliveries received against documentation as appropriate.</li> <li>• Check deliveries using the hygiene checklist for deliveries.</li> <li>• Control hazard(s) that could be present at this stage.</li> <li>• Take appropriate action if the food delivered, the delivery vehicle or the delivery personnel pose a risk to food safety.</li> <li>• Follow the correct procedure when food packaging (containers, bags, glass, etc.) breaks.</li> <li>• Keep the delivery area clean.</li> <li>• Where appropriate, remove outer packaging from food.</li> <li>• Where appropriate, decant food into clean containers and cover.</li> <li>• Transfer deliveries to their appropriate storage area as soon as possible.</li> </ul>
24	Ensuring food safety during storage	<ul style="list-style-type: none"> <li>• Store food and non-food items separately.</li> <li>• Store food in the correct storage area.</li> <li>• Ensure food is stored at the correct temperature.</li> <li>• Store food within its shelf life.</li> <li>• Ensure food being stored is covered and labelled.</li> <li>• Ensure stock rotation in each storage area.</li> <li>• Use correct procedure for the storage of rejected goods.</li> </ul>

	<p>25 Ensuring food safety during preparation of food</p>	<ul style="list-style-type: none"> <li>• Handle and prepare raw and ready-to-eat/ processed food in separate areas unless the area is cleaned after preparing raw food.</li> <li>• Avoid cross-contamination.</li> <li>• Adhere to colour-coding system if in place.</li> <li>• Ensure food is not placed directly under insect electrocutors.</li> <li>• Ensure food safety when washing food items.</li> <li>• Avoid over-handling of food.</li> <li>• Use time-temperature controls to prevent and control bacterial growth.</li> <li>• Use recommended method of thawing food.</li> <li>• Ensure thawed food is not re-frozen.</li> <li>• Maintain a clean and hygienic area.</li> </ul>
	<p>26 Ensuring food safety during cooking and cooling of food</p>	<ul style="list-style-type: none"> <li>• Adhere to hygienic practices to avoid cross-contamination.</li> <li>• Avoid over-handling of food.</li> <li>• Use potable water to cook food.</li> <li>• Use time-temperature controls to prevent and control bacterial growth.</li> <li>• Use recommended method of re-heating food.</li> <li>• Keep cooked food separate from raw food during cooling.</li> <li>• Maintain a clean and hygienic area</li> </ul>
	<p>27 Applying correct and appropriate cleaning procedures in maintaining a clean food operation</p>	<ul style="list-style-type: none"> <li>• Distinguish between the removal of dirt and the removal of bacteria from surfaces.</li> <li>• Know which chemicals to use when cleaning, e.g. detergent, disinfectant, sanitizer, etc.</li> <li>• Follow the correct procedure when using various chemicals.</li> <li>• Ensure that equipment, utensils and work surfaces in the food operation are maintained in a clean condition.</li> <li>• Use separate cleaning equipment for toilet areas and areas to which cleaning equipment has been designated to prevent cross-contamination.</li> </ul>

	<p>28 Using hygienic procedures in storing raw/ in-process/ processed food items</p>	<ul style="list-style-type: none"> <li>• Segregate raw and processed foods.</li> <li>• Reseal part-used packs.</li> <li>• Store in-process material and finished products separately from raw materials.</li> </ul>
	<p>29 Applying the required heat treatment</p>	<ul style="list-style-type: none"> <li>• Outline how heat treatment influences the safety of the products being produced.</li> <li>• Apply the correct heat treatment to the food for the correct length of time during the food-production process.</li> <li>• Record the time-temperature data of the foods.</li> </ul>
	<p>30 Checking deliveries appropriately</p>	<ul style="list-style-type: none"> <li>• When food is delivered ensure that:             <ul style="list-style-type: none"> <li>- Food and non-food items are segregated.</li> <li>- It is at the correct temperature.</li> <li>- It is free from pest infestation and obvious contamination and is in a good condition.</li> <li>- Raw and ready-to-eat/cooked foods are segregated.</li> <li>- Packaging of delivered goods is intact and there is no evidence of tampering.</li> <li>- Canned food being delivered is not blown, rusty or dented.</li> <li>- It is still within the “use-by” or “best-before” dates.</li> <li>- The delivery personnel behave in a hygienic manner and are hygienically dressed.</li> <li>- The delivery vehicle is maintained in a hygienic condition.</li> </ul> </li> <li>• Procedure is followed for when food being delivered does not meet the hygienic requirements of the establishment.</li> <li>• Accepted deliveries are transferred to the correct storage area.</li> </ul>

<b>Monitoring</b>	<ol style="list-style-type: none"> <li>1 Evaluate the effectiveness of training. Awareness of safety requirements and competency level must be recorded after each training.</li> <li>2 Direct supervisors check to ensure that procedures are being carried out effectively.</li> <li>3 Document the training offered to food handlers according to form No. XXX "Employee training record".</li> </ol>
<b>Training</b>	Every three months
<b>Corrective actions and review of training</b>	<p>Training will be provided to any food-service employee who does not follow the procedures in this SOP.</p> <p>Training programmes should be routinely reviewed and updated where necessary.</p>
<b>Record keeping</b>	<p>Records are kept in the office of the quality manager.</p> <p>They must be stored at least five years</p>
<b>Related documents</b>	<p>Format No. XXX: Hygiene checklist</p> <p>SOP No. ZZZ: Hand washing</p> <p>SOP No. YYY: Personal hygiene</p>
<b>Literature/ references</b>	<p>Food Hygiene Regulation, 2012</p> <p>SLS 143:1999 clause 11</p>

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

<b>Name of the Company</b>	
<b>Additional information is required</b>	
<b>Monitoring Checklist</b>	Identification
Employees Training Record	<p>Issue No: 001</p> <p>Issue Date:</p>

Title of the training	
Trainer's name and qualification	
Location	
Date	



## Common food allergens

The following foods are considered common food allergens:

- Peanuts
- Tree nuts (such as almonds, hazelnuts, walnuts, cashews, Brazil nuts, pecans, pistachios and macadamia nuts)
- Milk
- Eggs
- Fish
- Crustaceans
- Cereals containing gluten (including wheat, rye, barley and oats)
- Soya
- Sesame seeds
- Celery
- Mustard
- Lupins
- Molluscs (including mussels, oysters, squid and snails)
- Food additives: sulphites and sulphur dioxide at levels above 10 mg per kg or per litre.

The figure below shows the types of foods that are considered as the sources of most food allergies.<sup>35</sup>

### Eight major foods or food groups believed to account for 90 per cent of food allergies



**Milk**



**Wheat**



**Egg**



**Soybeans**



**Peanuts**



**Tree Nuts**  
(almond, cashew,  
pecan, walnut, hazelnut,  
macadamia)



**Shell Fish**  
(Shrimp, crab, lobster)



**Fishes**

*Illustration 23: Eight foods which trigger most food allergies (the “Big Nine”)*

<sup>35</sup> School Nutrition Association, <https://schoolnutrition.org/learning-center/food-allergy/the-big-9/>

Some allergens can be hidden in food ingredients.

- Milk and milk-product derivatives (non-fat milk solids, cheese, yoghurt, caseinates, whey, lactose)
- Egg and egg derivatives (eggs, egg albumen, egg yolk, egg lecithin)
- Peanuts, tree nuts and derivatives
- Fish derivatives (surimi, fish sauce, fish paste)
- Soy and its derivatives (soybeans, hydrolyzed vegetable protein, soy protein isolate, soy lecithin)
- Gluten – wheat, barley, rye, triticale, wheat bran, malt, oats, corn flour, oat bran

### How to deal with food allergies

There are no cures for food allergies. People who have a food allergy need to practice total avoidance of the offending food and read food ingredient lists carefully. As for the producers, cross-contamination must be avoided during cooking and preparation.

### Control of allergens in food production

Here is a simple example to show how an ingredient that can provoke an allergic reaction can enter a product that is intended to be free of any allergens during the production process. The illustration at right shows two types of cakes: The first is topped with nuts (cashews); the second is not. The one with the nut toppings can cause an allergic reaction to nuts, the other cannot. If both cakes are cut using the same knife, cashew particles can enter the cake meant to be free of cashews. To avoid this, it is of utmost importance to clean the knife very well after using it for the cake with the potentially allergenic ingredient (cashews).

#### Food allergies



Could cause allergies



Contains no allergies



Cleaning production utensils

*Illustration 24: Control of allergens in food production*

In the same vein, the following measures need to be taken in food processing to avoid cross-contamination by allergens:

- Minimize the chances of cross-contamination by ensuring a good layout of the plant (for instance, avoiding dust from peanut operations to settle on food that is meant to be free of allergens).
- Have physical barriers where necessary. Avoid crossover of lines that process non-allergenic and allergenic foods.
- Consider process flow in the design.
- Effectively segregate, especially at transfer points.



