UNIT-1 Introduction to Food Safety

Learning Outcomes
By the end of this unit the learner will be able to:
• Understand the risks associated with substandard food safety • Discuss the potential consequences of low food safety standards • Describe the seven most important principles of a safe food supply chain

Unit 1
Introduction to Food Safety

The term 'food safety' is used in reference to all activities and protocols involved in the preparation, storage and handling of food products, with the aim of mitigating the risk of foodborne illness or injury. Throughout all stages of the supply chain - from cultivating crops through to the consumption of commercially available food products - a wide variety of potential health hazards must be taken into account.

Food safety practices are only considered acceptable when they are implemented effectively throughout each stage of the food production life cycle, providing adequate protection for those working with them and for the end customer.
Maintaining food safety standards calls for meticulous attention to detail and expertise from several diverse academic fields, including but not limited to engineering, microbiology, chemistry and physics. Any business that plays a role in the sourcing, production, distribution or retail of food products is legally obliged to demonstrate the strongest possible commitment to good safety and hygiene standards.

The Food Safety Act 1990 provides the most detailed overview of current food safety laws, though there is additional legislation applicable within the four territories of the United Kingdom. For example, the Food Standards Agency outlines a series of guidelines and legislative requirements for businesses in England, Wales and Northern Ireland.
The Food Standards Agency created a standardised system for measuring the food safety standard of a business, based on three key aspects:

- Hygienic food handling practices
- The physical state and cleanliness of the business
- Food management systems

The Food Hygiene Rating Scheme awards businesses a score based on their performance across each of these key areas. The five scores a business can be awarded indicate the following, and are designed to help customers make educated and confident choices:

5 – Hygiene standards are very good
4 – Hygiene standards are good
3 – Hygiene standards are generally satisfactory
2 – Some improvement is necessary
1 – Major improvement is necessary
0 – Urgent improvement is required

Businesses are assessed in relation to how they handle food, how the food is stored and prepared, the cleanliness of the facility and the extent to which food safety is proactively managed.

However, the Food Hygiene Rating Scheme does not offer any insight into the quality of the food, the

culinary skill level of the staff, customer service standards, food presentation or the comfort of the establishment.

Under Food Safety Law in the UK, the Most Important Elements of Food Safety are:

1. **Strong Focus on Hygienic Practices** - This refers to the personal hygiene of the staff members, hygienic food handling practices, effective cleaning, avoidance of cross contamination, control of allergens, use of appropriate cooking temperatures and safe food storage practices.
2. **Implementation of Food Management Systems** - A broad area of interest that covers all main aspects of the system implemented to ensure the business is run in a safe and hygienic manner, including staff training, supply and delivery, traceability, labelling, record keeping and HACCP.
3. **General Building Hygiene Standards** - Focuses strongly on risk prevention through cleanliness and maintenance, encompassing hygienic waste management, pest control, ventilation and air quality, appropriate lighting and the general layout of the premises.

Each of the above plays an equally important role in ensuring a business reaches the required food safety standard to operate legally in the UK.

Food Safety Regulations in a Globalised World

Regulatory standards vary significantly from one country to the next. Food is one of the most extensively traded commodities worldwide, yet the way in which food safety is defined and measured differs between international territories. There has been little by way of standardisation or agreement of norms over the decades, which can make it difficult to maintain consistently high standards when sourcing products and ingredients from different countries.

However, most food safety laws worldwide are based on the same two primary concepts - GMP and HACCP:

GMP - This refers to the internationally recognised quality assurance guidelines known as 'Good Manufacturing Practices', which are applicable to the production of food and beverage items, pharmaceuticals and cosmetics, medical devices and dietary supplements. GMP outlines a series of protocols and standards all manufacturers and suppliers within the supply chain must comply with, in order to maintain the consistent quality of their products and ensure they are safe for the end customer.

HACCP – Hazard Analysis and Critical Control Points refers to a risk-based approach to the mitigation of numerous physical, chemical and biological risks associated with food production, and distribution and consumption. The basic premise of HACCP is to ensure all possible threats are identified and compensated for ahead of time, in order to prevent them from happening in the first place. HACCP tracks the journey of food product from field to fork, analysing all potential risks at every stage throughout the supply chain and ensuring steps are taken to minimise or eliminate them accordingly.

