

Rock Phosphate and Manure are a Very Effective Combination in Providing P for Crop Production Even in High pH Soils

Higher Yields • Increased Nutrient Uptake • Better Phosphate Availability

- Crops grown with high quality rock phosphate and farmyard applied manure out yielded the same crops grown using synthetic fertilizer even on high pH soils
- **WHEAT** grown with rock phosphate in combination with farmyard manure out yielded rock phosphate with other amendments and that combination of multiple amendments out yielded synthetic fertilizer on high pH soils
- **CANOLA** grown with rock phosphate, farmyard manure and phosphate dissolving bacteria out yielded canola grown with synthetic fertilizer and farmyard manure. This rock phosphate combination produced canola with higher oil and nitrogen content than the canola produced with synthetic fertilizer on high pH soils
- Adding sulphur to a combination rock phosphate and farmyard manure improves crop yield and macro and micro-nutrient uptake versus synthetic fertilizer with sulphur even on high pH soil
- **CHICKPEA** yield was maximized using a combination of 50% rock phosphate with 50% farmyard manure applied 7 days prior to seeding and at an application rate of 800 kg per hectare on high pH soil
- The combination of rock phosphate and manure works very well because rock phosphate combined with organic materials such as farmyard manure, poultry manure or other organic materials will produce acids as they breakdown which in turn changes water insoluble fractions of rock phosphate into water soluble phosphate. In addition, as organic materials breakdown they release humic acids which also convert unavailable soil phosphate into available forms. Further to this, any added or present microbes will breakdown, unavailable rock phosphate apatite, into plant available mono and di-calcium phosphate. This combination of natural biological reactions appears to provide greater agronomically effective plant useable material than synthetic soluble P alone.

Blend Fertoz-Phos powder with your manure or compost to increase phosphate availability, promote nutrient use efficiency, and achieve better yields.

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Supporting Studies and References

- A study by (Sekhar and Aery 2001) showed that high quality rock phosphate and farmyard manure were more effective at increasing **chickpea** biomass and seed output than DAP fertilizer alone on a soil with a pH of 7.6 and, in a second trial, at increasing **wheat** biomass (seed output was slightly less but not significantly less) than DAP fertilizer alone on an 8.5 pH soil using farmyard manure applications of 4 tonnes per hectare
- A study by (Waheed et al., 2015) showed that rock phosphate and farmyard manure outperformed, rock phosphate and humic acid, or, rock phosphate and effective microbes, in terms of **wheat** biological yield and seed output and outperformed SSP in terms of biological yield (seed output slightly less but not significantly). Although the combination of rock phosphate, farmyard manure, humic acid and effective microbes blended together outperformed all other combinations both in wheat biological yield and seed yield terms. All the experiments were done on a silty clay loam soil with a pH of 7.8, with less than 1% organic matter and an extractable P of less than 6.
- A study by (Awaad, et al., 2009) showed that **canola** on a sandy soil with a pH of 7.5, with rock phosphate with farmyard manure performed almost as well as super phosphate with farmyard manure and that canola with rock phosphate, farmyard manure and phosphate dissolving bacteria out yielded super phosphate with farmyard manure. The canola seeds from the rock phosphate, farmyard manure and phosphate dissolving bacteria were also higher in oil content and protein than the seeds from superphosphate and farmyard manure application.
- A study by (Khan, et al., 2017) showed that **wheat** yield was maximized using a combination of compost, made from farmyard manure and rock phosphate, applied with sulphur versus single super phosphate (SSP) applied with sulphur or several other combinations. The soil used for the experiment was a silt loam with a pH of 7.8, P content of 3.26 mg/kg and organic matter of 0.76%. Nitrogen, phosphate, potassium levels were matched between the compost treatment and the SSP treatment. The compost (made from farmyard manure and rock phosphate) with sulphur maximized uptake of most macro and micronutrients. As an example, nitrogen uptake by the control (no fertilizer was 57.0 kg/ha, N-P-K fertilizer was 101.t kg/ha, N-P-K with sulphur was 105.1 kg/ha and the compost (rock phosphate and farmyard manure blend) with sulphur was 125.7 kg/ha.
- In a three part study by (Ditta, et al., 2018), the most effective blend for maximizing **chickpea** yield, was found to be a combination of 50% rock phosphate and 50% farmyard manure, that the most effective application time was 7 days prior to seeding and that the optimal application rate of compost was 800 kg/ha. The soil used in the experiment had a pH of 7.6, organic matter of 0.67% a total N of 0.056% with available P of 8.6 mg/kg. The maximum combination out yielded the recommended N-P-K application rate by 21%.

References

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- Waheed, M., M. A. Khan, T. Naseem, D. Muhammad, M Mussarat, 2015. Improving Effectiveness of Rock Phosphate through Mixing with Farmyard Manure, Humic Acid and Effective Microbes to Enhance Yield and Phosphorus Uptake by Wheat. Pure Appl. Biol., 4(4) 480-490.
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