The figure below shows a few measures to control allergens in food production:

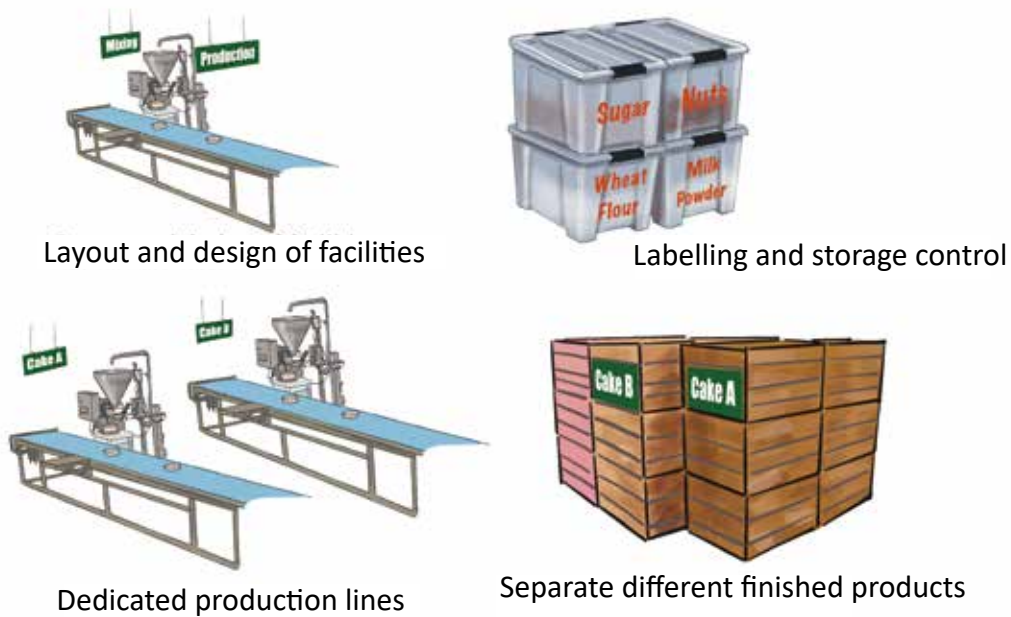


Illustration 25: Further measures to control allergens in food production

Planning of food production

- In order to minimize the probability of cross-contamination during a production run, produce the foods with no allergens first. Foods containing allergens may only be manufactured afterwards.

Labelling and packaging

- Ensure that the label gives an accurate description of the product formulation and list of ingredients.
- Ensure that the label is used on the correct product.
- Ensure that labels are updated when formulation changes are made.

The figure below shows what a typical warning label for food allergens could look like:

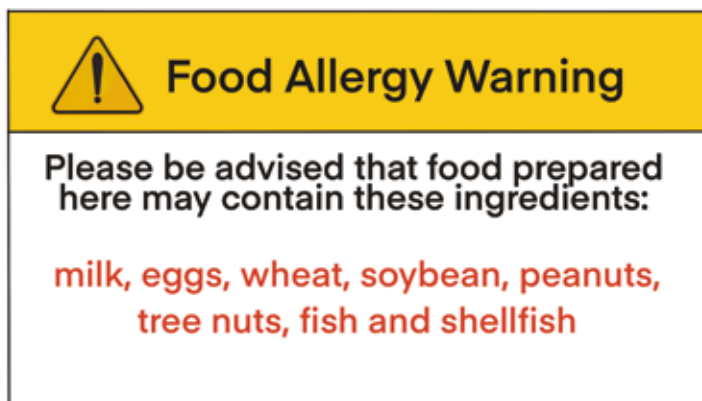


Illustration 26: Food allergy warning label

**Cleaning**

- Ensure that the design and installation of equipment allows easy cleaning.
- Keep equipment clean to minimize potential cross-contamination.
- Clean the production line thoroughly after producing a product containing allergens.

**Allergen risk assessment and management**

- **Allergen mapping** includes the assessment of potential allergens found in all the ingredients, the raw materials, the equipment and the facility as a whole. This is done to identify the risk of potential allergen contamination in production.
- Allergen control measures are then established according to the risk(s) identified. These include the control procedures in various areas:
  - Product development
  - Supplier control
  - Receiving and storage
  - Production process
  - Packing and labelling
  - Cleaning and sanitation
  - Employee training

**Attachments:**

- A) Standard operating procedures (SOPs)
  - Prevention of cross-contamination of food allergens
- B) Checklists/forms
  - Allergen matrix in food products
  - Allergens in the process lines
  - Allergens in the production facility

<b>Name of the Company</b> Additional information is required	
<b>Standard operating procedure</b>	Identification
Prevention of cross-contamination of food allergens	Issue No: 001 Issue Date:

<b>Purpose</b>	To prevent the cross-contamination of food allergens
<b>Scope</b>	This procedure applies to all food-handling employees who handle, prepare or serve food or enter the premises of the food production.
<b>Responsible</b>	Quality manager
<b>Procedure</b>	<p><b>Allergen mapping</b></p> <ol style="list-style-type: none"> <li>1. Identify the allergens found in the ingredients or materials used in food processing. See form XXX: Allergen map 1.</li> </ol>

2. Identify the schedule of each production line or equipment and identify the possible allergen cross-contamination (e.g. which products are produced in the same line or using the same equipment and which ones are produced first). See form YYY: Allergen YYY map 2.
3. Map the sources of allergens in the plant layout to identify the high-risks areas. See form ZZZ: Allergen map 3.
4. Update the allergen map/matrix when changes are made. Incorporate the results of allergen mapping into the HACCP plan and when setting up or reviewing the allergen controls.

### **Allergen control**

#### *Labelling*

1. Check the product label and ensure that it gives an accurate description of the product formulation and list of ingredients. Follow the rules on allergen labelling of the product destination.
2. If necessary and unavoidable, provide additional precautionary statement on the labels (e.g. "This product is produced in a line that also produces peanuts" or "Contains traces of nuts").
3. During packing, ensure that the label is used on the correct product.
4. Ensure that the labels are updated when formulation changes are made.
5. In the case of food service, ingredients can be incorporated on menus lists, highlighting the allergens.
6. Establish controls for the storage of the packaging and labelling materials for the different products.
7. Minimize the chance of cross-contamination by ensuring a good layout of the plant (e.g. consider the dust from peanut operations). Consider process flow when designing or redesigning the layout.
8. Set up physical barriers where necessary. Avoid crossover of production lines that process non-allergenic and allergenic foods.
9. Process the products containing allergens last in a production run to minimize the chance of cross-contamination. If possible, dedicate a line for highly allergenic food (e.g. containing peanuts, seafood or tree nuts).
10. Effectively segregate non-allergenic and allergenic foods, particularly at transfer points and storage areas.
11. Ensure that the design and installation of equipment allows easy and adequate cleaning.
12. Refer to raw material control procedures. Include the inspection for cross-contamination of allergens at the supplier's site.

#### *Cleaning and sanitation*

13. Refer to the cleaning and sanitation procedures. Keep the equipment and utensils clean and sanitized to minimize potential cross-contamination.

	<ol style="list-style-type: none"> <li>14. Clean the production line thoroughly after producing a product containing allergens.</li> <li>15. Use dedicated or colour-coded cleaning equipment for different production zones.</li> <li>16. Ensure proper controls when cleaning non-food-contact surfaces such as floors and walls (e.g. high-pressure spraying in and around the line being cleaned can easily transfer particles and contaminate the running line).</li> <li>17. Refer to the cleaning and sanitation procedures for validation and verification. Test kits can be used to detect the presence of allergens in samples (e.g. ELISA test kits).</li> <li>18. Ensure that personal hygiene rules are followed from the receiving of raw materials to the delivery of products.</li> <li>20. Prevent allergen cross-contamination from the canteen or other sanitary facilities via the employees.</li> <li>21. Retraining or refresher training should be carried out in sites where a high risk of cross-contamination exists.</li> </ol>
<b>Monitoring</b>	Annually, allergen maps 1-3 or whenever there are changes
<b>Training</b>	Every three months Training sessions are documented
<b>Corrective actions</b>	<ol style="list-style-type: none"> <li>1. For allergen cross-contamination, review the allergen mapping form and trace the source of the allergen. Provide appropriate control measures, if necessary. Prevent allergen cross-contamination from the canteen or other sanitary facilities via the employees.</li> <li>2. If contamination is caused through the food handlers, conduct a refresher training.</li> <li>3. For wrong labelling, review the correctness of labels or ensure that the responsible production staff use the right label with the corresponding product.</li> <li>4. Check if the product is fit for distribution. If it is not, proceed to the disposal of the product.</li> </ol>
<b>Record keeping</b>	Records are kept in the office of the quality manager They have to be stored at least five years
<b>Related documents</b>	Allergen maps 1-3
<b>Literature/ references</b>	Codex Alimentarius, Code of Practice on Food Allergen Management for Food Business Operators <a href="https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&amp;url=https%253A%252F%252Fworkspace.fao.org%252Fsite%252Fcodex%252Fstandards%252FCXC%2B80-2020%252FCXC_080e.pdf">https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&amp;url=https%253A%252F%252Fworkspace.fao.org%252Fsite%252Fcodex%252Fstandards%252FCXC%2B80-2020%252FCXC_080e.pdf</a>

Prepared by:	Reviewed by:	Approved by:
Date:	Date:	Date:

**No.26 - Allergen mapping level 1: Ingredient matrix type A (for various products)**

	Milk	Egg	Cereals	Soya	Sesame	Peanut	Tree nuts	Lupin	Celery	Mustard	Fish	Molluscs	Sulphites
Bread rolls	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No
Butter	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Chicken stock	No	No	No	No	No	No	No	No	Yes	No	No	No	No
Soya oil	No	No	No	No	No	No	No	No	No	No	No	No	No
Tinned tomatoes	No	No	No	No	No	No	No	No	No	No	No	No	No
Vegetable oil	No	No	No	No	No	No	No	No	No	No	No	No	No
Whey powder	Yes	No	No	No	No	No	No	No	No	No	No	No	No

