techtalk

Potential of biostimulants

Biostimulants are playing an increasingly critical role in helping crops reach their full potential and growers to maximise profit margins. As a leader in the field of crop nutrition, Ilex Enviroscience has been providing sound scientific advice on this essential input to progressive UK growers and agronomists for two decades.

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'Vitamins' for plants

Biostimulants purport to offer growers stronger, more resilient plants and are becoming increasingly popular as growers look to more sustainable management practices. With new regulations about to come into force in the EU, will the UK follow its lead? *CPM* finds out more.

By Melanie Jenkins

Biostimulants are by no means a recently discovered tool, with the use of seaweed as a soil conditioner dating back generations. But the industry's knowledge and understanding of them could still be perceived as being in its infancy.

As growers look to reduce inputs, focus more on environmentally friendly practices and utilise tools such as integrated pest management, biostimulants have garnered a growing interest and the market has expanded. But new regulatory frameworks may soon unfold and there are still questions about product effectiveness.

CPM speaks to Murray Smedley, managing director at Ilex Enviroscience — a long standing member of the European Biostimulants Industry Council (EBIC) — to better understand where biostimulants are headed next. In his role as GB liaison officer for EBIC, Murray will be supporting a robust regulatory framework without prohibitive costs which ensures products are safe and claims justified while not stifling innovation with prohibitive costs.

What are biostimulants?

The function of biostimulants is to stimulate natural plant processes to improve vigour, making plants less vulnerable to pests and diseases and increasing tolerance to abiotic stresses — which can be caused by water deficiencies, a lack of sunlight or sub-optimal temperatures.

Their effect is to enhance beneficial characteristics within the plant or the rhizosphere surrounding the plant roots, including improvements in nutrient use efficiency. This results in increased quality of the crop and overall yield. It's important to recognise biostimulants themselves don't directly provide fertilisation or offer any pesticidal activity — they're best described as 'vitamins' for plants.

They may contain a wide variety of substances; including plant materials and extracts, microorganisms, polymers and organic acids. One of the most popular type of biostimulant in the UK is inorganic phosphites and these are recognised at a genetic level to stimulate plant growth.

What role can they play?

Biostimulants are another tool to support growers in maximising yield. Often consisting of naturally originating ingredients and usually applied at low rates, they can play a key role in sustainable food production by potentially reducing other necessary, and sometimes environmentally damaging, inputs.

> *"Biostimulants are another tool to support growers in maximising yield."*

They can be used in management programmes to help alleviate stress, pre-emptively or after stress has occurred. In arable situations in the UK, biostimulants are most often used preceding a stress event. But if you're pushing

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your crop to the maximum, you might apply biostimulants more often to help maximise crop potential.

When applied to seeds or soil, they can impact the soil microflora and act to improve nutrient use efficiency — making nutrients more readily available to the plant. In cereals it's common to apply biostimulants as a seed treatment, so that as soon as roots emerge the biostimulant can help improve rooting, setting crops up for the winter.

Though they aren't pesticides, they can help a plant recover once a pesticide has done its job.

How are they regulated?

In all cases, biostimulants must not infer plant protection claims — only authorised pesticides can make these.

Currently, each country in Europe has its own regulatory process. Some countries are quite stringent and require proof of effectiveness, safety and stability, and others — like the UK — are far more relaxed.

New EU Fertilising Products Regulation (FPR) is due to come into force on 16 July 2022, which aims to harmonise requirements to allow those who obtain a CE marking to place biostimulants in all EU member states. However, suppliers of biostimulants are also allowed to continue to be regulated under national rules, meaning manufacturers will have a choice to continue at a national level, or to adhere to the FPR rules and be able to market their products across all EU member states.

Given the wide variety of types of biostimulants — together with their uses and claims — this is a complex piece of legislation. Part of EBIC's work is to assist the EU Commission in developing guidelines for the new product regulations as these are complex and may have gaps that require clarification. The FPR is currently a long way off providing enough guidance to allow manufacturers who wish to put biostimulants on the market to be ready to do this before the regulations come into force.

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Does this apply in GB?

In GB, the only rules governing biostimulants are indirect. Both the authorities and the industry are keen to ensure that any claims made by biostimulant manufacturers don't infer pesticidal activity, but beyond this they only need to make sure products are safe, fit for purpose and labelled appropriately.

The industry is largely self-regulated in GB, meaning the government relies on industry picking up on inaccuracies from manufacturers and reporting them to the Chemicals Regulation Division of HSE.

EBIC members are required to make certain their products are labelled clearly, accurately and correctly to ensure safe use.

The new EU FPR rules won't come into force in GB, but Defra is reviewing the impact and benefits of the FPR after it launches, and we should expect to hear of Defra's position by the end of this year. This allows Defra to see how the FPR impacts ▸

A place at the table

The dwindling pesticide portfolio has resulted in the use of biostimulants becoming more mainstream on one Cambridgeshire arable farm.

Third generation farmer James Fountain of Delavals Farm, Whittlesey, says it was a leap of faith when he decided to introduce biostimulants applied as foliar nutrients to oilseed rape and potatoes. But he has no regrets and intends to use more products like them going forward.

Delavals Farm is a traditional fenland farm, rich in nutrients, which produces 160ha of winter wheat, 50ha of pre-pack potatoes, 60ha of sugar beet, 55ha of winter barley, 30ha of OSR, 22ha of mustard, 20ha of spring barley and 15ha of winter beans.

