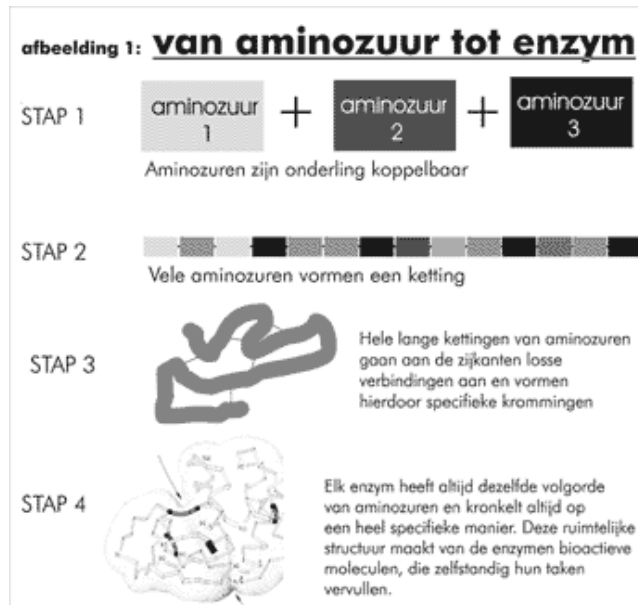


Luxury molecules for photosynthesis

Two years ago I began to write these botanical articles, the first issue was 'vitamins and amino acids for plants'. In this article I want to shine a light on vitamins and amino acids again, but this time especially aimed at photosynthesis. I want to try to repeat myself as less as possible and I recommend first to read the articles vitamins for plants and amino acids, materials of life.



A few things I will have to repeat, to make it comprehensible. For human beings vitamins mean: matters that can not be made by ourselves but are necessary to stay healthy. A human being has to eat these vitamins, to absorb enough. All plants (there are a few exceptions) can make all biological matters itself. During the evolution animals and especially human beings made themselves dependent on the production of plants. Because there were always enough plants, it was not necessary any more to make some matters themselves. Human kind and its closest relatives, apes, are degenerated a lot during evolution because they can not produce for instance vitamin C, what most other mammals can produce.

For plants our vitamins are no vitamins at all, because they can build everything itself and need only water, air and nutrition salts.

Amino acids

There are twenty amino acids that make the whole building up of all living creatures. Again evolution made human beings lazy and we cannot produce some of the amino acids ourselves. These ones are called 'essential' and must be absorbed with food. If there is a lack of one, diseases will develop. The other way around the building up of muscles can be reached by concentrated supply of amino acids together with enough exercise. The bodybuilders are good examples. In fact amino acids do the same in plants but the difference is that the plant-cells make all amino acids itself.

The most remarkable task of amino acids is being material for all protein. Just like a Lego set with twenty different stones. For photosynthesis some things are very important. Photosynthesis is a continuously passing on of light-energy via a big amount of different energy transferring molecules, until the energy is long lasting stored in sugar. These energy transferring molecules are mainly enzymes and often combined with micro elements (Highlife October 2000). Enzymes are big proteins with a lot of amino acid materials. A big part of the enzymes are used in photosynthesis and to constantly produce these (especially when a plant enlarges its mass in its growing-phase) there is always much amino acids needed. Amino acids partly exist of nitrogen and that is why plants need a lot of this in the growing phase because they produce more material (new plant parts). In the blooming phase especially the cells are supported and the enzymes are only renewed, this is the reason why a plant needs less nitrogen in the blooming phase.

The amino acids and vitamins have a few other functions for photosynthesis. So the green leaf (chlorophyll) is build up of the simplest amino acid with the help of vitamin B6 as a catalyst. Four of these amino acid materials make a ring and close a magnesium molecule in the middle. Again a lot of growth, many new plant parts with a lot of green leaf, so a lot of nitrogen (for the amino acid) and enough magnesium for the building of chlorophyll is needed.

Important functions of the vitamins are: the creation of transport molecules that give the enzymes enough energy ('tankers' with hydrogen as fuel). These transport matters are made of the vitamins B3

and B2. Vitamin B6 is an element of the most important catalyst for the building of sugar and this is the highlight of photosynthesis, to turn light-energy into sugar to grow and bloom fully with the energy of the sugar.

How can we improve the photosynthesis from the outside?

It is possible, by knowledge of all facts that influence a plant (like light, air, movement of air, water, temperature, etc.), to let the photosynthesis work out as optimal as possible. Very important is the right amount of nutrition, adjusted to the cycle of the plant (grow, bloom, top of the blooming). If all facts are right and the transport inside the plant is also good, photosynthesis is going okay. But a plant is not ashamed to absorb instant vitamins and amino acids. These are produced in soil around the roots by bacteria's and fungi. It is very common for plants to have a bit of vitamins or amino acids. On rock wool or coco or other substrates on the contrary, the root does not find the rich environment of the soil and has to get some extra attention.

Amino acids, vitamins and other 'luxury molecules' are made continuously in every plant-cell. Every cell works for itself, but looks at the needs of the neighbour. This happens in a very easy way. A plant is pure and subtle, but very effective to the principle of concentration. If there is a lot of one matter in a cell, nothing or very less is made. If there is less of the matter available, then it is fully produced to bring it on the right level. Every cell works for itself but all cells are allied by tunnels and that is why the different concentrations between two cells is compensated. By adding from the outside we can move the concentration proportions and help the plant to make no more ready-made molecules. So an addition of different plant supplies is a luxury for plants but certainly not unnecessary. By adding these luxury molecules the plant saves energy and time that is needed for the photosynthesis of these matters and can invest its energy for instance in stronger buds.