



AVAIL[®]

Phosphorus Fertilizer Enhancer

Fertiliser enhancer for granular phosphate

More usable phosphate means better use of your fertiliser investment and better yields



The product is for use only by professional suppliers, blenders, agricultural and horticultural contractors. There is no restriction to the crops it can be applied to.

Verdesian Life Sciences Europe Ltd.



Why Avail is an important addition to granular phosphate fertiliser

Up to 90% of applied fertiliser phosphate is locked up or fixed in the soil within days of application to the soil. Usually only about 1 kg phosphate per ha is available to the plant in the soil solution. A small part of the remaining soil phosphate may be found in a more or less well-exchangeable or labile fraction with most of the phosphate in the less well to non-exchangeable stabile fraction. Applying technologies that can reduce the lock up of fertiliser phosphate and maintain its availability meets good agricultural practice (GAP).

Acid soil systems – phosphates are fixed through reaction with cations of aluminium , iron and manganese

Alkaline soil systems - phosphates are fixed through reaction with cations of calcium and magnesium

Avail preferentially attracts these cations leaving more reactive phosphate available to the plant either in solution or in a labile state.

Soil pH and multivalent cations Al, Fe, Mn, Ca, and Mg strongly influence P availability and solubility. Soil pH at either alkaline or acid ranges below pH 6 will generally decrease P solubility. Alkaline soils are determined by minerals containing basic metals as Ca and Mg while with falling pH values Fe and Al become increasingly available in acidic soils locking up P in Al- and Fe-phosphates. For example, Al and Fe containing minerals become available more rapidly in acid soils, resulting in the formation of poorly soluble and less plant available Al and Fe phosphate precipitates. Similarly, elevated solution Ca and Mg concentrations in alkaline soils enhance P precipitation. CaCO₃ (limestone) in calcareous soils, can result in adsorption of Ca-P minerals on the mineral surfaces, further reducing P solubility. Due to all of these factors , crops grown in soils with low P solubility are proven to respond positively to phosphate fertilisers treated with Avail (see Meta-Analysis in Product Positioning section).

KEY FEATURES

Avail for phosphate fertiliser contains 40% w/w partial sodium salt of maleic-itaconic copolymer. The formulation has a pH of 7-8.

Avail has a high cation exchange capacity (CEC) of 1800 meq/100g with molecular weight of 3-4000g/mole. The specific gravity is 1.29 g/ml. The CAS number is 556055-76-6

Avail is a patented long chain polymer structure of 30-40 mers, designed to specifically attract multivalent cations of aluminium, iron, manganese, calcium and magnesium that are in the soil profile and which influence the lock up of phosphate.

MODE OF ACTION

AVAIL works by:

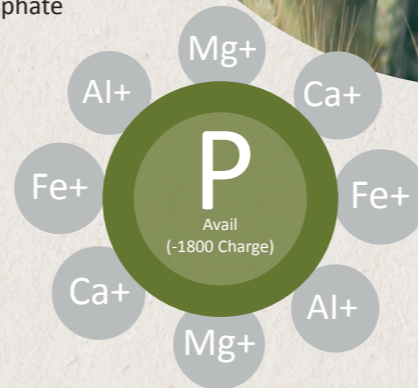
Creating a negatively charged shield in the micro-environment around the phosphate granule.

The long chain negatively charged co-polymer within Avail bonds with the positive ions, Al, Fe, Mn, Ca, Mg, reducing fixation by up to 30% , leaving the phosphate (PO₄³⁻) in a soluble form and thus available to be taken up efficiently by the roots of the crop.

BENEFITS

Avail is fully water soluble which means it moves with the phosphate fertiliser granule as it enters the soil profile protecting the phosphate by up to 30 % from lock up over a number of months. This solubility allows the protected phosphate to be available to the plant from the start.

Avail helps to protect fertiliser phosphate from being fixed to the soil, improving P efficiency.



Avail is not a nutrient source or a substitute for fertiliser.

The product has a shelf life of 2 years.

After application the Avail will remain fully active over the storage time of the treated fertiliser.

Trials have demonstrated by improving P efficiency and under conditions where there is a positive response to P, this allows reducing applications rates by up to 20% without loss of yield.

Avail to date has been used on more than 29 million hectares and can be applied to all forms of phosphate granular fertilisers e.g. MAP, DAP, TSP, NP. Avail treated phosphate fertilisers can also be used within blends.

There is no restriction on the crop, soil type or soil pH it can be applied to.

As the polymer breaks down in the soil to shorter chains and functional groups it retains its CEC activity therefore providing protection to the fertiliser over a number of months keeping the phosphate soluble.

PRODUCT POSITIONING

AVAIL Phosphorus Fertilizer Enhancer: Meta-Analysis - Agronomy Journal Volume 110 , Issue 1 2018. Extract :

Observations were conducted under conditions where a positive yield response to a P enhancement product would be expected – that is, low soil test phosphorus (STP), strong alkaline or acid pH, and low P fertilizer rate. Of the 116 observations that were evaluated under responsive conditions, they resulted in an average yield response to AVAIL of 4.6% (P < 0.0001). AVAIL effectively increased yields when used appropriately under conditions where a P response was expected.

Where phosphate restrictions occur Verdesian would recommend using 80% of your normal rate of application when using Avail treated phosphate fertiliser, this will bring immediate commercial benefit and under responsive conditions to P will equal your normal yield.

