

Products for increasing soil Mineral Fertility

The following Table provides a list of fertility products that can assist in increasing mineral fertility in a soil. Although some of these products can be used for short term nutrient supply they can also be used to build mid and long term soil nutrient supplies. It is best to get a Total Nutrient Reserves test done to see what spectrum of nutrients are present and in what balance before using these products. Some of these products can also be used as soil additives to address major soil constraints such as acidity, sodicity or low exchangeable Calcium levels.

* Nutrients levels are in percentages

Product	Comments	*Calcium	Magnesium	Potassium	Sulphur	Phosphorous	Trace Elements	Application
Lime	Provides Calcium as well as adjusting pH. Various grades of quality.	22 - 40	0.5 - 3					Available as powder, granules or micronised in liquid as a suspension. The finer the grade the more responsive it will be in the soil. Used in acid soil situations where exchangeable Calcium levels may also be limiting.
Dolomite	Provides Calcium & Magnesium as well as adjusting pH. Various grades of quality.	19 - 22	6 - 13					Available as powder, granules or micronised in liquid as a suspension. The finer the grade the more responsive it will be in the soil. Used in acid soil situations where exchangeable Calcium & Magnesium may be limiting. It is very useful in Granite derived soils which are usually low in both Calcium & Magnesium.
Gypsum	Provides Calcium & Sulphur.	23			17			Available as powder, granules or micronised in liquid as a suspension. The finer the grade the more responsive it will be in the soil. Used in soil situations where exchangeable Calcium and/or Sulphur may be limiting but the soil is not acidic. Can also be used to help mitigate soil sodicity.
Rock Phosphate (RP)	Provides Calcium & Phosphorus. Various grades of Phosphorus levels and reactivity depending on the source material. Some sources may contain fluorine or heavy metals.	30				8 - 11		Available as powders of various fineness, including as a colloidal product (superfine), and as a granule. Used where overall Phosphorus levels are low. Is only responsive for current plant growth needs in low P lock up soils or where high levels of biological fertility are present.

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Bio-activated Rock Phosphate	Provides Calcium & Phosphorus. Made from Rock Phosphate, Bio-activated RP has been composted or digested by microbes that solubilise the Phosphorus from the rock.	30				8 - 11		Usually available as a powder. Some granules are on the market. Used where overall Phosphorus levels are low. Usually is only responsive for current plant growth needs in low P lock up soils or where high levels of biological fertility are present. When purchasing it is recommended to do a cost-benefit analysis to see if the extra cost of bio-activation leads to an improved Gross Margin over straight Rock Phosphate. It is also recommended to look for trial data showing the benefits of the inoculants used in the bio-activation process.
Super Phosphate	Provides Calcium, Sulphur & Phosphorus. Made from Rock Phosphate, Super Phosphate has been treated with Sulphuric Acid which solubilises the Phosphorus from the rock. It also adds the Sulphur to the product.	20			11	9		Usually available as a rough granule. Used where overall Phosphorus levels are low to build up Phosphorus levels or where immediate plant response is required. Is perceived to be detrimental to soil health when used over long time periods. Critical advantage over Rock Phosphate is that it also supplies Sulphur so it is useful for soils that are low in overall Sulphur.
Triple Super Phosphate	Provides Calcium, Sulphur & Phosphorus. Made from Rock Phosphate, Triple Super Phosphate has been treated with Phosphoric Acid which solubilises the Phosphorus from the rock.	15				17		Usually available as a rough granule. Used where overall Phosphorus levels are low to build up Phosphorus levels or where immediate plant response is required. Is perceived to be detrimental to soil health when used over long time periods. Has a very high proportion of soluble P.

