***Food Sciences***

***Lecture 6 COOKING***

The process of subjecting foods to the action of heat is termed (called) as cooking .

**OBJECTIVES OF COOKING**

**1-Improves the taste and food quality**

Cooking improves natural flavour and texture of food. For example roasting groundnuts, frying onions and cooking meat with rice with spices, and roasting coffee seeds improve the flavor. Too much of cooking lowers the flavor as flavoring compounds are volatile.

**2-Destruction of micro-organisms**

Micro-organisms are present everywhere and some are useful in making curd, cheese and bread. Some are harmful and cause infections or produce toxins, e.g., clostridium botulism and salmonella. Some moulds produce toxins. Aspergillus flavus produces aflatoxin in groundnuts, cereals and spices. This

aflatoxin is a health hazard. One of the most important methods of protection of food against harmful micro-organisms is by

the application of heat. Cooking food to the required temperature for a required length of time can destroy all harmful microorganisms in food e.g., pasteurised milk.

**3-Improves digestibility**

Cooking softens the connective tissues of meat and the coarse fibres of cereals, pulses and vegetables so that the digestive period is shortened and gastrointestinal tract is less subjected to irritation. Cooking improves the texture hence it becomes more chewable. Cooking also bursts the starch granules of pulses and cereals so that the starch digestion is more easier, rapid and complete. When dry heat is applied to starches they are converted to easily digestible dextrins. Cooking increases the access to enzymes and improves digestibility.

**4-Increases variety**

By cooking, same food can be made into different dishes. For example, rice can be made into plain, pulav, lemon rice, biryani, or combination with pulses and idli. Wheat can be made into chapatis, puri, paratha or halwa.

**5-Increases consumption of food**

Cooking improves the texture and makes the food chewable. Improvement in texture and flavour by cooking increases the consumption of food to meet our nutritional requirement.

**6-Increases availability of nutrients**

Raw egg contains avidin which binds biotin making biotin unavailable to the body. By cooking, avidin gets denatured and biotin is available to the body.

Trypsin inhibitors present in soyabean and duck egg get denatured on cooking and availability of protein is improved. Toxic substances from kesari dhal can also be removed by boiling it and throw in gaway the water. Cooking increases the quality protein by making some amino acids available to the body.

**7-Increases antioxidant value**

Cooked tomatoes are associated with greater health benefits, compared to uncooked, because the heating process makes lycopene more easily absorbed by the body. Lycopene – the pigment present in tomatoes – reduces the risk of some cancers.

**8-Concentrates nutrients**

This may be due to removal of moisture or using combination of foods or due to cooking procedures, e.g., sweets.

**9-Limitations of cooking**

• Thiamin, which is heat sensitive, may be lost during cooking. Water soluble nutrients are leached into the water during cooking. Vitamin A and C content may be reduced due to oxidation and heat.

• Quality of protein may be reduced due to destruction of certain amino acids during cooking e.g., bread crust has less quality of protein compared to the inside portion.

**PRELIMINARY PREPARATIONS**

Preliminary preparation is the term used to describe the tasks done before or ahead the final preparation of food . Preliminary treatment of food includes 1-cleaning,2- peeling, 3-cutting and grating,4- sieving,5-soaking, 6-coating, 7-blanching, 8- sprouting, 9-fermenting, 10- drying and 11-filtering.

**1-Cleaning:**

The term cleaning is applicable to vegetables, fruits and many other food products. Many food products may have portions to be discarded, for example, withered or discoloured leaves in green leafy vegetables.

***Advantages:***

• Washing food are removed Insecticides, sprays, chemicals and dirt.

• Washing cereals helps to remove husk, mud and any other unwanted matter.

• Washing in warm water helps to kill the worms e.g., worms in cauliflower.

• Washing flesh food products helps to remove blood, dirt and unwanted impurities.

• Cleaning process helps to remove gills from fish, hard shells from prawns and crab.

***Disadvantages:***

• Washing cereals like rice causes loss of B complex vitamins especially thiamine. This can however be reduced by quick and thorough washing.

• Water-soluble vitamins are lost when fruit and vegetables are cut and then washed.

**2-Peeling:**

this method involve the removal of non-edible or fibrous portion of fruits or vegetables e.g., peeling of banana and potato, beans.

***Advantages:***

• Non-edible or fibrous portion is removed.

• Dirt and chemicals which is retained after cleaning on the skin can be removed.

• Appeals better to the eye after peeling and stringing e.g., potatoes and beans.

***Disadvantages:***

• Some nutrients might be lost e.g., peeling and exposing fruits can bring loss of vitamin C.