FIELD PERFORMANCE CRITERIA

Maize trials

Phosphate + Avail	Number of trials	Ave Yield response kg/ha
Granular P-fertiliser	177	559 (+5.5%)

Avail will protect phosphate under all field conditions. However, from experience, growers will see maximum field benefit when applying their treated phosphate fertilizer under the following conditions:

- Placement of phosphate fertiliser as opposed to broadcast
- Soils with sub optimal pH, high or low
- Soils which have a positive response to P fertilisation
- Soils with a low organic matter content

ENVIRONMENTAL

Earth Worm Study – France , January 2018

ASSESSMENT OF THE INDIRECT EFFECT AND LONG-TERM EFFECT OF THE DEGRADATION OF AVAIL USED IN MIXTURE WITH PHOSPHATE GRANULAR FERTILISERS – INCUBATION ASSAY IN CONTROLLED CONDITION – CONCLUSION

The application of the product AVAIL at its rate of use and at 3 and 10 times this rate does not show any negative impact on the growth and on the mortality of earthworms. The product seems to have a positive effect on the growth of earthworms in comparison to the untreated check agricultural soil. In mixture with the agricultural soil used in the trial, the application of the product AVAIL does not have significant ecotoxic effect on the reproduction of earthworms in comparison to the soil alone.

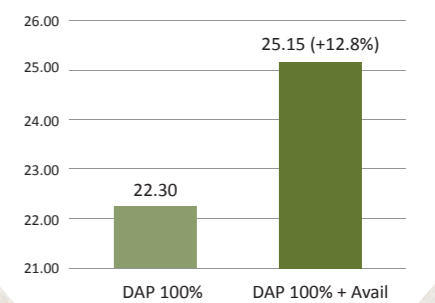
Avail applied with phosphate fertiliser does not affect soil bacteria, earthworms, other soil life, fish or fauna.

Avail treated phosphate can be applied at a reduced rate to normal rate. As soil erosion by wind and water can introduce phosphates into water courses which can lead to algae bloom, reducing mineral P applications by up to 20% may assist to reduce this environmental hazard.

The Avail polymer breaks down in the soil to carbon, oxygen, hydrogen and sodium.

Due to the size of the molecule it does not get taken up by the plant, therefore there are no residues in the harvested crop.

Avail, potato trial - Hauts -de France 2016
Yield (tonnes /ha)



AVAIL® - Guide to application, blending and storage

AVAIL® (granular)

- Avail improves the availability of phosphate from granular based P-fertilisers by providing season long protection from fixation by metals within the soil surrounding the applied fertiliser.

Application – general

- Avail (granular) is used with granular phosphorus fertilisers such as DAP, TSP, NP, NPK
- Avail remains effective over a cropping season and beyond
- Avail improves storage and application properties of the phosphorus fertiliser and reduces dust formation
- Fertiliser bulk blends containing Avail treated phosphorus fertiliser show improved storage and handling properties

Application rate:

- 2.1 litres / tonne of fertiliser

How to apply:

- use standard application equipment. It is recommended to use 316 grade pumps and attachments for application of Avail. Seals should be made of HDPE, Gore-Tex, Teflon or Viton.
- Dye may be added to the Avail before application – follow dye manufacturer instructions

Using a calibrated sprayer apply onto phosphorus fertiliser moving on conveyor belt

- Immediately after application, the Avail treated fertiliser should have mixing process to ensure equal distribution

Mixing drum

- drum must always be filled with fertiliser first
- Avail should be applied by spraying into the moving drum
- small batches can be treated by slowly pouring Avail into the moving drum
- Residence time in the drum should be no more than 6 minutes

- it is not necessary to evenly cover the entire granule surface; however, an approximate equal amount of Avail should have impregnated any fertiliser granule.

Drying time:

- treated fertiliser should be allowed to dry
- the typical drying time is ± 5 minutes, however,

the actual drying time will depend on

- the fertiliser used
- the degree of moisture in the fertiliser
- environmental conditions, the temperature and relative humidity of the air
- the equipment used and speed of mixing.

-Additives as dyes can change drying time

Storage:

- Avail stores indefinitely without deterioration, however, containers should be kept in a cool, dry, clean place and protected from direct sunlight.
- Storage properties of Avail treated P-fertilisers are improved over non-treated.
- After application Avail will remain fully efficient over the storage time of the treated P-fertiliser.

Making bulk blends:

- Before blending with other components

- always treat the P-fertiliser first and have it dried before it is used in a blend. Avail treated P-fertiliser behaves as good as or better than untreated.

- as in any bulk blend the type and quality of the blending components may influence the properties (storage, shelf life, application) of the made blend.

Cleaning:

- After application, cleaning down of equipment with water is recommended as Avail is readily soluble in water

Safety and Disposal:

- Read instruction on product label before use. Wear protective clothing to avoid contact with skin or eyes or breathing in mist from sprayer. Observe local laws regarding disposal of containers.

Do not apply Avail for granular phosphate into liquid P fertiliser or onto seeds. The product is for use only by professional suppliers, blenders, agricultural or horticultural contractors. There is no restriction to the crops the treated phosphate fertiliser can be applied to, although always adhere to local regulations.

HAZARD STATEMENTS

H317 May cause an allergic skin reaction.

PRECAUTIONARY STATEMENT

P261	Avoid breathing mists/vapours/aerosols.
P280	Wear protective gloves/protective clothing.
P302 + P352	IF ON SKIN: Wash with plenty of water and soap.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P363	Wash contaminated clothing before reuse.
P501	Dispose of the contents/container in a collection centre for dangerous goods and hazardous waste in accordance to local, regional, national and/or international regulations.



VERDESIAN

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