

FSAT 5108 3(2-1)

INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY

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Lecture # 4

FOOD SOURCES:

Human food is primarily of plant and animal origin. Fish is categorized as sea foods.

Plant: Plant based foods include fruits, vegetables, roots, tubers, cereals, legumes, nuts, oilseeds, spices etc.

Animals: There are numerous species of animals on earth but in Islam there are only few lawful animals (Halal animals). Halal animals are those that are split-hoofed, ruminant mammals. These include cow, buffalo, camel, sheep, goat and similar other animals.

Birds: Among birds are hen, duck, turkey, quail etc. among sea animals all kinds of fish is halal for Muslims.

Food supply in Pakistan:

Plants:

Cereals / grains: Wheat, rice, maize, barley, jowar, bajra etc.

Pulses / legumes: Beans, lentils, chickpea, black gram, ground nuts

Fruits: Mango, banana, orange, guava, apple, apricot, almonds, grapes, peach, pear, plum, dates etc.

Vegetables: Spinach, gourd, okra, turnips, potatoes, cauliflower, green peas etc.

Sugar: Sugar cane, sugar beet

Oils and fats: Mustard, soybean, cotton seed oils

Spices: Cumin, black pepper, cardamom

Animals:

Animal meat: Beef, mutton, game animals

Bird meat: Poultry, duck, turkey, game birds

Fats: Butter, ghee, tallow

Animal products: Milk, yoghurt, cheese, eggs

Insect product: Honey

Marine:

Fish: Sardines, salmon

Crustaceans: Lobsters, crabs, shrimps

Shellfish: Oyster, clams

Lecture # 5

FOOD AND NUTRITION IN PAKISTAN AND WORLD WIDE:

Daily requirement of calories and protein per an adult per day is 2,415 calories and 71.5 grams respectively. High mortality rate among mothers and infants is attributed to malnutrition, Iron and anaemia deficiency. To prevent malnutrition, micronutrient deficiency control programme has been employed by emphasizing on fortification of vitamin- A, iron and iodine.

Globally, the population is increasing drastically. This is giving rise to low availability of agricultural land and in-turn less food production. About 25% of world's food is lost after harvesting during handling, processing, storage and distribution. In Pakistan food losses ranges from about 20% in cereals and 40% in fruits and vegetables. In future food supply can be increased upto 10- 20% by reducing post-harvest loses.

DEVELOPMENT IN FOOD INDUSTRY

Food preservation in the ancient times

Man has gone through various stages of food preservation.

Old Stone Age: The primitive man lived in caves and gathered food by hunting animals. In this age techniques used to preserve food were drying, roasting and boiling.

New Stone Age: in this age man settled in villages and started land cultivations processing techniques like fermentation and extraction were learnt.

Bronze period: in this age mans settled in cities and learnt to bake bread from cereals, and brewed beer from cereals like barley, corn etc. butter and cheese making were discover. Man also learnt the techniques of filtration and flotation.

Iron Age: in this age the sea and the land trade flourished man used brine to preserve vegetables and sugary liquors for fruits. Practice of adulteration became common during this period.

Lecture # 6

Laying scientific foundations of food preservation

During the French wars in eighteenth century strong foundations of food processing industry were laid. The French forces were making gains on the war front but were losing grounds to an unseen enemy, hunger. French government announced twelve thousand Francs for the discovery of method of food preservation by which it could be transported to army over long distance without spoilage.

Nicolas appert emerged as the great winner. His work was the discovery of principles of sterilization by heat.

1. Place the food to be preserve in bottles.
2. Close the bottles with utmost care.
3. Subject these bottles to the boiling water for a certain length of time.
4. Remove the bottles from water at the end of given time

Appert's method of food preservation is now known as canning and appert is known as the "Father of Canning".

Developments in Processing Techniques

1. Cold storage and freezing technology:

These are the oldest techniques freezing of food was done in the mountains and near the Arctic Circle, fish and game was preserved in ice. Later ice salt mixture was used to freeze foods. Invention of mechanical refrigeration system in the late 19th century provided basis for commercial freezing.

2. Drying and dehydration: anciently, drying was carried out using sun and air energy. Development of dehydration equipment with vacuum enabled removal of moisture from delicate foods. Freeze drying involves sublimation of ice from frozen foods. Heat sensitive foods like instant tea, coffee, and fruit juices are preserved using freeze drying.

3. Flour milling: flour milling has passed through numerous stages from grinding between stones, pestle and mortar followed by roller mills. The old stone mills (chakki) driven by animal power or water or still visible in rural areas.

4. Dairy industry: process for producing evaporated milk was patented in 1835. It was improved by the use of vacuum for removal of moisture. Later condense milk sealed in cans was introduced. Invention of centrifugal cream separator, developments in refrigeration in pure culture techniques, lead to variety of batter quality dairy products.