

Food Handler's Bible - License B



FOOD SAFETY //
QUALITY CONSULTANCY

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This course will deliver to the student the fundamental Food Safety requirements as determined by the Maltese Food Safety Commission as enforced by Legal Notice 178/2001. Additional material related to HACCP and the Pre-requisite program will allow the student to

achieve a deeper understanding of the subject and be able to apply the knowledge efficiently.

Table of Contents

FOOD HANDLER'S BIBLE - LICENSE B	2
INTRODUCTION - WHY DO THIS COURSE?	2
WHO WILL BENEFIT FROM SAFE FOOD?.....	2
THE IMPORTANCE OF FOOD HYGIENE.	2
THE NEGATIVE IMPACTS OF LACK OF FOOD SAFETY	3
WHO IS RESPONSIBLE?	3
LEGAL BASIS TO FOOD SAFETY	3
TEAM WORK.....	4
FOOD HAZARDS – WHAT ARE THESE?	4
BIOLOGICAL HAZARDS - LIVING	4
FOODBORNE ILLNESSES OUTBREAKS	5
PRIONS.....	8
VIRUSES.....	8
PARASITES.....	9
BACTERIA.....	10
CAMPYLOBACTER	10
SALMONELLA SP.	11
STAPHYLOCOCCUS AUREUS.....	11
BACILLUS CEREUS.....	11
ESCHERICHIA COLI SP.....	12
CLOSTRIDIUM PERFRINGENS.....	12
WHAT BACTERIA NEED TO SURVIVE?.....	13
HOW MUCH OF THESE ELEMENTS IS ENOUGH OR TOO MUCH?.....	13
IMPORTANT TEMPERATURES.....	14
HOW DO BACTERIA GROW?.....	15
BACTERIAL HOTSPOTS.....	16
HIGH RISK AND LOW RISK FOODS	17
HIGH RISK FOOD.....	18
LOW RISK FOOD	19
THE MOST VULNERABLE PEOPLE IN OUR SOCIETY	20
WOULD YOU BE ABLE TO DETECT A COMPROMISED FOOD FROM A CLEAN & SAFE ONE?	21
WORKED EXERCISES - 1	22
CHEMICAL HAZARDS.....	23
PHYSICAL HAZARDS	24
HAZARD COMPARISON; PROS AND CONS.....	25
DANGEROUS FOOD	26
WORKED EXERCISE 2.....	27
FOOD CONTAMINATION: THE WHAT & THE HOW?.....	28
CROSS CONTAMINATION.....	28
PREVENTING CROSS CONTAMINATION.....	29
PREVENTING CROSS CONTAMINATION...CONTINUED	30
HAND WASHING PRACTICES.....	31
HOW GOOD DO YOU WASH YOUR HANDS?.....	32
COMMON CAUSES OF FOOD POISONING & HOW TO AVOID THEM	33
FOOD ADULTERATION.....	33
FOOD SAFETY PREREQUISITE PROGRAM (PRP)	34
PREMISES.....	35
CHEMICALS AND THEIR CONTROL	36

HOW TO CLEAN	41
EQUIPMENT, MACHINERY & MAINTENANCE.....	44
CONTROL OF BRITTLE PLASTIC & GLASS (GBP).....	47
KNIVES AND SLICING BLADES.....	47
GOOD STORAGE BAD STORAGE	47
LIGHTING AND VENTILATION.....	48
AIR, WATER AND OTHER GASES.....	48
PEST CONTROL PROGRAM.....	49
RAW MATERIAL STORAGE.....	50
WASTE MANAGEMENT.....	52
PERSONNEL.....	55
PERSONAL HYGIENE.....	55
TRAINING.....	59
LEGAL REQUIRMENTS & LIMITATIONS.....	60
RAW MATERIALS (RM'S).....	61
SUPPLIER APPROVAL & MONITORING.....	61
FINISHED GOODS SPECIFICATIONS.....	62
ACCEPTANCE & REJECTION OF INCOMING GOODS.....	63
CONTROL OF NON-CONFORMING PRODUCTS.....	63
FOOD STORAGE AREAS.....	64
ALLERGENS.....	64
WORKED EXERCISE 3.....	69
WORKED EXERCISES 4.....	72
DISTRIBUTION AND TRANSPORT.....	73
TRACEABILITY & RECALLS.....	73
CUSTOMER COMPLAINTS.....	76
PROCESS MAPPING.....	77
HAZARD ANALYSIS & CRITICAL CONTROL POINTS – HACCP.....	78
THE CODEX ALIMENTARIUS 7 PRINCIPLES OF HACCP.....	78
ENVIRONMENTAL HEALTH INSPECTORS.....	79

FOOD HANDLER'S BIBLE - LICENSE B

INTRODUCTION - WHY DO THIS COURSE?

This course is primarily a legal requirement under Legal Notice 178/2011 to every Food Handler (FH) or anyone who intends to be one. A FH is not necessarily a person who makes a living out of handling food but also anyone who handles food for charities, Non-Governmental Organization (NGO's), and other private functions.

Legal Notice 178/2001 states the following:

3. (1) No person shall act as a food handler without registering as such with the Food Safety Commission.
 3. (2) No person shall employ any food handlers in any food business who are not registered with the Food Safety Commission and are in possession of a current registration document.
- It is important to know that, you are always responsible for your actions and this philosophy also applies to Food Safety practices. Therefore you need to know the do's and the don'ts of Food Hygiene. At the end of this course the application of the knowledge gained will be as simple and easy, just like riding a bike, you do not need to think; you just do.

Most importantly, you do this course to apply the knowledge learned, produce SAFE FOOD and reduce the potential of food borne illnesses and outbreaks. Making sure a food handler has adequate training and tools for food safety is an important aspect of protecting public health. If someone who is sick comes into contact with food, she can spread the disease to other people.

WHO WILL BENEFIT FROM SAFE FOOD?

A food handler is a person who works in a facility where food is produced and packaged, and comes into contact with food while on the job. This can include everyone from prep cooks at restaurants to quality inspectors on a production line. The benefits of food safety are holistic, the customer, the food industry and even you will benefit from having a reliable system. Imagine that nobody trusts the food industry; there would be no restaurants, no hotels, no food manufacturers and no food business at all.



THE IMPORTANCE OF FOOD HYGIENE.

Food hygiene may be defined as follows:

- The cleanliness and health and attitude of the workers
- The cleanliness of the equipment, utensils and premises
- The quality and cleanliness of the raw materials
- Monitoring of temperatures

If you are not yet convinced that Food Safety is needed, consider that **food is a necessity not a luxury** and therefore, its safety is vital to have a healthy population.

THE NEGATIVE IMPACTS OF LACK OF FOOD SAFETY

In the United States (US), the economy loses between **10 to 83 billion dollars a year** in revenue. This is contributed by

- Food Waste
- Sick leave from the job.....promoting low productivity
- Bad reputation and loss of customers
- Hospitalization and extra hours worked by the hospital staff.
- Cancellation of flights, vacations and other plans.
- Legal action and compensation fees.
- 5,200 deaths



WHO IS RESPONSIBLE?

In the eyes of the law responsibility is not a straight line; however, remember **YOU** are always responsible for **YOUR** actions. You have a Moral (responsibility and a Legal responsibility to do the right thing).



If your place of employment/business is facing a law suit by an alleged injured or a badly sickened customer, **YOU** must be able to give an explanation of what precautions were taken to prevent such incidents. Such action is called Due Diligence. In a clear case of injury by negligence the court can fine the business or the individual up to €12,000 and/or 5 years imprisonment. Therefore, it is much more feasible to prepare safe food than taking shortcuts that might impact the customers health.

LEGAL BASIS TO FOOD SAFETY

A multitude of laws are in place to enforce the right practices in the industry, predominantly to the food handler. The following are of direct relevance:

- Legal Notice 178/2001 - Registration of Food Handlers
- Legal Notice 180/2011 - Registration of Food Outlets
- Regulation (EC) 178/2002 - General Principles and Requirements of Food Safety
- Regulation (EC) 852/2004 - Hygiene of Foodstuffs
- Codex Alimentarius - International Recognized Standards of Practice

In a clear case of injury by negligence the court can fine the business or the individual up to €12,000 and/or 5 years imprisonment.

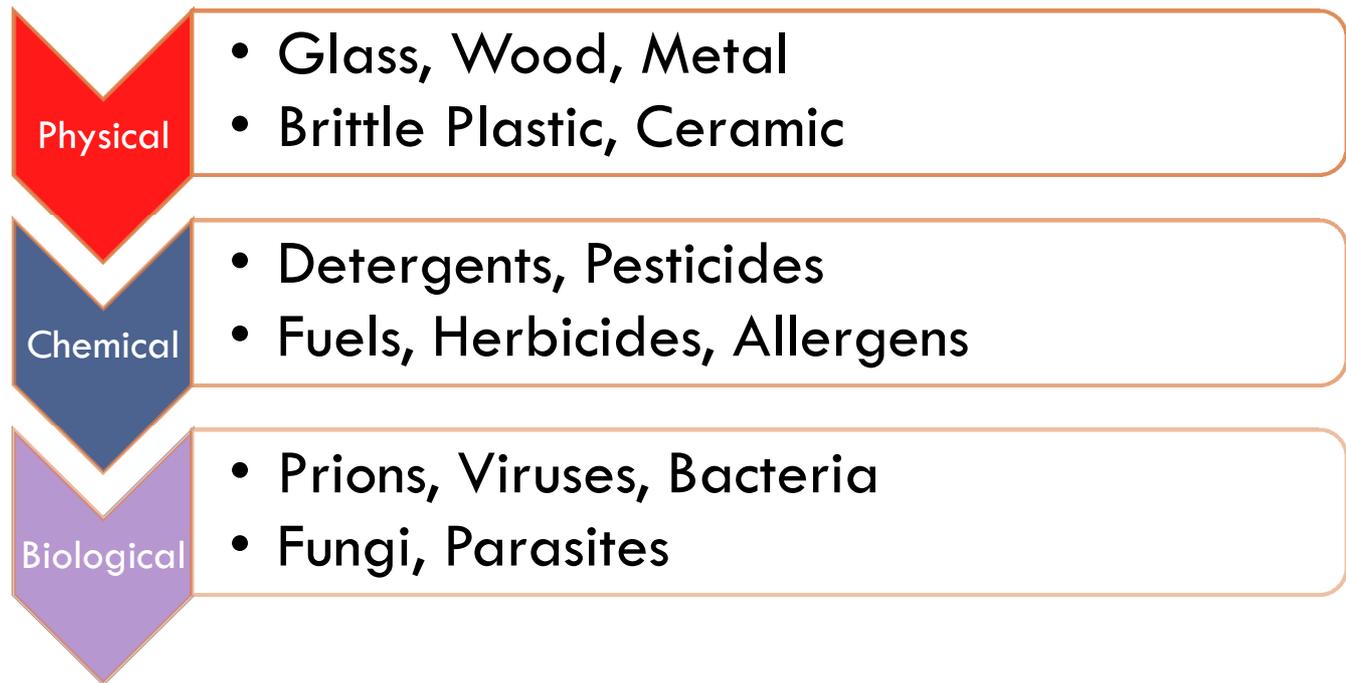
TEAM WORK

The best preventive action any food establishment can undertake is to induce a team mentality. Remember a chain is as strong as its weakest link, having said that, it takes only one bad action along the process to poison a customer.



FOOD HAZARDS – WHAT ARE THESE?

Food hazards can be defined as any agent that is reasonably likely to cause illness or injury in the absence of its control. These hazards are categorized into three main profiles:



BIOLOGICAL HAZARDS - LIVING

Our world is crawling in biological (living) creatures, some are harmless, some are beneficial but some are harmful. Harmful organisms are called Pathogens – these cause illness. These are found everywhere: on the skin; in the air, etc. Below are the most commonly found:-

- **Prions** - The smallest infective particle
- **Viruses** - These are very small but bigger (20-1400nm) and more developed than Prions. Need a living host to survive.
- **Bacteria** - These are bigger than Viruses (0.5 - 5µm) lives independently on both living and dead creatures.
- **Parasites** - Much bigger than bacteria and live off, often bigger living creatures, stealing nourishment in the process.
- **Fungi** - Live on anything, living, dead and aids decomposition.

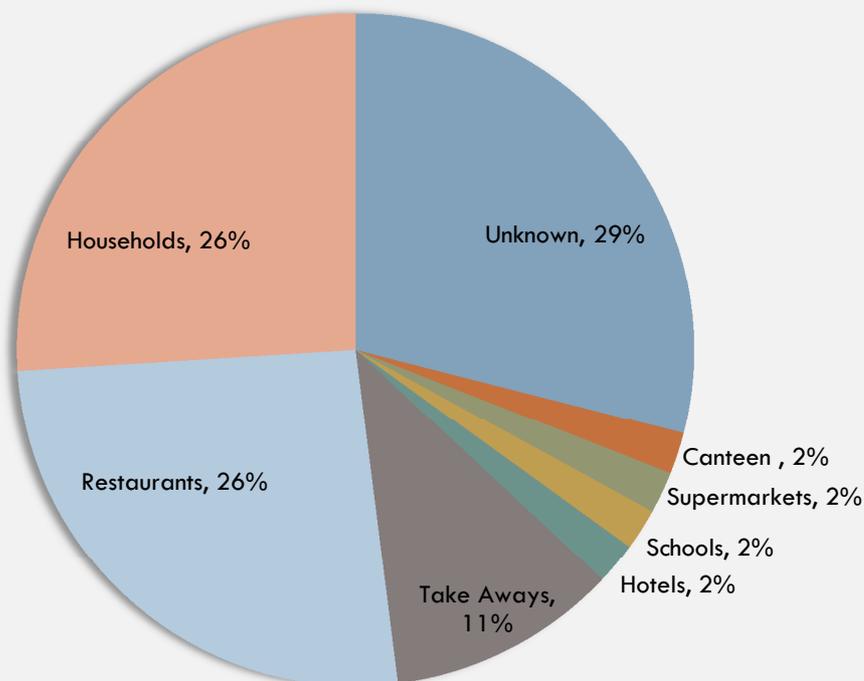
1. The number one infective organism is Bacteria
2. 1nanometer is 1mm/1,000,000.
3. 1micrometer is 1mm/100.
4. The thickness of a human hair is 75,000nm (nanometres) in diameter.
5. 25,000 bacteria can easily fit on a needle point.

FOODBORNE ILLNESSES OUTBREAKS

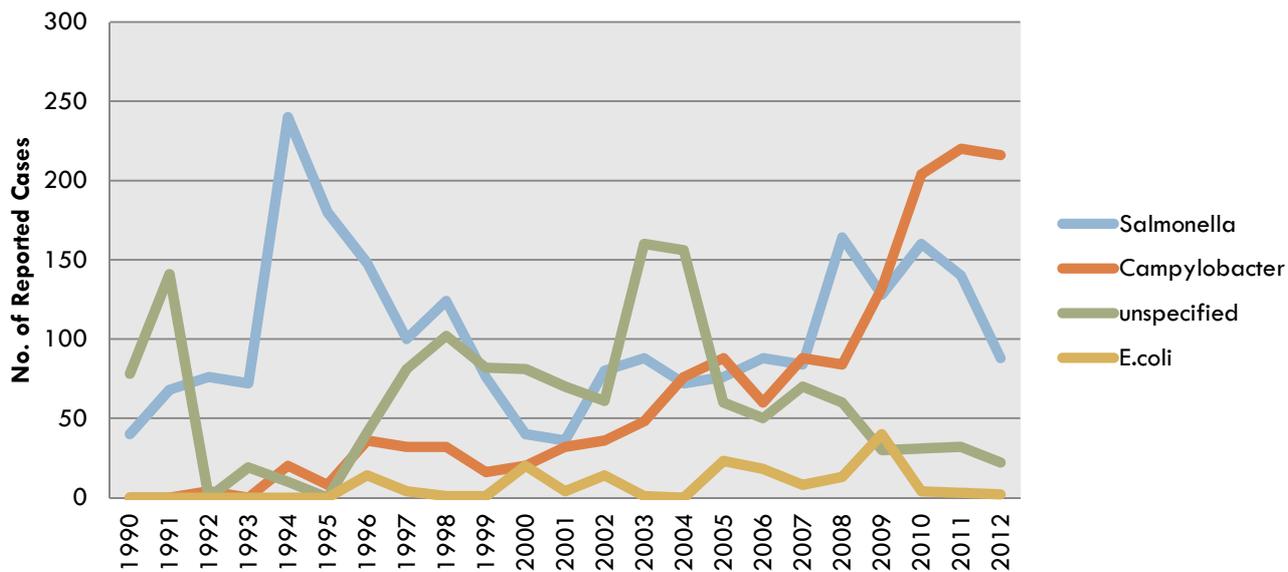
According to statistics issued by the Maltese Centre for Disease Control (CDC), outbreaks are following a downward trend; however, due to newly discovered pathogens and means of measurements, the end result looks collectively higher. The registered decrease is due to several factors, namely Training and more knowledge availability and better hygiene practices throughout the industry.

The main sources of such foodborne illnesses are surprising, 26% comes from Restaurant and another 26% come from households shedding light on the fact that training is also needed in everyday culinary practices.

