



## BOTANY 101 – HOW PLANTS GET THEIR FOOD

The journey in to the wonderful world of Botany begins with a thorough understanding of “Photosynthesis” – the way in which plants make their own food – *yes that’s right*, “fertilizers” and “plant food or nutrient products” are not foods for the plant at all, plants make their own.

Fertilizer and plant food or nutrient products would be more correctly termed “Nutrients” or in other words the necessary “Vitamins” and “Other Elemental or Compound Substances” that assist the plant with other aspects of their cellular function, health and growth. These nutrients are however, necessary for plants to make their own food.

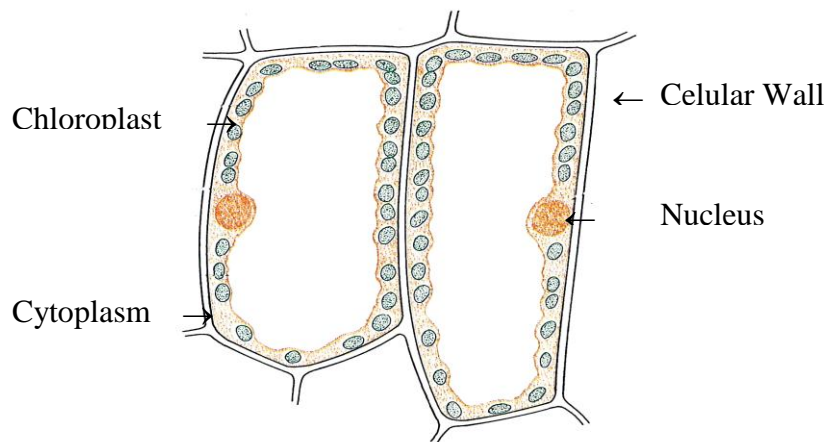
### Photosynthesis

Green plants take in carbon dioxide (CO<sub>2</sub>) from the air. They take up water (H<sub>2</sub>O) from the soil and then combine the CO<sub>2</sub> with the H<sub>2</sub>O to make the food; glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



Therefore - 6 molecules of carbon dioxide combine with 6 molecules of water to make one molecule of glucose and 6 molecules of oxygen (given off to the atmosphere).

It takes energy to make CO<sub>2</sub> combine with water. This energy comes from sunlight and the energy is absorbed and used by a substance called chlorophyll. Chlorophyll is a green coloured chemical and it is present in the leaves of green plants. The chlorophyll in the cells is packaged into tiny structures called chloroplasts.



**Figure 1 - Palisade Cell**

All of the reactions to combine CO<sub>2</sub> and H<sub>2</sub>O take place in the chloroplast within the palisade cells that reside just under the epidermis (outer skin) of the leaves.



## BOTANY 101 – HOW PLANTS GET THEIR FOOD

### Carbohydrates

Glucose is one example of a carbohydrate. Other examples are starch, sucrose and cellulose (in cell walls). Carbohydrate molecules contain the elements carbon, hydrogen and oxygen and living organisms can easily change one carbohydrate into another

The glucose made by the chloroplast is either:

- (a) used to provide energy for the chemical processes in the cell (by respiration);
- (b) turned into sucrose and transported to other parts of the plant for other functions;
- (c) turned into starch and stored in the cell as starch grains for later use. In the absence of light starches are transformed back into glucose and transported out of the cell.

### Other Food

Glucose and starch are carbohydrates. Carbohydrates can be oxidised during respiration to produce energy. Plants need more than carbohydrates; they need proteins for making new cytoplasm and cells for growth. To make proteins plants combine glucose with compounds of nitrogen, specifically nitrate nitrogen.

### Mineral Ions

Nitrates are not the only ions that plants need to take in from the soil; they need phosphate, sulphate, iron, potassium, and magnesium ions. This is the reason why agriculturists and gardeners add fertiliser to the soil usually containing nitrates, phosphates and potassium (NPK), as well as other compounds.

### In Summation

Plants combine carbon dioxide from the air, and water from the soil to make glucose.

The energy needed for this process comes from sunlight, whereas the sunlight is absorbed by chlorophyll contained in the chloroplasts of the palisade cells just under the epidermis of the leaf.

The glucose can be used for energy or to make other substances where it is combined with other chemical elements such as nitrogen, phosphorus and potassium. These chemical elements are present as ions in the soil and are taken up by the roots, the majority of which are provided to the plant by means of supplemental nutrient additives such as ERUPT's™ nutrient products:

- 1) ERUPT™ ProGro Start™ (*nurtures throughout the "Vegetation Cycle"*)
- 2) ERUPT™ Budimus Maximus™ (*nurtures throughout the "Flowering Cycle" to Harvest*)

Combine these ERUPT™ nutrients with our Heirloom HY-Max™ Enhancers and it is easy to grow with yields, potency & flavour approaching that of a commercial grower.