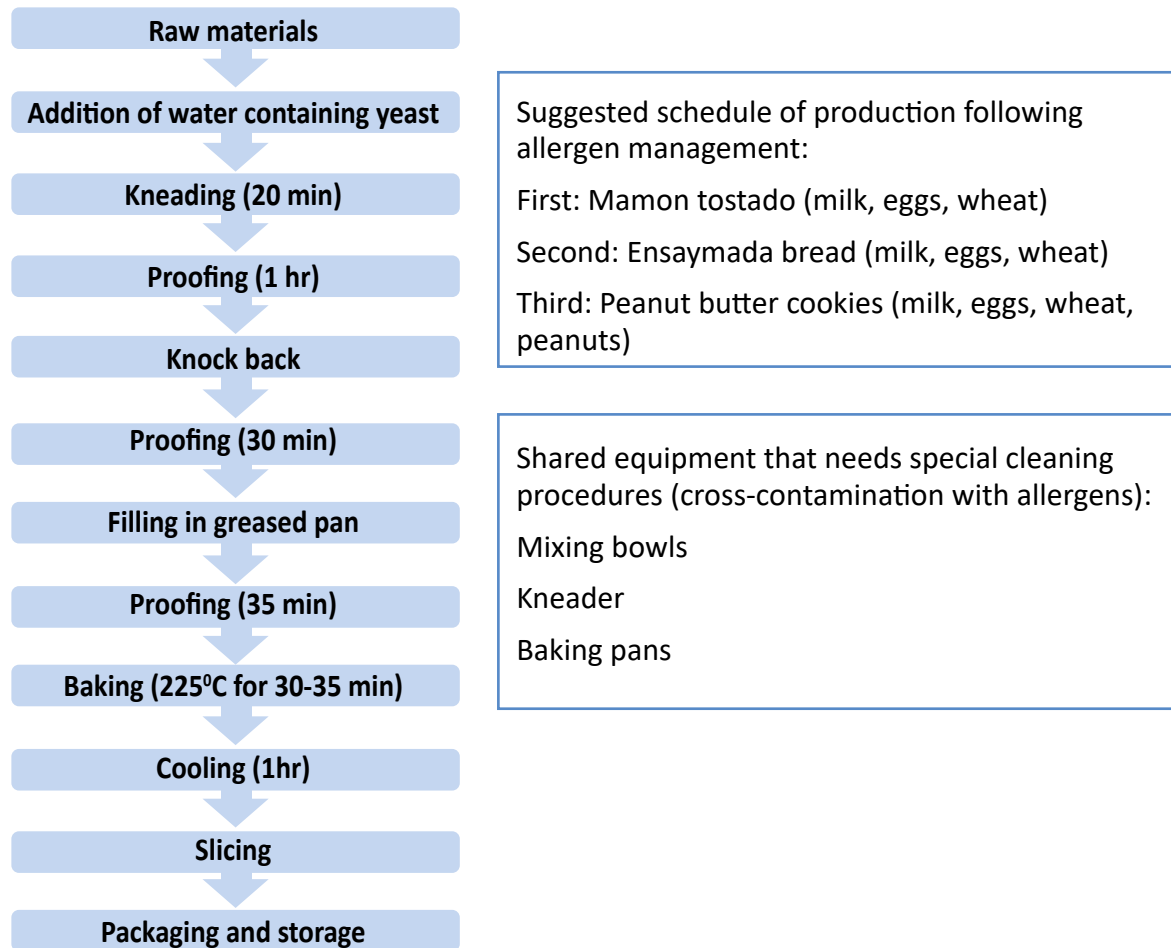
**No.27 - Allergen mapping level 1: Ingredient matrix type A (for various products)**

	Milk	Egg	Cereals	Soya	Sesame	Peanut	Tree nuts	Lupin	Celery	Mustard	Fish	Molluscs	Sulphites
Flour	No	No	Yes	No	No	No	No	No	No	No	No	No	No
Sugar	No	No	No	No	No	No	No	No	No	No	No	No	No
Butter	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Salt	No	No	No	No	No	No	No	No	No	No	No	No	No
Cheese	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Milk	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Egg yolks	No	Yes	No	No	No	No	No	No	No	No	No	No	No

**Example only. Please modify accordingly!**

**No. 28 - Allergen mapping level 2**

Production line 1



**Example only. Please modify accordingly.**<sup>36</sup>

**Allergen mapping level 3**

Sketch a layout of the plant. Identify/colour-code the possible sources of contamination in your existing layout and the storage arrangements. The layout should be based on the following key questions:

- Are allergenic products stored separately from non-allergenic products?
- Is the worker flow effectively controlled to avoid cross-contamination?
- Are the packaging materials stored separately?
- Are labels kept in a separate storage area?
- Are cross-contaminations through other sources of food (for instance, food consumed in the canteen) effectively controlled?

<sup>36</sup> Source: <https://i.pinimg.com/originals/1c/7b/a9/1c7ba96914d2ccdf459d77c624c0e4d3.jpg>

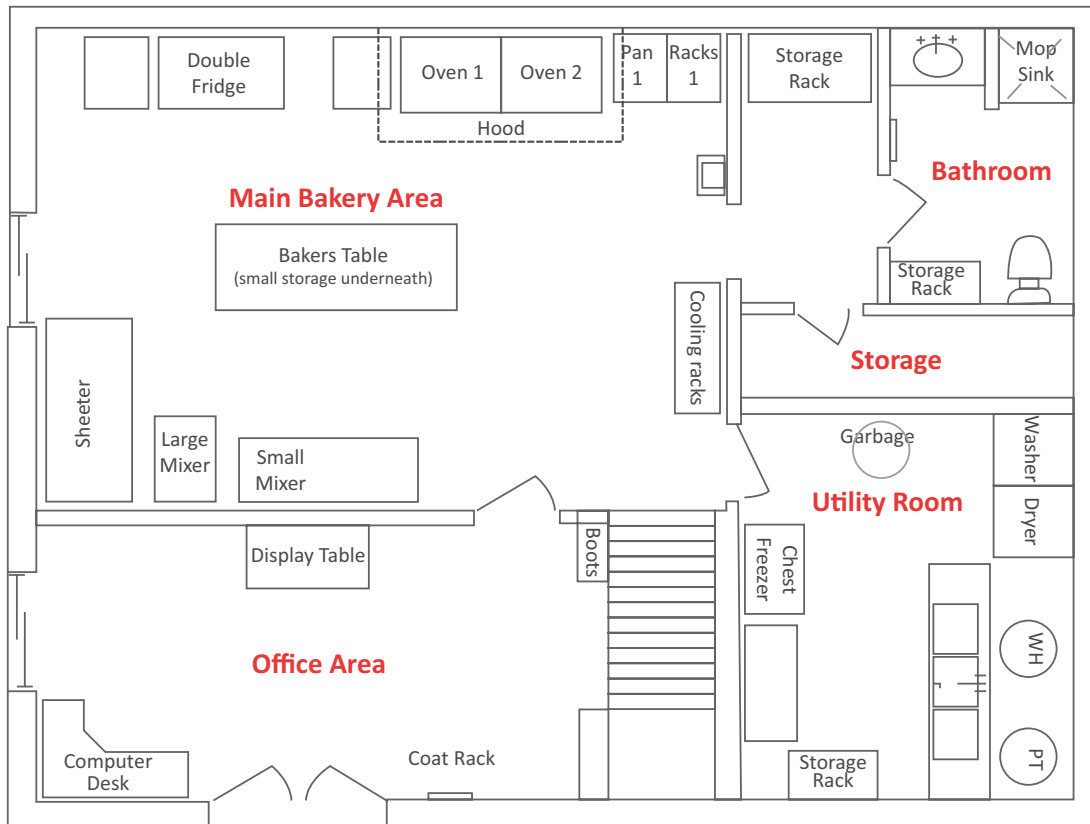
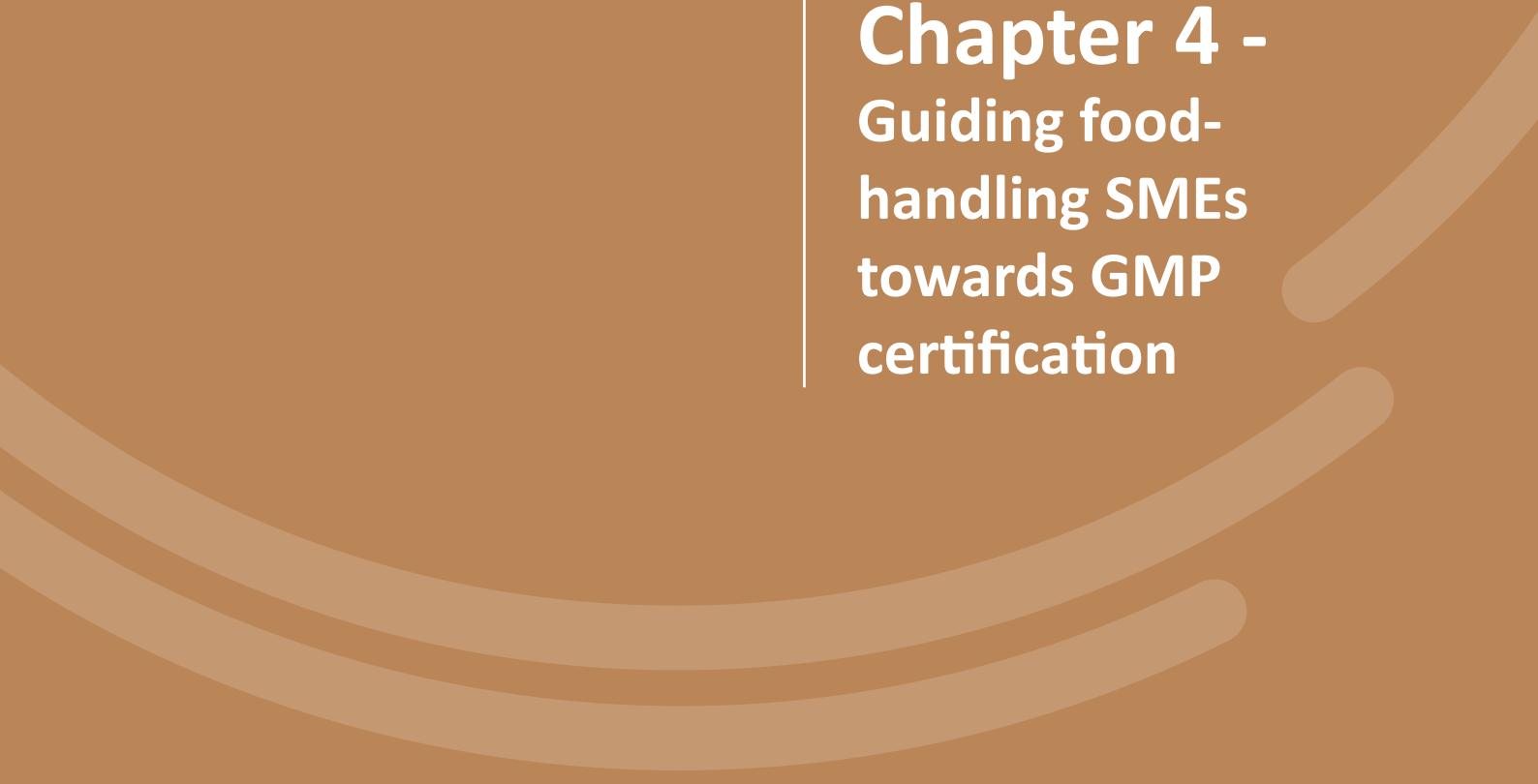


