ROCK PHOPSHATE AND THE ENVIRONMENT

Fertoz

Phosphorus is one of the major macro elements required for plant growth. Farmers can source and apply phosphorous to phosphate deficient farm land using a variety of commercial processed phosphate fertilizers or in its more natural form as rock phosphate powder or as a rock phosphate granular product alone or in a blend with other nutrients. In recent years, heavy phosphate application has come under greater scrutiny due to some of negative environmental impacts, although these impacts are not universal to both commercial and rock phosphate applications. This paper identifies some of the more common concerns raised regarding phosphate use and application and identifies truths and misconceptions based on the latest research.

Rock Phosphate is only for Organic Crop Production

Rock phosphate can be used for all types of crop production, including commercial, regenerative, and organic, and has been shown, in numerous studies, to be as effective as commercial phosphate fertilizer when properly applied for the given soil conditions

All Rock Phosphate is Organic

Not all rock phosphate can be approved for use in organic production systems. In order to be certified organic, rock phosphate must be naturally occurring, mined directly, physically (crushed, screened, sized, dried) processed and contain minimal levels of impurities such as heavy metals and radionuclides. States, nations and jurisdictions vary on the "approved" list of contaminants and levels. Always ask for detailed analyses. Some providers only show a few metals or levels, and avoid discussing problematic contaminants. Request detailed traceability.

Phosphorus from Rock Phosphate is limited by Slow Solubility and is not Usable by the Plant

Rock Phosphate is a more stable form of phosphorus and is initially bound to calcium. Phosphorus must be broken down into its plant usable form in order to be accessible by the plant.

Phosphate solubility can be increased through the use of acidic agents such as elemental sulphur, humates, compost, manures or solubilizing microorganisms. Phosphate solubilizing bacteria promote solubility of rock phosphate, without significant leaching of phosphorus.

Adding organic matter to the soil, to form organic acids through decomposition also increases microbial activity and safely increases rock phosphate solubility without leaching. Soil acidity increases rock phosphate dissolution and effectiveness; through addition of manure, compost and microorganisms. Rock phosphate amended with organic compounds showed better crop response and similar, if not higher yields compared to conventional fertilizers in numerous studies.

Rock Phosphate contains Low Phosphorus Analysis

It is important to use good quality ore containing high levels of total and available phosphorus. Phosphorus analysis from rock phosphate usually ranges between 5 to 35 % depending on the source. Sedimentary ore sources (soft rock) typically contain higher P_2O_5 analysis compared to igneous (hard rock) sources.

Rock Phosphate also contains essential nutrients such as calcium and silica in abundance and may contain trace levels of magnesium, manganese, molybdenum, boron, iron, copper and zinc. Calcium is responsible for cell wall formation and protection against pests and disease. Silica ensures many functions including crop vigour and cell wall stability.

Concentrated chemical processing of conventional phosphorus fertilizer also removes the calcium and silica component of the fertilizer, which are very beneficial to the soil and plant. Calcium, silica, and phosphorus function synergistically to protect and grow the crop.

Phosphorus is a Limited Resource

The majority of the phosphorus applied in agricultural production is derived from rock phosphate either in its raw form or chemically processed into phosphate fertilizer. The chemical processing of rock phosphate into conventional fertilizer renders the phosphorus very soluble and subject to leach and run-off the land very rapidly. Proper selection of phosphorus fertilizer form can prolong the lifespan of this valuable resource.

Rock phosphate is less subject to leaching. Using rock phosphate in its raw form helps to build the soil reserve, mitigates losses to surface and groundwater systems and reduces frequency of application.

Eutrophication is a Major Environmental Concern caused by Agronomic Application of Phosphorus Fertilizers

Phosphorus is the one of the limiting sources (along with nitrogen) for algal growth. Over application of phosphorus fertilizer is one of the leading causes of eutrophication in aquatic ecosystems. Many water soluble phosphate fertilizers are susceptible to leaching and load into aquatic ecosystems and groundwater, leading to pollution and eutrophication. Eutrophication is expressed by excessive green-blue algae, reduced oxygen levels, decline in organisms, reduced biodiversity and long term effects of food webs. This phenomenon has the potential to affect our drinking water quality and ability to safely swim in lakes.

Among other important strategies, regulation on phosphorus fertilizer usage and sources has the potential to mitigate eutrophication and improve agronomic efficiencies. According to research, direct applied rock phosphate provides slow release fertility and reduces leaching and run-off. Studies done on leaching from rock phosphate compared to conventional fertilizers and found very high losses of phosphorus from conventional fertilizer. 96.6 percent of conventional phosphorus applied as fertilizer was leached, while only 0.3 to 3.8% was leached from rock phosphate fertilizer.

Impurities are Present in Rock Phosphate

Impurities can be found in many ore sources, including conventionally processed phosphate fertilizer. Choosing high quality product with low levels of toxic metals mitigates this concern. As noted above, States, nations and jurisdictions vary on the “approved” list of contaminants and levels. Always asked for detailed analyses. Some providers only show a few metals or levels, and avoid discussing problematic contaminants. Request detailed traceability.

Articles supporting these claims

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