



PHOTOSYNTHESIS AND SUGAR

Plant leaves are the most important chemical factories in the world. Without their basic product, sugar, there would be little food for humans or animals, no wood or wood products, no humus for the soil, and no coal for fuel.

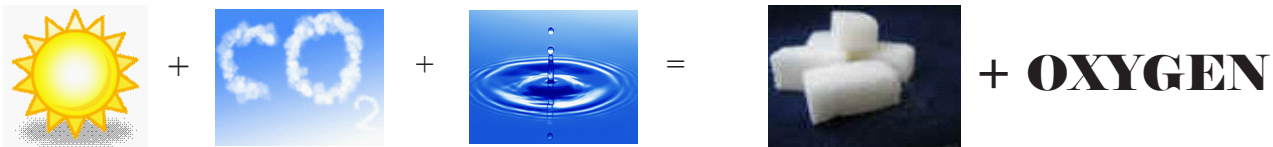
Inside of each leaf, there are millions of green colored microscopic particles called chloroplast manufacturing sugar. They trap radiant energy from the sunlight for power. Their raw materials are carbon dioxide from the air and water from the soil. Oxygen, a by-product, is released. This fundamental energy storing, sugar making process is called photosynthesis.



PHOTO = light

SYNTHESIS = put together

The chemical formula for photosynthesis is:



Sunlight + Carbon Dioxide + Water = Sugar + Oxygen

Energy + 6CO₂ + 6H₂O = C₆H₁₂O₆ + 6O₂

Sugar is the first product of a leaf's activity and is the primary source of a tree's continuing energy.

Every living cell goes to work on the sugar. Enzymes break down sugar and recombine it with the nitrogen and minerals to form other substances such as starches, fats, oils, and protein which help to form the fruits, nuts, and seeds. Sugar is also converted to cellulose, wood, and bark. It is used directly for energy in the growing in the growing parts of the tree which are its buds, cambium, and root tips.

Sugar or its recombined products are formed and stored in the tree during the growing season of May through September. Larger trees with larger crowns, containing more leaves, would produce and store more sugar. When a tree needs to grow leaves, sugar is a vital part of the process. This is called respiration. Sugar is acted upon by oxygen producing carbon dioxide, water, and energy. The chemical formula for respiration is the opposite of photosynthesis.

Sugar plays a role in fall leaf color. In the fall when the cool weather causes a slowing down of the photosynthesis, the work of the leaves comes to an end. The green chlorophyll in the leaf is broken up into the various substances of which it is composed, and whatever food there is on hand is sent to the body of the tree to be stored for use in the spring. All that remains in the cell cavities of the leaf is a watery substance in which a few oil globules and crystals, and a small number of colored, strongly refractive bodies can be seen. These give the leaves the yellow, orange and red coloring so familiar in the autumnal foliage.