Illustration 27: Layout of a bakery with safeguards to avoid cross-contamination



**Chapter 4 -  
Guiding food-  
handling SMEs  
towards GMP  
certification**





# Chapter 4 – Guiding food-handling SMEs towards GMP certification

## 4.1 Introduction into the upgrading process

Often, owners and managers of food-handling SMEs find it difficult to change their operations in such a way that safe food-handling practices and GMP certification can be achieved. The issues of how to get started, who will handle the process, what and how to change and how to get the employees to practice the changes are among the key concerns. In this manual, we would like to present a methodology that has proven successful in leading small and medium-sized companies from Sri Lanka towards GMP certification. It is a structured process that is driven by a coach and a team of trained guidance counsellors. It includes training sessions for company management and staff. In the process, employees are prepared for cooperating actively in the change process, operations in non-compliance with the GMP requirements are identified and operations are gradually improved with the involvement of the employees. Normally, companies engaging in this process need approximately nine months to become fit for certification. The process requires time and (often limited) financial investments, but the rewards are significant.

The process was developed and introduced in Sri Lanka by PTB, the national metrology institute of Germany, within the scope of the “Strengthening Quality Infrastructure in Sri Lanka” project. It was successfully implemented in close collaboration between PTB, the Chamber of Commerce and Industry of Yarlpanam (CCiy) and the North Central Province Chamber of Commerce, Industry and Agriculture (NCPCCIA). In the following, each important step and the results of the process are described.

## 4.2 Outline of the upgrading process

### 4.2.1 Raising awareness amongst food-handling SMEs

The first step is conducting awareness-raising workshops for food-handling SMEs. These workshops provide food handlers with a basic understanding of the sources of food hazards, give an overview of safe food-handling practices and provide a brief explanation of the existing food regulations in Sri Lanka. The methodology is hands-on and practical, making use of examples from real-life and drawing upon videos in the local language. These workshops last approximately half a day.



Photo 51: Video on foodborne illness shown during the workshop



Photo 52: Practical exercise on good hand washing during training

### 4.2.2 Selection of SMEs

At the end of each awareness-raising workshop, the trainers present the upgrading process and distribute the application forms for the interested SMEs. Companies stating their interest in participating are invited to another workshop which provides a more comprehensive introduction to the upgrading process. Next, the companies are assessed to explore their capabilities and commitment to undertake a change process. The assessments are done based on a grid entailing questions about the management structure, human resources, adherence to legal requirements, understanding of safe food-handling practices, commitment to involving management and employees in the change process, financial status and others. Based on the assessment results, a final selection is made of the companies that will be invited to take part in the upgrading process. These companies will enter into a formal agreement with the organization providing technical support.

### 4.2.3 Training of counsellors

The core task of the counsellors is to facilitate the SMEs in structuring, steering and documenting the upgrading process. They also provide technical advice, have a motivating role, especially when the actors experience difficulties, and facilitate employees' cooperation in the implementation of the upgrading process. The counsellors are final-year students or graduates of food science or hospitality management courses from universities or university colleges. Before acting as counsellors, they undergo training involving an overview of the coaching process; understanding of food hazards and good practices; knowing how to drive change in the business; and building collaboration between employers and employees. The training also gives an overview of the Food (Registration of Premises) Regulations, 2019 and Food (Hygiene) Regulations, 2012 and practices the assessment of a real food-handling company. Each counsellor is then assigned one or two companies to guide through the process. A baseline assessment of the assigned company (or companies) based on the ISO 22000:2018 prerequisite programmes checklist is then carried out.

#### 4.2.4 Training of enterprises

Counselling is accompanied by a set of trainings of enterprises (ToE) which focus on different aspects. The graph below gives an overview of the different topics:

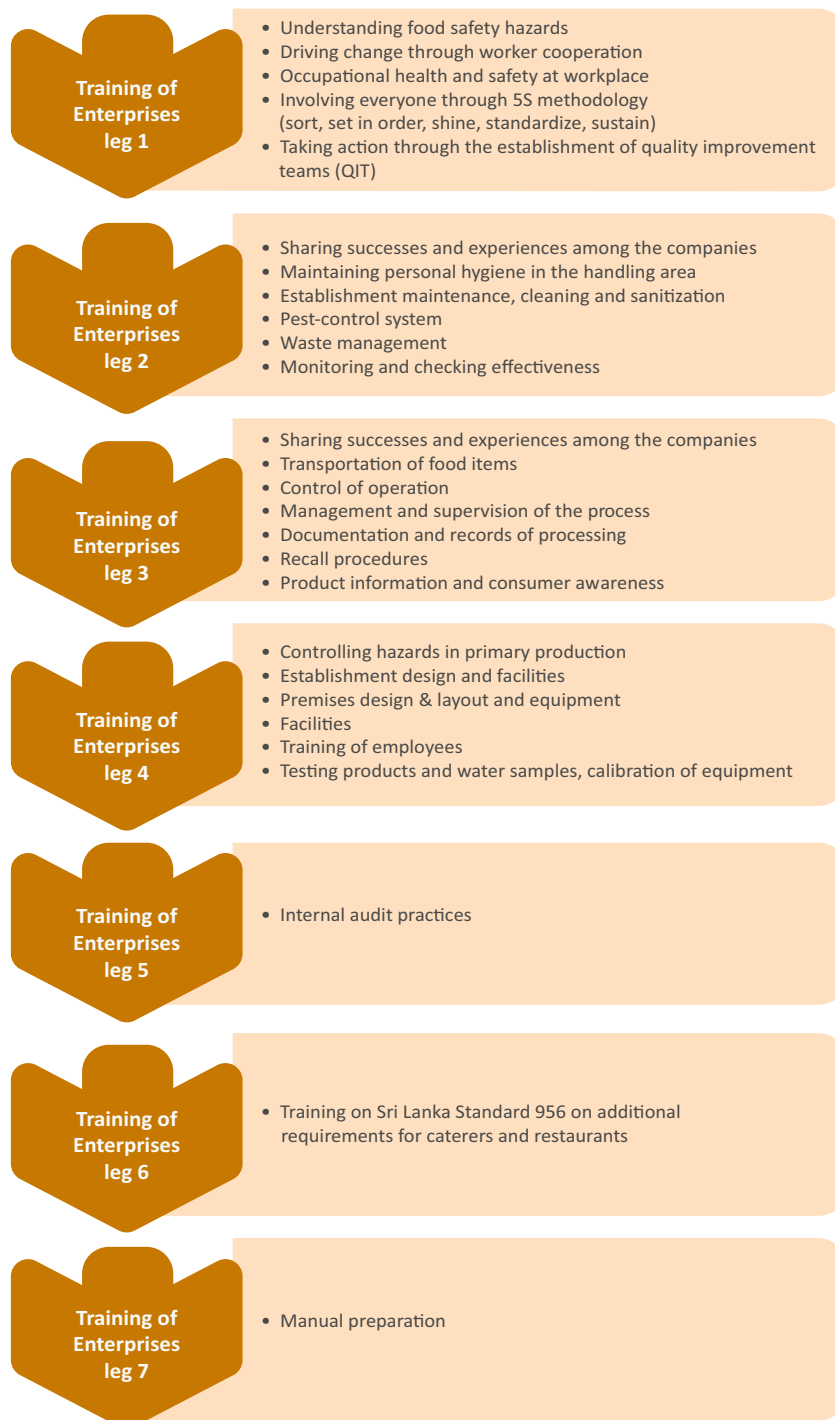


Illustration 28: Sequence of training sessions in the upgrading process towards GMP certification

Each leg takes one full day, and the participating SMEs demonstrate practical skills in the company from leg 2 onwards. Experience has shown that businesses which cannot demonstrate progress (for instance, due to the lack of commitment from the management) tend to refrain from the process.

