

## **Chapter II. Reading comprehension : Reading and analysis of texts relating to the subject.**

### **M1 Environmental Process Engineering Pollution and its negative effects**

Pollution is the degradation of natural environment by external substances introduced directly or indirectly. Human health, ecosystem quality and aquatic and terrestrial biodiversity may be affected and altered permanently by pollution.

Pollution occurs when ecosystems cannot get rid of substances introduced into the environment. The critical threshold of its ability to naturally eliminate substances is compromised and the balance of the ecosystem is broken.

The sources of pollution are numerous. The identification of these different pollutants and their effects on ecosystems is complex. They can come from natural disasters or the result of human activity, such as oil spills, chemical spills, nuclear accidents. These can have terrible consequences on people and the planet where they live : destruction of the biodiversity, increased mortality of the human and animal species, destruction of natural habitat, damage caused to the quality of soil, water and air.

Preventing pollution and protecting the environment necessitate the application of the principles of sustainable development. We have to consider to satisfy the needs of today without compromising the ability of future generations to meet their needs. This means that we should remedy existing pollution, but also anticipate and prevent future pollution sources in order to protect the environment and public health. Any environmental damage must be punishable by law, and polluters should pay compensation for the damage caused to the environment.

#### **Comprehension**

1. The damage caused by pollution might be irreversible :
  - a. True
  - b. False

True (a)

2. The ecosystem
  - a. Can always cope with pollutants
  - b. May not always be able to cope with pollution.

May not always be able to cope with pollution (b)

3. Pollution
  - a. Is always caused by humans.
  - b. May sometimes be caused by natural disasters.

May sometimes be caused by natural disasters (b)

4. An ideal solution to prevent pollution would be to
  - a. Refrain the development of some countries.
  - b. Continue developmental projects.
  - c. Take into consideration the future generations need to live in a healthy environment.

Take into consideration the future generations need to live in a healthy environment (c)

## **Terminology**

- ✓ Pollution: Pollution
- ✓ Health : Santé
- ✓ Ecosystem : Écosystème

Ecosystem : all the living and the non-living being. The entire planet

Living being : Found in an ecosystem, including various life forms, such as plants and animals.

Non-living being : Found in an ecosystem, including the various land-forms and the climate

- ✓ Terrestrial biodiversity : Biodiversité terrestre

Terrestrial biodiversity refers to animals, plants and micro-organisms that live on land, and also land habitats, such as forests, deserts and wetlands.

- ✓ Pollutant : Polluant

A pollutant is a chemical or biological substance which harms water, air, or land quality.

- ✓ Oil spills : Déversements du pétrole

Oil spills is the release of a liquid petroleum into the sea, especially due to human activity, or by accident.

- ✓ Chemical spills : Déversements des produits chimiques
- ✓ Nuclear accidents : Accidents nucléaires

Nuclear accidents with large radioactive releases lead to lethal risk to both individuals and to the environment. They are due to failures in reactors.

- ✓ Damage: Dommage
- ✓ Preventing : Prévenir
- ✓ Protecting : Protéger

Preventing generally comes before protecting. Prevention means avoiding something from happening, while protection comes if prevention is not successful, aiming to minimize further damage.

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### **M1 Pharmaceutical Engineering**

#### **Introduction to Drugs : Galenic Forms and Administration routes**

A pharmaceutical drug can be broadly defined as any chemical substance intended for use in the medical diagnosis, cure, treatment, or prevention of disease, also referred to as medicine, medicament or medication. Drugs are formulated into various dosage forms to facilitate ease of administration and ensure safety and efficacy. The dosage form and routes of administration are determined by many factors, including the age of the patient, the disease being treated, the area of the body that the drug needs to reach, the ease of administration, and the characteristics of the drug.

#### **1. Dosage Forms (Galenic Forms)**

A dosage form is a system or device by which the drug is delivered to the body. In a dosage form, the active ingredient is combined with the inert ingredients that can make up most of a medicine's volume and serve as carriers for the active ingredient (drug) to facilitate its administration. The inert ingredients include excipients (additives, binders, diluents and preservatives).

Many top-selling drugs are available in several different dosage forms for prophylactic or therapeutic use. They are formulated as: solid dosage forms (tablets, caplet, capsules, lozenges, powders and granules), semisolid dosage forms (ointments, creams, lotions, gels, pastes and suppositories), liquid dosage forms (transdermal dosage forms and inhalation dosage forms).

