Reg. No: B 3761 / N-F 1653 Act No. 36 of 1947

A SOLUBLE LIQUID FERTILIZER TO SUPPLY NITROGEN, SULPHUR, MANGANESE, ZINC AND BORON TO CROPS.

Active Ingredient: Nitrogen, Phosphorous, Sulphur, Boron, Manganese, Molybdenum, Zinc.

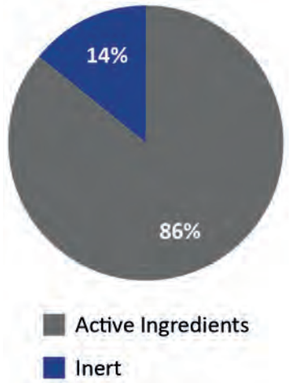
MULTI-ACTION GO TO PRODUCT

X-Press Functional is a multi-faceted foliar feed and bio-stimulant formulated to supply critical micro-nutrients and a balanced supply of plant growth promoting regulators to increase and sustain vigorous vegetative growth in crops.

Nutrients	Advantages
Mn 59.8 g/l Zn 40.8 g/l B 3.00 g/l Mo 0.50 g/l	Supply critical nutrient manganese, zinc, copper, molybdenum and balance of phytohormone levels as well as root flush.
N 68.0 g/l S 54.0 g/l P 15.1 g/l	This will activate plants immune system, stimulate root growth, increase plant ATP (energy) and growth rate ability.

HOW MANY PRODUCTS MAKE UP X-PRESS FUNCTIONAL
X-Press Functional contains more than 15 raw materials to make up the final product. The active ingredients make up a total of 861g/kg or 86.1% of the final concentrated product. Below follows a description of the actives that provide the exceptional performance of X-Press Functional.

- **Humectants**- Increase the absorption and availability of all compounds available from the application of products by increasing the contact time.
  - o Hygroscopic value attacks moisture from the atmosphere to get plant nutrient complex wetter for longer.
  - o Multiple functional wetting effect reduce evaporation and increase wetting of complex.
  - o Increase absorption through multiple chance to be absorbed into the plant and increase uptake on compounds through cuticle and stomata.
- **Mn** and **Zn** -Huge role player in chlorophyll which increase photo-synthesis and thereby increases the physiological ability of the plant.
- **GET** - Functions to balance the hormones and increases the defence mechanisms of the plant.
  - o The stage of V3-V6 is very important due to the plant determining internode amounts and the need to maintain optimal but balanced growth.
- **Mn** - Essential for many plant functions, these include photosynthesis, synthesis of chlorophyll and nitrate assimilation, activates fat forming enzymes. High soil pH reduces Mn availability, water logged conditions can reduce Mn availability.
- **N** - Structural component of several essential plant parts and components including chlorophyll, DNA & RNA and proteins.
- **Zn** - Helps with production of Auxins, activates enzymes in protein synthesis, and helps with the regulation & consumption of sugars. Necessary for root development. Helps with cold stress. Zn availability decreases as pH increases.
- **B** - Maintains balance between sugar & starch, translocation of sugars and carbohydrates, pollination and seed reproduction, cell division, N metabolism and transport of K to guard cells for proper control of internal water balance, high pH reduces availability.
- **CYK/IAA/ GA** - A balanced ratio of biostimulants in a plant would be 1:2:2. We need to maintain this ratio in order to deliver an optimal growth relationship.
- **Absorption -** Various sugars and complex agents in Functional increase the ATP value in the growing plant which in turn increases the energy level of the plant. This leads to higher absorption of nutrients and bio-stimulants.



ACTIVE INGREDIENT CONCENTRATION IN X-PRESS FUNCTIONAL

MICRO-NUTRIENTS AT CRITICAL TIMES FORMULATED IN X-PRESS FUNCTIONAL

X-Press Functional has been scientifically formulated with selected micro-nutrients with synergistic effects to increase the vegetative growth of crops. Below follows a breakdown of the complex interactions of the micro- nutrients contained in X-Press Functional:

Manganese Versus Other Nutrients
Manganese plays an important role in the metabolism of plants, particularly in processes of activation of different enzymes, chlorophyll synthesis and photosynthesis.

