

New ways of thinking

Bioscience products

Voltek Tiros and Voltek Bio L-CBF BOOST Liquid Gypsum Phosphorus Liberator

growing through innovation

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Following the successful launch of the Agrovista Innovation Range in spring 2020, we are delighted to extend our offering through the addition of five new products. This is a continuation of our work within bioscience, further reinforcing the ethos of the range - targeted solutions with tangible benefits. Soil health has been named as a key factor in the Agriculture Bill, so launching these additional products is just one way in which we hope to support

growers and give them the tools they need to address a sustainable future."

Craig Morgan, Head of Research and Development, Agrovista



Part of the **Agrovista Innovation Range**



Demonstrating return on investment

It's long been understood that the future of traditional crop protection products is uncertain. The regulatory landscape has a huge influence on what we, as an industry, can achieve in effective food production.

But it could also be a need to protect our environment, avoid exceeding maximum residue levels (MRLs), or the desire to try something new, that drives us to think outside of the box and step into the world of bioscience. Whilst we want to be creative and smart with our product choices, we also need to be able to demonstrate a return on investment from using these innovations. With abundance in the market-place, bioscience products must prove their efficacy to really make a difference.

Through our network of global innovators, Agrovista brings the latest in scientific developments to you, the grower. Whether that's maximising chlorophyll production, or mitigating plant stress, we are proud to provide products that are supported by both academic research and field trials.

Targeted **solutions**



Through truly understanding the science behind innovation, Agrovista can help you to select the correct bioscience products.

Whether that's meeting a crops' specific resource requirements, or overcoming a physiological problem, we know that choosing the right product for the right timing is key.

Effective use of bioscience in three steps



For cereal crops, this can be demonstrated through the following:

With specific products for each of these steps, Agrovista can successfully guide you through effective bioscience application to help you achieve maximum results.

Voltek

A unique biostimulant seed treatment complex for cereal crops that supports germination and improves crop establishment.

Grow faster, move stronger, from day one

How it works

Voltek contains a biostimulant complex known as a metabolite - a unique blend of phosphite, keto acids and additional nutrients. Applied as a seed treatment, this supports the growth and development of young seedlings as they emerge from day one.

Phosphite triggers root development, resulting in improved biomass and root exploration. This allows a plant to easily access the water and nutrients from the soil that it vitally needs during establishment.

By maximising nutrient uptake, this stimulates the plant to grow quickly, giving the plant the best chance to naturally overcome potential stresses and pressures throughout the lifecycle.

Another feature of the Voltek complex is keto acids - biological precursors to chlorophyll synthesis. These work by reversing chlorophyll suppression that a plant may experience during its lifecycle. By increasing chlorophyll production, keto acids maximise green leaf area and plant biomass, essential for crop growth.

Voltek's formulation also offers additional nutrition in the form of manganese and zinc, further supporting a crop's early nutritional needs.

Benefits

Voltek offers the following benefits:
Enhanced germination
Increased root and shoot biomass
Improved establishment rate and crop uniformity
Increased stress tolerance including overwintering

Abiostimulant seed treatment that *supports* germination and improves crop establishment





Voltek seed treatment showed a visual improvement in ground cover for this barley trial at Morley, Yorkshire. This is supported further by results from Canopeo - a green canopy measurement application.

% ground cover analysis in barley*



*Analysed at GS 24-26







Head of Research and Development, Craig Morgan said: "By applying biostimulant technologies directly to the seed, we support the crop right from day one and this is when it counts the most. Supporting a seedling during establishment, in often challenging conditions, will best equip us to overcome the many challenges that we may face throughout its lifecycle."

What this means for you



Application

Сгор	Rate	Application
Cereals (including mobile seed dressing)	1.0I/t	Seed treatment

Other features

- Liquid formulation
- Tank mixable
- Fully crop safe
- Cost effective solution



A combination of two complementary seed treatments offering the ultimate support for plant establishment and early nutrition.

