1. COMPOSITION (%P/P)

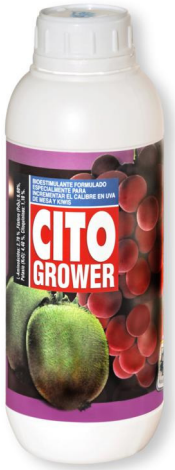
Free amino acids	2,5%
Phosphorous (P_2O_5) water soluble	6,0%
Potassium (K_2O) water soluble	5,0%

Biostimulant compounds

Compounds with hormonal activity	2,0%

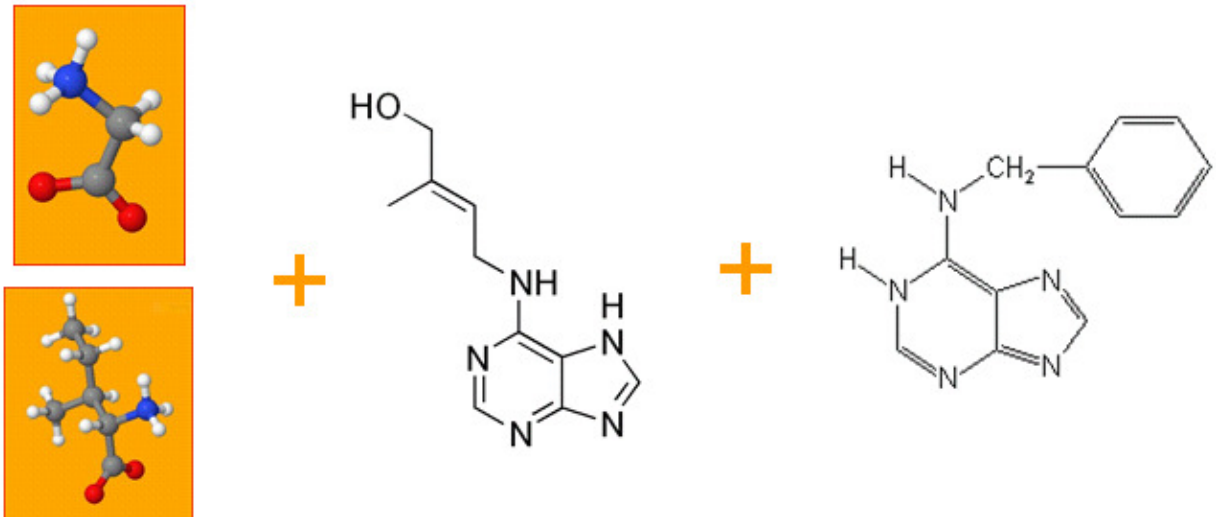
Mainly 6-benzyladenine - like (cytokinins) molecules

STANDARD AMINOGRAM (%P/P)		*PLANT HORMONES (ppm)*	
Glycine	**2,5**	**6-Benzylaminopurine**	**10000**



2. DESCRIPTION

CITOGROWER® is a product that contains soluble phosphorous (P), potassium (K), free amino acids and certain compounds with plant hormone activities (mainly cytokinin-like). It is a PK fertilizer that also contains biostimulant components, special for crop growth regulation and improvement of both fruit homogeneity and size.



Main components found in CITOGROWER®

3. MODE OF ACTION

CITOGROWER® includes phosphorous, potassium, amino acids and plant hormone-like compounds.

Phosphorous (P) is an essential nutrient fro plant growth; its functions can not be carried out by any other element. P contents in crops vary from 0.1 and 0.5% of dry weight. Although P levels in soil are usually high, the amounts of assimilable forms is much lower. In this way, soluble P forms are easily taken by plants since roots are able to take such P together with soil water. The main role for P in plants lies on its essentiality for plant growth; once P is taken by roots, it is fixed into several organic compounds such as nucleotides (DNA and RNA), proteins and enzymes, phospholipids (cell membranes), ADP and ATP, etc. During light-dependent photosynthesis, a proton gradient is generated with the aim of synthetizing new adenosine triphosphate (AT) from ADP (Fig. 1). Then, such ATP will be used in several physiological functions (from metabolic reactions to inter-membrane transport). On the other hand, when P levels are low an important decrease in leaf number and area is shown, which in turn leads to lower photosynthetic rates and thereby lower energy production (ATP). Thus, P limiting levels delays general plant growth (in both shoot and roots) and crop maturity but also decreases fruit quality. In addition, the development of the root system leads to a higher resistance to pathogen infection. P limiting contents are usually related with higher incidence or sensitivity to pathogenic diseases. Besides, since P increases both density and profundity of roots, exogenous supply allows increasing water use efficiency and thereby leading to crops with higher yields and improved nutritional status (mainly under abiotic stress and particularly under salt stress conditions).