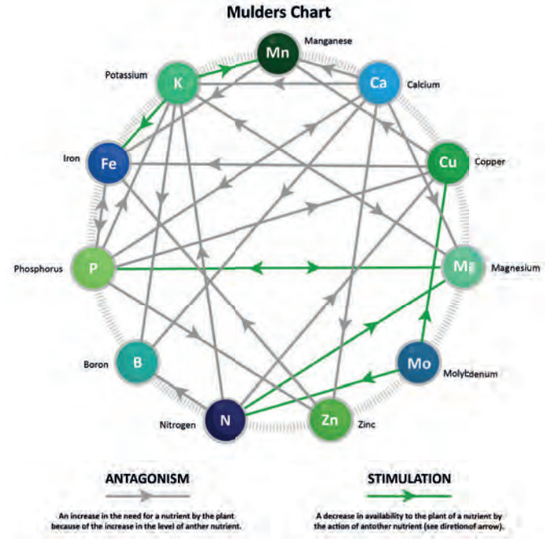
In leaf tissues, manganese is associated with proteins of the oxygen evolving system and is indispensable for the generation of the photosynthetic energy flow. The photosynthetic electron transport is affected when Mn deficiency occurs, since the first step of the electron transport chain is impaired.

Studies on the interaction between Mn uptake and other divalent cations have been reported. It has been reported that there is a higher concentration of iron in soybean leaves at lower Mn concentration. It was found that the concentration and amount of manganese in the soybean shoots decreased with increased iron concentration in the solution, probably an oxidation of iron by manganese.
Excess Mn has induced Fe deficiency in potatoes grown in nutrient culture and produced Mn/Fe ratios of 18 or more in plant tops. Aluminum counteracted these effects by increasing Fe content of plants and decreasing Mn/Fe ratios.

Increasing Mn concentrations can trigger a general synergistic effect on Ca, Mg, Na, P, and Cu net uptake, but displays an antagonistic action on K and Zn in some plants.

ZINC INTERACTION WITH OTHER ELEMENTS
Phosphorus is the most important element that interferes with zinc uptake, as zinc uptake by plants reduces by increasing phosphorus in soil. High levels of phosphorus may decrease the availability of zinc or the onset of zinc deficiency associated with phosphorus fertilization may be due to plant physiological factors. Some forms of phosphatic fertilizers, such as superphosphate, contain significant amounts of zinc as impurities and have an acidifying effect on soils.

The main reasons for effect of high levels of phosphorus on zinc deficiency can point to the following:
- Zinc transmission from plant roots to shoot reduces due to high concentrations of phosphorus, so zinc accumulates in roots or its uptake decreases by roots.
- Zinc concentration in shoots of plants decreases by effect of induced growth response (dilution effect); which means that the amount of zinc uptake in plants increases by increasing plant growth, but its concentration decreases in plant tissues, in other words that element will be diluted in plant tissues.
- Metabolism defect in plant cells that is related to zinc and phosphorus imbalance, so by increasing the phosphorus concentration, zinc tasks are impaired at specific positions in the cells.
- In absence or low concentrations of zinc, phosphorus uptake and transport increases in the shoot and its concentration increases in the leaves, and as a result can cause toxicity in the plant.
- This increase only occurred with zinc deficiency and was not observed in other micronutrient deficiencies; this means that zinc deficiency increases the permeability of plasma membrane in roots compared to phosphorus.



XPRESS FUNCTIONAL™

MBFi
Leaders in Science. Partners in Growth.

BORON INTERACTION WITH OTHER ELEMENTS

The supply and uptake of B brings about a shift in the internal physiological balance amongst certain nutrients, which result in secondary changes and alteration in the absorption and accumulation of other ions. For example, the interactions of P-Mg and Ca-Mg in some plants were caused by varying B supply in a sand culture study. It was suggested that B may be a component of one or more interactions or that complex interactions involving more than two elements may exist.

Research has shown that the concentration of Mn in the leaf blade of cotton was increased with low and high B in the substrate, while the concentrations of Cu, Fe and Zn drastically declined due to the interaction of Mn with these micro-nutrients.