#### **2. Administration Routes**

Drugs can be administered by a wide variety of routes. These may be generally divided into enteral routes (oral, rectal), or parenteral routes (sublingual, injection, topical, pulmonary, transdermal route).

## Comprehension

What are the different drug forms ?

There are three drug forms : solid dosage forms ? semisolid dosage forms and liquid dosage forms

What are the routes of drug administration ?

There are enteral routes and parenteral routes

What is the most common form of drug administration ?

Oral administration of medication is a convenient, cost-effective, and most commonly used medication administration route. The primary site of drug absorption is usually the small intestine, and the bioavailability of the medication is influenced by the amount of drug absorbed across the intestinal epithelium.

## Terminology

- ✓ Drug : Médicaments
- ✓ Disease : Maladie
- ✓ Medicament : Médicament
- ✓ Medication : médicament
- ✓ Additives : Additifs

Additives are inert ingredients that may be needed for a successful preparation of the dosage form.

- ✓ Binders : Relieurs

Binders promote adhesion of active and inactive ingredients in the tablets.

- ✓ Diluents : Diluants

Diluents are additives used to increase the bulk weight or volume of a dosage form.

- ✓ Excipients : Excipients

Excipients are inactive substances used as a carrier for the active ingredient.

- ✓ Preservatives : Conservateurs

Preservatives are substances that prevent or minimize the growth of bacteria or other microorganisms in the dosage form, typically used in multi-dose vials.

- ✓ Tablets : Comprimés

Tablets are available in variety of sizes, shapes, colors, and thicknesses. They are formed in molds or produced by compression, and are composed of one or more active ingredients and one or more inert substances.

- ✓ Caplet is a tablet that is shaped like a capsule, but smooth-sided like a tablet. It is often easier to swallow than large tablets, and is more stable than capsules.

- ✓ Capsules : Capsules

Capsules are a solid dosage form in which the drug is enclosed within a hard or soft gelatin shell. The gelatin shell dissolves in the stomach, releasing the drug. The gelatin shell may be transparent, semitransparent, or opaque. A capsule may contain powders, granules, crushed tablets, or liquids with one or more active ingredients and one or more inert ingredients.

- ✓ Lozenges : Pastilles

Lozenges : Also known as Troches or Pastilles are hard, oval, or discoid solid dosage forms with a drug contained in a flavored sugar base. They are dissolved in the mouth and generally have local therapeutic effects. Antibiotics, analgesics, cough suppressants, and antiseptics are also available as lozenges. Troche sizes vary; they usually have a chalky consistency in order to dissolve in the mouth.

- ✓ Powders : Poudres

Powders are finely ground mixtures of dry drugs and inactive ingredients that can be used topically or internally. When used internally, they should be dissolved in water prior to ingestion.

- ✓ Granules : are larger than powders and are wetted, allowed to dry, and ground into coarse, irregularly shaped pieces.

- ✓ Semisolid Dosage Forms : Semisolid agents are usually intended for topical application. These dosage forms are too thick to be considered a liquid dosage form and not solid enough to be considered a solid dosage form.

- ✓ Ointments : Pommades

An ointment is an example of a W/O (Water/Oil) emulsion because it contains a small amount of water dispersed throughout oil. It is applied externally to the skin or mucous membranes and can also be formulated and sterilized for use in the eye.

- ✓ Creams : Crèmes

A cream is an example of an O/W emulsion because it contains a small amount of oil dispersed in water. Creams can be easily massaged into the skin, without leaving an oily residue. Creams can also be formulated for vaginal or rectal use.

- ✓ Lotions : A lotion is an O/W emulsion that is thinner than a cream because its base contains more water. Lotions penetrate into the skin and can cover large areas without leaving an oily residue.

- ✓ Gels : A gel contains solid medication particles, like a suspension, in a thick liquid. It can be used internally and externally. Gels penetrate the skin without leaving a residue.

- ✓ Pastes : Pâtes

Pastes : A paste contains more solid material and less liquid base than a solid. Pastes are like ointments, but are stiffer, less greasy, and applied more thickly.

- ✓ Suppositories : Suppositoires

A suppository is designed to be inserted rectally, vaginally, or urethrally. The suppository base is an inactive ingredient, which melts or dissolves in the body cavity, releasing the medication.