A Brief History of Food Safety

The risks associated with foodborne illness and injury are nothing new. They have existed throughout history, prompting the human race to pioneer a wide variety of food preparation methods to reduce the risk of falling ill. Typical examples of which include heating food to an appropriate temperature, smoking meats and fish, canning, preserving, pickling and so on.
Advances in food science have enabled the modern world to gain a detailed understanding of how all known food preparation methods work and the extent to which they are effective in preventing foodborne illness. However, it wasn't until relatively recently that formal legislation was introduced to ensure sanitary standards were appropriately maintained in food production facilities.

A novel published by Upton Sinclair in 1905 horrified the American public, due to its graphic depictions of the unsanitary meatpacking industry of Chicago. Such was the uproar that the United States government introduced the Meat Inspection Act a year later, which would become the first law of its kind overseeing health and hygiene standards within a food handling environment. Businesses would subsequently be subject to regular external inspections and audits, in order to ensure their compliance.

Regulatory bodies were established in North America and Europe around the time of the industrial revolution, when businesses began transitioning to mass-production techniques for improved output and lower costs. It was agreed that as food production was becoming increasingly mechanised, new laws needed to be introduced to ensure the quality and safety of the items rolling off the production lines.

More recently, it was only in the years following the Second World War that the more affluent households of North America and Europe were equipped with refrigerators. This sparked a major shift in both food production techniques and the requirement for legislation to ensure chilled products were sourced, handled and sold in an appropriately hygienic manner. 1959 is heralded as the year when food safety principles transitioned from reactive to proactive, with the introduction of HACCP. What would become the standard system of hazard analysis and control for millions of businesses worldwide was pioneered by scientists at NASA in collaboration with the Pillsbury Company.

Over the course of the following two decades, it was accepted by scientists and food production businesses all over the world that traditional monitoring and inspection methods were nowhere near as effective as HACCP. This highly proactive hazard analysis and control system would subsequently be adopted by small and large businesses worldwide, and continues to serve as the primary framework for all food safety practices and regulations even today.

The Seven Principles of a Safe Food Supply Chain

HACCP is a widely adopted quality and safety framework, within which a business must formulate its own strategy to ensure it meets its obligations. According to official food safety guidelines outlined by the European Union, there are seven primary principles of a safe food supply chain that must be upheld by all businesses involved in the production or supply of food products:

Corporate Responsibility – This principle states that due diligence must be performed by every

operator within the supply chain to make sure that the resulting products are safe and of an acceptable quality standard.

Traceability – It is the responsibility of all businesses within the food sector to maintain detailed records of where their products and ingredients come from. Traceability means being able to trace back each and every ingredient to its point of origin, maintaining a full record of its journey from farm to fork.

Official Food Controls – These are the governmental bodies operating within a specific country that ensure all applicable food laws are followed and principles upheld, usually by way of regular audits, risk- oriented reviews, and the collection and analysis of product samples.

The Precautionary Principle – Precautionary measures can and should be taken by authorised bodies to minimise risk, which will then be reviewed on an ongoing basis and adjusted as necessary.

Independent Scientific Risk Assessment – These are the independent government bodies that conduct detailed scientific assessments of the risks posed by food products, with no political, economic or social bias that may otherwise affect the outcome.

Separation Of Risk Assessment And Risk Management – Distinctions are made between those responsible for risk management and those responsible for scientific risk assessment, due to the potential for major conflicts of interest.

Transparent Risk Communication – Where a potential food safety hazard is identified, the public must be notified immediately and in the clearest possible manner. Clear and concise information is essential for ensuring transparent communication and keeping the public safe.

