**FACT SHEET**

**August 2021**

# Australian made Single Superphosphate (SSP) fertiliser

## 8.8% phosphorus (P)

## 11 % sulfur (S) as sulfate

## Ideal for top-dressing grass-legume pastures

## MANUFACTURE

The invention of superphosphate is said to mark the birth of the modern fertiliser industry. Prior to this, naturally occurring ores and plant and animal wastes were the primary ways of adding nutrients to the soil. Bones and phosphate rock were commonly used as a source of phosphorus.

The manufacture of superphosphate involves treating phosphate rock with sulfuric acid to increase the solubility of the phosphorus it contains, making it more available for plant uptake.

Naturally occurring phosphate rock contains a high proportion of calcium phosphate $Ca(PO_4)_2$ which is normally not sufficiently water-soluble to be used as a fertiliser. The treatment of phosphate rock with sulfuric acid converts it to calcium dihydrogen phosphate $Ca(H_2PO_4)_2$, a water-soluble form that plants are able to utilise. It also adds sulfur (S), another essential plant nutrient, to the finished product. Sulfur is important in perennial legume based pastures.

John Lawes took out a patent for the manufacture of superphosphate in the United Kingdom in the 1840s. The royalties he received were used to establish the Rothamsted Research Station, the oldest agricultural research station in the world and the site of many internationally recognised long-term experiments.

Superphosphate, more correctly called single superphosphate (SSP), was first manufactured in Australia in Victoria in 1876. James Cuming (Victoria) and George Shirley (NSW) were among the early pioneers of the Australian superphosphate industry. Incitec Pivot Limited can trace its origins to these times, with antecedent companies having been involved in the fertiliser industry for over 100 years.

Superphosphate became and remained Australia's most important phosphorus fertiliser on crops and pastures until the 1970s. Since then, its cost competitiveness compared to other phosphorus fertilisers has declined. Superphosphate remains popular in legume-based pastures, but higher analysis ammonium phosphate fertilisers have replaced it in cropping, i.e. MAP and DAP.

Incitec Pivot Limited manufactures superphosphate at Geelong and Portland in Victoria from imported phosphate rock. The end product is known as **SuPerfect®**. Superphosphate is no longer manufactured in South Australia, New South Wales and Queensland. These plants have closed.

SuPerfect is an important pasture topdressing fertiliser, e.g. on dairy farms. Victoria is Australia's major dairying State.

## USE OF SUPERPHOSPHATE AS A FERTILISER

SuPerfect contains approximately equal amount of phosphorus and sulfur. As plants also contain approximately equal amount of phosphorus and sulfur, this make SuPerfect an ideal fertiliser where both phosphorus and sulfur are required, e.g. for top-dressing grass-legume pasture.

As a source of phosphorus, SuPerfect costs more per kg of phosphorus (P) than higher analysis alternatives, e.g. DAP and MAP. This is one of the reasons why superphosphate has declined in popularity as a cropping fertiliser. However, when value is placed on its sulfur (S) and/or calcium (Ca) content, SuPerfect is more cost competitive, and becomes more attractive to use. DAP and MAP are low in sulfur.

In high rainfall areas, the main reserve of sulfur in the soil is the soil organic matter. When the soil is cultivated, the breakdown (mineralisation) of soil organic matter is increased and sulfur is released. Smaller amounts of sulfur become available where the soil is not cultivated or disturbed. Consequently, sulfur is more likely to be required in fertiliser programs in perennial pastures than in crops where the land is fallowed before planting.

Furthermore, legumes are high in protein, and have a high sulfur requirement. Sulfur is an important constituent of protein. Consequently, sulfur usually needs to be applied in pasture fertiliser programs, and is less likely to be required in cropping.

The main topdressing seasons for pasture are the autumn and spring. Topdressing is avoided over summer. Many pasture species are dormant at this time of year in southern Australia where the rainfall is winter dominant. There is also a risk of nutrient loss in run-off in the event of heavy storms after application.

With winter active clover-based pastures, it is customary to apply superphosphate in the autumn at the start of the main growing season. This is the best time to apply superphosphate where soil phosphorus levels are low and immediate responses are expected.

Timing is less critical where phosphorus soil test values are higher and maintenance dressings of superphosphate are being applied. In these situations, phosphorus can be applied in the autumn or spring.

In southern Australia, ground conditions may be too wet during winter to allow spreading operations at that time of year. Spring top-dressings are often advocated on soils that have a high phosphorus fixing capacity and are prone to water logging during winter. Iron and

manganese become more available in the soil in these circumstances and react with phosphate ions in solution to produce less soluble phosphorus compounds.

In addition to phosphorus and sulfur, molybdenum is often required in pasture on acid soils. Molybdenum (Mo) is required in minute or trace amounts and plays an important role in nitrogen fixation. The *Rhizobium* bacteria in the nodules on legume roots have a ten times higher requirement for molybdenum than the host plant. Molybdenum fortified grades of superphosphate are available for use on legume-based pasture, e.g. SuPerfect Mo 0.025%.

Incitec Pivot Fertilisers (a business of Incitec Pivot Ltd ABN 42 004 080 264)

28 Freshwater Place

Southbank Vic 3006

Freecall 1800 009 832

www.incitecpivotfertilisers.com.au