

**Africa institute for project management studies**

**Course Name:**

**Human Nutrition and Dietetics**.

**Assignment Number: Module 7**

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ASSIGNMENT 7

1. Explain why we need to know amount of water in a food as food processors.

* Water in food is usually defined as moisture content or water activity.
* Moisture content is one of the most commonly measured properties of food materials. In addition to influencing the pH of foods, water is also important for;

1. Legal and Labelling Requirements. There are legal limits to the maximum or minimum amount of water that must be present in certain types of food.
2. Economic. The cost of many foods depends on the amount of water they contain water is an inexpensive ingredient, and manufacturers often try to incorporate as much as possible in a food, without exceeding some maximum legal requirement.
3. Microbial Stability. The propensity of microorganisms to grow in foods depends on their water content. For this reason, many foods are dried below some critical moisture content.
4. Food Quality. The texture, taste, appearance and stability of foods depend on the amount of water they contain.
5. Food Processing Operations. Knowledge of the moisture content is often necessary to predict the behaviour of foods during processing, e.g. mixing, drying, flow through a pipe or packaging.
6. Discuss methods of food spoilage.

* Any change in food that causes it to lose its desired quality and eventually become inedible is known food spoilage.
* Enzymes native to plant and animal tissues or from microorganisms are responsible for changes in the texture, colour, smell and appearance of foods e.g. microbial enzymes cause hydrolytic reactions, rancidity and browning in foods, and plant enzymes may cause over ripening of fruits and vegetables rendering them unsuitable for consumption.
* Chemical reactions like oxidative rancidity, oxidative and reductive discoloration, non-enzymatic browning and destruction of nutrients contribute to the deterioration of foods if not stored in a proper environment.
* Physical changes are responsible for loss of texture, flavours and structural damage. The most serious forms of quality deterioration include those due to microorganisms, following the survival and/or growth of spoilage, infectious pathogenic bacteria or the growth of toxicogenic ones.

1. Describe the process of food preservation by lowering the freezing temperatures.
2. Differentiate between Pasteurization and Sterilization.

* Pasteurisation is the application of heat to a food product to destroy pathogenic microorganisms, inactivate spoilage-causing enzymes and reduce/destroy spoilage microorganisms. Pasteurization kills part but not all the microorganisms present and usually involves the application of temperatures below 100°C. The heating may be by means of steam, hot water, dry heat, or electric currents and the products are cooled promptly after the heat treatment.
* Pasteurization is used to:
* Eliminate a specific pathogen or pathogens associated with a product as with milk, bulk liquid egg, and ice cream mix.
* Eliminate a large proportion of potential spoilage organisms as in beers, fruit juices, pickles and sauces.
* Kill competing organisms allowing a desired fermentation by starter cultures as in cheese making.
* Extend further shelf life by using other preservative methods like aseptic packaging and cooling.
* Avoid the rigorous heat treatments that might harm the physico-chemical organoleptic and nutritional quality of the product.

**Whereas** sterilisation is total destruction of life in the food item. However, this cannot be achieved without destruction of the nutrients in the food, which makes the food of no value. As such, sterilisation cannot be used for food items but can only be applied as commercial sterilisation, which means the same as pasteurisation. Heat and chemicals can be used to achieve sterilisation.

1. List the qualities that a packaging material should fulfil discuss CAP and ROP.

* Packaging is a tool that protects and contains the goods with the aim of minimizing the environmental impact on the consumption.
* Packaging is also defined as the wrapping material around a consumer item that serves to contain, identify, describe, protect, display, promote and otherwise make the product marketable and keep it clean.
* The below are the qualities a good packaging material should have;

1. Non-toxic.
2. Sanitary protection.
3. Moisture and fat protection.
4. Gas and odour protection.
5. Light protection.
6. Resistance to impact.
7. Transparency.
8. Tamper proof.
9. Ease of opening.
10. Pouring features.
11. Ease of disposal.
12. Appearance and printability.
13. Low cost.

* Reduced oxygen packaging (ROP) provides an environment that contains little or no oxygen, offers unique advantages and opportunities for the food industry but also raises many microbiological concerns. Products packaged using ROP may be produced safely if proper controls are in effect.
* Reduced oxygen packaging (ROP) is defined as any packaging procedure that results in a reduced oxygen level in a sealed package.
* ROP can be used to prevent degradation or oxidative processes in food products. Reducing the oxygen in and around a food retards the amount of oxidative rancidity in fats and oils.
* ROP also prevents color deterioration in raw meats caused by oxygen. An additional effect of sealing food in ROP is the reduction of product shrinkage by preventing water loss. These benefits of ROP allow an extended shelf-life for foods in the distribution chain, providing additional time to reach new geographic markets or longer display at retail.
* In addition, Controlled Atmosphere Packaging (CAP) is an active system, which continuously maintains the desired atmosphere within a package throughout the shelf life of a product by the use of agents to bind or scavenge oxygen or a sachet containing compounds to emit a gas.
* Atmosphere Packaging (CAP) is defined as packaging of a product in a modified atmosphere followed by maintaining subsequent control of that atmosphere.

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