The ultimate plant nutrition duo

How it works

By choosing to use Tiros and Voltek Bio seed treatments in combination, growers are addressing the biological and biostimulant requirements of a crop right from day one.

Tiros contains endophytes – the microorganisms found between living plant cells. Endophytes can influence a range of beneficial behaviours in a plant including fostering growth, fixing nitrogen and reducing the impact of abiotic stress.

Following considerable scientific research, endophytes can now be isolated, grown in culture and used to re-inoculate plants – the result of which is Tiros.

The specific bacterial endophytes found in Tiros have been carefully selected to fix atmospheric nitrogen and sequester other nutrients from the soil, living within the whole plant from roots to shoots. This results in improved root and shoot biomass, which leads to increased drought stress tolerance. Because the product optimises what is available in the soil, it reduces the reliance on artificial fertiliser products.

In contrast, Voltek Bio is a biostimulant seed treatment complex known as a metabolite, containing a unique blend of keto acid, amino acids and additional nutrients.

This metabolite complex boosts nitrogen and carbon uptake, to aid germination and support crop establishment. In doing so, it maximises the nutrients made available by Tiros, whilst helping to stimulate the plant to grow away from potential stresses and pressures.

Harnessing the power of these targeted products in combination provides a connected approach to early plant nutrition, helping growers to make the most of crop establishment.



Benefits

Using Tiros and Voltek Bio in combination offers the following benefits:

- Improved nutrition uptake and efficiency
- Increased root and shoot biomass
- Supported plant establishment and early vigour
- Improved crop uniformity
- Resistance to stress

Two complementary seed treatments that offer the **ultimate** support for plant establishment





Using Tiros and Voltek Bio in conjunction with a single-purpose dressing (SPD) is shown to have a positive impact on vegetation condition, as shown by the below NDVI scan for a barley trial at Scotland Wood.

NDVI (Normalised Difference Vegetation Index) uses visible and near-infrared bands of electromagnetic spectrum to collect and analyse data, indicating levels of healthy vegetation.



This is further supported by these barley trial results from Haselbech in Northamptonshire, conducted using Canopeo - a green canopy measurement application.

% ground cover analysis in barley*



*Analysed at GS 23-25





What this means for you

A trial conducted in North Lincolnshire in 2019 on Shabras winter wheat shows a considerable increase in yield following the use of Tiros and Voltek Bio.

Impact on yield in winter wheat



Demonstrating the improvement in shoot biomass, a winter wheat trial on Saki variety in Bedfordshire in 2020 shows an increase in g/m2 when seed is treated with Tiros and Voltek Bio.

Winter wheat establishment - plant biomass g/m2



Head of Research and Development, Craig Morgan said: "This seed treatment duo really is the ultimate in early nutritional support. Not only does it improve available nutrition, but it also improves the crop's ability to absorb it too. All direct to seed, from day one."

Application

Сгор	Rate	Application
Cereals (including mobile seed dressing)	1.0l/t per product	Seed treatment

Other features

- Liquid formulation
- Fully genome mapped; no mammalian toxicity
- Can be applied either at seed plant or via mobile unit

L-CBF BOOST

A liquid carbon additive that acts as a food source for soil microbes, increasing nutrient availability and improving the efficiency of applied fertilisers.

Feed your soil microbes

How it works

L-CBF BOOST[™] is formulated using filtered cane molasses and contains a range of nutrients including nitrogen, potash and sulphur. It works by acting as a food source for soil microbes and fungi, which enables them to increase in population. With greater numbers, these then improve the availability of key nutrients; boosting root mass, crop yield and overall soil and plant health.

Soil microbes need to be fed to survive and multiply, but over the years numbers have declined due to excessive tillage and pesticide applications. Because of this, crops have required even greater levels of artificial fertilisers and chemicals, which has further damaged these vital microbes.