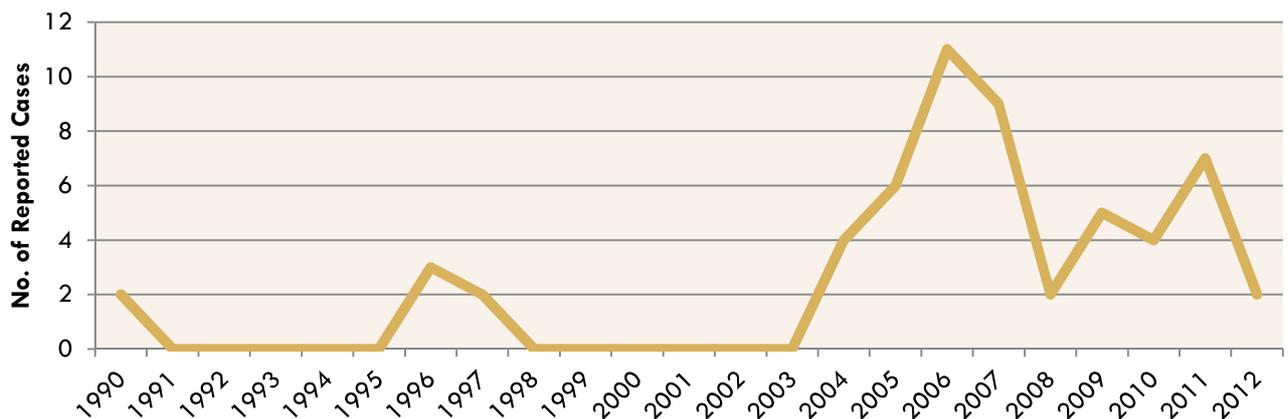
Foodborne Outbreaks in Malta 2012



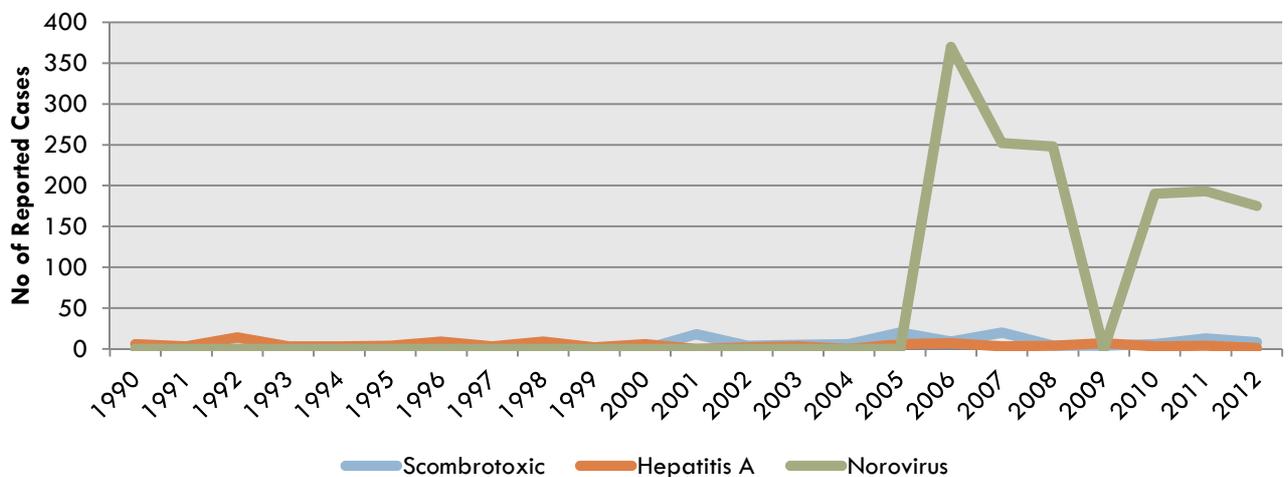
Major Bacterial Foodborne Illnesses



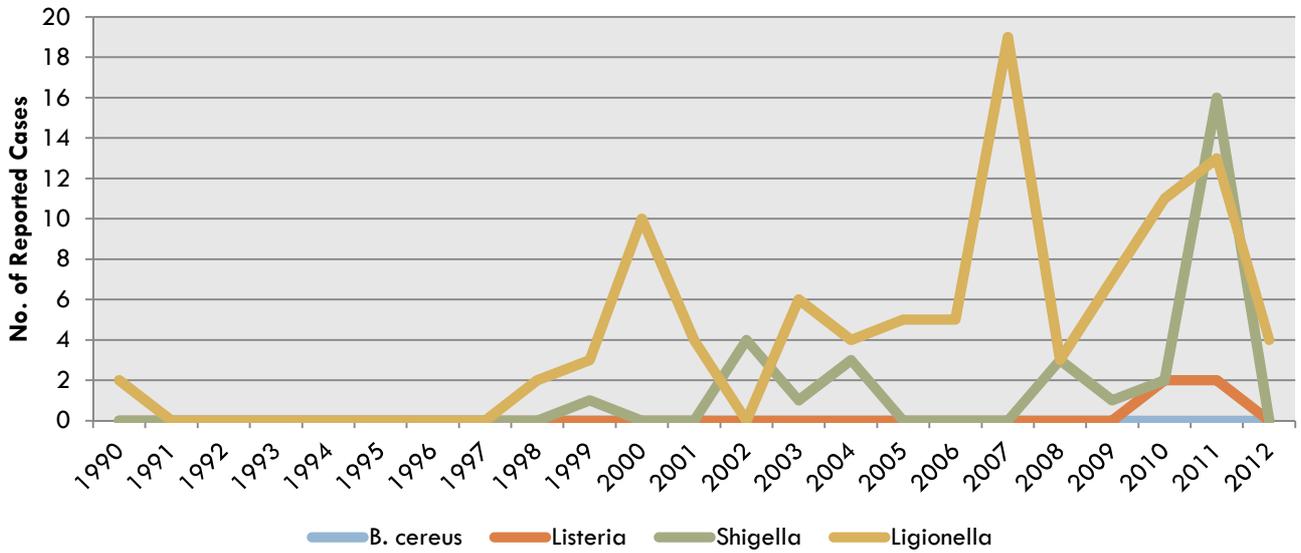
Parasitic Infections Reported Cases (Giardiasis)



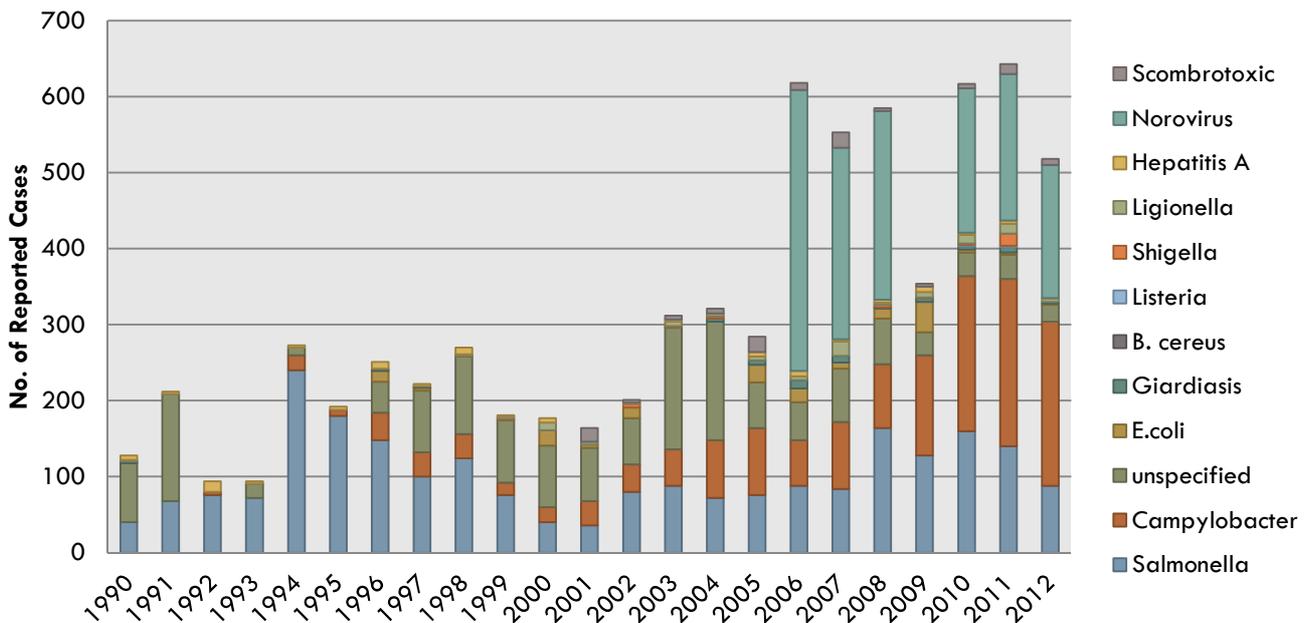
Viral and Scomrotoxin Illnesses



Minor Bacterial Foodborne Illnesses

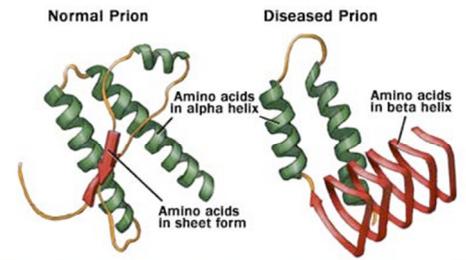


Gross Foodborne Illness



PRIONS

Prions are relatively uncommon however, if left uncontrolled; the disease will become a pandemic issue in a brief period. The most notorious form of disease is "Mad cow Disease" (Bovine Spongiform Encephalopathy) where the spine and parts of the brain start to degenerate (*filled with holes until it resembles a sponge*) leading to death. This disease is highly transmittable to humans consuming infected meat developing Creutzfeldt - Jakob disease (CJD).

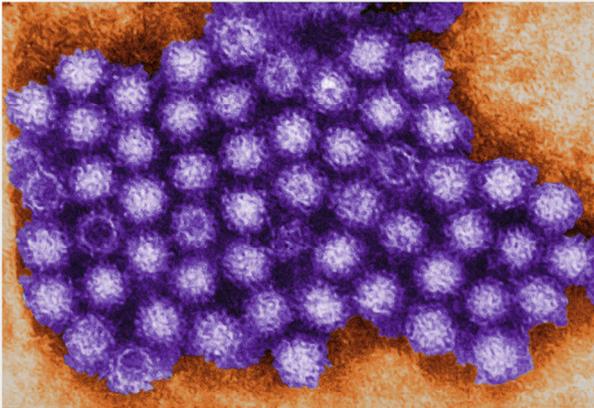


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<http://nawrot.psych.ndsu.nodak>

VIRUSES

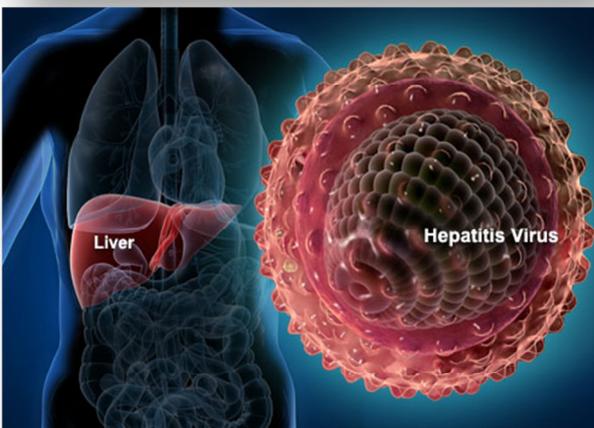
The most common foodborne infective Viruses are the following:



Norovirus – Highly contagious, big trouble to cruise liners.



Rotavirus – Very common in children



Hepatitis A & E – Will produce Jaundice (skin and white of eyes will turn yellow)

PARASITES

The most common parasites are the following:



Giardia Intestinalis – The disease is called Giardiasis.

Once infected, the sufferer will experience diarrhoea, abdominal cramps and mild fever.

Origin: **Infected Water**



Entamoeba histolytica – The disease is called Amoebiasis.

Typical symptom is Dysentery- bloody diarrhoea or mucus

Origin: **Infected Water**



Taenia solium – Also known as Tapeworm.

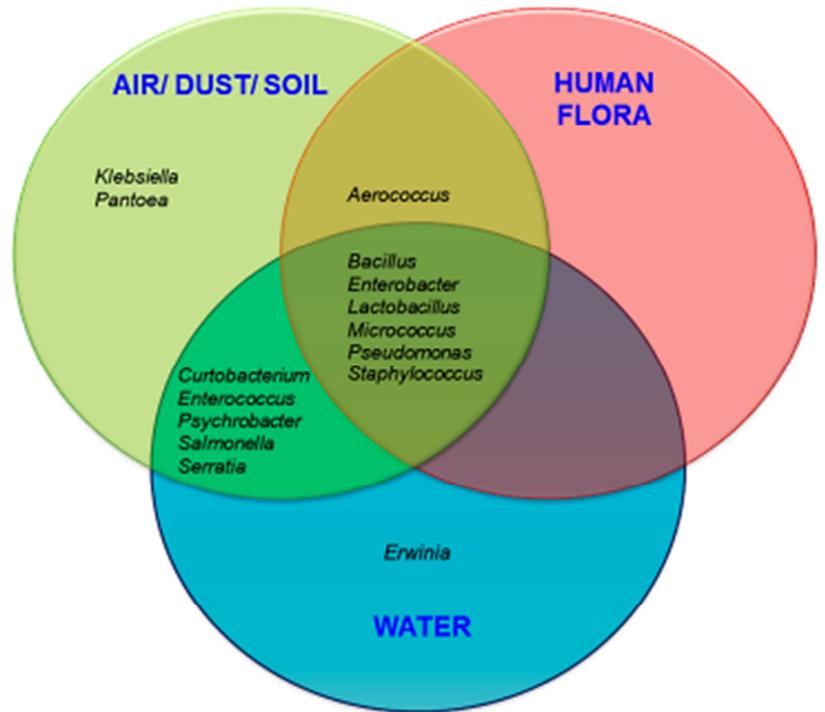
Typical symptoms are weight loss, loss of appetite, anaemia.

Origin: **Under cooked infected pork**

BACTERIA

These microorganisms are extremely adaptable and can be found practically everywhere. The list below shows some of the likely sources:

- Spoiled Food
- Animal Guts & Human Guts.
- Infected Waters
- Dirty Food Surfaces
- Animal Droppings
- Pest
- Soil
- Waste
- Mobiles/Money



The following illustration of bacteria will provide you with an overview of the most common pathogenic bacteria and their characteristics. You will also note that their capability to do harm increases which can be denoted as the effect of evolution.

CAMPYLOBACTER

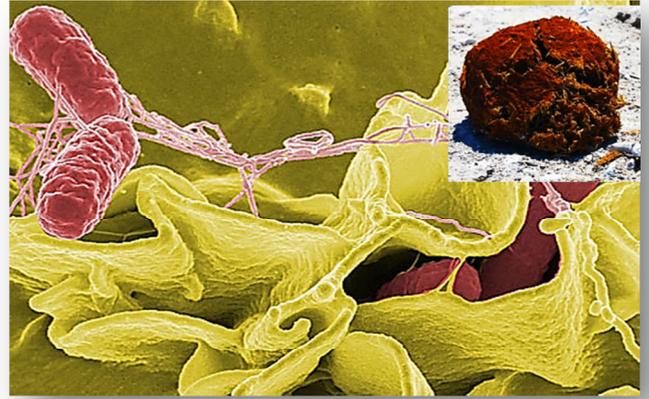
- Motile, non-spore forming
- Onset in 2 - 5 days after exposure
- Mortality rate 99 deaths/annually (US)
- **Only 500 cells will cause infection.**
- Symptoms: Nausea, vomiting, abdominal cramps, diarrhoea, fever, headaches, muscle pain, bloody stool.
- Duration: 2 to 10 days.
- Route of entry: Oral.
- Food Sources: Poultry, raw milk, raw meat



Source: FDA Bad Bug Book

SALMONELLA SP.

- Motile, non-spore former
- Onset in 6 to 72 hours after exposure
- Mortality rate <1%
- **Only 1 cell will cause infection**
- Symptoms: Nausea, vomiting, abdominal cramps, diarrhoea, fever, headaches
- Duration **4 to 7 days**
- Route of entry: Oral
- Food Sources: Fresh Produce



STAPHYLOCOCCUS AUREUS

- **Toxin Producer** (100 to 200ng is enough to make you ill)
- Onset in 1 to 7 hours after exposure
- Mortality is not common.
- 100,000 cells will infect.
- Symptoms: Nausea, stomach cramps, vomiting, diarrhoea
- Duration: Few hours to 1 day
- Route of entry: Oral
- Food Sources: Wide Spread: poultry, raw milk, tuna, eggs.
- Other sources: Line in our mouth and nose, cuts and boils.



BACILLUS CEREUS

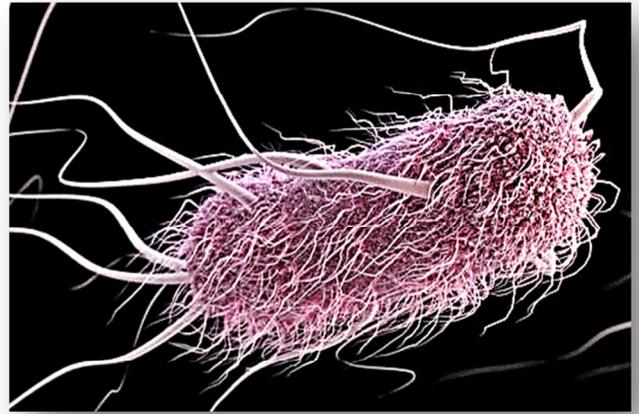
- **Toxin producers, Spore Formers**
- Onset in 6 to 15 hours or 0.5 to 6hrs
- Mortality; Rare
- Only 10,000 cells will cause infection
- Symptoms 1: Watery diarrhoea, mild abs cramps
- Symptoms 2: Vomiting
- Duration: 24hrs – 48hrs
- Route of entry: Oral
- Food Sources: Widespread / rice



Source: FDA Bad Bug Book

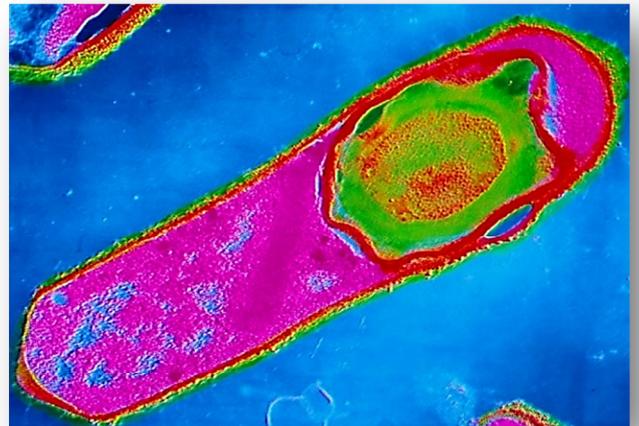
ESCHERICHIA COLI SP.

- Highly Motile, **toxin producers**
- Onset in 8 to 24 hours
- Mortality rate **380,000 annually**
- 10,000,000 cells to cause infection.
- Symptoms: Watery diarrhoea, without blood/mucus, rarely with fever or vomiting. Abdominal cramps, nausea.
- Duration: **Few days to 19days**
- Route of entry: Oral
- Food Sources: Wide spread



CLOSTRIDIUM PERFRINGENS

- Highly Motile, **spore former, toxin producers**
- Onset in 8 to 16 hours
- Mortality rate 7 annually (US)
- 1,000,000 will infect.
- Symptoms 1: Watery diarrhoea, mild abs cramps
- Symptoms 2: Abdominal pain, bloody diarrhoea, vomiting, **patchy necrosis of intestine**
- Duration: 24hrs - 2wks
- Route of entry: Oral
- Food Sources: Beef, poultry, vegetables,
- **Can Survive cooking and multiples much faster than other bacteria (<10 minutes).**
- **Spores can survive boiling water for 60 minutes.**



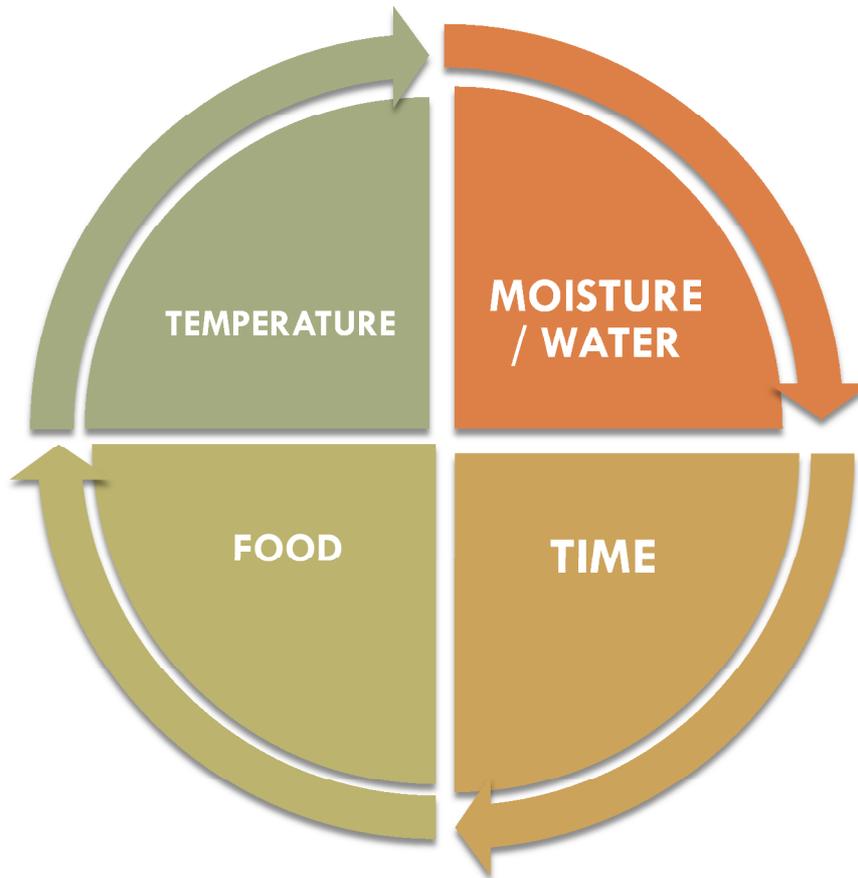
Source: FDA Bad Bug Book

Toxin produced by bacteria will not be destroyed by normal cooking temperatures.

Spores will not die with normal cooking temperatures. Only temperatures above 134°C will destroy spores.

WHAT BACTERIA NEED TO SURVIVE?

Bacteria need all four elements in the below circle to be able to grow. If they are starved from any of the elements they would not be able to grow.