- ✓ Transdermal Dosage Forms : A transdermal patch dosage form is designed to hold a specific amount of medication to be released into the skin and absorbed into the bloodstream over time via a patch or disk.

- ✓ Inhalation Dosage Forms : Gases, vapors, aerosols, powders, sprays, solutions, and suspensions intended to be inhaled via the nose or mouth are known as inhalations

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### **M1 Food engineering Introduction to Food engineering**

Food engineering is a scientific, academic, and professional field that interprets and applies principles of engineering, science, and mathematics to food manufacturing and operations, including the processing, production, handling, storage, conservation, control, packaging and distribution of food products.

The following are some of the applications and practices used in food engineering to produce healthy, tasty, and sustainable food :

#### **✓ Refrigeration and freezing**

The main objective of food refrigeration and/or freezing is to preserve the quality and safety of food materials. Refrigeration and freezing contribute to the preservation of perishable foods, and to the conservation some food quality factors such as visual appearance, texture, taste, flavor and nutritional content. Freezing food slows the growth of bacteria that could potentially harm consumers.

#### **✓ Evaporation**

Evaporation is used to pre-concentrate, increase the solid content, change the color, and reduce the water content of food and liquid products.

#### **✓ Packaging**

Food packaging technologies are used to extend the shelf-life of products, to stabilize food (preserve taste, appearance, and quality), and to maintain the food clean, protected, and appealing to the consumer.

#### **✓ Energy for food processing**

To increase sustainability of food processing there is a need for energy efficiency and waste heat recovery.

✓ **Heat transfer in food processing**

Heat transfer is important in the processing of almost every commercialized food product and is important to preserve the hygienic, nutritional and sensory qualities of food. Heat transfer methods include induction, convection, and radiation. These methods are used to create variations in the physical properties of food when freezing, baking, or deep frying products, and also when applying ohmic heating or infrared radiation to food.

✓ **High pressure**

High-pressure food processing is also known as "cold pasteurisation". It extends the shelf life of food while preserving its essential nutritional and organoleptic properties.

✓ **Pulsed electric field**

The electric fields used are pulsed and of high amplitude. The amplitude of the field destroys the bacteria, while the short duration of the pulse means that the medium is not heated and the quality of the food is preserved.

**Comprehension**

✓ What means food manufacturing ?

Food manufacturing is the process of turning raw agricultural materials into food products that people can consume. It involves various steps such as, processing, packaging, and distributing food.

✓ What is the difference between refrigeration and freezing ?

The difference between the two processes goes beyond the difference in temperature. The stronger preserving action of freezing is due not only to the lower temperature but also and mainly to the depression of water activity as a result of conversion of part of the water to ice.

✓ What are the principles of heat transfer in food processing ?

The main mechanisms of heat transfer in food processing are conduction, convection, and radiation.

✓ Which of the following is called as cold pasteurization?

- a) Freeze drying
- b) Heating under low pressure
- c) Irradiation
- d) Heating at low temperature

Irradiation (c). The irradiation is also known as cold pasteurization as it destroys the foodborne disease caused by pathogenic microorganisms and parasites.

### **Terminology**

- ✓ Food engineering : Génie alimentaire
- ✓ Processing : Transformation
- ✓ Handling : manipulation
- ✓ Storage : Stockage
- ✓ Packaging : Emballage
- ✓ Healthy : Santé
- ✓ Tasty : Savoureux
- ✓ Sustainable food : Alimentation durable
- ✓ Freezing : Congélation
- ✓ Perishable foods : are those that spoil the most quickly and require refrigeration.
- ✓ Taste : Goût
- ✓ Flavor : Saveur
- ✓ Shelf-life : Durée de conservation
- ✓ Sensory : Sensorielle
- ✓ Baking : Cuisson au four
- ✓ Deep frying : Friture
- ✓ Cold pasteurisation : pasteurisation à froid

Cold pasteurization may refer to Pascalization, a method of preserving and sterilizing food, in which a product is processed under very high pressure and to Food irradiation, exposing foodstuffs to ionizing radiation to preserve food, reduce the risk of food borne illness, prevent the spread of pests, delay or eliminate sprouting or ripening, increase juice yield, or improve re-hydration