By changing perspective on soil health and focussing on feeding soil microbes, we can increase their numbers and therefore improve the productivity of applied fertilisers. This is particularly useful for nutrient-hungry crops such as maize, beet and potatoes, as well as cereals and oilseed rape.

With soil health firmly on the political agenda, building long-term soil fertility and improved nutrient cycling will help growers to replenish their soils' natural biology.

Benefits

L-CBF BOOST offers the following benefits:
 Improves nutrient availability and cycling
 Increases root mass

Supports long-term organic matter building including cover crop conversion

- Low C:N ratio to help balance soils
- Improves applied fertiliser efficiency

A food source for soil microbes that increases nutrient availability





Increased root mass in maize treated with L-CBF BOOST, as well as length of roots and exploration potential is show in the images below.

Maize images captured from a trial at Knutsford, Cheshire.



What this means for you

When L-CBF BOOST is applied alongside a bacterial treatment on soil with low organic matter content, a yield increase of 9.8% can be achieved, equating to £141/ha ROI.

This is because L-CBF BOOST provides the vital food that the applied bacteria require.

The trial was conducted on maize in Broxton, Norfolk in 2019.

Yield response in maize, **low** OM soils

£141/ha ROI



In comparison, when L-CBF BOOST is applied to soils with existing high organic matter content, used alone it can achieve 8.2% yield increase, equating to £144/ha ROI. Here, L-CBF Boost is improving the activity of existing soil microbes.

The trial was conducted on maize in Lackham, Wiltshire in 2019.

Yield response in maize, **high** OM soils

£144/ha ROI 18.5 +8.2% 18.4 t/ha 18.4 t/ha 17 17.0 t/ha 16.5 16 15.5 15

Treatment

Application

Сгор	Rate	Application
	10-15I/ha	At planting or with early herbicides
Autumn and spring sown combinables	Followed by: 5-10l/ha and/or 3-5l/ha with each fungicide application	With spring liquid nitrogen With each fungicide application
Autumn and spring sown grass	20l/ha	At planting
	Followed by: 20I/ha	In spring after each cut
Maize	20I/ha at planting	At planting
	Followed by: 20I/ha	At emergence
Potatoes	40I/ha	At planting or pre-emergence
	Followed by: 10l/ha	At tuber initiation
Sugar and fodder beet	20I/ha	At planting

Other features

- High levels of available carbon
- Tank mixable
- Various pack sizes including bulk



Chris Martin, Head of Soils at Agrovista said: "By mimicking the vital work of a crop's root exudates, which feed rhizosphere microbes and fungi by naturally releasing carbon compounds, we can tap into a broad range of crop benefits. As this product has been independently trialled globally for more than 10 years with great results, we are delighted to be able to offer it to our customers."



Inspiring change...

Liquid Gypsum

A liquid soil conditioner that helps soil flocculation; improving workability, drainage and root exploration to support crop establishment.

Building your soil structure

How it works

Gypsum (calcium sulphate dihydrate) causes the small particles found in clay soil to flocculate to create larger particles. In doing so, this enables better aggregation leading to improved soil porosity, water infiltration and drainage, as well as increased root development. This can all assist in improving water use efficiency.

Soils treated with gypsum are well-equipped for tillage, requiring less energy for cultivation and posing a lower risk of compaction. Improved soil aggregation and permeability also provide an excellent starting point for introducing no-till management systems.

In liquid form, gypsum quickly penetrates the entire top soil, flocculating the soil particles at depths where roots are most active. By creating stable soil particles and therefore pore spaces, roots can move more easily.

Liquid Gypsum is also a useful nutrition source of calcium and sulphur, helping to improve structure whilst balancing calcium-magnesium ratios particularly in 'tight' high magnesium soils.

As the product is applied with a conventional sprayer, risk of further soil compaction through machinery use is reduced.

