Respiration

Respiration is defined as oxidation of organic substances and the released of carbon dioxide and energy.

One of the most important substances that enter the Respiration process are carbohydrates and fats.

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{Energy}$$

organic acid that collected in plant tissues may eventually oxidize to carbon dioxide and water.

$$C_4H_6O_5 + 3O_2 \longrightarrow 4CO_2 + 3H_2O + \text{Energy}$$

And in special circumstances protein may be used as a respiratory agent and dioxide completely or partially to intermediate products.

All living organisms breathe continuously to provide the energy needed to build and sustain their body. Respiration is divided into two parts:

1. **Aerobic Respiration:** Respiration occurs with oxygen and involves many steps of the biochemical can be summarized in the following equation.

   $$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{Energy}$$

   If the substance of the reaction is carbohydrates.

   $$C_{18}H_{34}O_2 + 25.5\ O_2 \longrightarrow 18CO_2 + 17H_2O + \text{Energy}$$

   If the substance of the reaction is fats.

   Protein may also be used as a respiratory agent, oxidized to carbon dioxide and ammonia.

2. **Anerobic Respiration:** Respiration occurs without oxygen., there are many green plants that can oxidize organic matter with no oxygen. And if they occur in low organisms or yeasts for exampleit is called **Fermentation**, alcoholic fermentation involves the production of ethyl alcohol and carbon dioxide and a small amount of glucose energy as in the equation.

   $$C_6H_{12}O_6 \xrightarrow{\text{no oxygen}} 2CH_5OH + 2CO_2 + \text{Energy}$$

Lactic fermentation involves the production of lactic acid from lactose as in the equation.

$$\text{Lactose} \xrightarrow{\text{no oxygen}} \text{Lactic acid} + CO_2 + \text{Energy}$$

The first phase of Aerobic and anerobic Respiration is the same as in which the glucose molecules are oxidized to two molecules of pyruvic acid whose composition is associated with editing two molecules of ATP and two molecules of enzymatic reducer facilities $NADH_2$ as in the equation.

$$C_6H_{12}O_6 + 2ADP + 2Pi + 2NAD \longrightarrow 2CH_3COCOOH + 2ATP + 2NADH_2$$

The experiment: Effect of respiration on the dry weight of plant tissue

Used materials: seeds of *Triticum aestivum* or *Hordeum vulgare* ,
Sensitive balance, pots, soil or sawdust.

The method of work:

1. Take 5g of *Triticum aestivum* or *Hordeum vulgare* seedsm pot the seeds in an oven at 70˚C for 2 days and then re-weight the seeds.
2. Record fresh weight and dry weight of seeds.
3. At the same time take weight of two additional groups of seeds *Triticum aestivum* or *Hordeum vulgare* each group containing 10 seeds.
4. Suppose dry weight of these two groups is the real dry weight that estimated for the first group.
5. Plant the two groups in the pots and keep the first groupin dark and the second group under the light.
6. Keep watering the pots whenever it is required.
7. When the length of plants leaves are kept in the dark approximately 2 cm.
8. Lift plants from soil carefully and be careful not to cut the roots.
9. Do the same for plants exposed to light.
10. Wash the roots well with water and dry them, then put each group separately, then estimated the fresh weight for the nearest demical number.
11. Cut plants in each group to small pieces and put them in an oven at 100˚c for two days to estimate dry weight.
12. Arrange results in a table and explain the following:
    A. What is the ratio between the total of plants grown and total seeds weight.
    B. What is the ratio between the dry weight and dry seeds weight.
    C. Do the same comparison in (B) for plants that have grown in dark.
    D. What happens if you leave the plants growing in dark for a long time and why? discuss it.