Fertoz

Improving Rock Phosphate Availability

Phosphorous is the second macronutrient after nitrogen essential for plant growth.

Rock Phosphate in its raw form is usually bound with calcium and silica oxides. In order, to improve the phosphate availability from the raw product, rock phosphate typically is crushed into a fine powder, to improve surface exposure to acidic agents. It should be noted that both calcium and silica are excellent agents in improving soil tilth and health and promoting plant growth.

Hundreds of studies have been undertaken in numerous countries around the world showing that rock phosphate combined with acidic agents can result in a phosphate product that is similar or more effective for promoting plant growth as Super Phosphate, MAP or DAP fertilizers even in high pH soils. The list of potential acidic agents is numerous and varied and while providing improved phosphate availability these agents may also provide the opportunity to improve soil structure and health and provide for the addition of other plant required nutrients, such as nitrogen, potassium and sulphur.

The list of acidic agents utilized to improve phosphate availability of rock phosphate can be organic and non-organic approved, so depending on the overall objective, i.e., commercial, regenerative of organic crop production, could drive the blending decision, although, many agents could be used with all three types of crop production. The most common acidic agents used to improve phosphate availability of rock phosphate include elemental sulphur, humic acid, compost, cattle manure and poultry manure. Other acidic agents include: ammonium sulfate, ammonium nitrate, fulvic and citric acid (often used with very fine ground rock phosphate in liquid fertilizer systems) and solubilizing microbes.

The combing of rock phosphate with an acidic agents, essentially replaces the process of making commercial phosphate fertilizer, which is the combining rock phosphate with sulphuric acid. The advantages of blending rock phosphate directly with specific acidic agents provides for the opportunity of tailoring the agents that are most effective to the targeted soil type, the opportunity of adding other soil healthy amendments to the blend, avoiding the addition of commercial fertilizer salts and greatly reducing phosphate leeching issues.

Specifically, when combined with organic materials like compost and sulphur, the following occur:

- Reduces dependence on chemical fertilizer
- Maintains higher levels of P in soil solution for longer period of time than fertilizer alone
- Sulphur lowers soil pH, creating a suitable environment for the release of phosphate into soil solution in its usable form and subsequent uptake by the crop
- Compost improves the breakdown and digestibility of rock phosphate, rendering it more available to the plant

One caution should be noted with rock phosphate and that is that not all rock phosphate is the same. Some rock phosphates are low in total and available phosphorous and may contain plant unhealthy heavy metals. Fertoz Rock Phosphate is always mined from high total and available phosphate sources with plant friendly mineral levels.

Some of the world studies done on comparison of rock phosphate against commercial fertilizer include:

- (Osman, 2015, Studies on the Possible use of Rock Phosphate in Agriculture), humic, fulvic, citric, sulfur, and compost,
- (Wahid, et al, 2015, Addition of Rock Phosphate to Different Organic Fertilizers influences Phosphorus Uptake and Wheat Yield), humic acid, farm yard manure, poultry manure.
- (Ditta, et al, 2017, Application of Rock Phosphate Enriched Composts increases Nodulation, Growth and Yield of Chickpea), compost, phosphate solubilising microorganisms.
- (Pillai, et al, 2014, Evaluation of Performance of Crop Production Using Low Grade Fine Sized Rock Phosphate with Ammonium Sulphate in Alkaline Soil), ammonium sulphate, ammonium nitrate.
- (Waheed, et al, 2015, Improving Effectiveness of Rock Phosphate through mixing with Farmyard manure, Humic Acid and Effective Microbes to Enhance Uield and Phosphorus uptake by Wheat), manure, humic acid, effective microbes
- (Evans, et al, 2006, Application of reactive phosphate rock and sulphur fertilizers to enhance the availability of soil phosphate in organic farming), sulphur.
- (Al-Oud S. S., 2011, Improving phosphorus availability from phosphate rock in calcareous soils by amending with: Organic acid, sulfur, and/or organic manure) sulphur, manure, organic acid
- (Chien, et al, 2003, Evaluation of Rape Response to Different Sources of Phosphate Rock in an Alkaline Soil)
- (Noor-Us-Sabah, et al, 2016, Comparative Efficiency of High (Triple Super Phosphate) and Low (Rock Phosphate) Grade P Nutrition source enriched with organic amendment in Maize crop) organic matter
- (Bustamante, et al, 2016, Phosphorus availability from rock phosphate: Combined effect of green waste composting and sulfur addition) compost, sulfur
- (Abbasi, et al, 2013, Agronomic Effectiveness and Phosphorus Utilization Efficiency of Rock Phosphate Applied to Winter Wheat), Poultry manure, phosphate solubilising bacteria, compost
- (Choudhary, et al, 1993, Long-term comparison of rock phosphate with superphosphate on crop yield in two cereal-legume rotations), sulphur
- (Naseer, et al, 2014, Direct and Residual effect of Hazara Rock Phosphate on Wheat and Succeeding maize in Alkaline Calcareous Soils)
- (Basha, et al, 2017, Evaluation of Rock Phosphate and Potassium Feldspar with Biological and Organaic Amendments and Its Effect on Soil Phosphorus and Potassium Availability and Uptake, Growth and Yield of Canola) humic, phosphate and potassium dissolving bacteria inoculation
- (Stamford, et al, 2005, Effects of Rock Phosphate, sulphur with and without Acidithiobacillus and organic by-products on mimosa grown in a Brazilian tableland soil) sulphur, organic matter, solubilizing bacteria
- (Supanjani, et al, 2006, Rock phosphate-potassium and rock-solubilising bacteria as alternative, sustainable fertilizers) solubilizing bacteria
- (Sharma, et al, 2009, Effect of different sources of phosphorus on summer mungbean in alkaline soil of Delhi) solubilizing bacteria