With soil health named as a key factor in the new Agriculture Bill, use of gypsum to help improve structure and functionality is likely to increase significantly across the UK, as farmers are encouraged to move less soil mechanically.





Benefits

Liquid Gypsum offers the following benefits:
Reduces soil cracking, run-off and erosion
Supports crop establishment
Source of calcium and sulphur
Increases stability of organic matter
Improves harvest conditions for root crops
Fast acting compared to granular equivalents

A soil conditioner that *improves* workability, drainage and root exploration





Liquid Gypsum is highly soluble and as such is around



than insoluble granular gypsum.

What this means for you

Liquid Gypsum can be applied through a conventional sprayer using traditional water volumes. This means application is more accurate than many traditional sources of gypsum which are difficult to apply evenly, as shown below.



*On a weight for weight basis



Application

Rate	Application Timing
5-20I/ha	To soil, pre or during cultivation

Other features

- Liquid formulation
- Fully soluble and tank mixable
- Can be used with conventional farm sprayers
- Available in various pack sizes



Chris Martin, Head of Soils at Agrovista said: "Gypsum has been used in agriculture for more than 250 years, but by applying it in liquid form, we truly unlock its many benefits. This is particularly useful when looking to improve compacted soils, or those with high magnesium indexes."

Phosphorus Liberator

A soil-applied product that dissolves existing phosphorus locked up in the soil, making it available to plants and improving soil health.

The key to accessing soil nutrition

How it works

Phosphorus Liberator contains carboxylic acid salt – an organic compound with the ability to break down calcium phosphate found in soil, into crop available form.

By using organic acid complexes, bound calcium phosphate is released in a manner that is not possible with water alone, and is neutralised with a counter-ion that allows the freed calcium phosphate to stay in solution.

By keeping phosphate in solution, the bonds with other minerals such as calcium are broken. Once broken down, phosphate is then available in the soil for uptake by the plant as nutrition.

Phosphorus is critical for crop growth, particularly during important phases such as germination, rooting, flowering and seed production. Deficiency of this important mineral can lead to reduced growth, tillering and tuberisation, and necrosis of older leaves.

The carboxylic acid technology found in Phosphorus Liberator also releases soil-bound manganese, whilst feeding saprotrophic fungi – organisms that help to degrade organic matter and release other nutrients found in soil.

With potential restrictions to phosphorus management on the horizon, effectively utilising existing soil-bound nutrients and improving water quality will be pivotal.



Benefits

Phosphorus Liberator offers the following benefits:

- Improves soil heath and access to nutrition
- Supports plant growth and establishment through increased rooting
- Maximises phosphate and fertiliser efficiency

Dissolves locked up soil-bound phosphorus



Agrovista trials conducted autumn 2019 at a site in Leominster show a visible improvement in the establishment of oilseed rape following an application of Phosphorus Liberator at 51/ha.

Images show 10 days post application.

Phosphorus Liberator also performs well during difficult oilseed rape establishment conditions, such as this high-trash site in north Yorkshire.







What this means for you

A winter wheat crop assessment conducted in Suffolk in January 2020 shows the positive impact Phosphorus Liberator can have on average plant and root weight.

Winter wheat early crop assessment, Suffolk 2020



nspiring change... bioscience products and new ways of thinking

An assessment on spring beans in Oxford 2020 also shows favourable results.

Spring bean development, Oxford 2020



Untreated:



Treated:



Chris Martin, Head of Soils at Agrovista said: "As the regulatory landscape changes in terms of fertiliser use, Phosphorus Liberator could become a go-to tool for those needing to unlock currently inaccessible nutrients within the soil, therefore reducing the reliance on traditional nutritional solutions."

Application

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Other features

- Operates in a wide temperature range
- Functions during dry conditions
- Non-hazardous and biodegradable
- Tank mixable and can be used with a conventional sprayer
- Available in various pack sizes

Contact your local Agrovista agronomist today, to discuss our Innovation Range and how these exciting new products can support you.





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