



IIT KHARAGPUR



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CERTIFICATION COURSES

# Dairy and Food Process and Products Technology

PROF. TRIDIB KUMAR GOSWAMI

AGRICULTURAL AND FOOD ENGINEERING DEPARTMENT

IIT KHARAGPUR

Lecture 11

High voltage **breaches** the **structure** of the **cell membrane** which is controlling many of the vegetative cells' **homeostatic** mechanism, including the maintenance of **cytoplasmic pH** value, the pH gradient across the membrane, and the **osmotic balance** of the cell. The **major disadvantage** is that the **treatment time requirement or number of pulses requirement** is **very high**. Synergism with other preservation factors may improve efficacy, e.g., nisin and other bacteriocins potentiates the lethal effects of electroporation.

## High voltage electric pulses:-

High voltage electric shocks (**electroporation**) are most effective for the inactivation of **vegetative** bacteria, yeasts, and molds, while bacterial **spores** are much more **tolerant**.

**High intensity light pulses:-** High intensity laser and non coherent light pulses - **microbicidal effect** - offer new practical approaches to the **decontamination approaches** to the food and packaging material surfaces – not self sufficient – **killing effects** may some times result from **partial heating**. Processes like physical removal of microorganisms from surfaces (**ablation**), and **ultraviolet irradiation** are required to form the basis of the technique and requires detailed research.

**High intensity magnetic fields:-**

**Oscillating magnetic fields** inactivate microorganisms on packaging materials.

Mechanism is believed to be – magnetic energy couples into dipolar molecules and may change membrane fluidity and interfere with ion fluxes across cell membranes. **Bacterial spores are not affected.** Efficacies of the treatments have not exceeded about 100 - fold reductions in the number of **vegetative bacteria** (e.g., *Streptococcus thermophilus* inoculated into milk, *Saccharomyces cerevisiae* in orange juice, mold spores in bread etc.) – **limited application.**

### **Microbiological safety:-**

If aim is to **inactivate microorganisms** in foods



there must be **some basis for judging** the efficacy required to deliver a sufficiently microbiologically safe product. Thermal processing is traditionally based on the particular inactivation kinetics – typically – for the **sterilization** of high water activity and low acid foods, the **12D** concept of the targeting spores of proteolytic strains of **Clostridium botulinum** has consistently proved to be very safe. For **pasteurization**, **6-D or 8-D** processes are often concluded to be suitable targets for the destruction of vegetative pathogens.

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Lecture 12 (Food Laws – why?)



# Food Laws

## Food laws and Regulations

### Objectives ?

To meet a country's **sanitary and phytosanitary** requirements, food must comply with the local laws and regulations to gain market access. **What are the factors on which it depends?**

In some countries food laws also govern **food quality** and **composition** standards.

**The requirement of food regulation may be based on several factors such as :**

✓ whether a country adopts international norms developed by the **Codex Alimentarius** Commission of the Food and Agriculture Organization (**FAO**) of the United Nations (**UN**) and the World Health Organization (**WHO**)

✓ A country may also have its own **suite of food regulations**.

## Why we need food safety standards?

The term 'safe food' represents different ideas to different audiences. Consumers, special interest groups, regulators, industry and academia will have their unique description based on their perspectives.

Food safety is an issue of growing importance due to several worldwide trends in food system.

The growing movement of people, live animals, and food products across borders, rapid urbanization in developing countries, changes in food handling, and the emergence of new pathogen or antibiotic resistance in pathogen all contribute to the increasing food safety risks. The liberalization trade and the growing number of imported foodstuffs too increase the food safety risks.

**Inadequate food safety** is a **significant contribute** to the burden of **disease** in different countries and should be **addressed** as the food **system develops** and along with related investments in public health. **Basic sanitation** and **water services** may be a **prerequisite** for addressing many food safety hazards.

**The industrialization of agricultural production**, and increase in the number of **food service establishment**, also **tourism**, urbanization with subsequent changes in **lifestyles**, food consumption pattern and food **preparation practices** will require high level of **food safety standards**.

# Food laws in INDIA

The Indian Parliament has recently passed the *Food Safety and Standards Act, 2006* that overrides all other food related laws.

