

## FERTILIZERS OR ADDITIVES? First part

By William Texier - GHE

By speaking to our clients or visiting shops, I have come to realise the difficulties faced by cultivators in differentiating between a fertilizer and an additive.

However, this difference is both fundamental and simple: A plant requires variable quantities of mineral salts to nourish itself. Any product that provides mineral salts, whether it is the primary or secondary source, or a micro-element, is a fertilizer. This fertilizer is necessary to sustain the plant and, in hydroponics, is the sole source of nutrition. If it is a complete fertilizer, not only is it necessary, but also sufficient, because it provides the plant everything it needs for its metabolism. Both in theory and practice, you can have very healthy plants and a rich harvest using a complete fertilizer on its own.



*Cymbidium in full bloom, cultivated in an AquaFarm with Flora Series, Diamond Nectar (fulvic acid and humic acids) and Mineral Magic (silicate in powder form)*

So why use additives? There are products that have a function other than nourishing the plant. They promote and accelerate growth whilst improving its general health and resistance to insects and pathogenic diseases. Generally, they either function by providing the plant with ready-made molecules, thus saving energy which can otherwise be used elsewhere, or they give signals to the plant, increasing its metabolism.

There are several kinds of additives and they often have multiple actions. This article, presented in two sections, looks at the more common ones on the market today.

### Silicate:

In order for an element to be considered indispensable to a plant, there has to be evidence of a deficiency in the plant caused by the absence of the element. With modern hydroponics, it became possible to create deficiencies in a plant's nutrition by isolating one element or another. This is how a list of mineral salts essential to the plant's life was established. This test was never carried out on silica, essentially because it is such an abundant element in soil that it is difficult to create an environment without it. However, there are strong indications that silica is an essential element.

In any case, it has a number of functions in plants:

In solution, it is absorbed by the plant in the form of silicic acid. It penetrates into the cells and strengthens their structure. This means they are more resistant to attacks by insects, which find it difficult to pierce into the cell walls. They tend to go for plants that are easier to attack.

But silica has other advantages: In the nutritive solution it helps to stabilize the pH. It also protects the roots of pathogenic fungi such as pythium and fusarium by killing their spores on contact.

Silica is found on the market either in liquid or powder form. In the first instance, it comes in the form of potassium silicate, an effective way of providing silica; however, it is limited by the poor solubility of potassium silicate in the levels of pH used in nutritive solutions. In the second instance, it comes in silica clay, which is very rich in silicate and contains a number of useful elements in traces.

This clay can be used externally, in powder, on foliage applications or around the root, to prevent a fungal attack. It can also be used internally, in the nutritive solution, to be absorbed by the plant.

Adding silica does not give a spectacular result because it is, after all, a preventive substance. However, an informed cultivator is quick to realise that his plants are healthier than usual, that it has been a long time since they were attacked by insects, and that the pH is more stable.

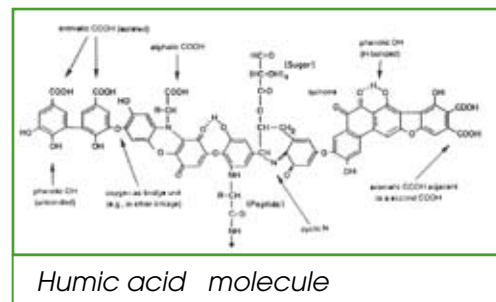
### Humates

These are a large family of molecules that have similar characteristics. They are defined by the way in which they are extracted rather than by a chemical structure. Humates are the result of the decomposition of organic matter. They are, of course, found in



*Trichocereus peruvianus: a little Mineral Magic (silicate in powder form) to promote quicker healing, and avoid disease and decay.*

the ground. They only represent a small portion of the matter that was decomposed; the remainder consists of other minerals that the plant uses for nourishment. The family is divided into three fractions according to their molecular weight: humic acid, with the highest molecular weight, ulmic acid, and fulvic acid, a molecule which has a much shorter chain, but numerous active sites. The chemistry of humates is complex. More than a million different molecules are listed in this category. Nevertheless, they have common points with respect to both their composition and structure.



In fact, humates make up the active element of the soil. When you add them, whether into soil or into a nutritive solution, you increase the plant's activity. In view of the aforementioned, it is easy to comprehend that all the humic or fulvic acid-based products on the market are not the same. This means that the concentration of the active matter is of no help to us, because the activity does not depend on the concentration, but on the source of the product! They are often extracted from a rock called leonardite, but not all leonardite deposits are the same. You have to do numerous tests on the cultures to determine the most effective product.

Their action is incredibly diversified:

First in soil: they increase the water retention capacity, improve ventilation, enhance texture, prevent from drying out in case of drought, make the soil lighter, and help prevent soil erosion.

On a chemical level, they keep the elements insoluble in the root area; they encourage the conversion of some of these elements into an easily assimilated form by the plants, then "release" them so that the plant can absorb them. They have a strong ionic exchange capacity - both anions and cations - which acts as a buffer in soil as well as in the nutritive solution. They increase the quantity of nitrate in the soil. Finally, they are rich in organic matters and mineral substances indispensable to the plant's growth.



*Thumbergia grandiflora: cultivated in a Dutch Pot with Flora Series and Diamond Nectar.*

On a biological level, they stimulate the metabolism, accelerating cell division and activating growth in the root area. They increase the germination rate of seeds, facilitate the assimilation of nutrients, boost microbial life in soil, aid photosynthesis, increase root respiration and stimulate enzymatic activity. This impressive range of actions boosts the popularity of humates among gardeners and horticulturists.

Humates are used for watering soil or are dissolved in the nutritive solution, but they are just as effective for foliar spraying.

Subject to finding a good quality product, humates and particularly

fulvic acid, the most active, are still my favourite for improving the health of plants and the quantity and quality of the harvest. No other product offers a range of actions as wide and diversified. Moreover, it is a natural product, one of the essential elements of soil, and can be used in organic cultivation too.



*Roots in AeroFlo, cultivated with FloraNova and Diamond Nectar*

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