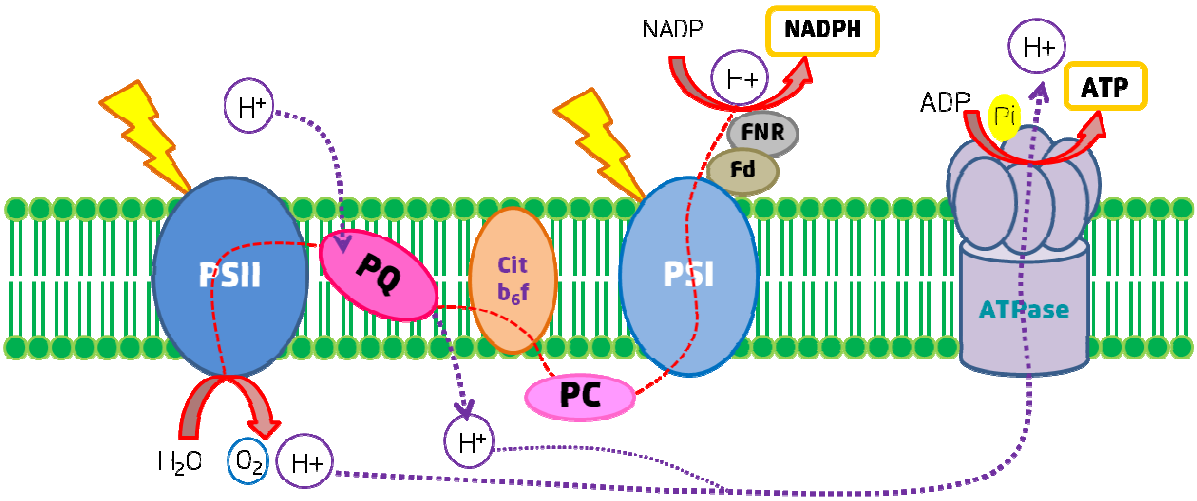


Fig. 1 Electron transport chain (light-dependent photosynthesis phase).
PSII, Photosystem II; PQ, Plastoquinone; Cit b_6f, Cytochrome b6f; PC, Plastocyanine; PSI, photosystem I, Fd, Ferredoxin; FNR, ferredoxin-NADP reductase; ATPase, enzyme ATPase; Pi, inorganic phosphorous; H^+, proton.

As mentioned for P, **potassium** (K) is also essential for many plant processes such as photosynthesis, enzymatic reactions energy-dependent, seed formation and quality, stress tolerance and crop maturity. Combination of both P and K usually enhance beneficial effects of treatments, increasing crop yield. However, in contrast to P, K is not found in any cellular component, although it still becomes fundamental for regulation of

several developmental processes. K is able to modify the structure of several enzymes related to plant growth, activating them by allowing their interaction with substrates. Moreover, the presence of K helps in maintaining cytosolic pH between 7 and 8, which is the adequate for most of enzymatic reactions. On the other hand, K plays a key role in osmoregulation (and thereby in water balance); K accumulation in root cells helps in redirecting water to themselves, while in guard cells it leads to a turgor increase by water accumulation and stomata opening, allowing gaseous change. The existence of K+ ion channels in plasmatic membrane enables maintaining the membrane potential needed for energy generation (ATP) during photosynthesis. In this way, when K levels are insufficient, photosynthetic rate decreases at the same time that ATP generation is also reduced (and thus all ATP-dependent processes). Furthermore, K is essential for protein and starch synthesis (starch synthetase), becoming fundamental for plant development. In addition, it has been shown that K has a strong influence on crop quality. Adequate K levels significantly increase both plant resistance to diseases and fruit quality and durability. Therefore, even short K deficiency periods might cause strong injurious effects on crops.

L-glycine is the smallest (lowest molecular weight) amino acid, which favours both chelation and assimilation of soil nutrients. It is also fundamental for purine biosynthesis (nucleotides, nucleic acids) and photosynthesis, since it is the precursor for pyrrole group generation (which in turn is found in chlorophyll molecules).

Finally, plant hormone **cytokinin**-like compounds found in CITOGROWER® (6-benzyladenine-like compounds) stimulate cell division, morphogenesis (tissue differentiation), nutrient mobilization (from source to sink organs), axillar buds growth, leaf expansion and chloroplast development (transition from ethioplasts to chloroplasts), among other functions in plant physiology. In addition, exogenous cytokinins are shown to efficiently delay leaf senescence, which in turn allows keeping chlorophyll levels for longer, thus perpetuating carbohydrate synthesis in photosynthesis.

In summary, CITOGROWER® promotes plant growth by activating several cell processes such as enzymatic pathways in key phases of crop growth. Its main effect lies on cytokinin-like activity, which stimulates growth and also delays senescence, while maintaining an adequate nutritional status (by glycine, P and K supply) also strongly influence in the quality of the crops.

4. USE RECOMMENDATIONS

CITOGROWER® applications after flowering are recommended to increase fruit quality. Dose and frequency of treatments might vary depending on developmental phase and growing conditions of plants. However, exceeding recommended dosages might cause not desirable effects. CITOGROWER® is strongly recommended in specific nutritional programs for fruit trees.

Possible antagonisms might be considered when combining CITOGROWER® with other fertilizers. In this way, its combination with gibberellins can lead to unwanted effects (antagonism with cytokinins) in some plants such as legumes (nodule formation), potatoes (tuber formation) or flower development in grapes).

5. USE BENEFFITS

- Treatments with **CITOGROWER®** stimulate cell division and elongation.
- It allows obtaining higher and more homogeny fruits.
- Once harvested, treated fruits keep flavour and consistence for longer.
- Leaf senescence is significanly delayied.