• Some edible portion might be removed along with peel.

**3-Cutting:** This is dividing the food into smaller pieces, thus helping in easy cooking .

***Advantages:***

• The product is easily cooked.

• It is easily consumed.

• Spoiled portion of the food can be discarded.

• Appearance of the food can be improved, e.g., salads.

• Grating helps in proper blending of the product.

***Disadvantages:***

• Smaller the size, greater the surface area, greater the loss of nutrients .

**4-Sieving:** Sieving is done to remove coarse fibres and insects. dirt and unwanted impurities.

***Advantages:***

• Helps in removal of dirt, worms, fibre and stones from the whole grains.

• The shelf life of food products can be improved.

• Flour becomes fine.

• Helps in blending.

***Disadvantages:***

• Bran is lost, thereby some nutrients like fibre, protein and B vitamins may be lost.

**Soaking:** Soaking is done in water either plain or salted with sodium chloride or sodium bicarbonate.

***Advantages:***

• Hastens the process of cooking.

• It facilitates grinding e.g., in making idli or dosa.

• Texture of food softens.

• Peel can be easily removed from soaked products like whole grams.

• Make the extraction of tamarind easier.

• Reduces pungency in onions.

***Disadvantages:***

• Water-soluble nutrients may be leached into the water.

**6-Coating:**

The term coating refers to covering a food with a layer of crumbs, flour or other fine substances before cooking it. There are different ways of coating a food.

***Advantages:***

• Coating adds colour and flavour to the finished product.

• The coat of breading helps in transmission of heat to the food product.

• It brings less-fat absorption.

• Produces a crunchy texture.

• Helps the food to retain moisture.

• They help in binding the food substances.

***Disadvantages:***

• Battered or dredged food cannot be held long, otherwise the product becomes soggy.

• Breading may not stick to food.

• The breading may break during frying.

**7-Blanching:**

This is plunging food into boiling liquid and immersing in cold water. This destroys enzymes present in food hence used as preparation for preservation. Food products normally blanched are tomatoes, potatoes, almonds, carrots and beans.

***Advantages:***

• Peel can be removed easily.

• It is a preliminary method for canning and freezing.

• Micro-organisms present on the surface are partially removed.

• Enzymes bringing spoilage can be inactivated.

• Blanching causes better exposure of pigment, hence improves the colour of the food product.

***Disadvantages:***

• Part of water-soluble nutrients may be lost.

• Long-time blanching undesirably softens the food.

8-**Sprouting or Germination:**

sprouted foodacquires vastly improved digestibility and nutrition qualities when compared to non-sprouted food .cereals like wheat and all kind of pulses are generally sprouted .

***Advantages:***

• Digestibility can be increased as complex substances are converted to simple substances e.g., starch to amylose.

• Discomfort due to flatulence can be reduced.

• This decreases cooking time as grain becomes tender.

• Water-soluble vitamins are increased.

• Dehusking is easier.

• Thickening power of starch is reduced.

• Availability of proteins and aminoacids is increased.

**9-Fermentation:**

Fermentation is the process of breaking down of complex matter into simpler ones with aid of enzymes and bacteria. This can be under aerobic or anaerobic conditions. Fermented foods are often more nutritious than their unfermented counterparts.

***Advantages:***

• Texture and taste is improved.

• Quality of protein is improved as availability of some amino acids increase.

• B vitamins are synthesized by micro-organisms.

• Shelf life of food product can be prolonged e.g., milk is converted to curds.

• Fermented foods are easily digestible.

***Disadvantages:***

• Sometimes unwanted micro-organisms can develop and bring about spoilage of food.

• Acidity of the product is increased.

**10-Drying:**

Drying or dehydrating is removal of moisture from food products. Removal of moisture helps to prolong the shelf life of the food. Foodstuffs generally dried are mango and gongura for pickles. Cereals, pulses and spices that are normally used are dried products only.

***Advantages:***

• Shelf life can be prolonged.

• Dried food grinds easily.

• In vegetables like ladyfinger, removal of moisture helps in reducing stickiness.

**11-Filtering:**

This process is generally done to remove dirt, unwanted particles or to remove moisture from foodstuff. In the preparation of cottage cheese or paneer, whey water is extracted. Foodstuffs filtered are coffee, tea, rice, soups, fruit juices and tamarind water.

***Advantages:***

• Removal of dirt and unwanted particles.

• Better extraction of flavour compounds in making tea and coffee.

• Improves taste.

***Disadvantages:***

• Nutrients are lost e.g., in whey water, and rice kanji. This loss can be compensated by utilising the liquids for some other purposes rather than discarding them.