Like so many farms of its type, the potato enterprise relies on a quality skin finish and high yields for the pre-pack market. Main varieties include Orchestra, Melody, Mozart and Fandango.

"The trigger point for us to test biostimulants was when we went back into growing OSR after the revocation of neonicotinoid seed treatment for flea beetle," explains James. "When applied early we found that the foliar nutrition helped plants to enhance their own natural immunity and therefore counteract the damage caused by the pest.

"We applied the phosphite-based foliar biostimulant Oilseed Raiser, which promotes healthy root development and green area index and boosts crop resilience. For us, the key factor is the phosphite technology because the chemistry helps crops overcome the stresses of adverse weather, nutrient imbalances and deficiencies."

Around seven years ago James carried out his own replicated trials using the multi-nutrient formulation PK Maxx+ on potatoes. This, combined with on-going advice and guidance from John Allen of Ilex Enviroscienses, gave him the confidence to keep biostimulants in the product armoury.

"In the trial, applying PK Maxx+ early to the crop helped it establish well ahead of drought-like conditions. The product contains both phosphate and phosphite forms to provide rapid and efficient delivery of phosphorous at critical growth periods, boosting root development and stimulating healthy growth, build tuber numbers and produce more saleable yield."

On close visual inspection soon after application, root development noticeably improved as it allowed the plants ability to hunt for natural nutrients and water in the soil, effectively building a level of natural drought tolerance, he explains.

Now biostimulants have secured their place in James' input armoury. At an average cost of £7/litre, the 10% increase in saleable potato yield return has proven to be a solid investment.

This season James will apply Stimplex at the early rosette stage for reducing stress and building yield followed by an application two to three weeks later of PK Maxx+.

Working with John Allen, James Fountain has gained confidence to keep biostimulants in the product armoury.

"We see biostimulants now as a key component in our inputs and they're considered a major part of the yield and quality building process — they're a low-risk option for us. All the products we're using have tank-mix compatibility with pesticides, so we can apply them at the same time rather than in a separate pass."

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▸ products on the market, how it controls them and how growers and agronomists react.

Where do microbials fit in?

Microbials are just one of many classes of biostimulants which are becoming increasingly popular in the UK and Europe, but regulations are particularly challenging.

Currently, the FPR provides only a very limited 'positive' list of species that can be marketed as biostimulants. EBIC and other industry associations see this as unnecessarily prescriptive and are working with the authorities to amend the regulation to allow the use of any microorganism which is proved to be safe and beneficial.

There remains a lot of work to be done to ensure EU growers have access to such products, which are widely used to improve sustainable food production worldwide.

When Defra comes to address biostimulant regulations, EBIC wants to ensure it recognises a 'negative' list of harmless microbials rather than a 'positive' harmful list.

What about nutrition?

A key characteristic of many biostimulants is an improvement in nutrient use efficiency. Many include traditional nutrients within their formulation to provide a direct and often immediate improvement in the nutrient status of the treated plant. Such products may be labelled with a fertiliser declaration which provides the grower with a clear composition.

As well as increasing nutritional benefit in the conventional way, the addition of macro or micro-nutrients may also be because a number of biostimulants — especially phosphites — are recognised to increase plant uptake of nutrients.

What's their potential in UK?

Biostimulants can play the same important role in sustainable food production as those used elsewhere in the world. Their role has become increasingly important over the past ten years as their benefit in food production has been recognised.

Given our increasingly unpredictable climate, crops often suffer a number of stress events during the growing season and so the value of biostimulants to improve vigour before — and aid recovery after them — is high.

Other social and environmental aspects, such as the drive for farm-to-fork food production and a decreasing food growing area as demand for growing crops for energy increases, means the need for more efficiently grown food is increasing.

There's also likely to be a drive for greater food security in the UK as the government looks to improve our self-sufficiency as a nation and reduce our reliance on imports. Biostimulants will play an increasingly important role in helping growers maximise crop potential.

It's important to check that biostimulants have either been developed specifically for the UK or tested in local crops and weather conditions.

How do I know they work?

The very wide range of biostimulant products have equally diverse modes of action, meaning it's not easy to categorise each into a defined mode of action, as can be done with pesticides.

Likewise, beneficial effects can't be guaranteed in the same way as biostimulants act by reducing the impact of crop stress events, which may or may not occur during the growing season.

Traditionally, in the UK there's been no legal requirement to provide data or undertake independent assessments of the benefits of biostimulants placed on the market. And it's only been recently that manufacturers have begun to present evidence to show that the compounds within biostimulants can act in a number of ways that have an effect on plant growth.

The very wide range of biostimulant products have equally diverse modes of action and can be used on many different crops.

But as biostimulants are neither a pesticide nor a fertiliser, there's no guarantee of a benefit at all times.

EBIC members recognise the importance of providing trials evidence and increasing knowledge transfer to improve understanding and confidence for growers to include biostimulants within their sustainable crop production programmes.

The EU FPR (and we anticipate in due course, the GB equivalent) requires studies to show the beneficial effects of biostimulants which match and justifies their label claims. ■

Potential of biostimulants: top tips

- **Biostimulants can help improve nutrient use efficiency** – which is becoming more important in relation to the environment and rising costs of production
- **A move towards more sustainable farming** – with fewer inputs, could provide an opportunity for biostimulants to be used to help bolster crop health
- **More resilient crops** – as volatile weather event become increasingly common, more resilient crops can help ensure growers get a good yield, whatever the season