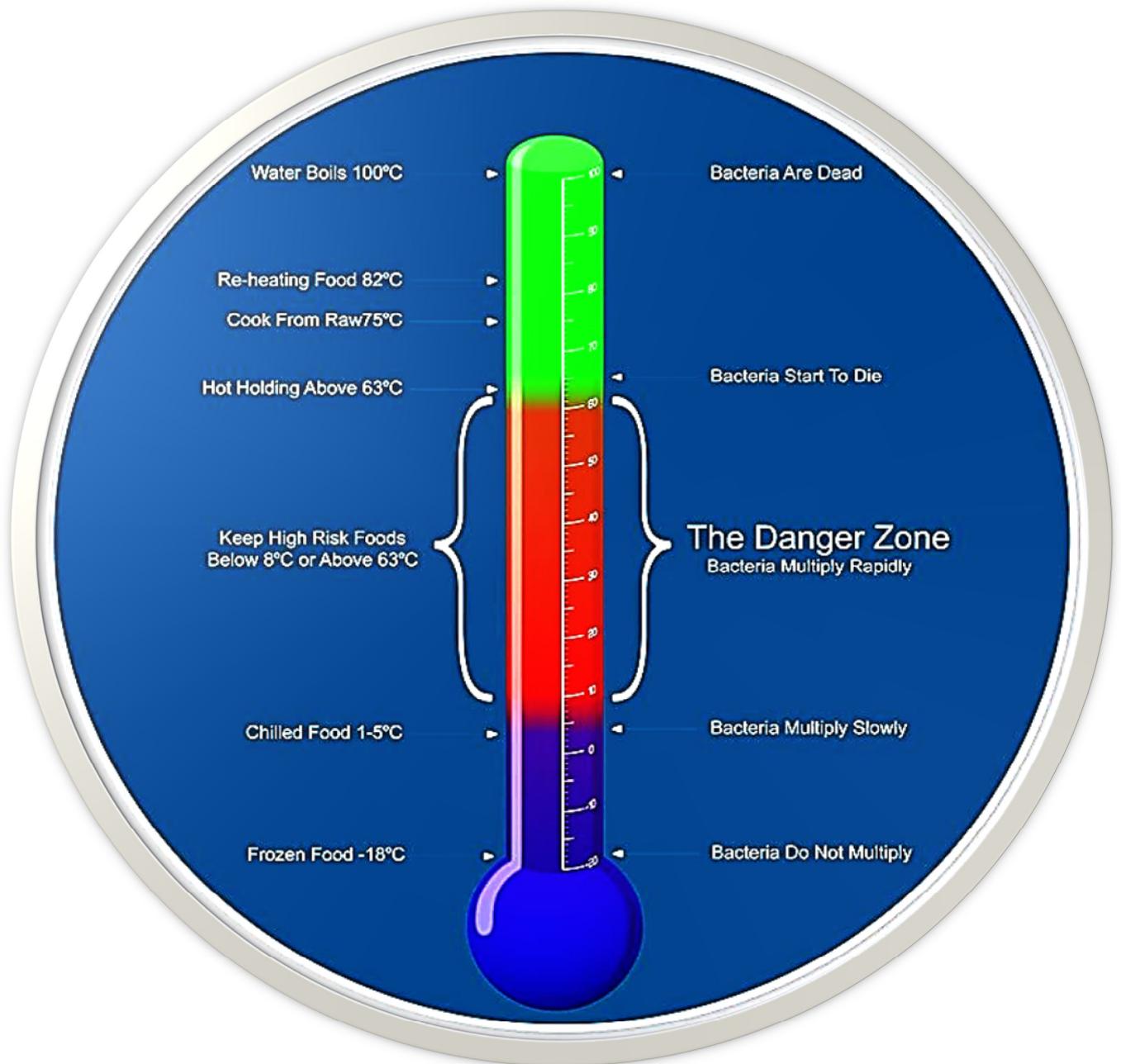


HOW MUCH OF THESE ELEMENTS IS ENOUGH OR TOO MUCH?

- **Moisture:** the more the merrier
- **Time:** the more the merrier
- **Food:** the more nutrients are readily available the better. Bacteria have a preference to high protein foods.
- **Warmth:** Thankfully, bacteria are very sensitive to temperature.
 - **Below 5°C, bacteria will SLEEP, not die.**
 - **Above 63°C, bacteria start to DIE.**

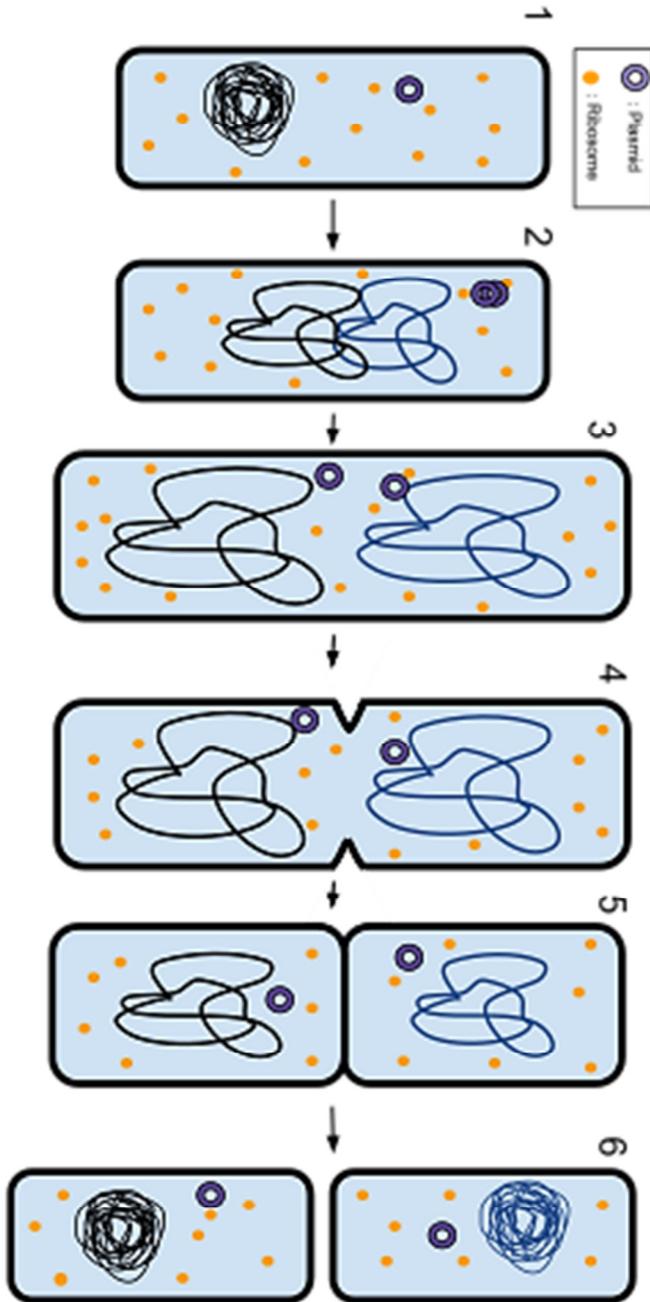
THE TEMPERATURES BETWEEN 5°C AND 63°C ARE CALLED THE DANGER ZONE.

IMPORTANT TEMPERATURES



IDEAL TEMPERATURE FOR BACTERIA GROWTH IS 37°C, THAT HAPPENS TO BE OUR BODY TEMPERATURE.

HOW DO BACTERIA GROW?



The process by which bacteria grow is called binary fission. There is no need for males and female partners to have sex in order to reproduce. Given the right conditions, bacteria will split in two every 20 minutes.

IN THE DANGER ZONE 1 BACTERIUM WILL BECOME 1280 IN JUST 4 HOURS.

BACTERIAL HOTSPOTS

No that you know what are the elements bacteria need to flourish, you will learn some places where bacteria typically grows.



Bacteria need Food, Moisture, Time and Temperature. In holes or gaps like the ones provided by a worn out wooden chopping board, dirty finger nails and broken food contact surfaces, all 4 elements are made available. Since they remain undisturbed because the area is not easy to clean, Time is provided in abundance and thus, bacteria will flourish.

HIGH RISK AND LOW RISK FOODS

Most foods carry a risk factor, some are low risk but some are high risk, depending on how many of the 4 elements the product can provide for bacteria to grow.

Time and Temperature are the elements that are not dependent on the food, but on the operator/employee by making these available enough.

Food can provide the other two elements:

- Nourishment (Food) itself
- Moisture



EXAMPLE 1 : When I was a kid, I used to be bewildered why fresh meat has to be kept in the freezer or fridge while salami or other similar meat cuts can be left outside, hanging at a display with no bad effects. Later I learned that since the salami is dried, it can deliver no moisture to the bacteria that might be present and therefore, bacteria cannot grow. Look at the table below to see which elements are made available by the Salami sausage.

Element	Available or Not Available
Food	Yes
Moisture	No
Time in the right temperature	Yes
Temperature	Yes

EXAMPLE 2 : Another typical case is rice. When it's dried it can be held outside without any risk, however, once it is moistened or cooked, it has to be cooled down as soon as possible and kept refrigerated. It must also be consumed within 24 hours after cooking when kept at refrigerator temperature. Look at the table below to see which elements are made available by the refrigerated cooked rice.

Element	Available or Not Available
Food	Yes
Moisture	Yes
Time in the right temperature	No
Temperature	No

75% of Food Poisonings are implicated by High Risk Foods.

HIGH RISK FOOD



Raw Meat and Poultry:

Beef, Pork, Lam, Mutton, Chicken, Turkey, Duck etc.

Raw Milk & Eggs:

Cows, Goats, Sheep Milk and Chicken, Turkey, Duck, Geese Eggs etc.



Shellfish:

Crabs, Lobster, Shrimps, Prawns, Oysters, Clams, Mussels etc.

Cooked Rice:

Long Grain, Basmati, Whole Grain etc.

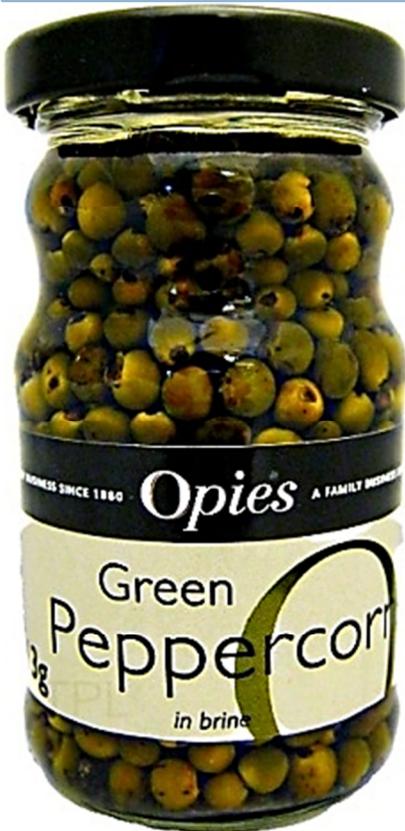


LOW RISK FOOD

Dried Foods: No Moisture



High Salinity: No Moisture



Foods with high salt content and high sugar content prevent bacterial growth because. This is because salt and sugar absorb moisture from food and therefore also absorbs the water in the bacteria itself, killing it in the process.



Pickled Foods: No Moisture, Low pH (acid)

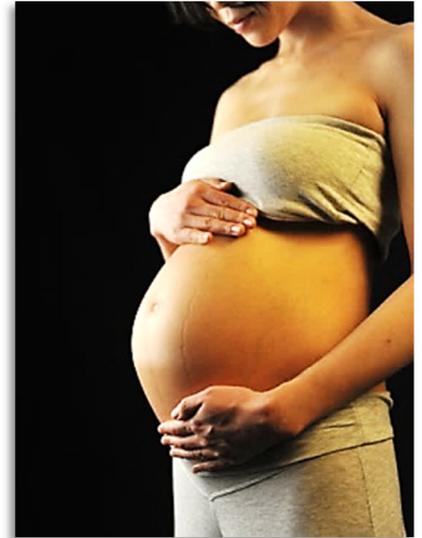


High Sugar Foods: No Moisture



Chemically reserved

THE MOST VULNERABLE PEOPLE IN OUR SOCIETY



1. Children under the age of 3 years.
2. Pregnant women
3. The elderly, over the age of 75 years
4. The chronically sick.

The above four categories of people are more vulnerable to illness than any other; therefore, food prepared for these people must be made with extra care.

Case scenario: A pregnant lady who becomes ill with Salmonella in the first three months, will be at high risk of losing the baby,

WOULD YOU BE ABLE TO DETECT A COMPROMISED FOOD FROM A CLEAN & SAFE ONE?



If an infected food can be detected by any of our senses, no one would ever get poisoned. The effect of biological hazards on food cannot be smelt, seen nor tasted. Their presence in food will be enough to introduce the infection as growth will take place inside of the person.

WORKED EXERCISES - 1

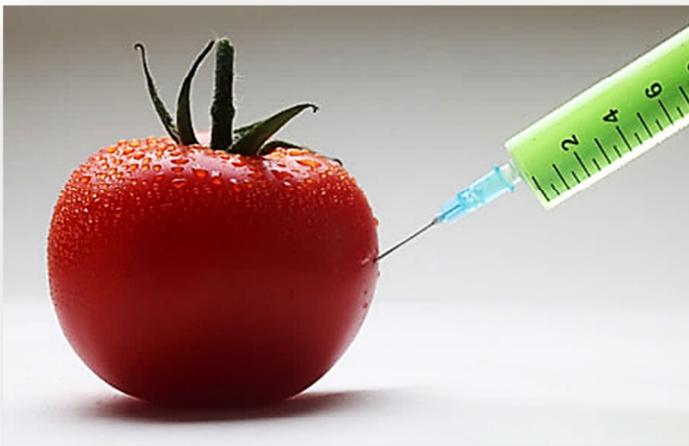
	Item	High Risk	Low Risk	Reasoning
1	Unpasteurized Milk	x		Lots of moisture and bacteria in milk, temperature sensitive
2	Raw Meat	x		Lot of moisture and possible bacteria, temperature sensitive
3	Raw Chicken	x		Lot of moisture and high risk of Salmonella, temperature sensitive
4	Cooked Rice	x		Lot of moisture and high risk of Bacillus Cereus, temperature sensitive
5	Shellfish	x		Lot of moisture and possibility of Vibrio Vulnificus, temperature sensitive
6	Pickles Onions		x	Low pH (Acidic) low on moisture
7	Dried Legumes		x	low on moisture
8	Hard Sweets		x	low on moisture
9	Dried Rice		x	low on moisture
10	Cream Cakes	x		High in moisture, temperature sensitive
11	Bread		x	Low in moisture
12	Dry Biscuits		x	Low in moisture
13	Dried Nuts		x	Low in moisture
14	Yoghurt	x		High in moisture, temperature sensitive
15	UHT Milk (long life)	x	x	Low when closed, high once opened due to bacteria induction.

CHEMICAL HAZARDS

Chemical hazards are chemicals that are not intended to be in food and will cause harm to the consumer. Chemical hazards might not have an immediate effect like biological hazards but will manifest the symptoms.

Typical causes of Poisoning with Chemicals:

- Mishandling of **Pesticides**
- Carryover of **Insecticide** and/or **Herbicide** from unwashed fresh fruit and vegetables
- Lack of Control on **Cleaning chemical** storage, handling and use.
- Unsuitable Hardware: **Copper** (Cu) and **Lead** (Pb) containers should not be used. (The Roman Empire suffered health wise due to pipework made of lead)
- **Non-Food Grade Lubricants** used during Maintenance.
- Canning with **Tin** (Sn), Tin leaks into food. (Tin has a direct effect on sperm count reduction in men as compared to the average man of 60 years ago)
- Unlabelled **Allergens**, allergenic foods that are not declared on the pack but contained.



PHYSICAL HAZARDS

Physical hazards are things that end up in food and can cause immediate harm to the consumers. These contaminants are sometimes referred to as foreign bodies.

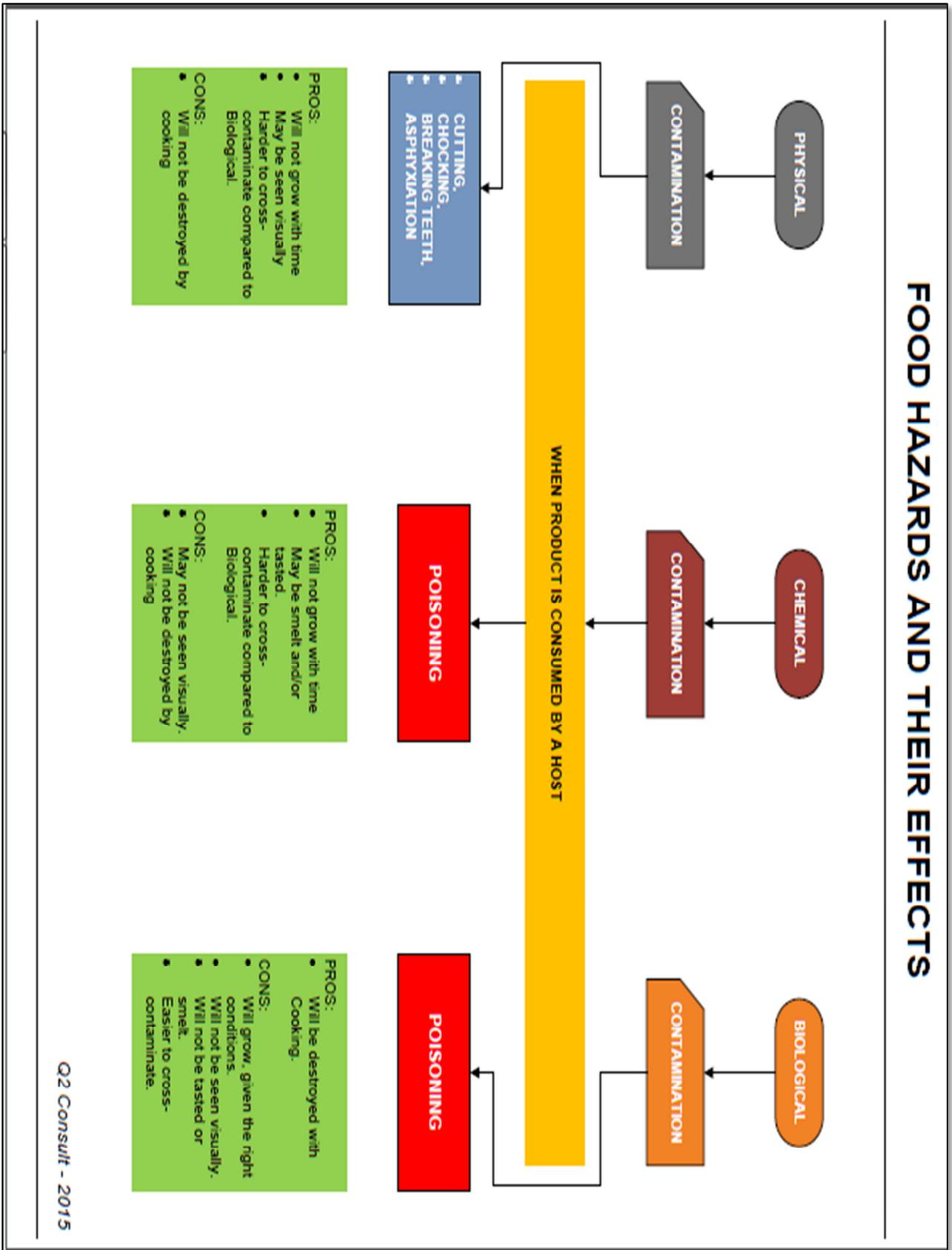
Typical cases of physical hazards and their effects:

Physical Hazard	Effect
Broken Glass Shards and brittle plastic	Cuts in mouth, oesophagus, stomach and intestines
Metal – Needles, Pins, Staples, Fish hooks, nails, wires, blades	Cuts in mouth, oesophagus, stomach and intestines. Can get stuck in the throat and food passage. Can choke.
Wood – Toothpicks, Matches, Splinters	Can get stuck in the throat and choke the consumer.
Stones, Olive bone, Date bone	Can break teeth
Bone Fragments	Cuts in mouth, oesophagus, stomach and intestines. Can get stuck in the throat and food passage. Can choke.
Shells – Broken, Mussels, Snail Shell	Cuts in mouth, oesophagus, stomach and intestines. Can get stuck in the throat and food passage. Can choke.

Hair, Cartilage, Short pieces of string and eggs shells are not considered hazards but as Quality issues



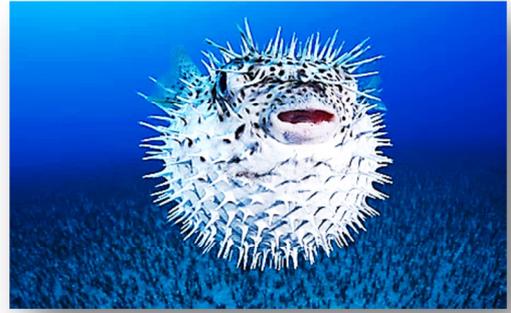
HAZARD COMPARISON; PROS AND CONS



DANGEROUS FOOD

These are items that are sometimes eaten and are dangerous to the health of the consumer and therefore, should be avoided.

- **Puffer Fish** – have a poisonous gland attached to its liver. If pierced during preparation the toxin will kill the consumer.
- **Poisonous Mushrooms** – Some mushrooms have a very powerful toxin that can kill whoever consumes them.
- **Contaminated Water** – water can look clear but may not be always safe.
- **Bloated Canned Food** – bloated cans are due to the unsuccessful pasteurization process when canning or because the can has a small hole. Bacteria inside the can will digest the food and produces gases.
- **Goods past the “Use by” date** – Highly perishable items, like milk, should not be consumed after the Use by date due to the potential of
- **Screw caps with popped out safety button** – The safety button should not make any clicking when pressed. If it does click before opening, it shows that air has seeping the container **and is no longer** vacuum and sterile.
- **Raw Green Potatoes** - two alkaloids, solanine and chaconine, that are dangerous to humans. Ordinarily, a potato contains only small amounts of both. However, sprouted or green potatoes can have unusually high quantities of solanine. Solanine causes diarrhea, nausea, cramping,



headaches and in extreme cases organ failure and death. Green potatoes should not be eaten, either raw or cooked. (www.livestrong.com)



WORKED EXERCISE 2

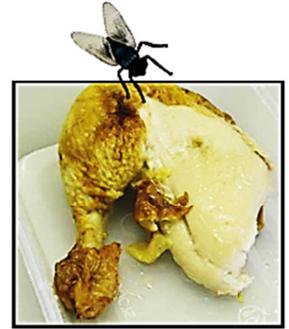
HAZARD	PHYSICAL	CHEMICAL	BIOLOGICAL
Broken Glass	x		
Non-food Grade Detergents		x	
Bacteria			x
Metal Staples	x		
Olive Stones	x		
Metal Shavings	x		
Mercury		x	
Earrings	x		
Poison		x	
Tapeworm			x
Amoeba			x
Broken Mussel Shell	x		
Fish Hook	x		
Peanuts	x	x	

Peanuts can be physical hazards to kids as they might choke on them due to the shape and texture makes it easy for the nut to slide into the wind pipe before it is chewed. Peanuts are also a chemical hazard to people who suffer from peanut allergy.

FOOD CONTAMINATION: THE WHAT & THE HOW?

Food contamination can occur very easily if attention is not given to certain good manufacturing practices. Contamination can occur with all three types of hazards.

DEFINITION:
SUBSTANCES ADDED
INTENTIONALLY OR
UNINTENTIONALLY THAT
MAKE FOOD UNFIT FOR
HUMAN CONSUMPTION.



The following are examples of generic causes of food contamination:

- Lack Of Maintenance or ill-Timed Repairs
- Lack Of Cleaning And Area Organization
- Uncontrolled Personnel Traffic In Food Preparation Areas
- Lack Of Incident Management: Glass Breakage
- Lack Of Control On Brittle Materials
- Non-Qualitative Raw Materials
- Lack of Hygiene Awareness and Practices.

CROSS CONTAMINATION

Cross contamination is many a times the consequence of the original contamination.

DEFINITION: THE ACT OF TRANSFERRING
SUBSTANCES, INTENTIONALLY OR
UNINTENTIONALLY, FROM
CONTAMINATED FOOD AND/OR FOOD
CONTACT SURFACES ON TO OTHER FOOD.



The risk of cross contamination is greatly amplified when the source is biological, because if given the right conditions these will **GROW**.

Common causes are:

- Fluids from 'Contaminated' food in contact with Ready-To-Eat food (RTE).
- Using same **kitchen utensils** to process RTE foods after being used on raw foods.
- Bad use of Gloves.
- Pest ingress may spread and/or cause contamination.

PREVENTING CROSS CONTAMINATION

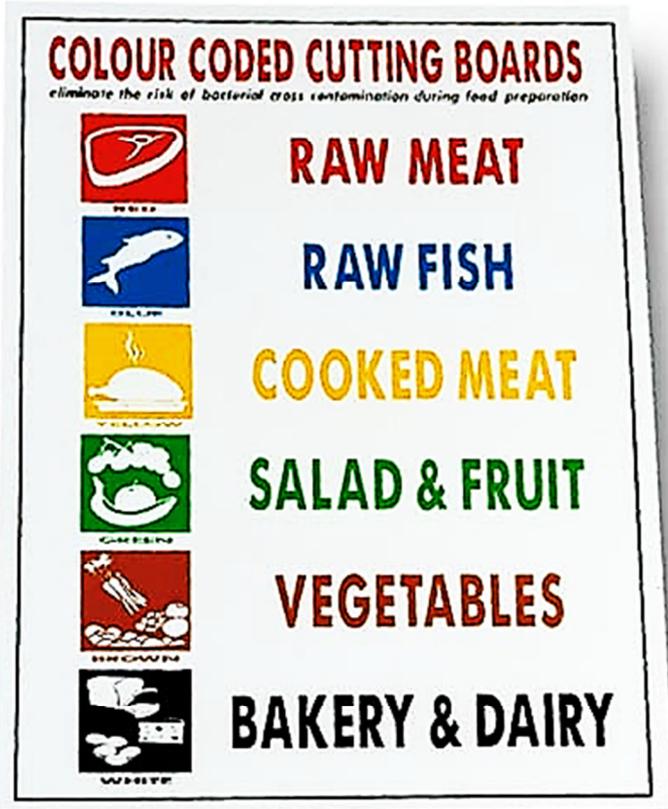
When **shopping**, always separate raw meat, poultry & fish from other foods, especially RTE.

- Place at the bottom the trolley, in plastic bags to avoid dripping over.
- When at home or place of workplace place raw meats in the **refrigerator and freezer** (Inc. marinate), at the bottom shelves and in non-porous container to avoid spillages over RTE.
- Always follow the below configuration for safe keeping.

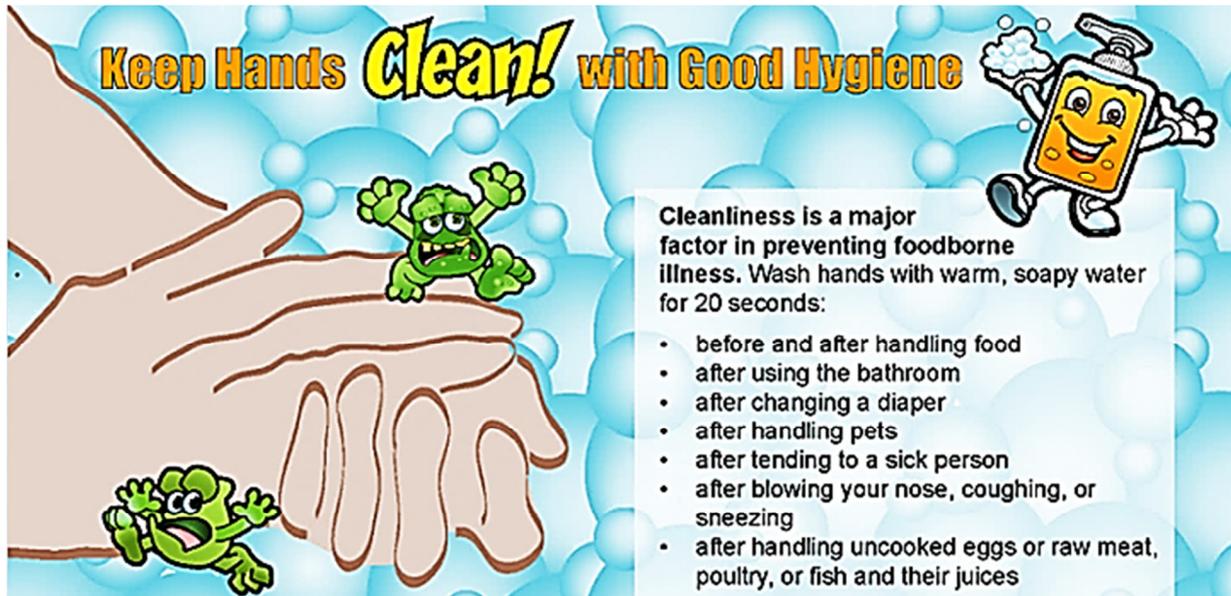


PREVENTING CROSS CONTAMINATION....CONTINUED

One of the means by which cross contamination can be avoided, is using a colour code for the kitchen utensils. There is no international standard that dictates which colour should be used for what, however, once a colour code has been established, it should be maintained and enforced. It is also mandatory that a colour coding chart is affixed to wall in a prominent area. The chart is important to prevent new kitchen staff from getting confused and using the wrong colour code.



HAND WASHING PRACTICES



Keep Hands Clean! with Good Hygiene

Cleanliness is a major factor in preventing foodborne illness. Wash hands with warm, soapy water for 20 seconds:

- before and after handling food
- after using the bathroom
- after changing a diaper
- after handling pets
- after tending to a sick person
- after blowing your nose, coughing, or sneezing
- after handling uncooked eggs or raw meat, poultry, or fish and their juices

Do not use cloth towels to dry your hands; instead use disposable ones or hot air hand dryers.

FIGHT GERMS BY WASHING YOUR HANDS!



1 Wet your hands

2 Soap

3 Lather and scrub - 20 sec

4 Rinse - 10 sec

5 Turn off tap

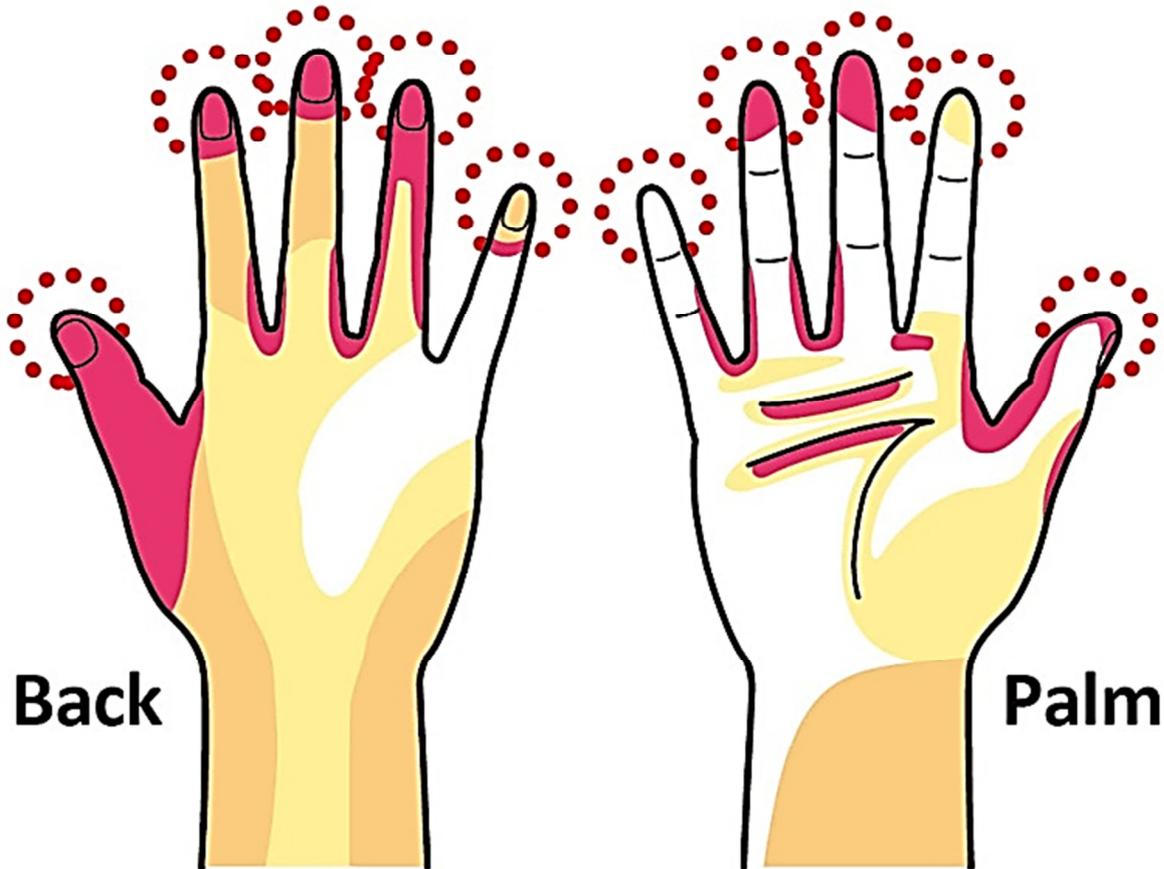
6 Dry your hands

DONT FORGET TO WASH:

- between your fingers
- under your nails
- the tops of your hands

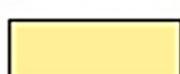
HOW GOOD DO YOU WASH YOUR HANDS?

In many cases, a food handler washes his hands with the expectation that no part of his hands were missed, however, it is most often not the case. A study was conducted by FDA in the US using a florescent spray and light. The subjects' hands were sprayer with florescent ink (invisible to the naked eye) from both sides, and were asked to wash their hands, as they usually do. After the washing the light was switched on to see the areas that were not cleaned and the below is the result.



Back

Palm

-  **Most Often Missed**
-  **Often Missed**
-  **Less Often Missed**

COMMON CAUSES OF FOOD POISONING & HOW TO AVOID THEM

CAUSE	CORRECTIVE ACTION
Contaminated Raw Materials	Buy from a reliable supplier against specifications.
Food Poisoning in Meat	Cook it thoroughly before eating
Bacterial growth in Raw Materials	Store Raw materials in the right temperature.
Fluids from raw food dripping on RTE	Always store raw food at the bottom and covered.
Keeping high risk cooked food unrefrigerated for a long time (over 4 hours)	Don't, always place cooked food in a refrigerator as soon as it cools, if not to be served immediately.
Eating food that has been touched by a sick person.	Don't eat foods touched by sick people. Discard!
Pest Ingress in the kitchen	There should be means to prevent pest ingress, however if such thing takes place, discard any uncovered food and contact Pest Control Contractor.
Cross-Contamination	Use a colour code system and train staff before first shift. Enforce hand washing. Avoid having sick people on the shift. Have validated cleaning procedures and chemical use. Avoid any dangerous maintenance practices during shifts.
Washing hands in the utensil sink	Have well labelled, unobstructed and strategically placed Hand Washing Basins.

FOOD ADULTERATION

Food adulteration is when food is added with additional substances to increase bulk or weight. This practice will be cheating the consumer by paying for good quality food and receiving a lesser portion. Some common examples of this malpractice are:

- Water in milk
- Starch in ketchup
- Soy mince in meat stuff
- Saline solution in frozen chicken

However, not all cases of food adulteration are "harmless". It all depends on the adulterant added to the food and to whom the food is intended. In June 2008, Sanlu Group in China added Melamine in infant milk formula to mimic the protein content. As a consequence, 6 babies died and another 54,000 were hospitalized with kidney stones. (The Guardian (London)).

In another case in 2004, 13 babies died of malnutrition as they were fed watered-down milk.



FOOD SAFETY PREREQUISITE PROGRAM (PRP)

In any food establishment, in order to have an acceptable level of food safety, a Pre-Requisite Program (PRP) is necessary. A PRP is the foundation to higher food safety standards. There are various Food Safety Standards on the market and the most popular are the British Retail Consortium (BRC), IFS, FSSC22000 and SQF. FSSC22000 defines the PRP as:

*“The basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain;
3.2 Suitable for the production, handling and provision of safe end products.
3.5 and safe food for human consumption.”*



Just like a big house needs to be built on a solid foundation, a PRP is needed to build a strong Food Safety System.

The practices to be implemented in a PRP are categorized into three main groups as shown in the illustration above.

PREREQUISITE PROGRAM

PREMISES

PERSONNEL

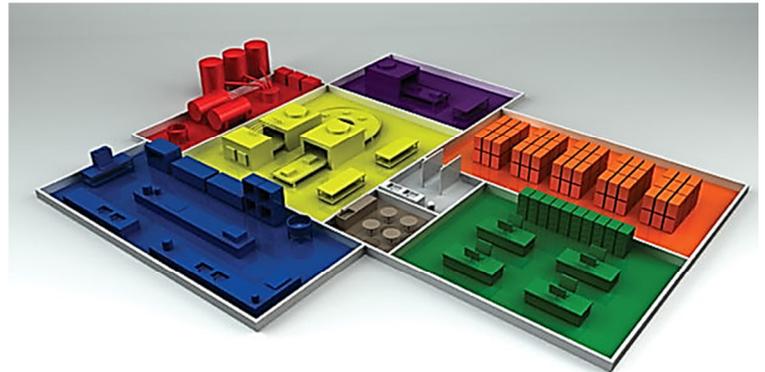
RAW MATERIALS

PREMISES

The place where food will be processed should be designed, located, constructed and maintained following the principles of good hygiene practices. Flaking paint, broken windows, holes in walls leading to the outside, broken floors are all examples of an unfit place for food processing.

The building must be designed with the appropriate flows in mind, being:

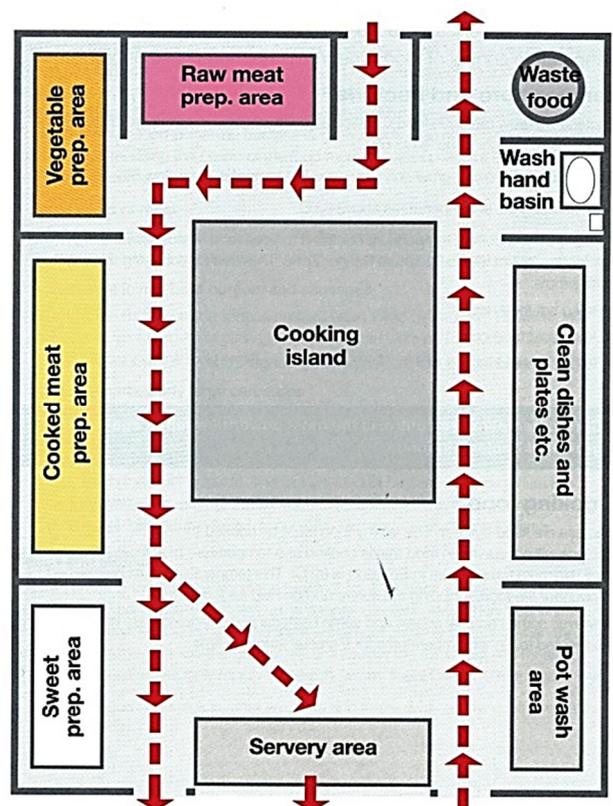
- Personnel
- Raw Materials
- Waste
- Finished Goods



On the right is an example of a kitchen layout.

- **Personnel:** will enter from the top left door.
- **Raw Materials:** will also enter from the top left door.
- **Waste:** received from the lobby will enter the kitchen from the bottom right door and collected together with the waste generated in the kitchen. This waste will be taken out from the top right door.
- **Finished Goods:** will be taken out from the bottom and centre doors.