Such as:

- Prevention of Food Adulteration Act, 1954
- Fruit Products Order, 1955
- Meat Food Products Order, 1973
- Vegetable Oil Products (Control) Order, 1947
- Edible Oils Packaging (Regulation) Order 1988
- Solvent Extracted Oil, De - Oiled Meal and Edible Flour (Control) Order, 1967

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Lecture 13

Milk and Milk Products Order, 1992 etc are repeated after commencement of **Food Safety and Standards (FSS) Act, 2006**.

Under the umbrella of Food Safety and Standards Act, 2006, the **Food Safety and Standards Authority of India (FSSAI)** has been established, which consolidates various acts & orders that have hitherto handled food related issues in various Ministries and Departments.

**PURPUS** of creating a regulatory body such as **FSSAI**

- ✓ to lay down science based standards for articles of food, and
- ✓ to regulate their manufacture, storage, distribution, sale and import to ensure availability of safe and wholesome food for human consumption.

## **FSSAI is entrusted with following functions to perform:**

- Framing of Regulations to lay down the Standards and guidelines in relation to articles of food and specifying appropriate system of enforcing various standards.
- Laying down mechanisms and guidelines for accreditation of certification bodies engaged in certification of food safety management system for food businesses.
- Laying down procedure and guidelines for accreditation of laboratories and notification of the accredited laboratories.

- To provide scientific advice and technical support to Central Government and State Governments in the matters of framing the policy and rules in areas which have a direct or indirect bearing of food safety and nutrition .
- To collect and collate data regarding food consumption, incidence and prevalence of biological risk, contaminants in food, residues of various, contaminants in food products, identification of emerging risks and introduction of rapid alert system.
- To provide training programmes for persons who are involved or intend to get involved in food businesses.

- To contribute to the development of international technical standards for food, sanitary and phyto-sanitary standards.
- To promote general awareness about food safety and food standards

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Lecture 14

**Bureau of Indian Standards (BIS)** - National Body of India for all Standards that resolves to be the leader in all matters concerning Standardization, Certification and Quality.

**What it does?** - Harmonious development of standardization, marking and quality certification.

- It provides new thrust to standardization and quality control.
- It evolves a national strategy for according recognition to standards and integrating them with growth and development of production and exports.

## Main Activities of BIS are :-

### Certification to

- Products
- Hallmarking of Gold Jewellery.
- Quality Management System
- Environmental Management Systems
- Occupational Health and Safety Management System
- Food Safety Management System
- Hazard Analysis and Critical Control Points (HACCP)
- Imported Products
- Laboratory Management
- International Activities
- Training Services

## **AGMARK is a Quality Certification Mark.**

The Directorate of Marketing and Inspection enforces the Agricultural Produce (Grading and Marketing) Act, 1937. Under this Act Grade standards are prescribed for agricultural and allied substances.

**What it does? :-**

- ✓ **It ensures quality and purity of a product.**
- ✓ **It acts as a Third Party Guarantee to Quality Certified.**

**Quality standards for agricultural commodities are framed based on commodities intrinsic quality.**

Food safety factors are being incorporated in the standards to compete in World Trade.

Standards are being **harmonized** with international standards keeping in view the requirements of World Trade Organization (**WTO**). **Certification of agricultural commodities is carried out for the benefit of producer / manufacturer as well as consumer.**

Products available under AGMARK are as follows:-

- **Pulses**
- **Whole and ground spices**
- **Vegetable oils**
- **Wheat Products**
- **Milk products**
- **Honey etc. etc.**

**Fruit Product Order (FPO), 1955** : - The FPO mark is a certification mark mandatory on all processed fruit **products** sold in India such as packaged fruit beverages, fruit-jams, crushes and squashes, pickles, dehydrated fruit **products**, and fruit extracts, following the **Food Safety and Standards (FSS) Act** of 2006.

**Objectives of FPO are:-**

❖ The main objective of FPO is to lay down quality standards to manufacture fruit and vegetable products maintaining sanitary and hygienic conditions in the premises.

It is **mandatory** for all manufacturers of fruit and vegetable products including some non fruit products like non fruit vinegar, syrup and aerated sweetened water to obtain a license under this Order.