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Guano	Provides Calcium & Phosphorus. Usually derived from aged bird droppings. Bat and seal droppings are another source. Analysis is variable between sources. Some Guano sources also have good levels of Silicon (up to 15%). Other products are blended with Sulphur.	30				8 - 12	Some have Silicon	Available as powder or granules. A micronised Guano in liquid as a suspension is also on the market. Is generally seen to be a more responsive Phosphorus fertiliser than Rock Phosphate. Is generally also more expensive than Rock Phosphate fertilisers.
FCMP (Fused Calcium Magnesium Phosphorus)	Provides Calcium, Magnesium, Phosphorus & Silicon. Made from Rock Phosphate, FCMP is made by fusing it with a high Magnesium mineral such as Serpentine at high temperatures.	24	10			8	Silicon	Usually available as a powder. Used where overall Phosphorus levels are low to build up Phosphorus levels or where immediate plant response is required. It also supplies good levels of Calcium and Magnesium. Is relatively soluble when compared to rock phosphate. Another advantage over Rock Phosphate is that it supplies Silicates, Magnesium and Calcium as well. It is very useful in Granite derived soils which are usually low in both Calcium & Magnesium.
Sul-Po-Mag (Kmag or Potassium Magnesium Sulphate)	Provides Potassium, Magnesium and Sulphur. Derived from natural mineral deposits.		10	18	22			Made into both coarse crystals and granules, Sul-Po-Mag supplies good levels of Potassium, Magnesium and Sulphur. Very useful for building up levels of these nutrients in light CEC soils such as those that are Granite derived. Mainly for horticulture market.
Magnesium Sulphate	Provides Magnesium & Sulphur. Soluble.		10		13			A crystalline product that is highly soluble. Generally used in horticulture as it can be dissolved and applied through fertigation systems. Mainly for horticulture market.

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Kieserite	Provides Magnesium & Sulphur. Derived from natural minerals.		15		20			A granular product that less soluble than Magnesium Sulphate and contains higher levels of both nutrients. Mainly for horticulture market.
Magnesium Oxide	Provides Magnesium.		54					A low soluble mineral form of magnesium that is slow to release. Can be supplied as a granule or as coarse crystals. The finer the grade the more responsive it will be in the soil. Often a cost effective way of applying Magnesium.
Potash	Provides Potassium & Sulphur. Processed from various natural minerals or industrially made.			42	18			A high analysis source of both Potassium and Sulphur. Readily soluble. Can be readily blended with many other fertilisers.
Potassium Chloride	Provides Potassium. Processed from various natural minerals or industrially made.			50				A high analysis source of Potassium. Readily soluble. It also contains Chloride which has adverse affects on some plants. Mainly used for the horticulture market.
Basalt Dust	Provides a low level of a broad range of nutrients. Made from crushed up basalt rocks. Quality can be very variable depending on source material.	Less than 1	Less than 1	2 to 7	Less than 1	Less than 1	A wide range	Usually available as a powder although some suppliers do sell granular forms usually combined with brown coal (humates). The finer the grade the more responsive it will be in the soil. It is very useful in Granite derived soils which are usually low in Calcium, Potassium & Magnesium and the range of Trace Elements, all of which may be supplied by a quality basalt dust.

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Sulphur	Provides Sulphur only. Derived mainly as a by-product of the petroleum industry, natural sources also exist.				100			Usually available as a powder although some suppliers do sell micro-granular forms. The finer the grade the more responsive it will be in the soil. It is also often combined with other fertilisers as a powder coating on granules.
Wood Ash	Provides Calcium & Potassium and minor amounts of Phosphorus and Magnesium.	23	2	4		>1	A range may be present	Not commonly used in farming now but was used traditionally.
Potassium Silicate	Provides Potassium & Silicon. Derived from a natural mineral deposit.			15			Silicon	A soluble powder which is also supplied as a liquid product. High levels of soluble silicon (17%) are in the product.
MKP (Mono Potassium) Phosphorus)	Provides Potassium & Phosphorus. Manufactured usually by combining potassium hydroxide with phosphoric acid.			28		22		A high analysis source of both Potassium and Phosphorous. Readily soluble. Mainly used for the horticulture market. Liquid products with dissolved MKP are also available.

Note that nutrient percentages above are approximate. Products vary in their analysis. Check all suppliers. Soil Land Food does not specifically endorse or dis-endorse any products mentioned. All information is provided for educational purposes only. No responsibility is accepted for agronomic results based on any information from this Factsheet.

Guidelines for using Mineral Fertility Inputs:

- The finer a mineral is crushed the more quickly the response.
- The more nutrients that are applied at once the more cost effective the application. Always Check compatibility.
- Processing always increases the cost per unit of nutrient. Heating, blending, granulating, coating and liquefying all increase the cost per tonne.
- Make sure the product quality and form is suitable for your application equipment.
- Always do a trial on new products and a cost benefit analysis on the results.

Further reading & references:

- Australian Soil Fertility Manual: 3rd Edition
FIFA & CSIRO
- Building Soils for Better Crops: 2nd Edition
Magdoff & Van Es
- Soil Fertility & Fertilizers: 5th Edition Tisdale et al.
- Fertilizer Manual: UNIDO & IFDC - United Nations