Example of the layout of a hygienic kitchen



Separation of 'Clean' and 'Dirty' areas

CHEMICALS AND THEIR CONTROL

Chemicals are everywhere and we cannot eliminate them completely, therefore, controls must be in place to prevent them from ending up in the food chain.

Types of chemicals common to food areas:

- Cleaning detergents
- Solvents
- Inks
- Lubricants and other maintenance materials
- Pesticides



In order to better control the chemicals, these must be first classified as **Food Grade** (are allowed in open food areas), **Non-Food Grade** (are not allowed in open food areas).

In some cases **Non-Food Grade** Chemicals must be allowed in open food areas, for example during a maintenance intervention. It is during such cases that more caution is needed to minimize the risks of cross-contamination.

- All chemicals must be stored in a secure location, preferably under lock and key and away from raw materials and finished goods.
- All chemicals must be well labelled and not advisable to refill with other chemicals. In the case the original contents of the can have been removed and replaced, make sure that what is inside is labelled on the outside.
- Chemicals must not be accessible to untrained personnel that might misuse them.
- Never mix two chemicals together unless it is prescribed by the supplier as these might react violently.
- Ideally, a chemical inventory **is** kept and held up to date. This way if any given quantity is missed it can be noticed.
- Where large quantities are stocked, a spill kit should be held handy in case of an incident.

CHEMICAL HAZARD SYMBOLS

The following info graphic provides information about the common Occupational Health and Safety (OHS) symbols commonly found on chemical containers. Each symbol has a meaning and a warning. It is advisable that you are knowledgeable of the risk involved when using a chemical to be able to avoid misuse and incidents that may lead to severe injury or death.



This symbol on the left denoted "Biological Hazards" and is often mistaken for a chemical hazard. This symbol is used as a warning that the area is contaminated with a biological agent e.g. Ebola Virus.

You can also find this symbol on plastic container that carry medical waste and/or contaminated carcasses from slaughter houses.



CHEMICAL HAZARD SYMBOLS

Chemical hazard symbols are found on some home products, as well as bottles of chemical reagents in the lab. Here, we take a look at European hazard symbols and the various dangers that they warn of.



ENVIRONMENTAL HAZARD

Indicates substances that are toxic to aquatic organisms, or may cause long lasting environmental effects. They should be disposed of responsibly.



ACUTELY TOXIC

Indicates life-threatening effects, in some cases even after limited exposure. Any form of ingestion and skin contact should be avoided.



GAS UNDER PRESSURE

Container contains pressurised gas. This may be cold when released, and explosive when heated. Containers should not be heated.



CORROSIVE

May cause burns to skin and damage to eyes. May also corrode metals. Avoid skin & eye contact, and do not breathe vapours.



EXPLOSIVE

May explode as a consequence of fire, heat, shock or friction. Chemicals with this label should be kept away from potential ignition sources.



FLAMMABLE

Flammable when exposed to heat, fire or sparks, or give off flammable gases when reacting with water. Ignition sources should be avoided.



MODERATE HAZARD

May irritate the skin, or exhibit minor toxicity. The chemical should be kept away from the skin and the eyes as a precaution.



OXIDISING

Burns even in the absence of air, and can intensify fires in combustible materials. Should be kept away from ignition sources.



HEALTH HAZARD

Short or long term exposure could cause serious long term health effects. Skin contact and ingestion of this chemical should be avoided.

Cleaning Instruction cards are a means to get a better assurance of cleaning consistency.

The Personal Protective Equipment (PPE) needed is advisable to make part of the instructions.

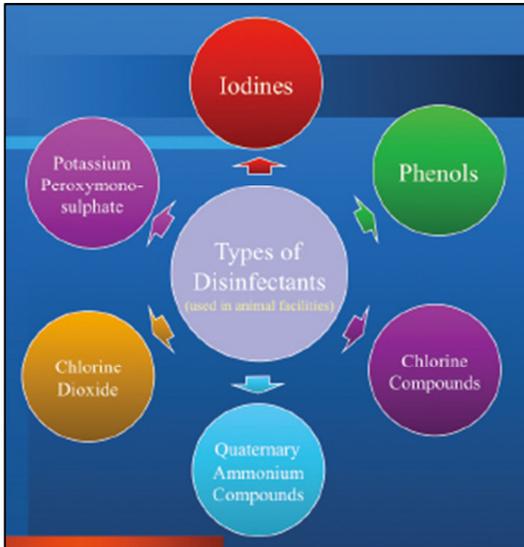
The Cleaning tools required must be specified. If any particular colour code is in place, this should be indicated.

The chemical and the concentrations to be used must also be indicated. On food contact surfaces the cleaning agents must be Food Grade.

The method, should be easy to understand and in an orderly manner.

Ref No: C10, C11 - Cables, Trunking & Electric Panels Exterior, Light Fittings.			
Area	Bread Cooler		
Responsible for Cleaning	Hygiene Operator & Maintenance		
Engineering Requirement	YES		
Responsible for Inspection	Packing Area Supervisor / QAA		
Use	Product	Rate	Cleaning Tools Required
			Hand Brush Dust Bin Extendible Brush
			Broom Vacuum Cleaner
			Dust pan Ladder
Personal Protective Equipment (PPE)			Special Precautions
Safety Goggles			<i>Never use liquids to clean the Electrical panels and Light Fittings and wiring.</i>
			<i>If any signs of insect infestation is noted advise Q.A. Manager immediately.</i>
Cleaning Method			
Weekly			
1. Use the vacuum cleaner to debris.			
2. Use the hand brush to remove the stubborn debris			
3. Sweep the Floors with a broom.			
4. Collect debris in dust pan and dispost in an assigned dust bin.			
Key Inspection Points			
			Light Fittings
External Electric Panel			
			Trunking
Internal Electric Panel			
	Cables		Beams & Walls

Disinfection is the process of killing (inactivating) 99.9% of harmful bacteria, cysts and other pathogenic microorganisms



There are several means by which disinfection can be achieved, namely: chemicals, heat, ultraviolet light, ultrasonic waves, or radiation. In small business setups, chemical disinfection is most viable.

Chemical disinfectants are common and come in many types. All disinfectants (or sanitizers) are effective but all have their limitations therefore, it is ideal to consult with a qualified or well informed supplier before making a choice.



The image to the right shows the growth of microorganisms that were present on the surface of a hand. A person doing the validation will confirm or otherwise, if cleaning was performed well.

Validation is the process by which a cleaning method is concluded as valid or invalid.

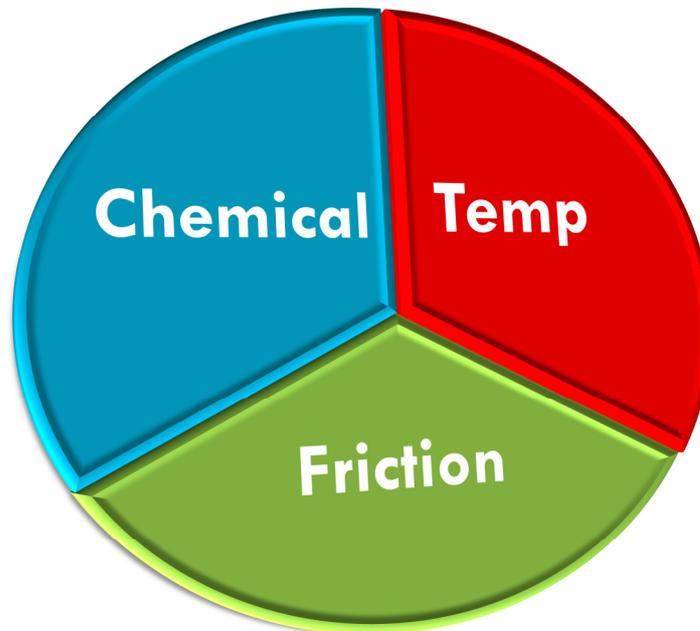
The cleaning method used on the left was invalid because it did not eliminate all the microorganisms on the surface on which it was applied. In contrast, the method used on the right was validated as it eliminated all the microorganisms.



HOW TO CLEAN

Cleaning is a function of the interaction of three components, Chemical, Temperature and Friction. To get the best effectiveness, the three **have** to be in a good balance i.e.

- Reduce **Chemical** = Increase in **Temperature** and Increase in **Friction**
- Reduce **Temperature** = Increase in **Chemical** and Increase in **Friction**
- Reduce **Friction** = Increase in **Temperature** and Increase in **Chemical**.



CLEANING METHODS

Cleaning Methods are various however; all must follow a simple process:

1. **Removal** of Big Dirt
2. **Washing** with a detergent, warm potable water and scrubbing (or fluid pressuring in the case of an automatic washer)
3. **Rinse** with potable water
4. **Disinfect** (Sanitize)
5. **Rinse** with potable water
6. Air dry

4 points to be kept constant to achieve a consistent result:-

1. Use the same **type of chemical** for the assigned **type of dirt**
2. Use the prescribed **concentration**
3. Use the prescribed **water temperature**
4. Allow the prescribed **contact time**.

CLEANING UTENSILS/TOOLS

Cleaning tools are a must have in order to maintain the good hygiene level required. For this reason such tools need to be managed well. One common mistake is to use tools assigned for **floor cleaning** to clean **food contact surfaces**. The best way to counteract such mistake is to implement a **colour** code.

There is no official way to such coding but it is preferable to use **RED** for floor cleaning and any other colour for non-floor cleaning.



Cleaning tools should be stored in an enclosed space on the inside of the shop and not exposed to the external elements.



Floor mops should be washed and sanitised after use and hung vertically off the floor. Never allow mops immersed in water.

The image below shows how **NOT** to store mops.



CLEANING IN PLACE (CIP)

In factories where the product passes through a series of pipework, access to the insides for cleaning is heavily restricted therefore; a mechanical system has to be installed.

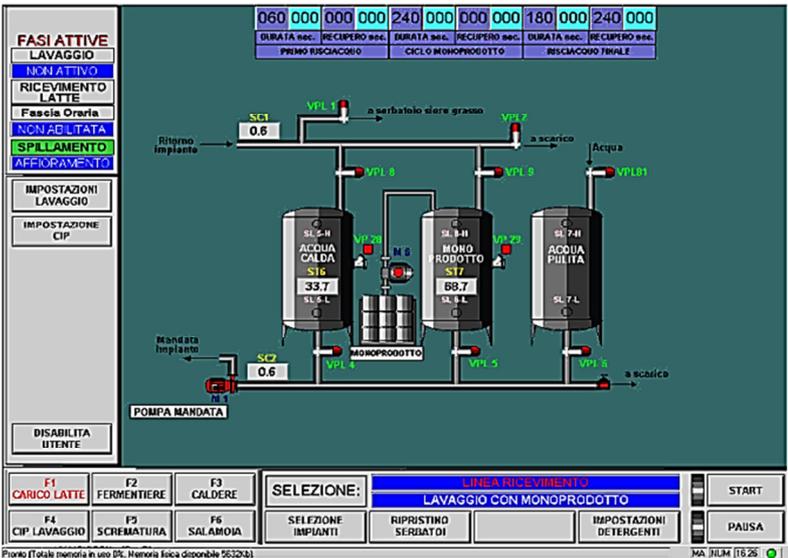
“Clean-in-place (CIP) is a method of cleaning the interior surfaces of pipes, vessels, process equipment, filters and associated fittings, without disassembly. Up to the 1950s, closed systems were disassembled and cleaned manually.” Wikipedia

These types of systems are very popular in ice cream factories, breweries, wineries, juice manufacturing, and sauce & mayonnaise factories. The biggest benefit is that the system will be cleaned faster with much better assurance that all the food contact surfaces are cleaned.



CIP systems have three tanks,

- 1. Clean main water for system flushing
- 2. Hot detergent (about 80°C) for cleaning
- 3. Clean hot water (about 80°C) for sterilisation.



The CIP system is computer controlled and all the cleaning parameters are automatically adjusted for the best efficiency.

EQUIPMENT, MACHINERY & MAINTENANCE

When discussing equipment, we have to categorise. Let's use the meat slicer in the picture on the right as an example:

Type of Equipment	Example
Direct food contact (DFC)	DFC is where the meat will make contact.
Indirect food contact (IFC)	IFC are areas like the black adjusting knobs.
Peripheral food contact (PFC)	PFC's are any other machinery and equipment that can have a negative impact on the safety of the food produced e.g. ceiling, walls, light fixtures.



The market is flooded with food processing equipment, however here are some attributes that you should consider when acquiring new equipment:

- Must be easy to clean surfaces
- Made of non-absorbent, non-toxic and corrosion free materials,
- Must be resistant to heavy exposure to chemicals, water and friction which might cause cracking and pitting.
- Should be free from Hard to Reach Areas and Dead Ends where food might be trapped.
- Must be self-draining,
- Easily maintained.

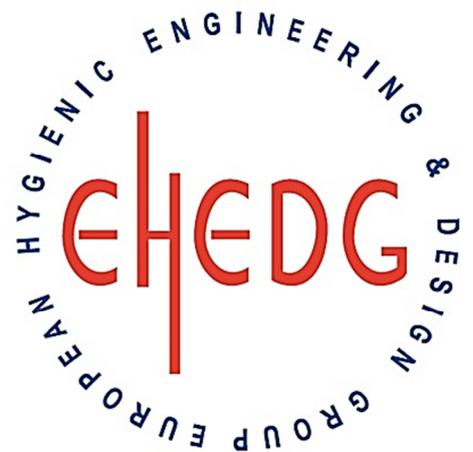
Equipment should be installed in a way that is accessible 360° to facilitate cleaning. Where space does not allow, heavy machinery should be installed on wheels for easy movement.

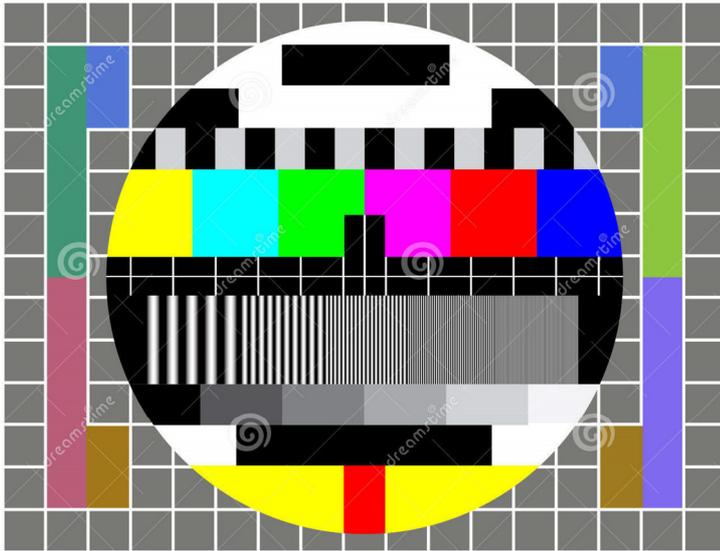
Always consider the structure on the underside of the machine as this is the area where it is the hardest to reach even in well-designed machines. The structure should not have hollow sections that may allow collection of old food debris.

Investing in state of the art equipment is always the best solution to avoid disappointments later, especially in a new setup. *The European Hygienic Engineering & Design Group (EHEDG is a consortium of equipment manufacturers, food industries, research institutes as well as public health authorities and was founded in 1989 with the aim to promote hygiene during the processing and packing of food products.*

The principal goal of EHEDG is the promotion of safe food by improving hygienic engineering and design in all aspects of food manufacture.

EHEDG actively supports European legislation, which requires that handling, preparation processing and packaging of food is done hygienically using hygienic machinery and in hygienic premises (EC Directive 2006/42/EC for Machinery, EN 1672-2 and EN ISO 14159 Hygiene requirement). (www.ehedg.org)





The diagram on the left is called a screen test card. This was used to check if the colours on the look right i.e. yellow, turquoise, green, pink, red and blue. If these colours close to the centre of the circle look different, that means the colour your screen needs calibration.

The same approach will be applied to measuring instruments e.g. Thermometers, Scales, in our food processing environment.

It is essential to check the equipment calibration to ensure the accuracy of the reading given.

Definition: “Calibration refers to the act of evaluating and adjusting the precision and accuracy of measurement equipment. Instrument calibration is intended to eliminate or reduce bias in an instrument's readings over a range for all continuous values” (Wikipedia)

Calibration checks can be done in house (cheap way; less accurate) or externally at an accredited laboratory (expensive way, most accurate). If choosing to calibrate externally, make sure the service provider is accredited otherwise the value of the certificate provided is nil.



Example: To check if a thermometer is reading right, fill a container with ice water and see that the thermometer reads zero (0°C); fill a container (thermal flask “Thermos”) with hot water and see that the thermometer reads a 100°C (boiling). If the readings are off, always check if the batteries are low before discarding. Some top end thermometers can be calibrated.

Scales can either have their calibration checked by having a set of standard weights (certified) or sending the instrument to an accredited lab. If a business owns just a few pieces, it is advisable to send it to an accredited lab.

On the other hand if the business has several instruments it would be feasible to own a set of certified standard weights. It is advisable to have instruments on an inventory and calibration records and certificates are kept on file.



CONTROL OF BRITTLE PLASTIC & GLASS (GBP)

Certain material like glass has to be kept under control due to its fragile nature. The presence of brittle materials increases the risk having foreign bodies (physical hazards) in food. When possible, GBP should be eliminated from open food areas. When it is not possible to eliminate, an inventory of the items should be raised to be able to check for any breakage at a set frequency.

Where window panes are present in open food areas, a film of contact plastic is to be installed to avoid fragments ending in the food in case of an accident.

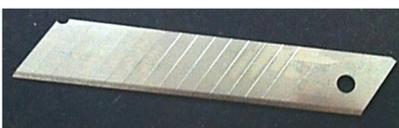
HOW TO MANAGE A GLASS BREAKAGE INCIDENT

1. Advise your superiors
2. Stop processing lines or any manual processing being done.
3. Stop people from passing through the area. Who leaves the area cannot go to other processing areas until an assessment is made.
4. Dispose safely of the affected food materials and packaging.
5. Get the cleaning tools to collect the debris (ideally disposable set)
6. Place glass shards in a specific sturdy container with a tight lid and dispose immediately.
7. Discuss if any corrective action can be undertaken to prevent such incidents.



KNIVES AND SLICING BLADES.

Like glass, blades and knives also increase the risk of foreign bodies (physical hazards) in food. To keep under control, an inventory (including the dimensions of the blade) of all the knives should be kept and updated with every change. If the size of the blade is not known, you will not be 100% sure the knife is completely recovered, should a breakage take place.



Snap-off blades like the one in the picture shown on the left should never be used because of its risk of easy breakage.



should the band blade snap.

Slicing blades (band blades) have a designated life time and should be changed in a timely manner to avoid and fragments and also avoid the risk of hurting someone



GOOD STORAGE

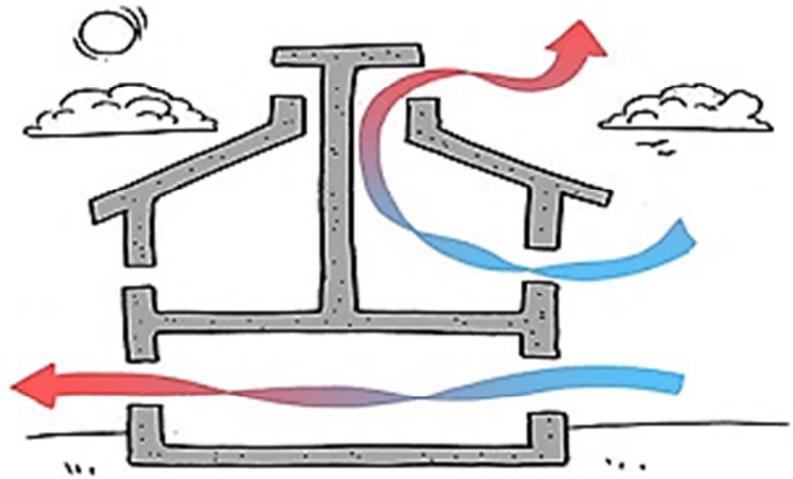


BAD STORAGE



LIGHTING AND VENTILATION

It is of adamant importance that in a food preparation area, there is adequate light and ventilation. In terms of the law, the level of light needed is a minimum of 500lux. The amount of ventilation and/or extraction needed depends on many factors, such as how easily air can flow naturally, how many burners are present in the kitchen the height of the kitchen, number of people working etc.