#### **4.2.5 Managing the upgrading process in the SMEs**

##### **Formation of quality improvement teams**

It is important to pinpoint the important role of the quality improvement teams (QITs) which are formed in each company after the first training of enterprises. The QITs comprise six to 15 employees and the owner/his or her representative manager. Among them, a team leader and a secretary are appointed. The team leader eventually assumes the role of the food safety manager. The QITs meet regularly and identify one to three problems which need to be resolved. It also monitors the resolution of these problems continuously.

##### **Working with quality improvement plans**

The QITs meet weekly on a specific day of the week. Each meeting does not exceed 30 minutes. For each problem to be resolved, a step-by-step plan is developed, using the template of the quality improvement plan (QIP). For each activity, a team is identified by the QIT to implement the activity, and one person from the team is appointed to lead the implementation of the activity. The names of the activity team members are recorded on the plan. Each member of the team is assigned a task with a timeline.

During the next meeting of the quality improvement team, progress in implementing the tasks is reviewed, the actual completion date is recorded in the plan and the reason(s) for deviations is stated. Based on the progress, new activities are identified and planned.

Since all achievements are recorded on the plan, the amount of improvement in the company's operations is visible. In addition, improvements are documented by taking pictures before and after the activity. This record as well as the minutes of the meetings of the QITs are used as a monitoring tool.

The counsellors participate in the meetings and guide the secretary of the QIT to electronically record activities, responsibilities and achievements on the plan. If any unforeseen issues or bottlenecks crop up, counsellors act as facilitators to remove the impediment.

In the attachment to this chapter, you will find an example of a quality improvement plan from one of the participating companies.

##### **Internal and external audits, GMP certification**

After the QIT has worked on upgrading the company for several months and after representatives of the company have taken part in all training sessions (see the list of training modules above under 4.2.4), the process is mature enough to conduct an internal audit. The internal audit serves as a final check to identify and remedy the remaining gaps in safe food handling before the external audit is performed by an external conformity assessment body.

The internal audit passes through the following steps:

- The QIT is introduced into the GMP checklist. This is the checklist external conformity assessment bodies use when they assess the conformity of a food-processing company with the requirements of the GMP standard.
- QIT and counsellor check each item on the checklist. Non-conformities are identified and documented.
- A plan for rectifying non-conformities is conducted, and task teams for rectification are formed using the QIP template. Deadlines for rectification are set.
- After the deadlines have passed, the counsellor will visit the company again and will check jointly with the QIT whether the non-conformities were corrected.

The next step is the preparation and implementation of an external audit which, if successfully completed, leads to GMP certification. The external audit is conducted by an accredited conformity assessment body. The fact that it is “external” ensures the impartiality of the audit. The process of an external audit can be summarized as follows:

- The company requests a quotation and an application form. The application form is filled out and forwarded to the conformity assessment body including documentation of the company’s management system for food safety.
- After the endorsement of the application, the date of the external audit is set. The conformity assessment body then sends an audit plan to the company.
- The audit itself consists of a review of the documentation of the company’s management system as well as a visit of the premises of the company. The visit is based on the GMP checklist (see above), which consists of a total of 60 items or “checkpoints”. These cover the good practices outlined in Chapter 3 of this manual. The visit and checking of the company’s premises normally last half a day.
- The visit is concluded by a closing meeting of the auditors with representatives of the company. Here, the auditor(s) presents the audit findings in a manner that is transparent and acknowledged by the company representatives. The auditors document non-compliances and agree to a corrective action plan with the company. The corrective action plan is handed over to the company.
- A maximum of two months is given to the client to take corrective actions for the non-conformities raised at the audit and submit the duly completed corrective action plan as well as the duly completed non-conformity reports together with evidence for the corrective actions implemented to the conformity assessment body.
- If the evidence submitted for the corrective actions implemented is satisfactory, the company will be recommended for certification. After the recommendation has been decided favourably, the conformity assessment body will forward the certification agreement, certificate and logo master to the company. The certificate will be valid for a period of three years. In between, annual surveillance audits will be performed by the conformity assessment body to ensure maintenance of the management system for food safety. After three years, a re-certification audit will be conducted.

The graph below gives an overview of the major steps in the upgrading process.

### Major steps in the upgrading process

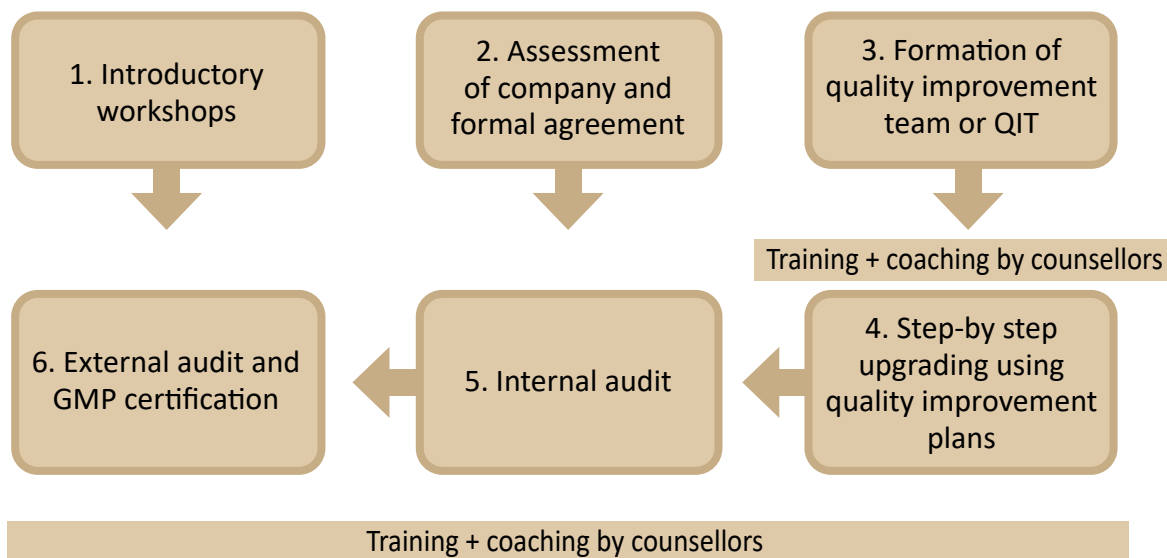


Illustration 29: Steps in the upgrading process towards GMP certification

## 4.3 Lessons learned from the upgrading processes

So far, two upgrading processes have been completed in Sri Lanka. These resulted in 33 food-handling SMEs gaining GMP certification. These processes produced various lessons for the organizers. Four of the lessons are summarized in the table below.

<b>Lesson 1</b>	<b>Lesson 2</b>	<b>Lesson 3</b>	<b>Lesson 4</b>
<b>The process is effective.</b>	<b>Worker-employer cooperation improved.</b>	<b>Quick wins boost motivation.</b>	<b>Practical training sessions bring commitment.</b>
A total of 64 % of all companies that had enrolled in the process got certified.	Workers played an active part in the upgrading. They also realized that work conditions improved. This lessened conflicts between staff and employers.	The upgrading process started with simple actions. These created “quick wins” and created a motivation to carry on with the process. SMEs see financial gains/savings during the initial stages which encourage owners to support the process more.	The training sessions addressed the needs of the SMEs. Employees understand the importance of upgrading. This brought commitment to change at the factory floor.



### A) Leading questions and recommendations

- Are your employees and management fully aware of each step in the production process?
- Do you want to have better control of your operations (for instance, by reducing waste and returns)?
- Are your staff and management fully trained in food safety?
- Are you looking for more cooperation from your employees and reducing the negative effects of high labour turnover?
- Are you interested in building a team that will implement measures for the betterment of food safety management?

### B) Further reading and references

None.

### C) Things to remember

- Repeated awareness-raising and training of employees and management on safe food handling is important.
- It is advisable to form teams within the company to discuss and remedy gaps in safe food handling. Employers and employees need to be equally involved!
- In changing the company's operations towards safe food handling, it is advisable to start with measures which are easy to do. Later, the more difficult issues can be resolved.
- Improvements in the company's operations should be documented (for instance, by photos). This helps to build motivation.
- Before an external audit is done by a conformity assessment body, an internal audit should be conducted and the necessary corrections be done.



#### Attachment:

Template of a quality improvement plan (QIP)



QUALITY IMPROVEMENT PLAN (QIP)/ Report		Name of the business:		Meeting date: / #:		XX-XX-XX / XXX
Participants:		Councillor: Team leader: Expert from PTB:		Planned finishing date		Comments
REF	Project & sub-activities	Person responsible	Progress indicator/ evidence	Start date	Actual finishing date	
1	1.1					
	1.2					
	1.3					
	1.4					
	1.5					
	1.6					
2	2.1					
	2.2					
	2.3					
	2.4					
3	3.1					
	3.2					
	3.3					
	3.4					
	3.5					
3.6						





**Chapter 5 -  
The Sri Lanka  
Food Act and  
key regulations**



# Chapter 5 – The Sri Lanka Food Act and key regulations

The handling of food is regulated by the Food Act No. 26 of 1980. The act regulates the manufacture, importation, sale and distribution of food. It also established the food administration process to safeguard consumers from foodborne illnesses. The act had two amendments, namely the Food (Amendment) Act, No. 20 of 1991 and the Food (Amendment) Act, No. 29 of 2011. The Food Act refers to food products but does not cover agricultural produce.