B has been shown to have significantly positive correlation between Fe-P, Ca-P and P, Fe and Ca and it is suggested that the differential absorption of these nutrients could be governed by B through a large or small nutrient absorption and distribution.

B has negative and non-significant correlations between leaf N and Ca, leaf Mg and Ca, leaf P and Ca and leaf K and Ca. It can be concluded from literature that B plays a role in the nutrient interactions within the plant, but it is still not clear whether B is directly or indirectly involved in the interaction of certain nutrients, however, the nature of these complex interactions is still obscure.

MOLYBDENUM VERSUS OTHER NUTRIENTS

Molybdenum is an essential micronutrient of higher plants. Although the Mo requirement by higher plants is very small, it has crucial roles, mainly via molybdo-enzymes. Nitrate reductase, an important molybdo-enzyme, catalyzes the rate-limiting step of nitrate assimilation.

Molybdenum deficiency occurs in highly acidic soils that are strongly weathered and leached and in soils in which the element is in an unusable form. Sulfur application may decrease Mo concentration in plants. Phosphorus generally increases the availability of Mo. This increase in Mo availability may be in part related to the reduced absorption of Mo by soil when P is applied.

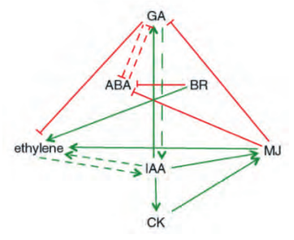


Figure 1: The complex interactions between hormones in plants.

Plant Growth Regulators and Bio-inducers in X-Press Functional

X-Press Functional has a balancing act of bio stimulants to ensure all biostimulants in the plant are in balance to generate vigorous vegetative growth.

CYK/IAA/GA–a balanced ratio of biostimulants in a plant would be 1:2:2. We need to maintain this ratio in order to deliver an optimal growth relationship.

- Cytokinin regulates cell division, induction of organ differentiation, control of stomatal movement, delay of chlorophyll breakdown and attenuation of leaf senescence.
- Auxins in plants are essential to initiate root formation, inhibit its elongation, the differentiation of phloem elements, apical dominance and tropisms.
- Gibberellins in plants increases stem elongation and leaf expansion.

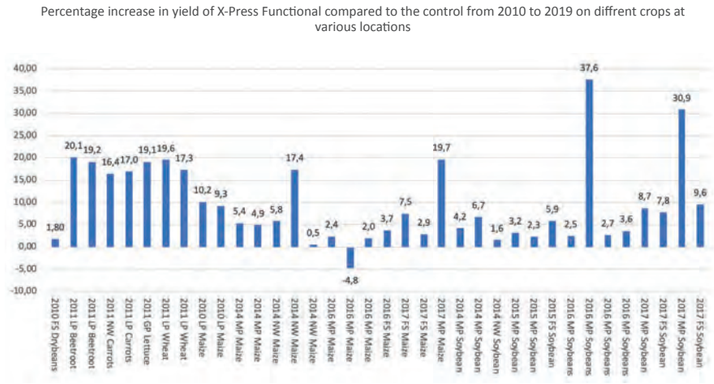
ADVANTAGES OF X-PRESS FUNCTIONAL:

- Supply critical nutrients manganese, zinc, copper and molybdenum, which balances the phytohormone levels and added root flush.
- This will activate plants immune system, stimulate root growth, increase plant ATP (energy) and growth rate ability.

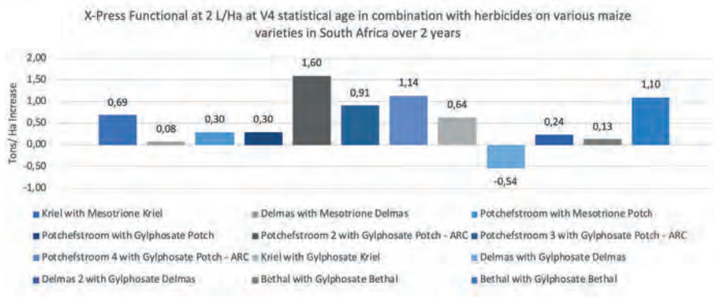
COMPATIBILITY OF X-PRESS FUNCTIONAL IN TANK MIXTURES:

- Compatible with glyphosate herbicide and conventional herbicides.

