

Fertoz-Phos is Part of the Solution to Higher Yields

Fertoz-Phos is not just phosphate fertilizer; it is a high quality source of calcium, phosphorus and silica that benefits the viability of soil organisms, continuously feeds the crop with essential nutrients, improves yield, and generates a return on investment.

Prolonged Soil Health and Nutrition Relies on High Quality Inputs

Fertoz-Phos contains three very important soil and plant health nutrients including phosphate, calcium and silica.

Phosphorus is essential nutrient (primary nutrient) for all living organisms and is required for normal growth and maturity and is often considered the second most important nutrient for plant growth after nitrogen. In plants, phosphorus plays a crucial role in photosynthesis, respiration, energy storage, cell division and cell enlargement as well as other processes. Fertoz-Phos is derived from high quality sedimentary phosphate sources “soft rock phosphate” which tend to provide for greater phosphate availability than rock phosphate derived from igneous rock sources “hard rock phosphate”. Fertoz-Phos total phosphate typically runs well above its 20% label minimum and availability is typically above 6% based on over Neutral Ammonium Citrate (NAC) test. The NAC test is a general index measure. Actual phosphate availability in your soil depends on numerous factors including soil type, soil acidity, soil temperature, moisture, plant root types and if other amendments are added to the soil with the phosphate. Amendments that increase soil acidity such as sulphur, humates, compost and biologicals will raise phosphorous availability well above the NAC availability index and based on numerous scientific studies (see://http:) often result’s in growth and yield similar or greater than synthetic fertilizers or in other words, phosphate availability similar or greater than synthetic fertilizers.

Since **phosphorus** is essential for photosynthesis and many other plant functions, it is important to maximize phosphorus uptake. Application of sustainable, naturally sourced phosphorous is key to maintain soil health and plant availability.

Calcium is an essential plant nutrient (considered an important secondary nutrient) and is required in in relatively large amounts for plant development. Calcium is important for plant growth, plant health and nutrition and is involved in photosynthesis and plant structure. Calcium regulates transport of other nutrients into the plant and is involved in the activation of certain plant enzymes. Calcium play important roles in root development, cell division, cell elongation, cell wall structure and plant defensive mechanisms. Calcium is also important for nitrogen absorption. A common feature of calcium deficiency is curling leaves towards the veins or centre of the leaves and may include a blackened appearance. Less visible in calcium deficient plants is defective root systems. Roots are typically affected before above ground structures.

As a soil amendment, calcium helps to maintain chemical balance in the soil, promotes healthy soil structure and root development, reduces soil salinity affects on plant growth and increases water penetration and plant water usage especially under saline conditions.

A recent Western Producer article highlighted the many benefits of calcium in the soil for crop production. Calcium helps beneficial micro-organisms thrive by increasing soil breathability through formation of micropores. This also allows increased rooting depth into the soil. Through soil revitalization, better plant stand, and improved defense against pathogens by adding sustainable nutrients such as calcium and phosphorus to the soil, less pesticide and herbicide control is needed. Brad Boot states “Weeds don’t like Calcium and Phosphorus”.

Silica is considered a non-essential plant nutrient although in field crops silica is known to improve uptake of necessary nutrients and minerals, strengthen cell walls, affect plant growth and quality and enhance plant resistance to stresses such as drought and fungal diseases.

Depending on the status of your soil, effective inputs used towards balancing the mineral, nutritional and health status of your soil include:

- High quality **Rock Phosphate** with high calcium and phosphorus levels
- **Gypsum** to ensure sufficient calcium
- **Sulphate of Potash** for optimal potassium and sulphur levels
- **Elemental Sulphur** for added sulphur requirements
- **Humates** and **Biologicals** to improve the soil organic matter and increase levels of biological organisms necessary for soil nutritional abundance and availability

These inputs are natural and sustainable contributing to lasting nutrition season long and over multiple years.

Good Input, Great Product, Excellent Yields

Rock Phosphate has been studied extensively. Multiple research studies conducted globally confirm the immediate and long term benefits of rock phosphate in agriculture.

- Better for the environment and more sustainable.
 - Minimizes eutrophication, groundwater contamination and soil salinity
 - Longer-lasting
 - Seed safe
 - Locally sourced
- Improved germination, early growth, root and shoot development, flowering
- Better yields

Over 13 trials including 95 treatments comparisons of rock phosphate only to untreated – a 35.8% average yield increase was calculated. Crops tested were wheat, corn, bean, potato, rice, amaranth, pea, oats, alfalfa and soybean.

Fertoz-Phos is a high quality source of rock phosphate with the above mentioned benefits. Other reasons to choose Fertoz-Phos over other phosphate products:

- High phosphate analysis with over 20% total phosphate and over 6% available phosphate
- Availability of phosphate increases with other applications such as elemental sulphur, humates, biologicals, composted manures and N-P-K fertilizers
- Locally sourced in Canada and the USA
- High quality product with minimal impurities and low heavy metals
- Sedimentary origin with no radionuclides, which are commonly found in igneous rock phosphate sources
- Low iron and aluminum levels, which are known to bind phosphates and reduce availability
- Sustainable, natural and organic approved
- Low in salts

Fertoz-Phos tested in Saskatchewan saw a bushel increase from 20-25 bu/acre during a dry year. With organic wheat prices at approximately \$18 per bushel, this producer can expect a return of \$90 per acre.

An Alberta producer found higher protein levels in wheat under Fertoz-phos treated (13.5-13.8%) vs. untreated fields (10.9%) and high protein in durum (15.8%) in Fertoz-Phos treated fields. While phosphate application has not been proven to increase protein in wheat, we have seen increased protein in multiple cases. One possible explanation is that phosphate deficiency is so severe that that it caused abnormal plant seed development, i.e., prevented the seeds from reaching normal protein levels. Research is still being done to determine whether P application is the main factor in the rise in the protein.

Cost and Return

The following calculations use approximate fertilizer costs, example yield and protein increases, and estimated average yields in organic production.

Fertoz-Phos, applied as a **powdered product** is approximately 40% cheaper than Mono Ammonium Phosphate (MAP) based on cost per pound of P, excluding the costs of application for both products.

-Include rock phosphate into your 3 year field rotation. Assuming a 60 lb/acre application rate of phosphate, apply powder rock phosphate at 300 lbs/acre at a cost of \$40-50/acre and assume a return of \$90/acre on wheat every year for 3 years without re-application. Increase your 3 year return by \$220/acre.

Fertoz-Phos, applied as a **granular product** is approximately 40% more expensive than Mono Ammonium Phosphate based on cost per pound of P, excluding the costs of application for both products.

-Assuming a 25 lb/acre application rate of phosphate in-furrow with the seed, apply granular rock phosphate at 125 lbs/acre at a cost of \$30/acre and assume a return of \$90/acre on wheat. Increase your annual return by \$60/acre.

-Include rock phosphate into your 3 year field rotation. Assuming a 60 lb/acre application rate of phosphate broadcast and incorporated in the spring or fall, apply granular rock phosphate at 300 lbs/acre at a cost of \$70-80/acre and assume a return of \$90/acre on wheat every year for 3 years without re-application. Increase your 3 year return by \$190/acre.

If **protein** levels in wheat are increased by the use of Fertoz-Phos, better grade and potential to sell as milling wheat is evident. Although grade spreads vary annually, a \$6.00 per bushel spread between feed and milling grades are used as example. Assuming an average yield in organic production of 30 bu/acre, an additional \$180/acre can be incurred.