The Food Act stipulates that food control in Sri Lanka is a subject under the Ministry of Health. The Director General of Health Services (DGHS) is the chief food authority. The Food Advisory Committee (FAC) advises the DGHS on matters related to food regulation. The Deputy Director General (and, in turn, the Director of Environmental Health, Occupational Health & Food Safety) functions as the head of food control. The Food Control Administration Unit (FCAU) under the ministry carries out the operational tasks related to food control.

### Food control regulation and administration (abridged version)

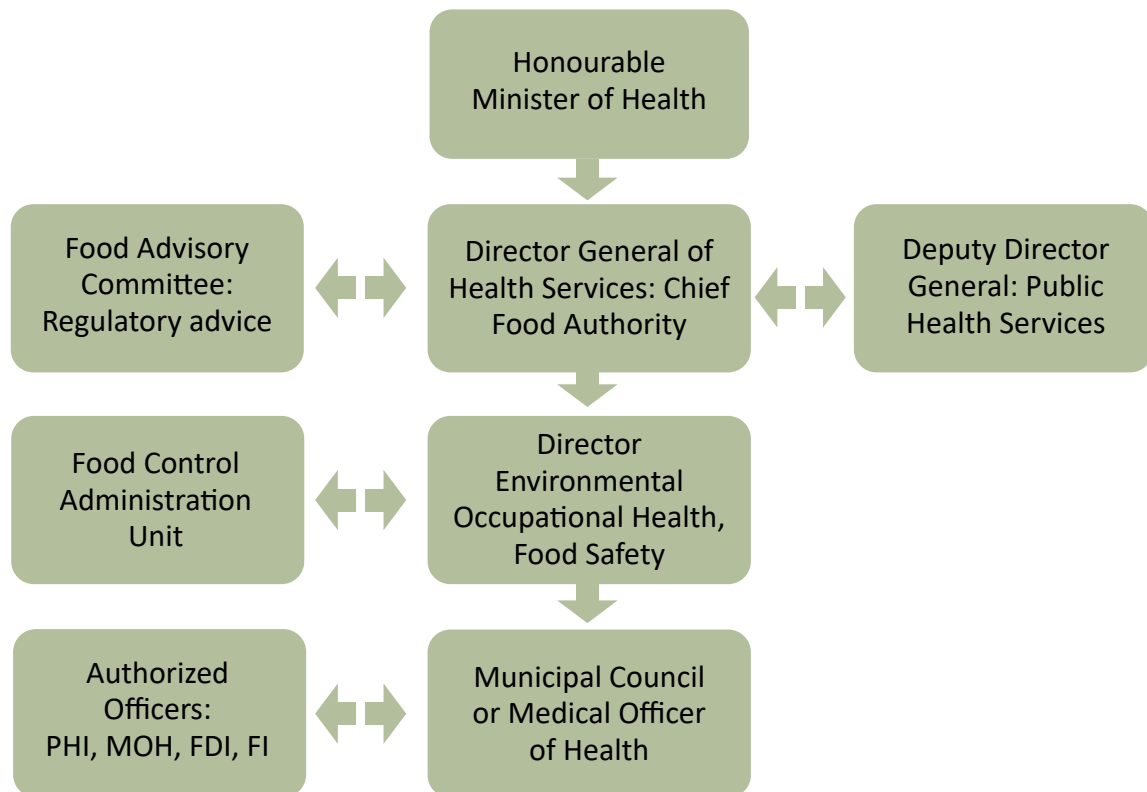


Illustration 30: Central food control administration (chart)

Based on the Food Act, there are several food-related acts addressing either specific products or cross-cutting topics. Their purpose is to ensure the quality and safety of foods. In legal terms, regulations must be observed by food handlers. As per 2022, there are 27 regulations related to food safety.

The following list shows which regulations were enacted by the authorities in Sri Lanka.

<b>List of food regulations in Sri Lanka 2022</b>	
<b>Product-specific regulations</b>	<b>Cross-cutting regulations</b>
<ul style="list-style-type: none"> <li>▪ Food (Colour Coding for Sugar, Salt and Fat) 2019</li> <li>▪ Food (Colour Coding for Sugar Levels) 2016</li> <li>▪ Food (Bread Standards) 2011</li> <li>▪ Food (Formaldehyde in Fish) 2010</li> <li>▪ Food (Melamine in Milk and Milk Products) 2010</li> <li>▪ Food (Vinegar Standards) 2007</li> <li>▪ Food (Bottled or Packaged Water) 2005</li> <li>▪ Food (Iodization of Salt) 2005</li> <li>▪ Food (Prohibition of Potassium Bromate in Flour) 2001</li> </ul>	<ul style="list-style-type: none"> <li>▪ Food (Preservatives) 2019</li> <li>▪ Food (Additives) 2019</li> <li>▪ Food (Registration of Premises) 2019</li> <li>▪ Food (Sweeteners) 2014</li> <li>▪ Food (Antioxidants) Amended 2013</li> <li>▪ Food (Antioxidants) 2009</li> <li>▪ Food (Flavouring Substances and Flavour Enhancers) 2013</li> <li>▪ Food (Shelf Life of Imported Food Items) Amended 2011</li> <li>▪ Food (Shelf Life of Imported Food Items) 2011</li> <li>▪ Food (Hygiene) 2011</li> <li>▪ Food (Colouring Substances) Amendment 2011</li> <li>▪ Food (Colouring Substances) 2006</li> <li>▪ Food (Packaging Materials and Articles) 2010</li> <li>▪ Food (Adoption of Standards) 2008</li> <li>▪ Food (Control of Import, Labelling and Sale of Genetically Modified Foods) 2006</li> <li>▪ Food (Irradiation) 2005</li> <li>▪ Food (Labelling and Advertising) 2005</li> <li>▪ Food (Miscellaneous) 1985</li> </ul>

*Illustration 31: Food regulations in Sri Lanka in 2022*

Further below is a link that leads to the website where all current and draft regulations are displayed. For a food handler, it is important to consult these regulations. For instance, companies using food-colouring substances will find detailed specifications that these substances must comply with.

Regulations are mostly based on Sri Lanka Standards (SLS). Standards are published documents that set out specifications and procedures designed to ensure products, services and systems are safe, reliable and consistently perform the way they are intended to.<sup>37</sup> They establish a common language that defines quality and safety criteria. The Sri Lanka Standards Institution (SLSI) is the national standards body (NSB) of Sri Lanka, established under the Sri Lanka Standards Institution Act, No. 6 of 1984. The SLSI functions under the Ministry of Science, Technology and Research. As of 2022, SLSI lists a total of 148 food-related standards.

By decision of the Government of Sri Lanka, some standards became regulations, which made them mandatory in legal terms. The adoption of standards that were not turned into regulations is voluntary. However, for food handlers it is beneficial to know the standards (including non-mandatory) that are relevant for the business and comply with them. Their compliance ensures a high level of food safety but also facilitates business. For instance, large supermarket chains in Sri Lanka demand conformity with relevant product standards from suppliers. For exporters it is imperative to conform with a) prevailing regulations in the target country and b) relevant international product standards (Codex Alimentarius – International Code of Practices).

Many regulations and most standards describe quantitative requirements as well as microbiological and/or chemical limits for specific items that must not be exceeded. For instance, SLS 214 “Fruit squashes and fruit cordials” states that the total soluble solids content should be 16 % by mass and that the acidity content must not exceed 1 %. It also provides the maximum content of heavy metals in the products (for instance, arsenic, cadmium and lead may not exceed 0.1 mg per kg, 1.0 mg per kg and 0.5 mg per kg, respectively). In order to verify that the food products do not exceed acceptable limits, food handlers need to have them tested at accredited laboratories. The QI Catalogue Sri Lanka (see below) provides a comprehensive overview of the test laboratories available in the country.

### **Important for all food-manufacturing businesses: the Food (Registration of Premises) Regulations of 2019**

The Food (Registration of Premises) Regulations of 2019, which took effect on 1 January 2020, provide important guidelines for all food-manufacturing businesses including SMEs.<sup>38</sup> According to the regulation, all food-handling businesses must:

- Register their premises with the food authority.
- Have the premises inspected according to the checklist attached to the regulation.
- Train food-handling staff in good hygiene practices (GHP) and good manufacturing practices (GMP) and provide evidence thereof.
- Demonstrate valid quality certificates such as GMP and ISO 22000:2018.

This means that food-manufacturing businesses must be certified at least according to GMP. This manual is based on the GMP standard. Following the recommendations given in this manual will enable your company to become GMP-certified with an accredited Sri Lankan conformity assessment body.

<sup>37</sup> See <https://www.slsi.lk> under item “FAQ”. Retrieved on the 23rd of February 2022.

<sup>38</sup> The link to the regulation is found here: <https://eohfs.health.gov.lk/food/images/pdf/regulations/Premises-Regulations-English.pdf>



## A) Leading questions and recommendations

- What is the difference between regulations and standards?
- What types of regulations exist in Sri Lanka?
- What are the relevant regulations and standards for your company?
- Do you know whether your company complies with the relevant regulations?

## B) Further reading and references

The website of the **Food Control Administration** provides important information about the Food Act and regulations in Sri Lanka. Here is the link: <https://eohfs.health.gov.lk/food/index.php?lang=en>. Under the “Regulatory” button one can access, among other things, current and draft regulations. They are available in English, Sinhala and Tamil.

