

NUTRITION LESSON NOTE

All organisms that are referred to as a living exhibits some unique features which include; the ability to move a part or whole of their body from one place to another, the ability to respire, the ability to respond to the changes in the environment or things around them, the ability to reproduce, the ability to feed themselves, the ability to remove metabolic waste product, and so on. The ability of living organism to feed themselves is termed Nutrition.

Therefore. Nutrition is the process by which living organism takes in food substances, digest, absorb the nutrients to generate energy used for the proper maintenance of health, growth and development. It involves five (5) stages which are;

Ingestion: This is the process of taking in food substance

Digestion: This is the process of breaking down complex food substances into smaller absorbable unit.

Absorption: This involves the uptakes of food nutrient in the body

Assimilation: This is the utilization of the absorbed nutrient by the body.

Egestion: This is the removal of absorbed and undigested food from the body system.

Ingestion → Digestion → Absorption → Assimilation → Egestion

TYPES/MODE OF NUTRITION.

Auto-trophic Nutrition: This is a type of nutrition whereby living organisms produce their own food themselves. It can be sub-divided into two types, which are;

a. **Photosynthesis:** This is a process whereby chlorophyll bearing organisms produce their food from inorganic substances such as carbon-dioxide (CO₂) and water vapour (H₂O) to generate organic substance (Glucose) in the presence of Sunlight.

It involves two phases which are the Light that occurs in the thylakoid of the chloroplast, and Dark Phases/Stages which occurs in the stroma region of the chloroplast. Examples of organisms that exhibit this mode of nutrition are plants and some algae e.g cyanobacteria (blue-green algae).

Chemical Formula: **sunlight**

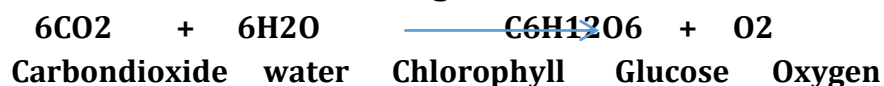




Fig.1 Photosynthesis occurs in the green pigment called the chlorophyll in the plant.

b. **Chemo-synthesis:** This involves the production of food from inorganic substances e.g Hydrogen Sulfide to generate organic substances(glucose). The process occurs in the absence of sunlight and chlorophyll pigment. However, they make use of chemical energy.

Chemical Formula: chemical energy



Hydrogen sulfide(initial energy sources), Carbon-dioxide (build sugar molecules), Oxygen(oxidation), Glucose(food produced), Water (by-product of reaction), and Sulfur(by-product often in the solid form).

Organism that feed through the autotrophic mode is termed Autotrophs or the Producers.

Heterotrophic Nutrition: This occur in organisms that depends on other organisms for survival. That is, organisms can not produce their own food themselves but depends on another organisms.

This type of nutrition can be subdivided into two which are Saprophytic and Holozoic Nutrition.

Holozoic Nutrition: This is the type of nutrition whereby organisms swallow their food in whole. Eg. Animals. Holozoic organisms can be categorizes as follows:

- a. **Herbivores:** These are organisms that feed on plants only. They are also referred to as the primary consumers. Examples are goat, sheep, cow, antelope, grasshopper,etc
- b. **Omnivores:**These are organisms that feed on both plant and animals. They are known as the tertiary consumers. Eg. Man.

- c. **Carnivores:** These are Organisms that feed on animals only. They are also known as the secondary consumers. As we have animals that feed through this process, there are also plants who used this method as well. Examples of plant that are carnivore in nature are the Pitcher Plant and the Venus-fly trap plant. They feed on insect. They can be also termed as an insectivorous plant.

All the organisms develop or possess an adaptive features for nutrition process which includes teeth

Saprophytic Nutrition: This is a type of nutrition that occurs in organisms that feed on decomposing or decaying substances or matters. They feed on the remains of dead plants and animals. These organisms are termed the **Saprobies**. Examples include the Fungi(e.g Mushroom) and Termites.

Parasitic Nutrition: This is the type of relationship between organisms where one organism called the Parasite feed on the host (Organisms that the parasite is feeding on). The host is harm along the process. The parasite maybe Ectoparasite, i.e parasite living outside the host e.g Ticks, Mosquito, Bedbugs, etc or Endoparasite, that is, parasite living inside the host, e.g Tapeworm, pinworm, whipworm, plasmodium spp., etc

DIETARY REQUIREMENT

This is the amount of nutrients which must be consumed on a regular intervals to maintain health in an otherwise healthy individual.