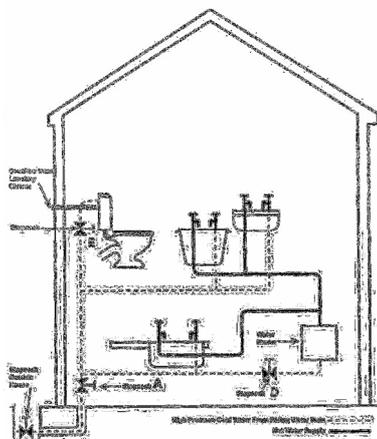
If natural ventilation and extraction is not well balanced, fumes, heat and Carbon Dioxide (CO₂) will accumulate and lead to a Health and Safety risks. The temperature in a kitchen should be kept in the safe limit of 25°C.

AIR, WATER AND OTHER GASES

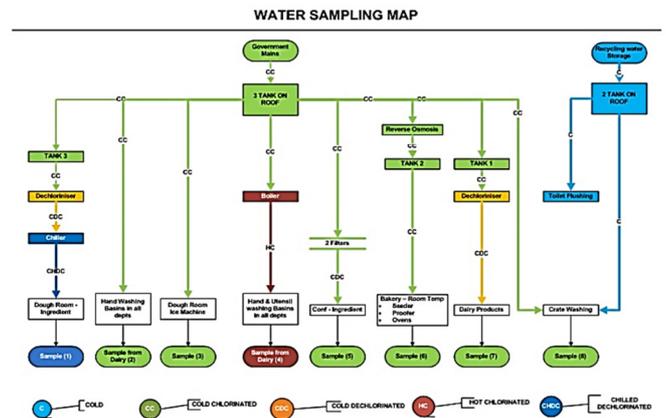
Air, water and other gases, are sometimes called invisible ingredients because their safety is taken for granted by many. Air (including compressed air), steam and other gases (modified air) that come into direct contact with food, must be clean and pose no risk. Air is a carrier to many things including, pollen, mould spores, combustion fumes/exhaust etc., therefore, it must be filtered where a risk is noted.

AIR in contact with high risk products, must be passed through a microbiological filter to filter out any airborne bacteria that might be present.

WATER (including Ice) that is used as a raw material in manufacturing of food, hand washing and equipment/utensil washing must be of potable grade (drinking) and according to the parameters set out on Legal Notice 17/2009. Where a business makes use of a cooling tower/s, the requirements of Legal Notice 5/2006 must also be addressed. The testing of water is to be undertaken by an accredited lab to ensure that the internal pipework pose no risk of contamination.



before entering a potable water point.



An up-to-date building schematic diagram should be available to identify sampling points and also avoid dead end pipes. Taps and other water dispensing points must be numbered for easy identification.

Government mains water (GMW) is considered as safe to use as an ingredient in food unless a national alert is broadcasted. GMW must not be passed through a roof tank or any other storage container



Roof tanks are risky as they provide an infection hazard especially if the lids are blown off after a storm.

If a food processing plant has non-potable water dispensing points, all water outlets must be labelled with the source.



OTHER GASES refer to steam and the gas in modified atmosphere packs. These will be in direct food contact and therefore needs to be clean and non-toxic.

PEST CONTROL PROGRAM

Pests come in many shapes and forms and attack various types of food on different levels of the food chain. For example Pigeons, target crops and seeds mainly in fields and other silos. In Malta, the most notorious pests are: Cockroaches, Ants, House Flies, Indian Meal Moths, Beetles, Mice, Drain Flies and Birds.



In order to be able to you have to keep in premises. There are two and the Beetles, and Ingress Pests (IP); all the rest.

place effective control against pests, mind the way they go into our types of pests; Stored Product Insects (SPI) i.e. Indian Meal Moth

A PEST IS A DESTRUCTIVE INSECT OR OTHER TYPE OF ANIMAL THAT ATTACKS CROPS, FOOD, LIVESTOCK, ETC.

As a rule of thumb, Prevention is better than cure. Curing a pest infestation is much costlier than prevention. Keep in mind that a food processing site has all the factors pests need:



- Food,
- Shelter and
- Stable conditions

SPI'S come as hitchhikers inside a packed item e.g. flour in the form of eggs, larvae & adults. Once the food source is exhausted, they will chew their way through packaging and migrate to other food sources. If not controlled, such insects can infest a factory in a small number of weeks.

The only way SPI can be prevented is by checking incoming goods on arrival prior to acceptance and storage. Signs are holes in bags, webbing, larvae, adults, droppings.

IP'S enters the facility from the outside through cracks in wall, under doors & open windows etc. infest the premises and attack food products. Most ingress pests have a higher level of risk because of their origins e.g. drainage pipes, sewers and other infected places.

Food Handler's Bible - License B

The best controlling measure against any pest is cleaning as it takes away the "Stable Conditions" needed however; a more preventive way is pest proofing the premises. As specified earlier, pest enters from any small space that we allow, so our capacity is to not allow such chances by installing:

- Nets on windows,
- Door gaskets to close off the gap at the bottom,
- Ventilator covers on the outside,
- Plaster any holes/cracks in walls leading to the outside,
- Chimney dampers
- Have double doors at doors leading to the outside.



We can also install control measures on the inside to prevent spreading the infestation should ingress occur. This is achieved by Electric Fly Killers (EFK's), Pheromone traps, rodent bait point amongst others.



RAW MATERIAL STORAGE

Storage areas are a big necessity in food production and attention must be given to sustain a good level of hygiene. First action that needs to be taken care of is assigning spaces that are adequate for the type of raw material to be stored.

Basic Segregation:

- Ambient Raw Material
- Refrigerated Raw Material (1-4°C)
- Frozen Raw Material (-18 to -22°C)
- Hot Cabinet (over 63°C)
- Packaging Material Storage
- Allergens Storage.

Must Have's & Do's

- No Clutter e.g. empty boxes, bags or mislaid items obstructing the passage way.
- Items are **easy to find** (consider bin method)
- **Fluids must be stored at the bottom**, never above dry goods.
- Allergens must be segregated, labelled and stacked in a manner to minimize cross contamination.
- Items off floor & away from walls to allow easy cleaning.
- Included in the Pest Control program.
- Consumed in **First In First Out** or **First Expiring First Out**



SOME ITEMS THAT COME WITH A BEST BEFORE DATE MAY BE USED POST DATE, BUT ONLY, AFTER REVALIDATION BY SUPPLIER.

TEMPERATURE CONTROLLED FOOD STORAGE (TCS)

The temperature inside such storage must be at a constant without fluctuations beyond the minimum threshold. Control can be affected either:

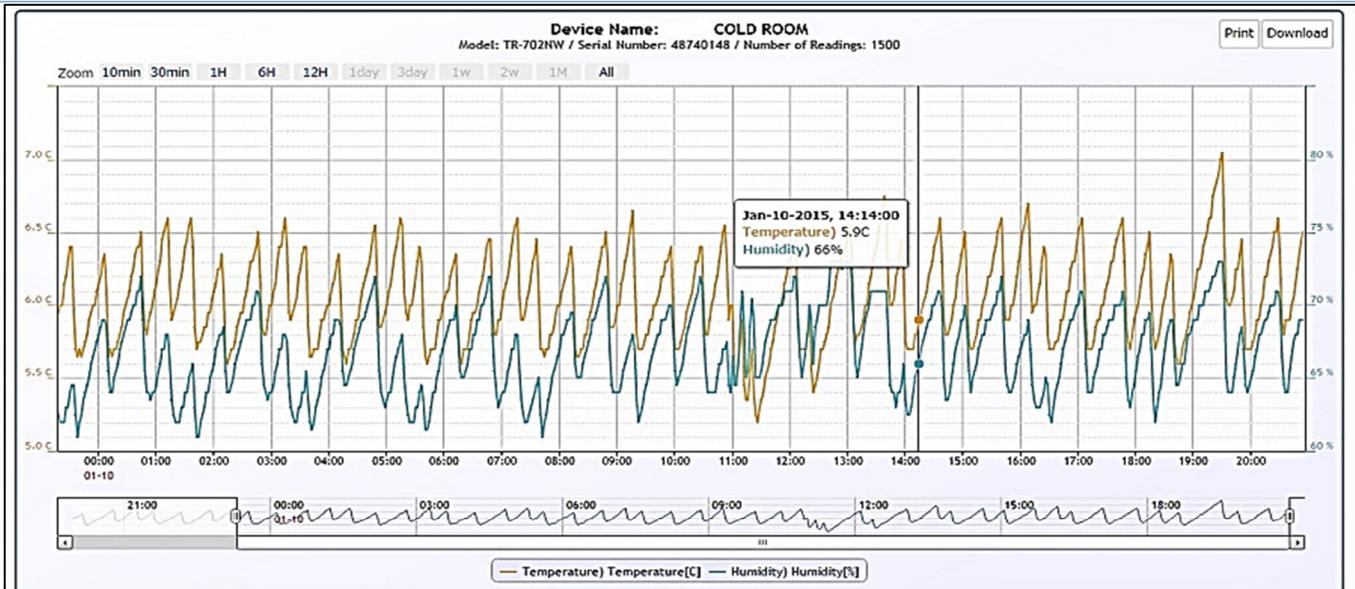
- Manually by checking the core temperature of an item inside the storage at predetermined intervals or
- Computer controlled, continuous monitoring.

In either option, records must be kept as evidence of such good practice. The following are crucial points to be observed:

1. It is also a very good practice to have items covered in a manner that minimizes cross-contamination.
2. Check for door packing integrity & ice build-up.
3. Transfer goods to other freezers during defrosting.
4. Avoid having condensation drops from ceiling.
5. Check that the plastic curtain is complete, unbroken and almost touching the floor.

When controlling temperatures, attention must also be given to the inside temperature of trucks and other vehicles. During the incoming goods scenario, the temperature of the goods must be checked on arrival prior to acceptance. This method is mostly effective for short distance deliveries as for long haul deliveries, temperature loggers are the ideal tools.

EXAMPLE: Let us imagine you had bought a container load of fresh milk that was in transit for 2 weeks. You check the temperature on arrival and it is 3°C and you accept the delivery. Sign the papers and unload the stuff to your storage. However, as soon as you deliver to the production area for processing your employees advise you that the milk is sour and smells really bad! That is when a data logger will come in handy. The thermograph below shows how temperatures fluctuated over the period the product was in transit. Usually when the temperature was under control the graph should show an even pattern similar to the picture below.



WASTE MANAGEMENT

Waste is a necessary evil and unavoidable. Some common sources of waste are paper & cardboard, food scraps & organics, plastic, metal and wood. It is very important that waste is not accumulated inside the premises and is collected in covered foot operated bins. If a system of waste separation is in place a colour coding system will help avoid confusion and misuse. It is also important to consider the time the waste collectors collect your garbage, i.e. if they pass by late morning do not leave the waste overnight as stray cats and dogs can tear the garbage bags and drag the materials around making a mess that will be hard to clean.



Common pitfalls of waste generation in the food industry are:

- Purchasing volumes that are higher than the consumption rate. – Stock will expire before it is consumed
- Lack of stock management and FIFO - New stock is consumed before older stocks
- Placing products and items on menu off production without first exhausting the raw materials in storage.
- Changes in packaging due to marketing necessities – Renders packaging redundant.
- Changes in legislations – renders raw materials and packaging redundant. If this mass of waste is managed well, it can be a valuable resource to the recycling process. In the food industry; 93% of waste is recyclable and only 7% is pure waste that is very positive.



However, in order for this waste to be recycled, separation has to take place. Unfortunately in certain less developed countries e.g. India, waste is not separated at all and dumped on land and the result is a wasteland the size of Malta. The only way to get rid of this waste is by incineration which consequently will put tons of harmful chemicals into the air we breathe.





According to statistics collected by the international Food and Agriculture Organisation (FAO), on average 30% of the food produced in the world is wasted. This statistic is highly contributed by the US where 30-40% of the food they buy is wasted.

In countries where waste are separated and prepared for recycling or is recycled, the amount of waste that goes to landfills is practically minimal. Taking Sweden as an example, they have run out of waste and imports recycling materials from other countries to sustain its needs for such resources.

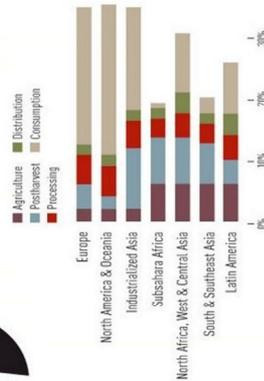
The info graphic on the next page shows how food is wasted on a global scale, bearing figures that are frightening. If everyone could contribute to reduce the amount of food waste, the amount of food generated could end world hunger twice. Do not buy more than you consume, do not prepare too much food, eat left overs (refrigerate and keep safe) and be responsible.

It is never a good time to be wasteful; someone else could have been fed.

30% CEREALS FOOD LOSSES

In industrialized countries, consumers throw away 286 million tonnes of cereal products.

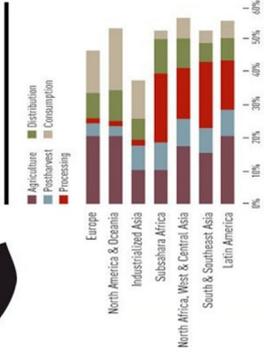
763 billion boxes of pasta



45% FRUIT & VEGETABLES FOOD LOSSES

Along with roots and tubers, fruit and vegetables have the highest wastage rates of any food products; almost half of all the fruit and vegetables produced are wasted.

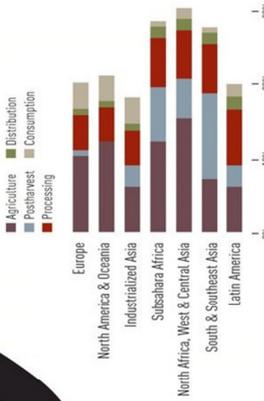
3.7 trillion apples.



20% OILSEEDS & PULSES FOOD LOSSES

Every year, 22% of the global production of oilseeds and pulses is lost or wasted.

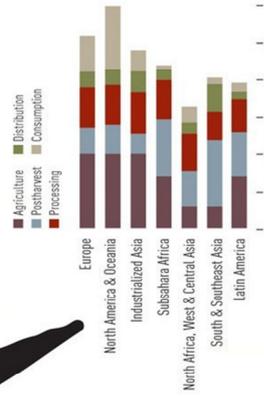
This is the same as the olives needed to produce enough olive oil to fill nearly 11,000 Olympic-sized swimming pools.



45% ROOTS & TUBERS FOOD LOSSES

In North America & Oceania alone, 5,814,000 tonnes of roots and tubers are wasted at the consumption stage alone.

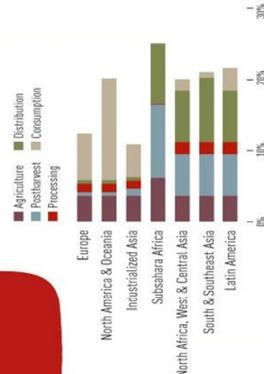
This equates to just over 1 billion bags of potatoes.



20% DAIRY FOOD LOSSES

In Europe alone, 29 million tonnes of dairy products are lost or wasted every year.

This is the same as 574 billion eggs.



30% FISH & SEAFOOD FOOD LOSSES

8% of fish caught globally is thrown back into the sea. In most cases they are dead, dying or badly damaged.

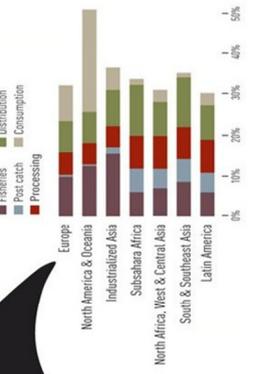
This is equal to almost 3 billion Atlantic salmon.



20% MEAT FOOD LOSSES

Of the 263 million tonnes of meat produced globally, over 20% is lost or wasted.

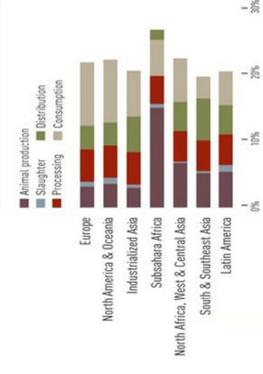
This is equivalent to 75 million cows.



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This is equivalent to 75 million cows.



PERSONNEL

People are the best resource a food establishment can have, however, it is the trickiest to control.

PERSONAL HYGIENE

Since people work in open food areas and can touch the food directly, their personal hygiene is of utmost importance. Bacteria live on our skin and inside our bodies whether we like it or not. Most of these bacteria are beneficial; however, if we do not take care of our hygiene by skipping showers and wearing dirty clothes the chances of accumulating harmful bacteria is heightened drastically.



When we take showers, we kill many of the bacteria on our skin and if any harmful bacteria are present on your excretory areas, these are removed. When a person has smelly armpits, the cause is due to bacteria. These will be digesting the micro sweat droplets deposited on the hairs or skin and the by-products produced are foul smell. Same with bad breathe; this can either be a cause of damaged teeth or infected gums, which again boils down to bacteria.



When we get sick, the bacteria causing the problem are inside of us and cannot be dealt with by having a shower. Therefore, the best way to prevent dispersion is to stay home and report sick. The easiest way for bacteria to travel around the food area is your hands. Hands are the body part that will touch the most surfaces and that is why hand washing is crucial and a must. On average a typical person touches their faces about 4 times every

hour and as such, you need to wash your hands at least every 15minutes. People with a nail biting habit have greater need to wash their hands due to saliva being transferred to the hands.

Always wash your hands:

- Before entering food processing areas & before touching any food.
- After handling raw materials (meat, eggs veg), waste, dirty equipment.
- Before and after using toilets
- After coughing, sneezing into your hands and blowing your nose.
- After touching your face & hair
- Handling the rubbish.
- Keep nails short and clean w/o varnish & false nails.
- Avoid nail biting.
- After smoking

DO'S

- Clean Clothes (ideally white),
- Use dedicated foot wear for kitchen areas,
- Use hair nets.
- Shaved face, no beards or else use beard snoods.

DON'T

- Smoke in any area. Smoking promotes Mouth to hand transmission of infections and a tainting smell.
- Eat on the production line but only in designated areas. This must be followed by hand washing to avoid potential disease & allergen cross-contamination.
- Use Mobile phones (Considered dirty as these are not items that can be washed)
- Wear Nail Varnish & False Nails
- Wear Jewellery & piercings (Only a plain wedding ring or a medical bracelet are allowed)
- Wear Cosmetics & Perfume
- Handle Money
- Allow Personal Items & Lunches in production areas
- Allow Septic bruises. Either cover or report sick
- Go to work Ill



Studies conducted by Quest Diagnostics in the US on beard swabbing, have shown that 95% of beards contain a considerable amount of Fecal Coliforms that may contaminate food.



It is important to note that freshly made tattoos are considered as skin wound and may spread infectious microbiology, therefore, these must be covered until fully healed.



THE IMPORTANCE TO REPORT ILLNESS

It is important to understand that when you are feeling sick, the infection would have occurred several hours earlier at the least, therefore, it will be already too late to prevent spread. For this reason, if you have a stomach ache, symptoms of gastric flu, colds, eye and ear infections, do not stay on the job, report your status to your manager and go home immediately.

On the contrary, if you are home on sick leave and start to feel better, you should not return to work until the doctor's certificate declares you as safe to return back to work. This is because even when the symptoms are gone, you may still be a carrier and able to transmit disease.



You must also report to your manager if someone in your household is or was, in your presence, in the past 3 days, suffering from a stomach bug before coming to work.

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MEDICAL SCREENING

Medical screen prior to employment is considered a very useful precautionary task towards any food establishment. Remember that some contagious diseases do not show any obvious symptoms therefore, it is only prudent that a registered Medical Doctor performs the medical examination and a fitness certificate is issued.