Food Safety – Key Terminology

Getting to grips with the basics of food safety terminology is essential for anyone who works in a food production or preparation environment of any kind. Most of which are learned through on-the-job experience, in accordance with the specific role of the individual in question.
A few examples of the main terminology you will encounter include the following:

Food Safety - an overriding term which encompasses all aspects of safe preparation, storage, handling, cooking and selling of food to safeguard the end customer

Food-Safety Hazard - anything that could compromise food safety in any way

Contamination - applies when the safety or hygiene of a food product has been compromised by a physical object, an organism or a chemical of any kind

Cross-Contamination - cross-contamination occurs when bacteria spreads between foods via equipment, surfaces or direct contact

Critical Control Point (CCP) - a step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level

Food Poisoning - sickness caused by the presence of bacteria or toxins in food, leading to symptoms such as vomiting, diarrhoea and gastrointestinal pain

Food Born Illness - used in reference to any type of illness or sickness caused by the consumption of contaminated food or drink items

Food Safety Management System (FSMS) - refers to the collective actions and protocols enforced by a business to reduce risks and make its food products safe for the consumer

HACCP - the systematic identification, evaluation and mitigation of potential hazards to ensure consistent food safety

Hazard - a biological, chemical or physical agent or factor with the potential to cause an adverse health effect.

Hazard Analysis - refers to the structured process of identifying and analysing all potential hazards and their causes, in order to subsequently ensure they are addressed using the HACCP system

Pathogen - any disease producing agent, microorganism or germ

Perishable Foods - applies to any food or drink item with the potential to spoil, typically due to exposure to inappropriate conditions. This includes most fresh foods, chilled items and anything that needs to be stored in carefully controlled conditions to stay safe

Potentially Hazardous Food - refers to perishable foods with the potential to become hazardous due to the development of toxigenic or infectious microorganisms, if not stored in ideal conditions.

Safe Temperatures - applies to all potentially hazardous foods, indicating the temperature they must be stored below and the temperature they must be heated to for safe consumption

The Importance of Food Safety and the Consequences of Non-Compliance

The financial and ethical implications of ineffective food safety are often underestimated. Many businesses fail to consider the potentially catastrophic consequences of failing to comply with all essential food hygiene principles and safety standards. Where hazardous food products are allowed to pass through the supply chain and make their way into customers' homes, the human cost and monetary cost can be huge.

The Cost of Food Recalls for Business

For the business, any number of monetary costs are incurred when a food recall becomes necessary. Food recalls occur when a business takes the required action to remove potentially hazardous products from sale, while at the same time advising those who have already purchased them to dispose of or returned them. Even a single anomaly in the safety or quality standard of a food product can lead to an entire batch being recalled, constituting a major expense for the business.

It is estimated that the average food recall costs a business in excess of £7 million, simply for the logistical costs of conducting the recall and for the wasted products and packaging. The figure does not take into account the potential for legal action to be taken against a business, in the event that

any of its customers fall ill. In addition, research also suggests that one in five consumers will stop purchasing products from brands who have been forced to recall products in the past.

The Human Cost of Unsafe Food

It is currently estimated that foodborne illness or injury affects one in 10 people each year. Issues regarding food safety are one of the most common causes of around 200 preventable diseases, resulting in hundreds of thousands of hospitalisations and countless premature deaths.
Even more tragically, it is estimated that up to a quarter of those who die as a result of foodborne illness or injury are young children. The human cost of unsafe food therefore significantly outweighs the monetary costs associated with product recalls.

What is Food Hygiene?
Briefly summarised, food hygiene is the term used in reference to the activities and procedures implemented to ensure food is produced, handled, shipped, cooked and served in a safe and hygienic manner.
The primary principles of food hygiene are as follows:

- **Personal hygiene**. Applies to all aspects of personal health and hygiene involving those handling and preparing food, including handwashing, sanitising, wearing the appropriate clothing and not working while ill.
- **Preventing cross-contamination**. Includes standard protocols like the use of separate cutting boards, utensils and surfaces to prevent the spread of bacteria and other contaminants between food products and hardware.
- **Cleaning procedures**. Intensive, thorough and hygienic cleaning of all kitchen equipment, using appropriate products with the capacity to kill germs and bacteria.
- **Allergen control**. Strict control measures to ensure allergens do not spread between different food items, utensils, surfaces and so on, with a clear disclosure of all potential allergy risks for the customer.
- **Safe storage of food**. Safe and hygienic storage standards, using appropriate containers, clear labelling systems, careful temperature control and a ‘First In, First Out’ system to maintain freshness.

Cooking temperatures. All food items cooked should be heated to the appropriate temperature and held at this temperature level for the required amount of time, to ensure that they are safe for consumption.

Further Reading: