



English language for agricultural majors

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Lecture 5

5 - food processing



Processing of foods is a segment of **manufacturing industry** that **transforms** animal, plant, and **marine materials** into **intermediate** or **finished value-added food products** that are **safer** to eat. This requires the application of **labor**, energy, **machinery**, and **scientific knowledge** to a step (**unit operation**) or a series of steps (**process**) in achieving the **desired transformation**.



Value-added ingredients or finished products that **satisfy consumer needs** and **convenience** are obtained from the **raw materials**.

The aims of food processing could be considered **four-fold**: (1) extending the period during which food remains **wholesome** (microbial and biochemical), (2) providing (supplementing) nutrients required for health, (3) providing variety and convenience in diet, and (4) adding value.



Food materials' **shelf life** extension is achieved by preserving the product against **biological, chemical,** and **physical hazards**. Bacteria, viruses, and **parasites** are the three major groups of biological hazards that may **pose a risk** in **processed foods**. Biological hazards that may be present in the raw food material include both **pathogenic microorganisms** with **public health implications** and **spoilage microorganisms** with **quality** and **esthetic implications**



Mycotoxin, **pesticide**, **fungicide**, and **allergens** are some examples of chemical hazards that may be present in food. Physical hazards may involve the presence of **extraneous material** (such as **stones**, **dirt**, metal, glass, **insect fragments**, hair). These hazards may **accidentally** or **deliberately** (in cases of **adulteration**) become part of the processed product.



Food processing operations ensure **targeted removal** of these hazards so that consumers enjoy **safe, nutritious, wholesome foods**. With the possibility of extending shelf life of foods and advances in **packaging technology**, food processing has been **catering** to **consumer convenience** by creating products, for example, **ready-to-eat breakfast foods** and **TV dinners, on-the-go beverages and snacks, pet foods**, etc.



Food processing, as an industry, has also responded to changes in **demographics** by bringing out **ethnic** and **specialty foods** and foods for **elderly people** and **babies**. **Nutrition fortification**, for example, **folic acid supplementation** in wheat **flour**, is another **function** of processing food.



The scope of food processing is broad; unit operations occurring after **harvest** of **raw materials** until they are processed into food products, **packaged**, and **shipped** for **retailing** could be considered part of food processing. Typical processing operations may include raw material **handling**, **ingredient formulation**, **heating** and **cooling**, **cooking**, **freezing**, **shaping**, and **packaging**.



These could broadly be categorized into **primary** and **secondary processing**. Primary processing is the processing of food that occurs after harvesting or **slaughter** to make food ready for **consumption** or use in other food products. Primary processing ensures that foods are easily **transported** and are ready to be **sold**, **eaten** or processed into other products (e.g. after the primary processing of **peeling** and **slicing**, an **apple** can be eaten fresh or **baked** into a **pie**).



Secondary processing turns the primary-processed food or ingredient into other food products. It ensures that foods can be used for a number of purposes, do not **spoil quickly**, are **healthy** and **wholesome** to eat, and are available all year (e.g. **seasonal foods**). In the previous example, baking of the pie is a secondary processing step, which **utilizes** ingredient from primary processing (sliced apple).



The food and **beverage manufacturing** industry is one of the largest manufacturing sectors in the US. In 2011, these **plants** accounted for 14.7% of the value of shipments from all US manufacturing plants. Meat processing is the largest single component of food and beverage manufacturing, with 24% of shipments in 2011. Other important components include **dairy** (13%), beverages (12%), grains and oilseeds (12%), **fruits** and **vegetables** (8%), and other food products (11%).



Meat processing is also the largest component (17%) of the **food sector's** total value added, followed by beverage manufacturing (16%). California has the largest number of food manufacturing plants, followed by New York and Texas. Demand for processed foods tend to be less **susceptible** to **fluctuating economic conditions** than other industries



EXERCISE A. *Diagram drawing*

Draw a diagram represents the food hazards

2 & 3 homework

EXERCISE B. *Answer the following questions.*

1. What are the aims of food preservation?
2. What are the four organisms mentioned in the text as biological hazards.

3&4 homework



EXERCISE C. *Circle the right answer.*

The largest shipped processed food component in the US in 2011 was:

- 1) Seed oils
- 2) Dairy
- 3) Meat
- 4) Fruits and vegetables

The biological hazards include:

- 1) Mycotoxins and fungicides
- 2) Virus and bacteria
- 3) Dairy and grains
- 4) Snacks and pet food

3, 4&5 homework