The website of the **Sri Lanka Standards Institute** (link: <https://www.slsi.lk>) posts information about all current standards in the country. The main page of SLSI’s website has a “Search Sri Lanka Standards” button. By clicking on it, a search mask appears that offers several search options. For instance, by ticking “keyword” and typing “food” all food standards appear. One may also search for specific products (for instance, ice cream or fruit juice) and the relevant standards show up. However, the website only provides a brief description of the standard; the complete standard must be purchased.

The **Codex Alimentarius**, or “Food Code”, is a collection of standards, guidelines and codes of practice adopted by the Codex Alimentarius Commission. The Commission, also known as CAC, is the central part of the Joint FAO/WHO Food Standards Programme and was established by FAO and WHO to protect consumer health and promote fair practices in food trade. The Sri Lankan Government adopted many food standards from the Codex Alimentarius into its own food legislation. Here is the link: <https://www.fao.org/fao-who-codexalimentarius/about-codex/en/#c453333>.

The **QI Catalogue Sri Lanka** is an interesting document for all readers seeking a comprehensive overview of the system of national quality infrastructure in Sri Lanka. It also provides an exhaustive directory of providers of services in the field of quality infrastructure such as, for example, chemical and biological testing laboratories. The QI Catalogue Sri Lanka can be found under this link: [https://www.slab.lk/wp-content/uploads/2021/01/PTB\\_QI\\_Catalogue-Sri-Lanka.pdf](https://www.slab.lk/wp-content/uploads/2021/01/PTB_QI_Catalogue-Sri-Lanka.pdf).

## C) Things to remember

- Regulations are legally binding. They ensure that food products are safe for consumption.
- Standards are voluntary. However, compliance with relevant standards ensures a high level of food safety, is a prerequisite in international trade and improves quality.
- The website of the Food Control Administration Unit provides access to all current and draft food regulations in English, Sinhala and Tamil.





**Chapter 6 -  
Food inspection  
in Sri Lanka**



# Chapter 6 –

## Food inspection in Sri Lanka

Food inspections are checks carried out by duly authorized government officials in food-handling companies with the purpose of ensuring the safety of food available for consumers. In Sri Lanka, inspections of food-handling companies are mainly conducted by public health inspectors (PHI). In addition to PHIs, other authorized officers such as medical officers of health (MOH), food and drug inspectors (FDI) and food inspectors (FI) also perform inspection tasks.

When inspecting food-handling companies, the duly authorized officers need to consider many factors. These factors are compiled in a checklist prepared under the guidance of the Food Advisory Committee of the Ministry of Health which serves as the key inspection tool.

The inspections and the grading pursue five objectives<sup>39</sup> :

- To ensure and maintain the quality and safety of food
- To educate and advise the owners and food handlers on safe food-handling practices
- To upgrade the food-handling establishment
- To formulate and implement an action plan to improve food safety
- To plan the programme and frequency of inspection in the company

The checklist on which inspections are based is called “Food Premises Grading Form” (or “H-800” for short). According to this form, the companies are inspected in five fields: general, building, food handler, processing and/or serving area and food storage. In each field, between five to seven items are assessed. For instance, the safety of the water supply, the cleanliness and cleaning of the establishment, control of pests and animals, sound pollution and the cleanliness of the toilet(s) are checked under “building”. Each item checked is then marked according to the degree of compliance with hygiene requirements (please see the marks for each item in the form annexed to this chapter). Based on the total number of marks attributed by the officers, the company is graded into four categories as shown in the following table:

<b>Table 23: Grading of food-handling companies after inspection</b>			
75 – 100 %	50 – 74 %	25 – 49 %	0 – 24 %
A grade (good)	B grade (satisfactory)	C grade (unsatisfactory)	D grade (very unsatisfactory)

If a D grade is awarded, the company must be closed immediately. The awarding of the other grades leads to different inspection frequencies. A food-handling business with an A grade will be inspected every three months, one with a B grade every two months and one with a C grade monthly.

The form is filled in duplicate, with one remaining in the inspected premise and the second one in the respective file of the inspection authority.

39 Ministry of Health: Manual for the Sri Lanka Public Health Inspector, Panaluwa, Padukka, 2010, p. 144

As mentioned above, the procedures of the Ministry of Health foresee food inspectors providing guidance and technical advice in the course of the inspections. However, if owners or managers of the food-handling establishments do not adhere to the guidance and advice given and continue to run the company in an unsatisfactory manner, the authorities have the mandate to take legal action.

It is important to note that food handlers following the good practices as outlined in Chapter 3 of this manual will deliver excellent results in the inspections.

### Testing food samples

Besides checking conditions and operations of food-handling establishments, the testing of food samples is a further aspect of the food inspection system in Sri Lanka. This task is performed by both FDIs and PHIs. The purpose of testing food samples is to check whether final products offered to consumers – either produced by the food handlers or sold in supermarkets, grocery stores, etc. – are fit for safe consumption and meet the respective product standards. The health authorities develop and implement monthly programmes for testing food samples. Also, food samples are taken after complaints from customers. Tests done as part of routine operations and in the event of complaints, are considered “formal” tests. It is also common for PHIs to take food samples during their inspection visits, for instance, when they suspect that a food item is unfit for consumption. These are called “informal” tests, meaning they are done randomly.

Formal test samples are forwarded to a laboratory authorized under the Food Act. The associated costs are borne by the local authority, and the test report is provided within 90 days. A food-handling company can also choose to deliver a sample to an authorized officer and get it tested for a fee. Only seven laboratories in Sri Lanka are authorized under the Food Act and mandated to conduct formal tests.<sup>40</sup> If the sample tests reveal severe deviations from the Sri Lankan Standard for the specific product, the laboratory drafts a report which forms the basis for legal proceedings. If there are no or only minor deviations, the company is requested to conduct the necessary rectifications for full compliance without undergoing legal proceedings.

A third aspect of the food inspection system in Sri Lanka is “Food Seizure and Detain”. Food is seized and detained when authorized officers find it obviously hazardous to human health, for instance, when meat is spoilt or yogurt contains spores.

The graph on the following page demonstrates the hierarchical chain in the implementation of the Food Act, including the division of tasks in inspection.

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40 A list of the approved laboratories is found on the website of the Food Control Administration Unit of the Ministry of Health: [https://eohfs.health.gov.lk/food/index.php?option=com\\_content&view=article&id=25&Itemid=166&lang=en](https://eohfs.health.gov.lk/food/index.php?option=com_content&view=article&id=25&Itemid=166&lang=en)

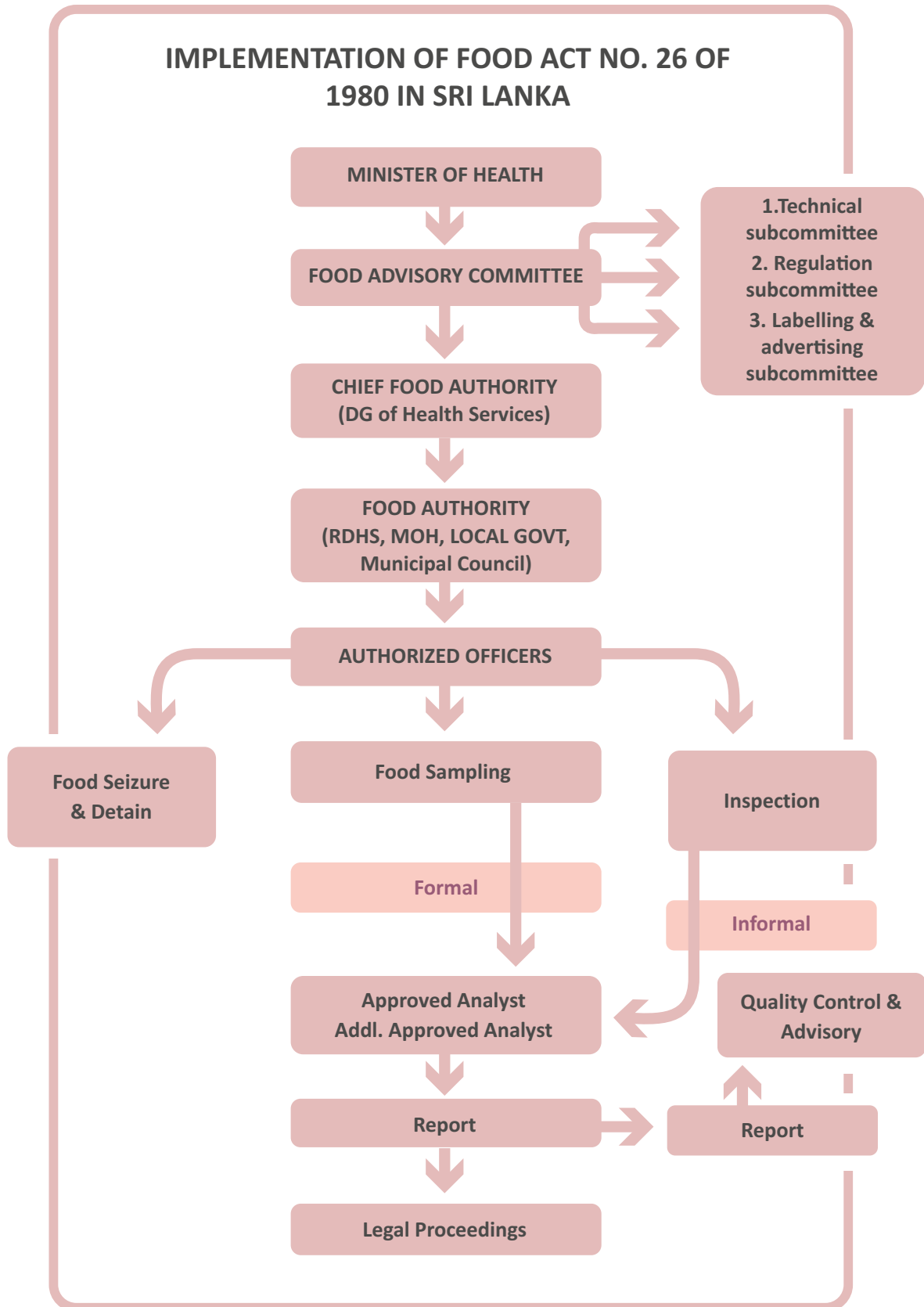


Illustration 32: Implementation of Food Act No. 26 of 1980 in Sri Lanka, including inspection system

## A) Leading questions and recommendations

What are the objectives of inspections?

