

What is the composition of Grain Start?

N	Ca	pH	SG
g/kg	g/kg		kg/l
39.1	49.2	2.7	1.21
g/l	g/l		
47.2	59.4		



N
Nitrogen

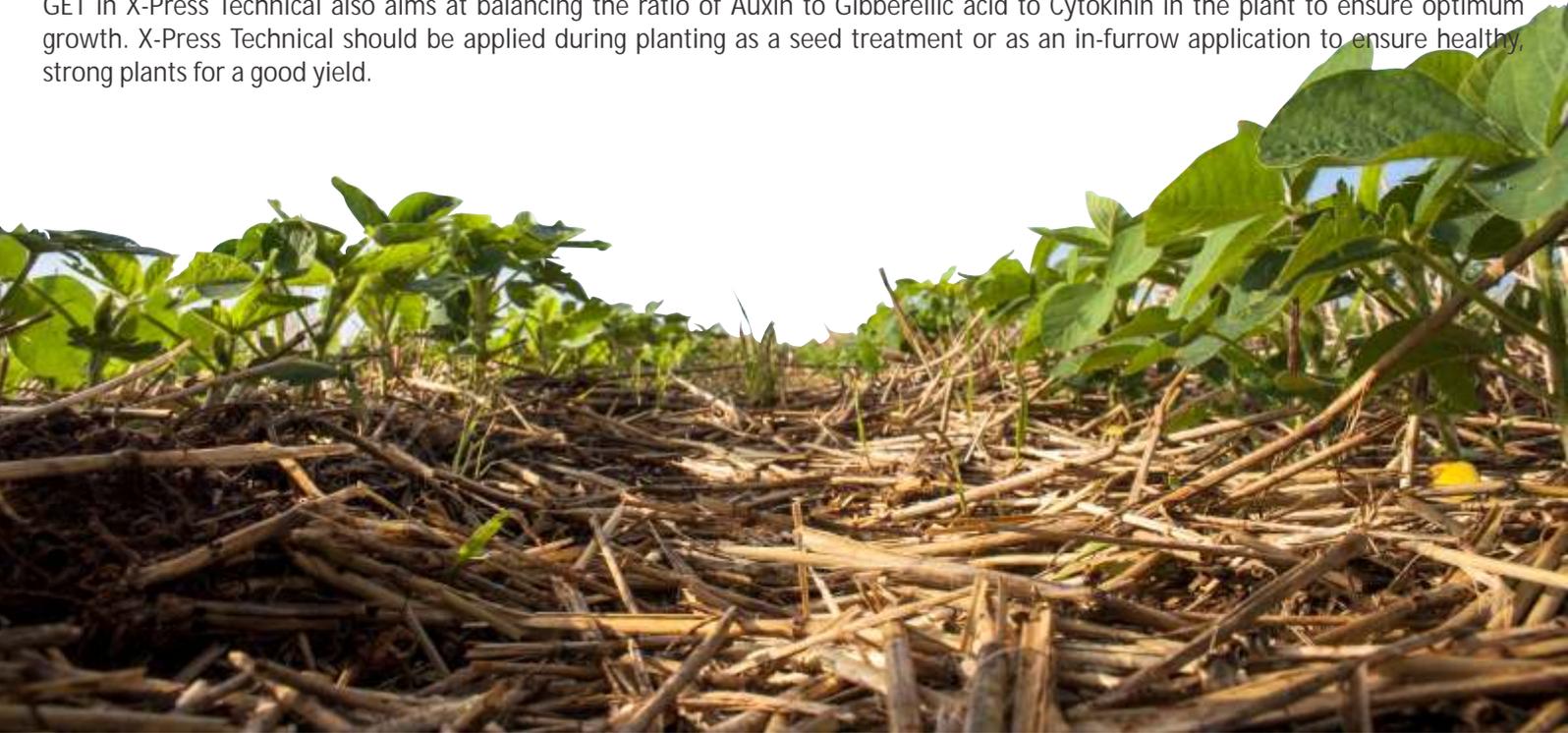
Nitrogen is an essential element of all amino acids. Amino acids are the building blocks of proteins. Nitrogen is also a component of nucleic acids, which form the DNA of all living things and holds the genetic code. Nitrogen is a component of chlorophyll, which is the site of carbohydrate formation (photosynthesis). Chlorophyll is also the substance that gives plants their green colour. Photosynthesis occurs at high rates when there is sufficient nitrogen. A plant receiving sufficient nitrogen will typically exhibit vigorous plant growth. Leaves will also develop a dark green colour.