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Lecture 15

In order to maintain hygienic production and quality standards FPO has laid down following minimum requirements :

- **Location and surroundings of the factory**
- **Sanitary and hygienic conditions of premises**
- **Personnel hygiene**
- **Portability of water**
- **Machinery & Equipment with installed capacity**
- **Quality control facility & Technical staff**
- **Product Standards**
- **Limits for preservatives & other additives**

## Food Products Order (FPO) - What are the food products?

- **Non fruit beverages, syrups and sherbets**
- **Vinegar, whether brewed or non-fruit**
- **Pickles**
- **Dehydrated fruits and vegetables**
- **Squashes, crushes cordials, barley water, barreled juice, and ready to serve beverages, fruit nectars or any other beverages containing fruit juices or fruit pulp**
- **Jams, jellies and marmalades**
- **Tomato products, ketchup and sauces**
- **Preserves, candied and crystallized fruit and peel**

- Chutneys
- **Canned and bottled fruits, juices and pulps**
- Canned and bottled vegetables
- **Frozen fruits and vegetables**
- Sweetened aerated water and without fruit juice or fruit pulp
- **Fruit cereal flakes**
- All unspecified fruit and vegetable products which are considered **microbiologically safe** and contains only permitted additives within permissible limits.

Each container in which any fruit product is packed shall specify a **code number** indicating the lot or the **date of manufacture** of such fruit product.

No person can carry on the business of a manufacturer except under and in accordance with the terms of an **effective license** granted to him under this Order (**FPO**) in **Form B** and shall not use the License number on labels of non-fruit products. **FPO** mark should be **printed** on the label with **license number**.

The labels shall not contain any **statement**, **claim**, design or device which is **false** or misleading in any particular concerning the fruit products contained in the package or concerning the **quantity** or the **nutritive value** or in relation to the place of origin of the said fruit products.



## Meat Food Products Order (MFPO), 1973 : -

### Objective:-

❑ To regulate production and sale of meat food products through licensing of manufacturers, enforce sanitary and hygienic conditions prescribed for production of wholesome meat food products, exercise strict quality control at all stages of production of meat food products, fish products including chilled poultry etc.

○ **Danger** - Meat & Meat Products are highly perishable in nature and can transmit diseases from animals to human-beings.

○ **Exclusion** - consumption on the spot like a restaurant, hotel, boarding house, snack bar, eating house or any other similar establishment.

## Milk and Milk Product order (MMPO) :-

**Objective :-** To maintain and increase the supply of liquid milk of desired quality in the interest of the general public and also for regulating the production, processing and distribution of milk and milk products.

**Who will come under this act?:-** Any person / dairy plant handling more than **10,000 liters** per day of milk or **500 MT** of milk solids (**MSNF**) per annum needs to be registered with the Registering Authority appointed by the Central Government.

The registration number shall either be exhibited **prominently** on the side label of any container or be embossed, **punched** or **printed** prominently thereon.

## Prevention of Food Adulteration (PFA) Act, 1954 :-

**Objective:-** To make provision for the prevention of **adulteration** of food. Broadly, the PFA Act covers **food standards**, general procedures for sampling, **analysis of food**, powers of **authorized officers**, nature of **penalties** and other parameters related to food.

**PURPUS:-** It deals with parameters relating to food **additives**, **preservatives**, **colouring** matters, packing and **labelling** of foods, prohibition and regulations of sales etc. The provisions of **PFA** Act and Rules are implemented by **State Government** and local bodies as provided in the rules.

**VERDICT (PFA) :** - What is meant by **Food Adulteration** and what is the **punishment** given to person / manufacturer involved in the **crime**?

**Adulterated How?:-** If food is **sub-standard**, **rotten**, **decomposed** or obtained from **diseased animal** or is **insect- infested** or is otherwise **unfit** for human consumption.

If food **contains** any other substance which **affects**, or if the article is so processed as to **affect**, **injuriously** the nature, substance or **quality** thereof.

if the article has been prepared, packed or kept under insanitary conditions whereby it has become contaminated or injurious to health

If any constituent of the article has been **wholly** or in part **abstracted** so as to **affect injuriously** the nature, substance or quality thereof.

If the article contains any **poisonous** or other ingredient which renders it **injurious** to **health**.

If any **colouring** matter other than that prescribed in respect thereof is present in the article, or if the **amounts** of the prescribed colouring matter which is present in the article are not within the prescribed limits of variability.

If the **quality** or **purity** of the article fall below the **prescribed standard**.

If **prohibited preservative** is used or permitted one used in **excess**.

# Thank You!!

