Pro-Germinator, the advantage of using encapsulated phosphorus

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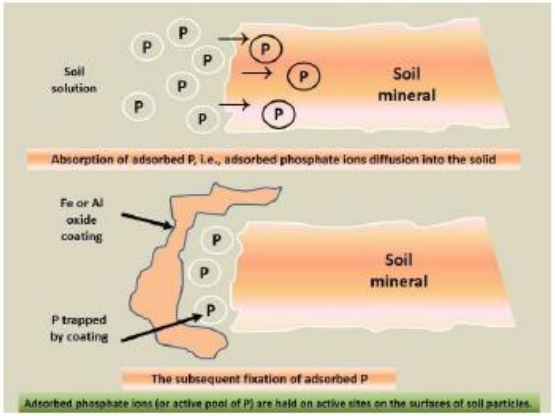
Soil phosphorus: promotes root growth and stimulates tillering, often hastens maturity, enhances winter hardiness, regulates protein synthesis, improves cell division and development of new tissue, and, is associated with complex energy transformations in the plant.

Elemental P is extremely reactive in soil and forms the simplest phosphate Orthophosphate or PO_4^{-3}, when combining with oxygen and exposed to the air. Once the soil is moist, orthophosphate exists primarily as $H_2PO_4^-$ in acidic conditions and as HPO_4^{2-} in alkaline conditions. These are the only forms in which phosphate is used by plants.



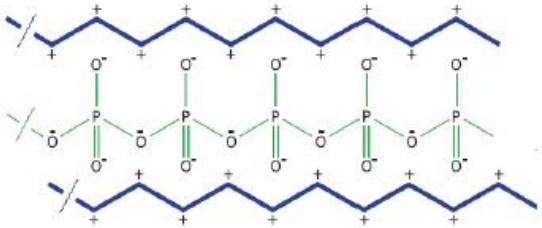
Pro-Germinator properties validation

Knowledge of ion exchange in soils would predict that anions are not retained by the negative charged soil colloids, and move in the soil similar to nitrogen. But, phosphorus moves very little, or relatively immobile in the soil compared to nitrogen and is not lost into the atmosphere, rarely does it leach beyond the reach of roots, even with large amounts of precipitation or irrigation and this apparent anomaly is that the soil solution contains only a very small amount of available phosphorus (0.05 part per million) in ionic forms ($H_2PO_4^-$ and HPO_4^{2-}) at any one time, knowing that the soil solution levels for phosphorus considered critical for plant growth, which range from 0.2 to 0.3 mg L^{-1}.

That is important because crops take up phosphorus only from the soil solution, and was the core of our testing method to measure the soil solution content of dissolved phosphorus by lysimeters solution suction.

The solution: AgroLiquid formulating slow release of plant nutrients having excellent crop nutrition at lower application rates than other phosphate products.

Pro-Germinator™ contains both orthophosphate, which is immediately available to the plant, and long-chain polyphosphates that are protected by flavonol chelation technology resulting in season long phosphorus availability.

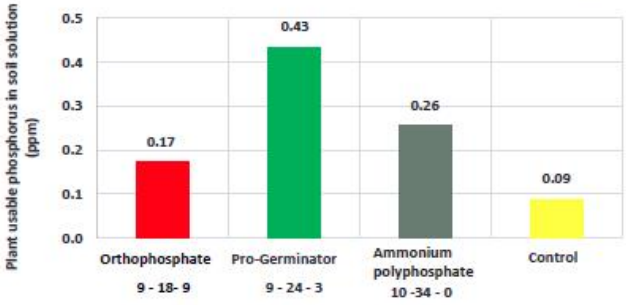


Protection of the polyphosphate in Pro-Germinator from fixation loss

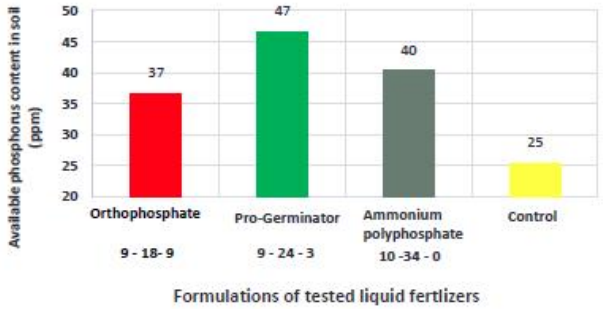
Soil monolith representing suction of soil liquids by Micro-Lysimeters for measurements of active phosphorus in soil.

Measurement process: Hydrophilic lysimeters were installed horizontally in solid soil at 10cm and 20cm (below the corn seed and Pro-Germinator placed in furrow at 5cm deep). The lysimeters were connected to a transparent PVC tube at the soil surface and extended with a flexible piece of PVC tubing for easy connection-disconnection with a 30 ml vacuum polycarbonate syringes for suction of the soil solution and measurement of dissolved phosphorus.

Results:



Measurements of phosphorus in soil solution revealed an efficient slow release of phosphorus in the Pro-Germinator treatment compared with other sources of liquid phosphorus formulations. This provides extended usability of phosphorus to plants after application of Pro-Germinator at planting.



The slow release of Pro-Germinator demonstrated in higher adsorption of phosphorus on active soil surfaces compared with other sources of liquid phosphorus formulations and helped to provide the available phosphorus in soil as potential source for plant growth.

Conclusion: These results proved the concept of Pro-Germinator's slow release of phosphate and sufficient available phosphorus. This was shown both in soil and dissolved in soil water was ready for use by plants 60 days after planting. This enhanced usability could enable Pro-Germinator to be used at lower application rates compared to other phosphorus fertilizers.