Ca
Calcium

Calcium is an essential plant nutrient. As the divalent cation (Ca^{2+}), it is required for structural roles in the cell wall and membranes, as a counter-cation for inorganic and organic anions in the vacuole, and as an intracellular messenger in the cytosol. It is important for Ca to be present in the extra-cellular solution to ensure the maintenance of selective permeability, i.e. membrane integrity. The presence of intracellular Ca increases the bond between the cell wall and plasma membrane. Plant cells can tolerate high concentrations of intracellular Ca. In addition to the structural role of Ca, it also serve as secondary messenger involved in several biotic stresses.

Why then use X-Press Technical instead of separate products for the different elements?

If we now stand back and have a less detailed look at the functions of the two elements in X-Press Technical, we realise that the functions are related. A plant receiving sufficient nitrogen will typically exhibit vigorous plant growth during the vegetative stage. A growing plant forms new material containing cells with cell walls and membranes where Ca plays an important structural role. The amino acids and seaweed in X-Press Technical will also stimulate growth and even more nitrogen will be necessary for more proteins in the new parts of the plant. All of this will lead to a healthy, active growing plant that will be more resistant to diseases and stresses. X-Press Technical also contains Gene Expression Technology (GET) that will result in increased plant height, increased root development, increased fruiting branches, increased fruit setting ratio, prevention of fruit dropping and resistance against diseases. GET in X-Press Technical also aims at balancing the ratio of Auxin to Gibberellic acid to Cytokinin in the plant to ensure optimum growth. X-Press Technical should be applied during planting as a seed treatment or as an in-furrow application to ensure healthy, strong plants for a good yield.



The effect of Amino Acids on plants

Only L-Amino Acids are assimilated by plants. D-Amino Acids are not recognised by the plant and therefore cannot participate in protein synthesis. Stress have a negative effect on plant metabolism with a corresponding reduction in crop quality and quantity. The application of Amino Acids before, during and after stress conditions supplies the plants with Amino Acids which are directly related to stress physiology and thus has a preventing and recovering effect. Plants synthesize carbohydrates by photosynthesis. A slow photosynthesis rate implies slow growth. Glycine and Glutamic Acid are fundamental metabolites in the process of formation of vegetable tissue and chlorophyll synthesis. These Amino Acids help to increase chlorophyll concentration in the plant leading to higher degree of photosynthesis. This makes crops lush green. Stomata are the cellular structures that control the water balance of the plant, the macro and micronutrient absorption and the absorption of gases. The opening of the stomata is controlled by both external factors (light, humidity, temperature and salt concentration) and internal factors (amino acid concentration, abscisic acid etc.). The stomata are closed when light and humidity are low & temperature and salt concentration are high. When stomata are closed, photosynthesis and transpiration are reduced (low absorption of macro & micronutrients). In this case the metabolic balance of the plant is negative. L-glutamic acid acts as a cytoplasm osmotic agent of the "guard cells", thus favouring the opening of the stomata. Amino acids have a chelating effect on micronutrients. When applied together with micronutrients, the absorption and transportation of micronutrients inside the plant is easier. This effect is due to the chelating action and to the effect of cell membrane permeability. Glycine and L-Glutamic acid are known to be very effective chelating agents. Amino acids are precursors or activators of phyto-hormones and growth substances. Amino acids increase the pollen germination and the length of the pollen tube. Glycine and serine (which is converted from glycine), are metabolites and if applied as foliar, it promotes *P. citrinum* W1 growth and increase antifungal activity. Glycine also increase the resistance of plants against salt-stress.



Leaders in Science. Partners in Growth.



No 144. 2nd Avenue
Modder East Orchards
Delmas, 2210
Tel: +27 (0) 82 738 0080
Email: info@mbfi.co.za
Web: www.mbfi.co.za