If pre-employed employees visit third world countries where sanitation levels may not be up to European standards medical screening is necessary to prevent any spread of potential disease.



Such precautionary rules should also be extended to visitors and any service contractors that the establishment might have. Visitors and contractors must always be accompanied by responsible site personnel.

ON THE JOB INJURY

When a person gets injured on the job, many a times, skin abrasions or cuts will be part of the scenario. It is only in rare cases that emergency services are needed. However, any incident, big or small should be immediately reported to the line manager.

- Injured persons must be moved away from the open food area and looked at by a first aider. In the case of small injuries, where an adhesive strip will be applied, this will need to be of a conspicuous colour (**Blue**) and waterproof. This will be applied to avoid inducing infection and spreading bodily fluids.
- In the case of serious injuries it is best to seek urgent medical attention and do not try to doctor yourself or fellow workers. If a certified first aider is on site, allow first aid while calling for an ambulance.
- An assessment must be undertaken, to see if any bodily fluids were dispersed on the food or food contact surfaces.
- Any affected food must be disposed of immediately.
- The affected area must be sanitized with an approved sanitizer (food grade disinfectant).



STAFF HYGIENE FACILITIES

The food establishment has to be able to provide the means for employees to keep themselves clean.

Changing rooms



Changing areas are built to allow employees to remove their "dirty" clothes and change into clean work clothes.

These rooms must be strategically located to enable the employees to change before entering the open food areas and be accessible only by employees.

Changing rooms must also be recorded on a cleaning schedule in order to be kept clean and organised.

Lockers



Where possible lockers must be provided to employees to be able to store their personal items and avoid bringing their belongings into the food areas. Lockers must be kept clean and emptied daily. Always purchase lockers that have the top part built at a 45° angle to prevent them from becoming a storage area.

Toilets and Hand Washing Basins



Toilets are an essential part of the Staff Hygiene Facilities together with the hand washing basins. Toilets must not be leading directly to open food areas to avoid any airborne bacteria during flushing and be transferred to the kitchen. This can be achieved by having a double door installed.

Also an adequate air extraction fan must be installed in the toilet cubicle to aid with the removal of the same airborne bacteria. It is very important that the duct exhausting the dirty air leads to the outside and is automatically closed when not switched on.

This is important to avoid pest ingress.



Hand washing basins (HWB) come in many shapes and forms however not all have the same practicality and effectiveness to control disease transmission.



The best pick would be a knee operated HWB to avoid manually touching any knobs. HWB must always be accompanied with bactericidal soap dispenser, disposable tissue papers or hand air dryer and a foot operated bin.

To avoid misuse, HWB must be marked by a sign pointing out that it must only be used for hand washing.



TRAINING

It's a legal requirement for All Food Handlers in terms of Legal Notice 178/2001 to undergo food safety training.

However more specific training will be needed dependent on the type and nature of the job undertaken.

Ideally, every position in the establishment should have a pre-assigned training program.

Where appropriate, assessments would be better undertaken to emphasise the knowledge gaps and affect re-training.



LEGAL REQUIREMENTS & LIMITATIONS

No place can operate as a food shop unless prior registered with the Food Safety Commission (FSC).

If a food establishment intends to export goods to other countries, different law might apply therefore it is responsible to become knowledgeable about the specific requirements in that particular country.

In the case a food shop switches ownership, the FSC registration must be renewed within 28days to avoid fines.

When the food shop changes the way and/or type of food preparation, such changes will be made available to the FSC within 28days.



RAW MATERIALS (RM'S)



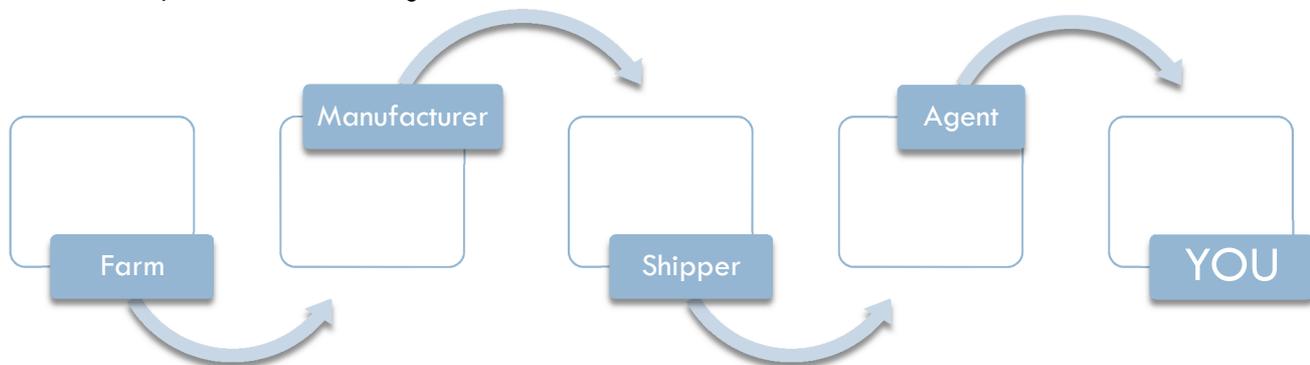
RM's are the basic components that will make up the finished product to be sold and need to be treated with care.

To be able to control the safety of the raw materials, the following measures must be in place:

- Supplier Approval & Monitoring
- RM Specifications
- Acceptance/Rejection on Incoming Goods
- Clean Food Storage (Temp Control) & Allergens
- Labelling (Allergens)

SUPPLIER APPROVAL & MONITORING

When choosing a supplier to purchasing RM's from the process might be a bit tricky. You can either buy from a manufacturer, broker or via an agent.



In Malta, most items are bought via agents due to the lack of manufacturing and natural resources. That means, that the product you are buying had to change hands a multitude of time before being in your hands and therefore, is more susceptible to damage and mishandling.

However, there are some criteria that are worth noting to help you choose your suppliers:

1. Price.
2. Availability of Information (questioners/specifications/certificates)
3. Punctual deliveries/Availability of RM's
4. Holistic Quality of Products/Service
5. Hygiene Control (2nd Party Audits)

The sum of the above 5 characteristics makes up for a good or poor quality supplier and should be always taken into consideration during the decision making and approval process.

1. Price is always the primary decision making factor however, it should not blind you from the other important factors.
2. A supplier should be able to provide you with:
 - a. Detailed specification for the RM's you are buying before you buy them.
 - b. A certificate of analysis (COA's) may also be provided for the particular batch of product you are buying.
 - c. Answering any questions and filling up questioners
 - d. Presenting without hesitation Environmental Health reports and audits.

3. Provide punctual deliveries and prevent Out-of-Stock situations.
4. Provide good quality products from certified suppliers, presenting no pest issues or other kinds of contamination.
5. Should make themselves available for hygiene audits as they should have nothing to hide.

The supplier approval process implies that you will not buy your RM's from "John Smith" just because you know his family (relationship) or you were in class together (old buddies).

Although first impressions go a long way, a relationship between a food establishment & a supplier will have to be monitored and where inconsistencies are noted, these will be tackled in timely fashion.

RAW MATERIALS SPECIFICATIONS

Specifications are detailed documents that indicate what you should expect when buying the product and in turn act as a sort of guarantee towards a level of quality. Other advantages are

FINISHED PRODUCT SPECIFICATION																												
HULLED SESAME - A22680																												
Commodity Name	Hulled Sesame Seed																											
Size	3mm (+/- 1mm)																											
Origin	Guatemala																											
Description	Small oval shaped seeds, bright, shiny, cream in colour, free flowing and free from foreign taint, mould and infestation.																											
Physical Contaminants Per 1kg composite sample	Damaged (inc Splits, Diseased & Weathered) 0.05% max																											
Purity	99.95%																											
Moisture	5% max																											
Storage Conditions	Dry Ambient																											
Best Before (Shelf Life)	12 months																											
Nutritional Information Per 100gms	Energy 2397 (573 KJ/kcal) Protein 17.25 g Total Carbohydrate 29.45 g Dietary Fibre 1.2 g Total Fat 49.67 g Saturated Fat 6.957 g Sodium 11 mg																											
Chemical	Free from Chemical Pesticides, residues or odours. Residual levels to conform to current regulations in force.																											
Heavy Metals	Conforms to current UK Food regulations in force.																											
Microbiological Guidelines	<table border="1"> <thead> <tr> <th></th> <th>Target</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>TVC</td> <td><10,000 cfu/g</td> <td>100,000</td> </tr> <tr> <td>Yeast</td> <td><400 cfu/g</td> <td>1000 cfu/g</td> </tr> <tr> <td>Moulds</td> <td><400 cfu/g</td> <td>1000 cfu/g</td> </tr> <tr> <td>Coliforms</td> <td><20 cfu/g</td> <td>500 cfu/g</td> </tr> <tr> <td>E.Coli</td> <td><10 cfu/g</td> <td>40 cfu/g</td> </tr> <tr> <td>S. Aureus</td> <td><20 cfu/g</td> <td>40 cfu/g</td> </tr> <tr> <td>B. Cereus</td> <td><20 cfu/g</td> <td>100 cfu/g</td> </tr> <tr> <td>Salmonella</td> <td>Absent in 25g</td> <td></td> </tr> </tbody> </table>		Target	Maximum	TVC	<10,000 cfu/g	100,000	Yeast	<400 cfu/g	1000 cfu/g	Moulds	<400 cfu/g	1000 cfu/g	Coliforms	<20 cfu/g	500 cfu/g	E.Coli	<10 cfu/g	40 cfu/g	S. Aureus	<20 cfu/g	40 cfu/g	B. Cereus	<20 cfu/g	100 cfu/g	Salmonella	Absent in 25g	
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Health & Safety	Refer to Health & Safety Data Sheet																											
GMO	Product is certified GMO Free																											
Packing	Multiply Paper sacks - 25kg net weights																											
Presentation	Palletisation 40 bags, Shrink-wrapped, CHEP Blue pallets																											
Labeling	Lot No, Supplier, Commodity name, Pack size (net wt.)																											
Document No.:	Hulled sesame - FPS749 - A22680																											
Version No.:	07																											
Reason For Issue:	New Format																											
Date Of Issue:	09/02/2010																											
Authorised By:	Adrian Jones																											
Page No.:	1 of 1																											

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Tel: +44 (0) 207 488 0777 Fax: +44 (0) 207 265 5285 www.fdlworld.co.uk

- Know your product better.
- Avoids surprises when purchasing.
- Helps you compare suppliers.
- Substantiates the Approval process.

Some common parameters are:

1. Size & weight
2. Origin,
3. Ingredients,
4. Storage conditions,
5. Shelf life,
6. Nutritional Information,
7. Allergen data,
8. Microbiological Criteria
9. Type of Packaging
10. GMO declaration
11. Hazard Contamination levels

FINISHED GOODS SPECIFICATIONS

In the same way, raw material specifications are beneficial for you when buying, having specifications sheets for your finished goods will benefit your potential customers, and however, that is not the only advantage.

- Building specification sheets induces research and measurement of details that one might be blind to before the process started.
- The manufacturing crew will know what GOOD looks like and what the customer is expecting and therefore, promotes standardisation of finished product irrelevant of who is working.
- As your product will become more standardised and consistent the product will be perceived as of better quality.



- Can be used as an information tool when promoting a product to new customers (foreign), regulatory bodies showing transparency.

ACCEPTANCE & REJECTION OF INCOMING GOODS

The Incoming Goods Control is the first line of defence against introducing goods of unwanted quality that might have an impact on food safety such as:

- Bad Temperature Control
- Pest infestations.
- Torn Bags & containers
- Broken Pallets
- Unlabelled products. (Traceability)
- Raw materials that are not up to specification.
- Hygiene of the transport vehicle

Such checks show how serious you are towards your food safety system. In turn, your supplier feels that he is being monitored and treats you with more respect. In case of litigation, you have proof or receipt or rejection.

Form No.:		HACCP PLAN		CODE _____	
INCOMING GOODS RECORD					
Supplier's Name				P/Order number:	
Product Name:				Product Specs Received:	Grd:
Date received:				IR Number Given:	
COA Received:	YES / NO, E-copy / Hard copy	Grd:		No. of Pellets	
Number of units:				Unit Size:	
Suppliers Details					
Supplier's Lot Number:					
Supplier's Production date:					
Supplier's Expiry date:					
Supplier checked against approved supplier List?				YES / NO	
Supplier's Carrier Registration Number					
Supplier's Carrier Hygiene & Integrity				Grd:	
Delivery Note Number / Invoice Number					
Product Integrity Details					
Unusual odour?				YES / no	
Unusual Colour?				YES / no	
Excessive moisture?				YES / no	
Is the Container/Receptacle torn?				Yes / NO	
Evidence of infestation / pest activity?				YES / no	
Goods delivered ambient/cool/frozen?				Ambient / Cool / Frozen	
In case of Cool or Frozen check temperature. CPI				°C	
Palletised goods					
Plastic / wood pallets?		Plastic / wood		Container damaged?	
Pallet liners used?		Yes / NO		Container number:	
Pallet's Integrity Undamaged/Signs of Pest infestation?				Seal Number:	
Units on Pallet stacked safely?		Yes / NO		Glass contamination of Container floor?	
Grading:				Container floor clean?	
Rejected:				Accepted:	
Quantity Rejected:				Quantity Accepted:	
Reason for Rejection:				Total Grading:	
Product Released into Production:		Yes / NO			
Reasons for Withholding:					
If any answers are highlighted in bold they must be immediately reported to the Quality Assurance Manager.					
Signature: _____				Name in Print: _____	
<i>Store Department</i>					

It is important never to accept goods that are not up to standard. Once the goods are off loaded and the transfer note is signed you have accepted the material and the food's safety is now your responsibility.

CONTROL OF NON-CONFORMING PRODUCTS

In food production, especially industrial manufacturing, it is an inarguable fact that a given % of rejection will be experienced. Common reasons for rejection are flaws in design, inadequate machinery, lack of employee training, human error, Research & Design trials, mechanical breakdowns etc.

It is a fundamental process in Food Safety and Quality Assurance that such unsafe/non-conforming products will not reach the customer.

Therefore a procedure must be in place to show your staff how to handle such products. By rejecting what is not "on-specification" you will benefit from:

- Brand image protection
- Avoids customer complaints
- Promotes a sense of pride in manufacturing operators.



FOOD STORAGE AREAS

Although main storage areas are not considered high risk zones, a level of control must be in place because food is to be kept in a clean space.

- No food should be stored on the floor, but always on pallets,
- No pallets should be left in the corridors
- Any expired or not in use material is to be discarded
- Liquids should be stored on the bottom shelves
- Raw Materials will be kept separate from Finished Goods.
- Food contact packaging to be stored separately and always covered.
- Glass containers must be kept shrink wrapped and on lower level shelves.
- Allergens must be stored separately to avoid cross-contamination.
- For ease of reference, a detailed plan is to be raised.
- Shelving should be at least 6 inches off the floor and away from the wall to allow cleaning.



ALLERGENS

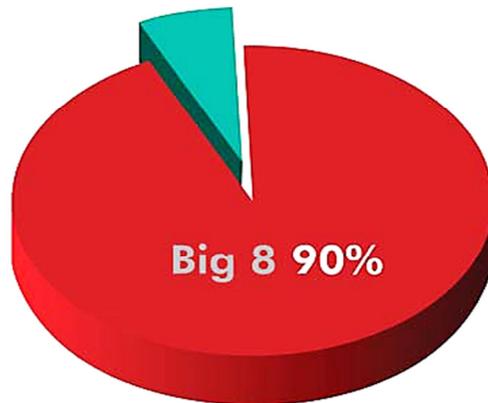
Allergens are food that when consumed by a non-allergic person are completely safe, however, when consumed by a sufferer the effect can lead to immediate death. An Allergen is a food source that triggers the body's immune system.



When an autoimmune response is triggered in a sufferer his / her body will start to bloat, when the bloating reaches the throat, it can asphyxiate the person.

There are more than 160 known foods that will cause allergic reactions in the world; however 90% of these dangerous reactions are caused by the Big 8.

All Others 10%



1. Peanuts,
2. Tree Nuts,
3. Wheat,
4. Soy,
5. Milk,
6. Eggs,
7. Fish,
8. Shellfish (Crustaceans & Molluscs)

You must remember that it only takes a miniscule quantity to effect a sufferer.

Allergens are such a threat to allergic people that the European Union has issued EC1169/2011 that gives specific instructions to highlight any allergen present in the product. The same emphasis is also given to the risk of cross contamination with other allergens that can end in the product. EC1169/2011 recognises 6 more allergens than the Big 8.

Allergens recognised by EC1169/2011 Annex II: *SUBSTANCES OR PRODUCTS CAUSING ALLERGIES OR INTOLERANCES:*

1. Wheat
2. Crustaceans
3. Eggs
4. Fish
5. Peanuts
6. Soybeans
7. Milk
8. Tree nuts: Almonds, Hazelnuts, Walnuts, Cashews, Pecan nuts, Brazil nuts, Pistachio nuts, Macadamia/Queensland nuts,
9. Celery
10. Sesame Seeds
11. Mustard
12. Sulphur dioxide-
13. Lupin
14. Molluscs



The list above also includes any derivative that might be manufactured from the same allergenic foods

EXAMPLES:

- Yoghurt comes from Milk



- Peanut Butter from Peanuts



- Dough made from Wheat Flour etc.



- Tahini or Halva (Helwa Tal-Tork)



LOWEST OBSERVED ADVERSE EFFECT LEVELS

The following values are commonly referred to as the Lowest Observed Adverse Effect Levels (LOAEL's) for the said 14 allergens are as follows. The values given are in parts per million which can be better understood as explained below.

- 1 kilogram (kg) = 1000 grams (g)
- 1g = 1000 milligrams (mg)

- Therefore 1kg = 1,000,000 mg

- So, 1mg of Allergen in 1kg of another food is 1ppm

- Therefore 20ppm of Wheat or Gluten is 20mg in 1kg of rice bread.

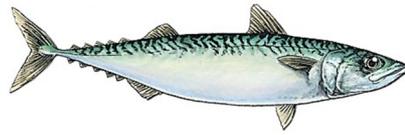
(www.allergenbureau.org)

allergen	action level 1
milk	< 50
lactose ¹	< 100
egg	< 20
soy	< 25
fish	< 100
peanut	< 8
tree nuts ²	< 10
sesame	<10
crustacean	< 10
gluten ³	< 20
celery	< 20
lupin	< 20
molluscs	< 20
mustard	< 20
SO ₂	< 10

OTHER ALLERGIC REACTIONS

Some fish, namely the below species (Scombroidea) may cause an allergic reaction in some individuals. These takes place if the fish is agitated for a long time and does not bleed well before killing. Such treatment will induce the secretion of Histadine (Histamine) in the fish. Histamine will not be removed by cooking and therefore, can still induce an allergic reaction.

MACKEREL



HERRINGS

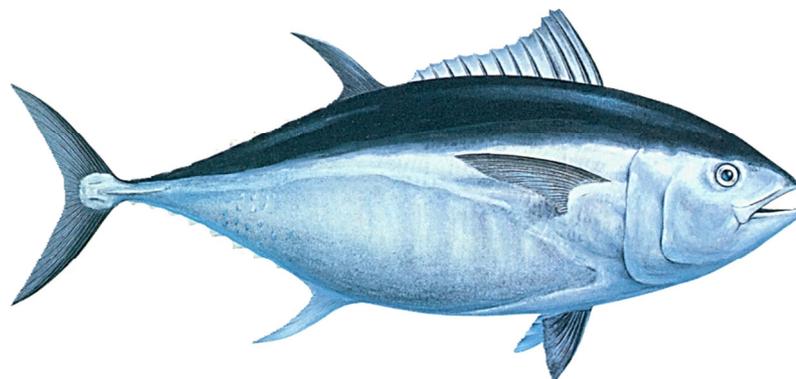


SARDINES

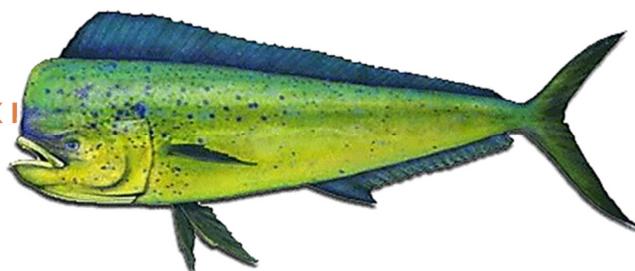
ALBACORE TUNA



BLUE FIN TUNA



DOLPHIN FISH (LAMPUKI)



WORKED EXERCISE 3

INGREDIENT	ALLERGEN	NON-ALLERGEN
Water		x
Pepper		x
Milk	x	
Sesame Seeds	x	
Bacteria		x
Mushrooms		x
Mustards	x	
Eggs	x	
Apples		x
Wheat	x	
Peanuts	x	
Tree Nuts	x	
Sunflower Seeds		x
Fish	x	
Soy	x	
Lupin	x	
Linseeds		x
Celery	x	
Molluscs & Shellfish	x	

Paella made with Arborio rice, chicken, chorizo and prawn.