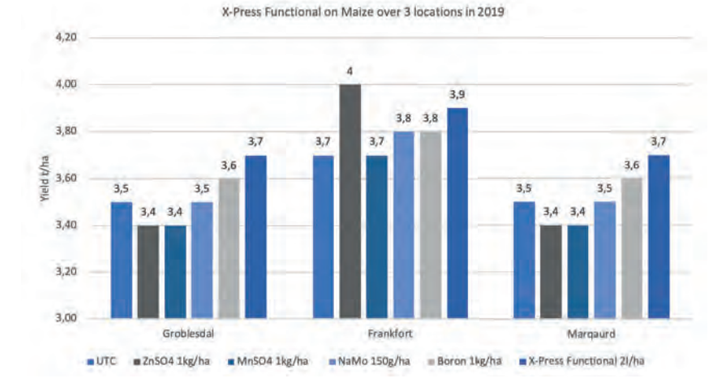
Graph 1: Over 36 trials in 9 years sourced from combined statistical based and commercial side by side trials. X-Press Functional in a multi-crop foliar applied nutrient and biostimulant with consistent results over a large variety of environmental conditions increasing crop yield.



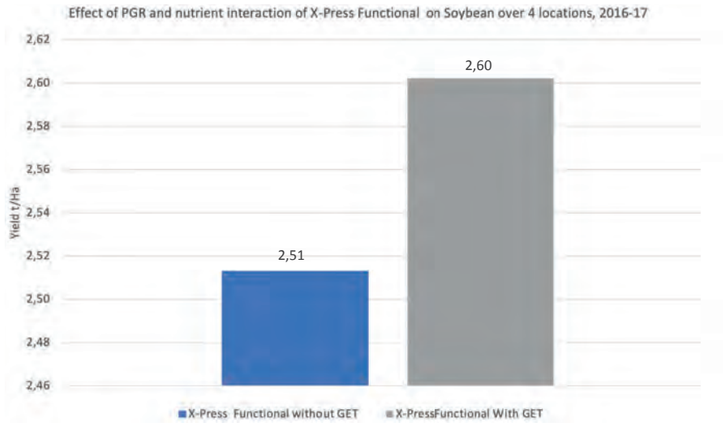
Graph 2: X-Press Functional is compatible with Glyphosate and other conventional herbicides. X-Press Functional supplies critical micronutrients and plant growth regulators to increase crop performance at the timing of conventional weed control interventions limiting crop set backs, improving yield and crop health.



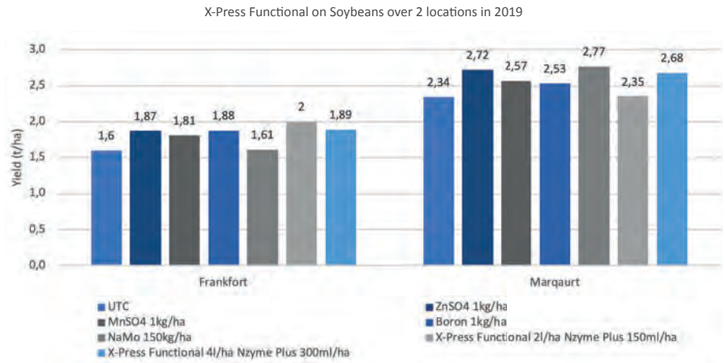
Graph 3: Effect of micronutrients and GET of X-Press Functional over three locations in the 2019 season. Results show that the combination of micro-nutrients has an interactive effect giving rise to higher yield increases over traditional micro-nutrient applications.