What is the current grading of your company? Do you know what needs to be improved in your company to obtain a higher grading?

If you follow all the good practices presented in Chapter 3 of this manual, what will happen to the grading of your company?

Under which circumstances can authorized officers take legal action against a food-handling company?

## B) Further reading and references

The following link gives you access to the “Manual for the Sri Lanka Public Health Inspector” which also outlines the roles of PHI in conducting inspections of food-handling companies: [https://phi.lk/Manual\\_for\\_the\\_Sri\\_Lanka\\_PHI.pdf](https://phi.lk/Manual_for_the_Sri_Lanka_PHI.pdf).

## C) Things to remember

- Food inspections are checks carried out by duly authorized government officials in food-handling companies with the purpose of ensuring the safety of food available for consumers.
- In Sri Lanka, most inspections of food-handling companies are performed by public health inspectors (PHI).
- The main instrument for inspection is the “Grading of Food Handling Establishments” checklist, also known as the “Health-800 (H800) Checklist”.
- The grading is done in four categories: A = good (75-100 marks), B = satisfactory (50-74 marks), C = unsatisfactory (25-49 marks) and D = very unsatisfactory (0-24 marks)
- It is the task of PHIs to provide guidance and technical advice for further upgrading of the food-handling companies. Legal action can only be taken if advice is not followed.



## Attachments

Food Premises Grading Form (Health800/H800 Checklist)

### Food Premises Grading Form H 800 (revised 2022)

Category of the premise:

Name of the premise:

Address of the premise:

Name of the owner/manager:

NIC number:

Address of the owner/manager:

Telephone number of the premise

Telephone number of the owner/manage

Date									
General	Premises registered under the regulation	0/5	0/5	0/5	0/5			0/5	0/5
	Registration certificate displayed	0/5	0/5	0/5	0/5			0/5	0/5
	(No need to be registered under the regulation) – refer to instructions	(10)	(10)	(10)	(10)			(10)	(10)
	Not convicted within one year	0/5	0/5	0/5	0/5			0/5	0/5
	Food not destroyed within one year	0/5	0/5	0/5	0/5			0/5	0/5
	Subtotal	.....	.....	.....	.....			.....	.....
Building	Safe water	0/4	0/4	0/4	0/4			0/4	0/4
	Cleanliness and cleaning	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4
	Pests and animals	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4
	Sound pollution	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4
	Toilets cleanliness	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4
	Subtotal	.....	.....	.....	.....			.....	.....
Food Handler	Medical certificates	0/2/5	0/2/5	0/2/5	0/2/5			0/2/5	0/2/5
	Hair net/head cap, mask, gloves, slippers/shoes	0/2/5	0/2/5	0/2/5	0/2/5			0/2/5	0/2/5
	Unhygienic behaviour (eating, chewing, smoking, spitting)	0/2/5	0/2/5	0/2/5	0/2/5			0/2/5	0/2/5
	Use clean utensils to serve food	0/2/5	0/2/5	0/2/5	0/2/5			0/2/5	0/2/5
	(No food handlers) – refer to instructions	(20)	(20)	(20)	(20)			(20)	(20)
	Subtotal	.....	.....	.....	.....			.....	.....



Processing and/or serving	Walls	Hygienic	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4	
	Floor	Hygienic	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4	
	Ceiling	Hygienic	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4	
	Food-contactable surfaces	Hygienic	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4	
	Wastewater	(Sanitary disposal of water)	0/2	0/2	0/2	0/2			0/2	0/2	
	Waste bins	All closed	0/2	0/2	0/2	0/2			0/2	0/2	
	(No processing and/or serving area) – refer to instructions			(20)	(20)	(20)	(20)			(20)	(20)
	Subtotal			.....	.....	.....	.....			.....	.....
Food storage	Cooked perishable food	Kept closed	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4	
		2/4 temperature rule	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4	
		Stored in food-grade container	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4	
		Contamination prevented	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4	
	(No storage of cooked food) – refer to instructions			(16)	(16)	(16)	(16)			(16)	(16)
	Uncooked food	Contamination prevented	0/2/4	0/2/4	0/2/4	0/2/4			0/2/4	0/2/4	
	Subtotal			.....	.....	.....	.....			.....	.....
Grand total			....../...	....../...	....../...			....../...	....../...	....../...	
Grade											
Signature of the PHI											

Date	Remark/advice

## Instructions on grading food premises using H800 (revised 2022)

### Category of the premise

Premise	Code	Description
Food factory	FF	A premise fully or partially manufacturing, processing or packaging food for human consumption. Bakeries and grinding mills exclusively carrying out grinding are not included in this category.
Hotel	HT	A premise which prepares and serves at least one main meal.
Bakery	BK	A premise which manufactures food items using wheat or other kind of flour.
Tea kiosk/snack bar	TS	A premise serving food items that are not a main meal.
Grocery	DS	A premise that does not prepare food but sells prepared food items or food ingredients.
Supermarket	SM	A large-scale premise which sells food and a variety of consumer items and has facilities for the customer to select items by themselves.
Others	OT	A premise that does not fall into any of the above categorizations.

### Procedure, marking, grading and frequency

Procedure	Grand total	Grade	Meaning	Inspection frequency
Circle the relevant mark. Marks indicated in italics and within brackets should not be added to the total and are to be reduced from the 100 to calculate the denominator. Final mark is to be calculated to a percentage. Fill out the form in duplicate. Give the first copy to the premise. Keep the second copy in the H800 file of the PHI office.	75 – 100 %	A	Good	Once in three months
	50 – 74 %	B	Satisfactory	Once in two months
	25 – 49 %	C	Unsatisfactory	Once a month
	0 – 24 %	D	Very unsatisfactory	Once a month

### Description of selected terms

Term	Description
Premise registration	Registration under Food (Registration of Premises) Regulations, 2019
Safe water	If the water is directly from water board line (n storage tank), consider that water is safe, unless there was an unsatisfactory report within the last year. Consider all other sources as unsafe
Pests and animals	If cockroaches, rats or other animals (even one) are present, mark 0. Mark 2 if any other pests or animals are present.
Sound pollution	Marking 0 means that one cannot hear a normal voice unless very close by. Mark 2 if a normal voice can carry only in 1 m. If a normal voice is heard beyond 1 m, mark 4.
Toilet's cleanliness	Mark 0 if water or soap is not available. Mark 2 if available but dirt or a bad smell is present. Otherwise, or if PHI thinks a toilet is not necessary, mark 4.
Food handler	A person who handles unpackaged food and food-contactable surfaces
Medical certificate, hair net head cap, mask, gloves, slippers/shoes, clean utensils to serve food, food storage	Award a 5 if more than $\frac{3}{4}$ (75%) of workers meet requirements. A 2 means that the condition is satisfactory between $\frac{1}{2}$ to $\frac{3}{4}$ (50-75 %). Mark 0 if it is less than $\frac{1}{2}$ (50 %).
Unhygienic behaviour	Mark 5 if no one displays unhygienic behaviour. Mark 2 if less than $\frac{1}{2}$ (50 %) do so. Mark 0 if more than $\frac{1}{2}$ (50 %) of workers engage in unhygienic behaviour.
Hygienic	Measures mentioned in the Food (Hygiene) Regulations. Mark 0 if both manufacturing and maintaining defects present. Mark 2 if there is one type of defect and 5 if no defects are present.
Perishable food	Consider eggs and egg products, milk and dairy products, raw meat, raw sea food, cooked cereals, cooked vegetables and peeled/sliced fruits as perishable food.
2/4 rule	Cooked perishable food should not be exposed to the temperature danger zone (4 – 60 C) for more than four hours. Refrigeration (<4 °C) or heating (>60 °C) should be carried out within two hours. The rule could be confirmed through investigation or documented evidence.
Food-grade container	Consider plastics with food grade symbols, stainless steel, melamine, ceramic, enamel and glass as food-grade containers. Give a 5 mark if all containers (100 %) are made of these materials; a 2 if more than $\frac{1}{2}$ (50 %) meet this criteria; and 0 if less than $\frac{1}{2}$ (50 %) of the containers are safe for food.
Cooked/uncooked food	Cooking is processing food by applying a temperature of >72 °C



## **Good Practices for Food - Manufacturing Businesses**

Contact:

University of Vavuniya

**Prof. Ananthini Nanthakumaran**

Email: [n\\_ananthi@vau.ac.lk](mailto:n_ananthi@vau.ac.lk)