The essential dietary requirements are grouped into Seven (7). These include:

1. **CARBOHYDRATES:** This is an energy giving food. They help in the building of the tissue. During digestion it is broken down into simplest forms called the Sugars. The sugars can be further classified into;

Monosaccharide: These are carbohydrates with one unit of simple sugars. This group of sugar is the simplest form of carbohydrate after the breakdown during digestive process. They are general referred to as **Simple Sugars**. They have the general formula of C_xH_{20y} (x and y can be any variables or numbers). Examples are: glucose (in starch food like cassava, corn, etc), Fructose (sugar gotten from citrus fruits eg Orange, Mango, Pineapple, etc), and galactose eg. Cheese;

Dissaccharides: These are carbohydrate containing two unit of simple sugars. They are also called the reducing sugars. Examples include: Lactose (Sugar found in Milk), Maltose (Found in beverages such as Malt, Sucrose (Sugar found in sugarcane).

Polysaccharides: These are sugar containing more than two simple sugar. They are also called the Complex Sugars. Examples: Starch, Cellulose (Plants), Hemicellulose (Plants and some fungi), Chitin (Arthropods), etc.

Sources of carbohydrate are food rich in starch eg cassava, fufu, yam, amala, semo, eba, etc and fruits such as Orange, Watermelon, etc.



Amala



cocoyam

Deficiency in carbohydrate can lead to Cachexia (Severe weight loss), Anorexia (loss of appetite), hypoglycaemia (low blood sugar). While excess sugar can lead to Obesity, Diabetes mellitus, etc.

2. **PROTEINS:** These are body building food. They help in the production of hormones, enzymes, and repair tissues in the body system. During digestion they

are broken down into units called the Amino Acids. The lack of protein in the body can lead to kwashiorkor and too much consumption can lead to Proteinuria (excess protein in the urine), edema (swollen), etc.

Protein can be categorized into two (2) major groups, which are **Plant-protein** (protein gotten from the plants) e.g. Groundnut, beans, cowpea, cashewnut, etc; and

Animal-protein (protein gotten or derived from animal). e.g. Milk, Egg, Fish, Cheese, and Meat.

3. **FATS AND OILS:** These are body-insulators. They regulate body temperature, form the important component of the cell membrane (Phospholipids), and provide energy for the body system. It can be **Saturated** (Solids in standard room temperature) e.g. Butter, Vegetable oil, Palm oil, etc. or **Unsaturated**, (Liquid in standard room temperature). E.g. Olive oil, castor oil, etc.

During digestion, Fats and oils are broken down into simple units or forms known as Fatty Acid and Glycerol. These simple units aid in the production of hormones that are steroidal in nature e.g. progesterone, hydrocortisone, estrogen, aldosterone, and testosterone.

Deficiency of fats and oils can lead to scaly or dry skin, brittle hair, alopecia (hair loss), and fat-soluble vitamins deficiencies.

Sources of fats and oils include: shea butter, margarine, cheese, palm oil, castor oil, vegetable oil, avocado, etc.

4. **VITAMINS:** These are body nourishing that enhances the metabolic activities in the body systems. They support the immune system and every other systems in the body. Vitamins are mostly found in fruits e.g. oranges, pineapple, mango, etc and vegetables such as Jute, spinach, etc.

There are various types of vitamins in the food taken by living organism and their body system, which are; Vitamin **A,B,C,D,E,K**, and so on.

Vitamins can be grouped into two(2) major categories. These are:

a. Fat Soluble Vitamins: These are vitamins that can be dissolves,absorbed, and utilized by the body system in fat. eg.Vitamin A, D, E, and K(sometimes pronounce as AHDEEK).

Vitamin A: Also known referred to as **Retinol** promotes good eyesights. Sources include carrots, palmoil, avocado, etc. **Deficiency causes Night blindness.**

Vitamin D: Also know as **Calciferol**. These promotes the absorption of phosphorus and regulate calcium. It maintain stong bone and teeth, muscle function, nerve health, and immune system. Sources include: direct exposure to sunlight(early morning sunlight), salmon fish, egg yolks,milk, yogurt. Deficiency can leads to **osteoporosis**, weakened muscles, and impaired immune function.