Ingredients Cooked Arborio Rice, Onion, Peas, Green Bean, Red Pepper, Chicken (9%), Tomato, Tomato Purée, White Wine, Chorizo, **Prawn (Crustacean)** (3.5%), Chicken Stock, Smoked Paprika, Garlic Purée, Parsley, Coriander, Salt, Cornflour. **Cooked Arborio Rice** contains: Water, Arborio Rice. **Chorizo** contains: Pork Shoulder, Pork Belly, Water, Salt, Smoked Paprika, Dried Skimmed **Milk**, Dextrose, Garlic, Curing Salts (Sodium Nitrite, Potassium Nitrate), Nutmeg, Oregano. **Chicken Stock** contains: Chicken Extract, Salt, Cornflour, Vegetable Purée (Carrot, Leek).

**Allergy advice**For allergens, see ingredients in **bold**.

According to the European Directive EC1169/2011 that took effect in December 2014, if any of the 14 allergens is present in the product these have to be listed in the Ingredient list in an EMPHASIZED manner on the food label.

Also,

If a product does not contain an allergen but may carry the risk of cross contamination from one, then you will also need to claim as such on the label.

IMPORTANT: Never claim that a food product is free from any allergen just because it's not part of the recipe. Product has to be evaluated and tested by a professional.

However, to control allergens it takes more than just labelling. The following exercise depicts all the actions that can be taken to control what goes into the product.

1. Purchasing RM against a detailed specification and from reputable suppliers will ensure better safety and less risk of undeclared allergens.
2. During the receiving process, if the product is loaded together with other allergens that should not be in the product, RM should be rejected, e.g. gluten free flour loading in the same truck with flour bags.
3. Storage of products that contain the most allergens should be stored at the bottom to avoid cross contamination in the case of a spillage.
4. The very basic of controls, is the actual ingredients that are put into the product, including rework. Rework many a times is forgotten as not a part of the recipe and can lead to serious repercussion.
5. In food establishments where the place does not provide enough segregation and cross contamination is likely, then the times during which different product with different allergens are produced must be timed to minimize that effect. Productions must start with the product having the least allergens and increasing.

6. Handling of the finished product till the packing stage is a very delicate part of the process and needs all the attention as any other part of the chain.
7. Process flow should not intersect other areas that may increase the risk of contamination. Contamination may also come from personnel that have worked in an area where allergens are worked.
8. The packaging area and the actual packaging must be kept allergen free. The packaging of choice must also be able to prevent any small particles from entering the product once sealed.
9. Sanitisation: many factories effect a clean down after a production and in between productions which host different allergens. It is very important that swabbing tests are carried out in strategic places to ascertain that any residue has been removed.



WORKED EXERCISES 4

Which of the below stacking formats prevent cross-contamination in case of a spillage?

The top right setup and bottom left setup are well stacked because the item on the top shelf has the least allergens in it and building the allergen content going down.

DISTRIBUTION AND TRANSPORT

Food establishments started to transport and distribute food as early as we can remember e.g. bakers selling their bread, fish monger, vegetable mongers and many others. Without the distribution function, the business would have to settle for sales from customers who are willing to come to the outlet or who live nearby. In the modern world, distribution has taken a much more global scale however the risks attributed have also grown equivalently therefore, control must be effected. The distribution function is often overlooked as it is most of the times away from the prying eyes of the Quality Assurance/Supervisory staff, therefore, people who work as distributors must be able to do their job right and safely without supervision.

Common pitfall in safe food distribution:

- Leaving loading bay doors which lead to the outside unlocked, promoting the risk of pest ingress.
- The absence of a double door (hygiene lock) at loading bays.
- Loading bays not equipped with roofs to protect the product from the elements during loading
- Unclean vans and the lack of ability to close efficiently.
- Products left in trucks overnight with unsecure doors.
- Distributing temperature sensitive goods with normal trucks leading to loss of temperature control.
- Lack of paperwork showing where the goods were distributed leading to loss of traceability.



TRACEABILITY & RECALLS

The ability to identify the origin of raw materials and packaging used in a particular batch of finished products.

You might have heard of the term “From Farm to Fork” referring to the traceability of the raw materials from the farm until on the table, ready to be eaten. Traceability is a legal obligation to all food establishments operating in the EU under EC 178/2002. The importance of being able to identify the origins of raw materials is because of the possibilities of recalls.



PRODUCT RECALLS/WITHDRAWALS

If at some point you realize that a particular batch of product that you have produced has the slightest chance of hurting somebody, the product should be:

Either, if it is still under the control of the manufacturing site, it is stopped from being distributed and quarantined until further notice.

Or, if already distributed, it must be recalled from the market. Recalls usually are affected with the involvement of the Health Authorities and can use public media to reach as much people as possible. Because of this bad publicity, food establishment tend to avoid unnecessary recalls, but this all boils down to the likelihood and the severity of the contamination.

A **product withdrawal** is a request to return a product after the discovery of safety issues or product defects that might endanger the consumer or put the maker/seller at risk of legal action. However the product would still be under the manufacturer's distribution center.

A **product recall** is a request to return a product after the discovery of safety issues or product defects that might endanger the consumer or put the maker/seller at risk of legal action." Product will be already distributed in shops and maybe already consumed.

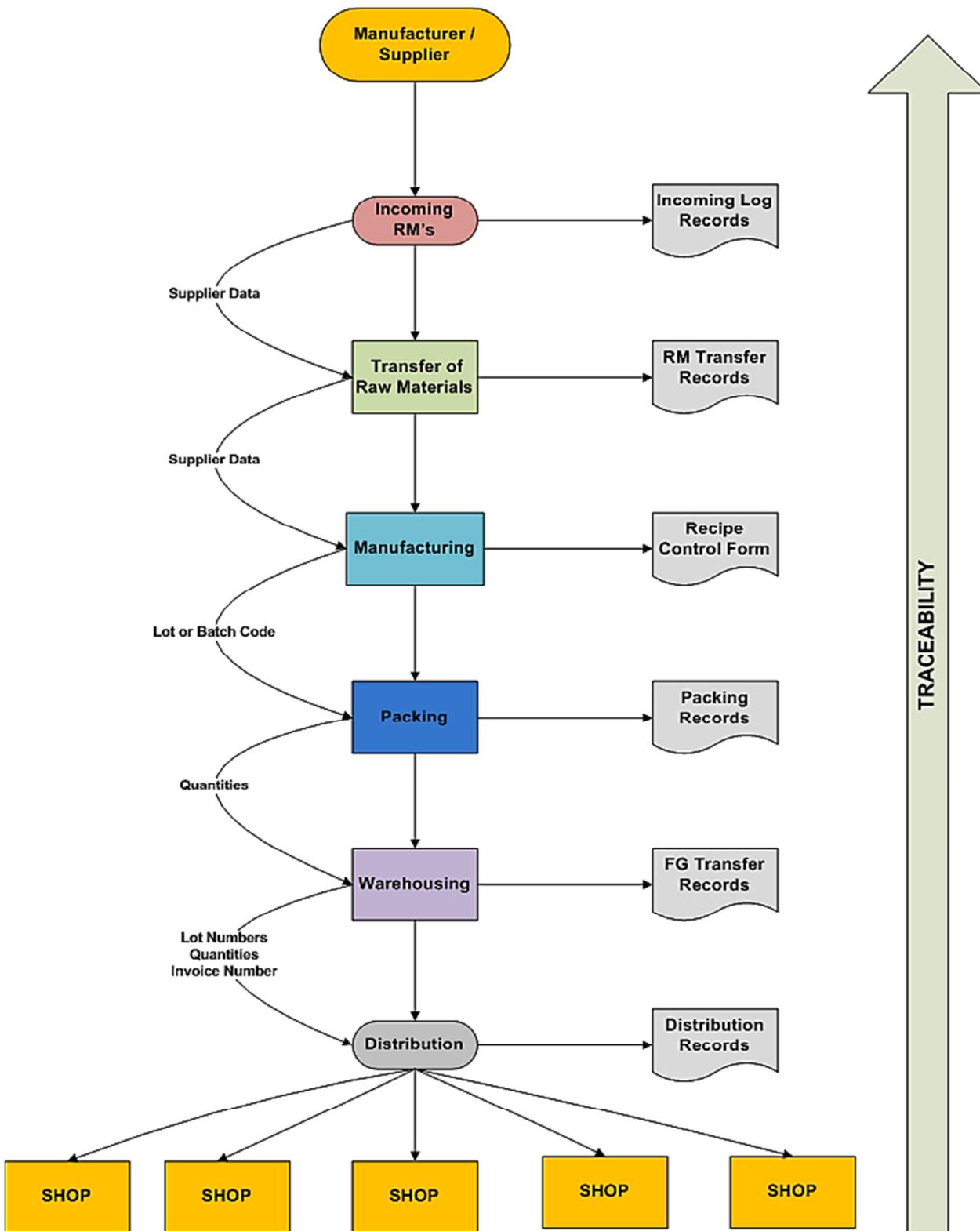
According to the US FDA (June 2013), the most common reasons for recalls are:

- Undeclared allergens were the primary hazard, accounting for 85 of the total of 224 reportable foods. That's 37.9 %
- Second was contamination with Salmonella, 63 reports and 28.1%.
- Third was contamination with Listeria monocytogenes, 48 reports and 21.4 %. Another bacterial contaminant,
- With a much lower incidence rate, was E. coli O157:H7 (4 reports, 1.8%t).

The following diagram shows in a generic way, how information is transferred from the beginning of the process to the end.



The following flow diagram portrays a typical process flow. The boxes on the right represent the type of document that would be filled in during the process, the tags on the left is the data that will be collected to facilitate a recall that might take place.



CUSTOMER COMPLAINTS

Nowadays society is aware that they have rights as consumers and for that reason; they have the right to complain when they are not pleased with something they have bought. There are as many reasons why people file a complaint as there are people, however, these can be pooled into some common categories dependent on the nature of the food:



- Moulding
- Under Weight or low Quantity Issues
- Bad Presentation
- Bad Taste & Off Smells
- Foreign Objects including Insects and other small animals
- Too Dry or Too Moist
- Food Poisoning (including allergies)
- Bad Date Code / Lot numbering (readability)
- Unreadable barcodes
- Lack of Quality in general.

First thing you have to do when you receive a complaint, irrelevant the way it reaches you, is to categorize it by the risk factor involved. The below questions should be asked:-:

1. Is it a Food Safety Issue – Is it Life Threatening, can someone get hurt?
2. Or is it a quality Issue? – Nobody will get hurt, but you might lose the client.
3. Or is it just a customer perception or expectation that was never meant to be delivered?

Keep in Mind: Studies show that only 10% of the people do present a complaint, the rest will just switch brand or do not buy.

Always try to please you customer and if possible close off the complaining session at the moment it is being filed. With all the means on social media today, a small incident can be brought up to the attention of the whole national in a matter of hours via Facebook, Twitter etc.

Always make the customer feel that you are giving them the attention they deserve, even if they don't. Log complaint details and contact back the customers, it shows a quality customer care service but it is how a progressive food manufacturer must deal with a client dissatisfaction for customer retention.



However the best way to deal with Customer Complaints isPrevent them from Happening.

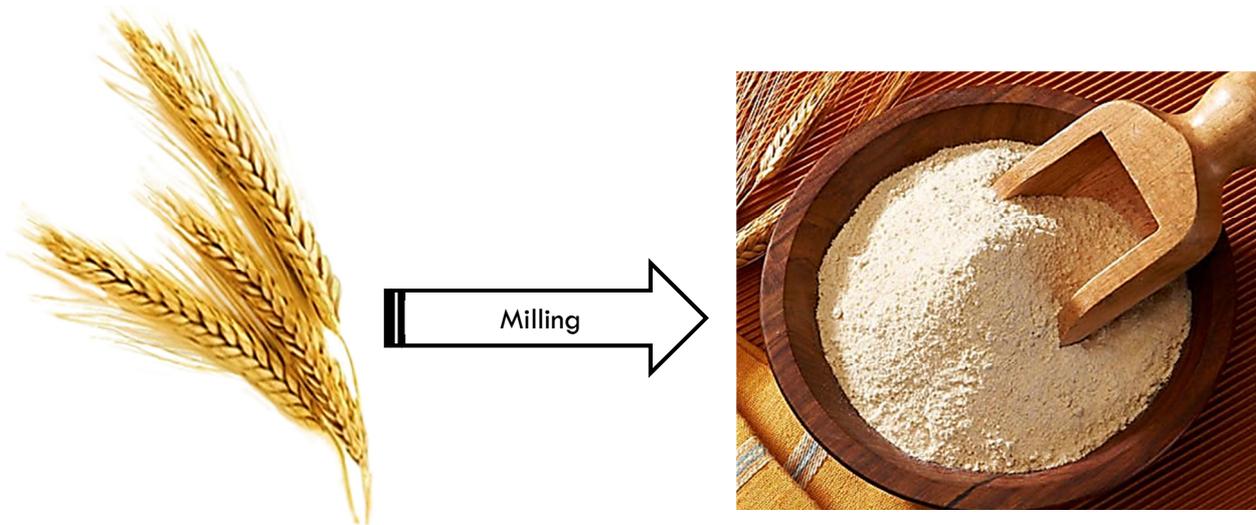


PROCESS MAPPING

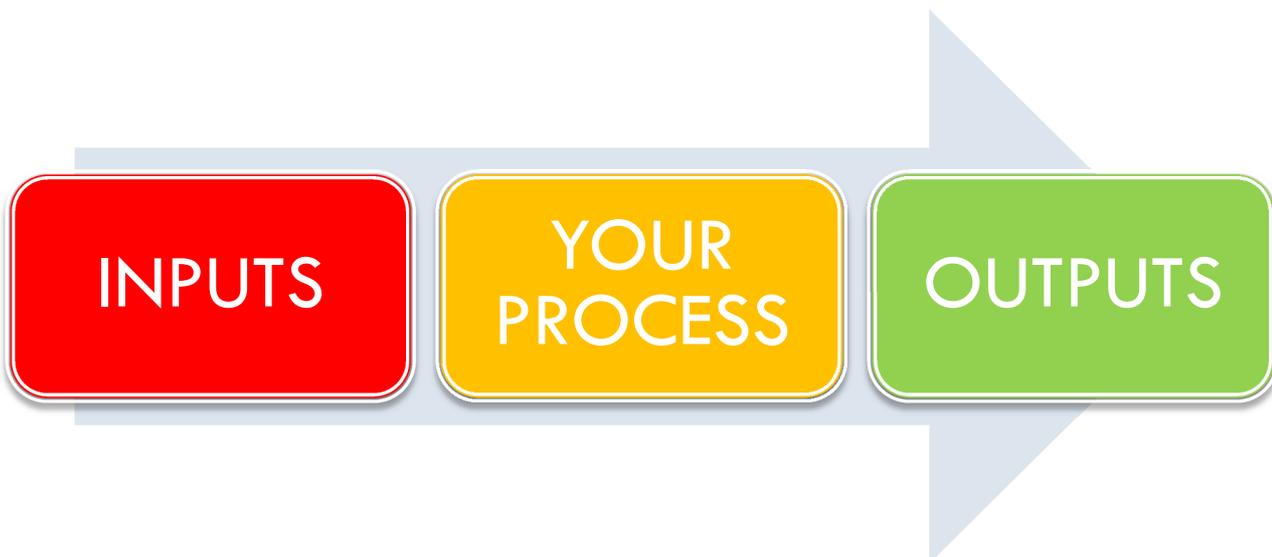
During your job you will be making a series of actions, to some of which you will be aware and some others will be taken for granted and be blind to. Process mapping is an exercise by which the whole process is broken down into mini action steps that are taken to create something. These action steps will be written down and placed in chronological order to help the reader understand.

Definition: "a series of actions or steps taken in order to achieve a particular end."

The below is a pictorial example of process mapping, you have the process starter i.e. wheat which will undergo milling and the result will be wheat flour.



The technical terms for what goes in and out of a process are INPUTS and OUTPUTS.



By understanding your process in detail, you will be able to see where you can improve it, you will see how it interacts with other processes done by other people and most importantly, you will be able to know what actions are safe and identify which can be less safe or hazardous towards the food in your process. The below diagram is a generic process for your guidance.



HAZARD ANALYSIS & CRITICAL CONTROL POINTS – HACCP

In the 1960's, the Pillsbury Corporation developed the HACCP control system together with NASA to ensure food safety for the first manned space missions. From there onwards the system proved to be very effective and eventually became a legal requirement under EC852/2004.

By now you might be already aware that your process is not immune to hazards and therefore, has to undergo a hazard assessment. It is during this exercise that potential hazards are identified. The function of the HACCP study is to put measure in place for every hazard identified to try to eliminate or reduce it to a safe level. Such assessment should be undertaken by a professional who has extensive experience in the field, **together with, the people responsible for the actual process.** That is how a **HACCP team** is formed.

THE CODEX ALIMENTARIUS 7 PRINCIPLES OF HACCP

- | | | |
|--------------|---|--|
| Preparation | } | <ol style="list-style-type: none"> 1. Achieve Management Commitment 2. Define Terms of Reference/Scope of Study 3. Select a HACCP Team 4. Describe the Product 5. Identify Intended Use 6. Construct a Flow Diagram 7. On Site Confirmation of a Flow Diagram |
| 7 Principles | } | <ol style="list-style-type: none"> 8. Effect a Hazard Analysis 9. Determine the Critical Control Points (CCP) 10. Establish critical limits for each CCP 11. Establish a monitoring system for each CCP 12. Establish a corrective action plan for each CCP 13. Verification of the monitoring system. 14. Establish documentation & Record Keeping |

EXAMPLE of the 7 Principle of HACCP in practice:

8. The **hazard** identified by the HACCP team is **metal fillings** that can come from the machinery processing the food. It is a **physical hazard**.
9. A typical **control measure** against such hazard is a **metal detector**. However, since there will be **no other process** during the manufacturing cycle to remove food that have been contaminated with metal, this step in the process is **critical**. Therefore this point in the process is **Critical Control Point (CCP)**
10. The acceptable **limits** of metal in food is – **none**
11. To **make sure** that the metal detector is working during production; **someone** will have to **check it**, but **how** and **how often**?
12. The person in charge of checking the metal detector will have to be knowledgeable of what **corrective actions** to do in the case the metal detector fails to work.
13. Since this point is critical that it functions all the time, a **supervisor** must **verify** that the metal detector operator is doing his check in the right way and in the right frequency.
14. **Records** are the evidence that all the above process is being undertaken correctly.

ENVIRONMENTAL HEALTH INSPECTORS

Environmental Health Inspectors are government appointed individuals who are knowledgeable about food safety and visit food establishments in order to audit and gauge you for the same parameters learned in this course. At the end of the inspection, a grade will be given:

'A' is the best pass result

'D' is the least pass result

A result lower than a 'D' may lead to fines and even closure of your business premises.



For more courses visit www.qsquared.com.mt or

Contact Mr Jean Pierre Sant by phone on +356 7964 2524 or send an email to info@qsquared.com.mt

thank
you!