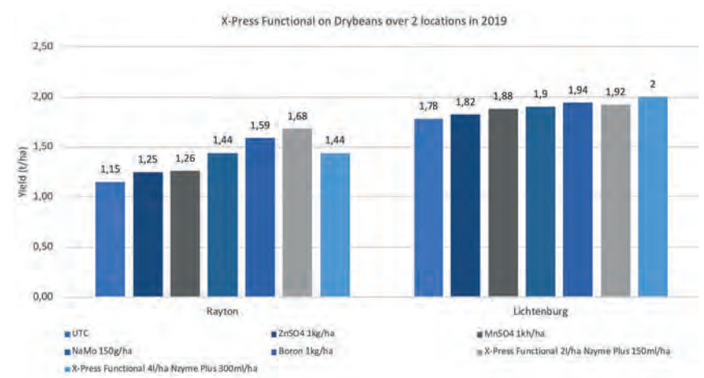
Graph 4: Effect of the balanced plant growth promoters in X-Press Functional. The balanced ratios of plant growth regulators in X-Press Functional induces vigorous vegetative growth in combination with the essential micro-nutrients. This limits environmental stress of the crop leading to increased crop yield.



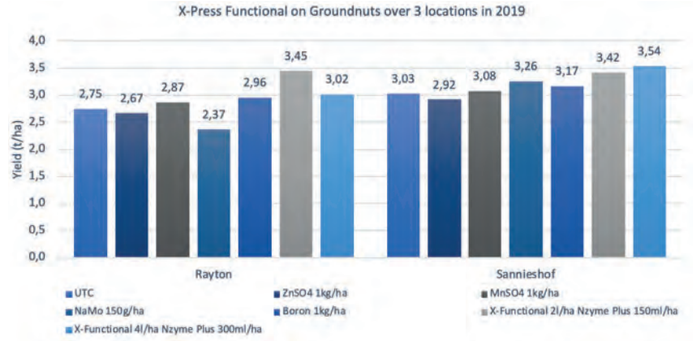
Graph 5: X-Press Functional showing yield gain on soybeans over two locations. At the Frankfort site 2L of X-Press Functional with Nzyme+ showed an yield increase of 400kg/ha. Zn, B and Mn was limiting yield factors at this site as seen in the yield response to these nutrients. At the Marqaurt locations Zn and Mo was limiting micro-nutrients, but the 4L application of X-Press Functional rectified the deficiency and increased yield with 340kg/ha.



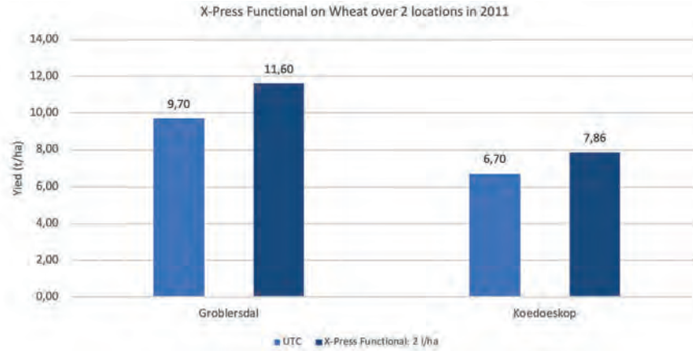
Graph 6: Effect on yield increase of X-Press Functional on Dry beans. At the Rayton trial X-Press Functional at 2L/ha with Nzyme+ showed a 530 kg/ha increase. From the results at this site B and Mo were limiting factors and the application of X-Press Functional rectified these nutrient limitations and ensured vigorous vegetative growth. Dry beans at the Lichtenburg site responded well to X-press Functional at 2 and 4L/ha giving yield increases of 140 and 220kg/ha respectively.



Graph 7: Effect on yield increase of X-Press Functional on groundnuts. In the Rayton and Sannieshof trials X-Press Functional with Nzyme+ increased crop performance significantly, increasing yield with 700kg and 390kg at 2L/ha at both sites respectively.



Graph 8: Effect of X-Press Functional on wheat yield. In both trials X-Press Functional improved crop performance significantly. Yield increases of 1.9 and 1.16 t/ha was shown in Groblersdal and Koedoeskop respectively.



Graph 9: Effect of X-Press Functional on sorghum yield. X-Press Functional improved yield with 200kg and 170 kg at H Otto and S Crous respectively. The average yield increase was 190kg/ha.