Vitamin E: Also called the **Alpha-Tocopherol** acts as an antioxidant that protect cells from damage caused by free radicals, support immune system, maintain healthy skins, and eyes and prevents blood clots. Sources include: green and leafy vegetables, soyabeans oils,cashew nuts, avocado,sunflower,corn,etc. Deficiency can lead to premature breakdown of red blood cells, muscle weakness, difficult in walking, peripheral neuropathy.

Vitamin K: Also called the **Phylloquinone** (K1) and **Menaquinone** (K2) promotes **blood clotting**. Deficiency can leads to **Haemorrhages**. Sources include: meat, spinach, cheese, egg, etc. Excess can leads to **Jaundice**.

b. Water Soluble Protein: These are vitamin B and C, they can only be absorbed and utilized by the system when dissolved in water.

Vitamin B: These are several vitamin B. Hence, they are referred to as Vitamin B complex. Eg. thiamine, riboflavin, niacin, pyridoxine, folate/folic acid, cyanocobalamine, etc.

Vitamin help in the maintenance of the body systems. Deficiency in vitamins can causes several disorders such as beriberi (deficiency of thiamine{B1}), which symptoms include: appetite loss, fast heart rate, muscle weakness, etc; sore throat ,cracks in the corner of the mouth and lips, inflammation of the tongue, glossitis are symptoms of deficiency riboflavin(Vitamin B2); folate deficiency causes spina bifida in babies/infant; pernicious anemia(deficiency of Vit. B12),etc.

Vitamin C: Also known as Ascorbic acid maintains the fast healing of wounds and support the immune system. Sources include: orange, pineapple, peppers, broccoli spinach, potatoes, etc. Deficiency can leads to **scurvy** whereby the individual would be suffering from delayed wound healing and bleeding gum.

5. **MINERALS:** These are the nutrients that maintain body growth and development. They can be grouped as

Essential Macroelements: Mineral nutrients that are needed or required in large quantities or amounts in the body system. Eg. Calcium, phosphorus, sulfur, nitrogen, magnesium, etc. and Microelement: Minerals needed in small quantity. They are also referred to as Trace Element. Examples are cobalt, mercury, iron, zinc, etc.

Sources of minerals are table salt, vegetables eg. Spinach, legumes such as beans, cowpea, etc.

Deficiency of the minerals can lead to various overall health problems. Examples include:

- Anemia (shortage of blood caused by iron deficiency),
- Goitre (enlargement of the thyroid gland caused by iodine deficiency),
- Rickets and bone malfunction (deficiency of calcium),
- Muscle cramps and bone malfunction (lack of phosphorus),
- Hyponatremia (excess loss of sodium) through sweat, etc.

6. **WATER:** Water is a nutrient that is essential for the activities of the body system. It helps in the transportation of hormones, nutrients, and provides energy for the body as well. It is a medium where other activities can be taken place. It helps in the dissolving of nutrients, absorption, and aids digestion. It also prevents constipation. Deficiency of water can lead to dehydration, high concentration of urine, weakness, and other problems such as kidney stones. Sources of water include: rivers, streams, well, oceans, sea, rain, lake, tap water, etc

7. **ROUGHAGES:** They are also referred to as fibers. These are nutrients that promote the good health of the digestive system. They prevent conditions such as hemorrhoids, constipation. That is, its major function is to promote good bowel movement. Sources of food rich in roughages are oranges, beans, potato, maize, etc.

BALANCED DIETS

Balanced diet is a diet that contains all the right amount of nutrients required by the body in the right proportion. It consists of all the essential nutrients required by the body for proper functioning.

IMPORTANCE OF A BALANCED DIET/NUTRITION

1. It provides overall health and energy level
2. It reduces the risks of chronic diseases
3. It improves digestion
4. It strengthens the immune system
5. It increases longevity

6. It promotes better management of weight
7. It helps to detoxify the body system
8. It main bodily function such as regulation of metabolism, fluid-balance, and tissues repairs.
9. It aids the transportation of nutrients
10. It promotes hormones and enzymes production