Discovery of Photosynthesis

Photosynthesis is the process by which plants and some other living organisms derive energy from light sources—usually the sun. Although this important process has existed since the beginning of time, everyone was totally oblivious of its existence, and it wasn't discovered until the 1800s. There isn't merely one scientist who made this discovery, as several different scientists over a period of more than 200 years contributed to the discovery of this important natural phenomenon.

There must be something in the water

Photosynthesis was partially discovered in the 1600's by Jan Baptista van Helmont, a Belgian chemist, physiologist and physician. Helmont performed a 5-year experiment involving a willow tree which he planted in a pot with soil and placed in a controlled environment. The willow tree was carefully and precisely watered over the 5-year period. At the end of his experiment Helmont concluded that the growth of the tree was the result of the nutrients it had received from the water and not the soil. Helmont's conclusion was inaccurate but his experiment proved that water contributes to the growth of plants.

There's also something in the air

Joseph Priestley is another scientist who contributed to the discovery of photosynthesis. He was born in 1733 and later became a chemist, minister, natural philosopher, educator and political theorist. His experiments included placing a lit candle inside a closed jar. The flame quickly went out and Priestley concluded that the air inside the jar had been "injured". He conducted similar experiments with mice and concluded that the mice had also "injured" the air.

Priestley later discovered that plants could be used to restore air that was "injured" by the candle and the mice. In 1774, the results of Priestley's experiments were published in "Experiments and Observations of Different Kinds of Air, Volume I." Although Priestley did not know it at the time, his experiments proved that air contains oxygen.

Plants, oxygen and light

Jan Ingenhousz is yet another scientist who contributed to the discovery of photosynthesis. He was a Dutch chemist, biologist and physiologist who performed important experiments in the late 1770s that proved that plants produce oxygen. Ingenhousz placed submerged plants in sunlight and then in the shade. He noticed that small bubbles were produced by the plants when they were in the sunlight. When they were transferred to the shade bubbles were no longer produced by these plants. Ingenhousz later concluded that plants use light to produce oxygen.

Plants need carbon dioxide

In 1796, Jean Senebier, a Swiss botanist, pastor and naturalist demonstrated that plants absorb carbon dioxide and release oxygen with the help of sunlight. In the early 1800s Nicolas-Théodore de Saussure demonstrated that while plants need carbon dioxide, the increased mass of growing plants is not the result of carbon dioxide alone but also the uptake of water.

Plants transform energy

In the 1840s Julius Robert Mayer, a German physician and physicist, stated that energy can be neither created nor destroyed. This is known as the first law of thermodynamics. He proposed that plants convert light energy into chemical energy.

The general equation

From 1862-64 Julius Sachs investigated how starch is produced under the influence of light and in relation to chlorophyll.

In the 1930s Cornelis Van Niel proposed the general equation for photosynthesis:

$CO_2 + 2H_2A + \text{Light energy} \rightarrow [CH_2O] + 2A + H_2O$

This eventually led to the simplified general equation that is commonly used today:

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