



IMPROVE FERTILIZER/NUTRIENT USE EFFICIENCY WITH PHYTOFULVIC ACID



Including unique FYTOFulvic range of products

Agrilibrum has successfully registered the unique plant derived PhytoFulvic acid as an active ingredient under Group 3 (registration no's M135 and M136) in South Africa (Act no. 36 of 1947)

Claims associated with the registration of PhytoFulvic acid and supported by statistical trial results were as follows:

Wetter/spreader - Water surface tension breaking.

Humectant/hygroscopic function – re-wetting of applied nutrients or chemicals.

PhytoFulvic acid stimulates plant growth through improved plant nutrient uptake and utilization.

PhytoFulvic 100WP (M135) and PhytoFulvic 50LC (M136) were registered for the Fulvic acid active ingredient per se. It is therefore a standard raw material ("fertilizer") to be used in the formulation of specific nutrient/fertilizer products to improve mineral nutrient use efficiency. The specific activity claims for this specific plant extracted PhytoFulvic acid source, is not applicable to other sources of fulvic acids and cannot be directly extrapolated to other sources of Fulvic acid. Similar extensive statistical trials will be required for other sources of Fulvic acid to prove comparable biological activity.

Mode of action of PhytoFulvic acid which improves crop nutrient utilization by activating the following multiple functions:

Primary actions – Soil chemistry that improves nutrient uptake:

- **Complexation** through neutralization of cation charges in binding of cations to these small water-soluble organic molecules that are then taken up by the roots as organic nutrient molecule complexes/chelates.
- **Mobility** of the neutralized cations are improved in the soil and within the plant and can more readily be transported to sites where it is biochemically needed to improve general metabolism and growth.
- The complexation of the cations and specifically the divalent cations in the soil, prevents reaction with phosphorous to form insoluble phosphate compounds, which is not available for plant utilization because both the cation and phosphorous anion will then be unavailable for root uptake.

Secondary Plant Biochemical/Physiological actions that results from improved nutrient uptake:

- **Improved** uptake and mobility of Iron and Magnesium as PhytoFulvic acid complexes and both divalent cations will directly improve chlorophyll concentration and photosynthetic activity in plants.
- **Improved** uptake of PhytoFulvic acid, Zinc will improve root and plant growth due to its direct involvement as a catalyst in the formation of the auxin, indole acetic acid (IAA) in plants, resulting in higher bio-active concentrations of other growth hormones namely Cytokinin and Gibberellins.
- **Improved** hormone functionality will result in improved root growth and root surface area, more efficient uptake of the PhytoFulvic acid neutralized cations and anions from the soil solution (water use efficiency) benefitting plant growth and metabolism.
- **Improved** Calcium uptake and mobility will directly improve fruit, vegetable and general crop quality and tolerance to pests and diseases.
- **Improved** Copper and Boron uptake, especially during flowering and fruit set, will have a direct effect on pollen viability and pollen tube growth that will affect fruit set.
- Since Phosphates are then available in the soil solution for root uptake and not bound to the PhytoFulvic acid neutralized cations, the energy needs of the plant in terms of adenosine triphosphate (ATP) formation to drive metabolism, can sufficiently be supported.