

## **Additive increases available nitrogen and lowers solid content of digestate**

Slurry additives that increase nutrient recovery and improve product consistency are commonplace in the dairy industry, but a cutting-edge trial has shown that these practical and financial benefits can also be available to digestate users.

A recent trial has found that adding a liquid slurry additive to an anaerobic digestion (AD) plant has delivered a 20% increase in available nitrogen and a 29% reduction in dry solids in comparison to the untreated product. This has made it easier for crops to access nutrients and reduced the time it takes to pump and apply the digestate.

Digestate is becoming an increasingly valuable source of plant nutrition for growers with access to it, but not fully realising the nutrient value has meant bagged fertiliser is still a more reliable source of crop nourishment.

Origin Fertilisers' Digest-It product has been proven to decrease ammonia emissions and increase ammonium nitrogen levels within slurry through aerobic fermentation, and speciality sales manager at Origin Fertilisers, Callum Norman, wanted to try the product on digestate as it has a similar nutrient composition to slurry.

"Dairy slurry is quite anaerobic so the makeup and biological status of digestate has many similarities. Our main aim was to try and improve the nutrient value of digestate through the addition of the Digest-It additive, allowing the grower to achieve more from the same product. A secondary element was to reduce the solid content within the digestate and make it easier to pump and handle."

### **Nitrogen content**

The trial started in December 2021, to coincide with the closed period of the Lincolnshire AD plant and local NVZ spreading restrictions. Digest-It contains food for dormant aerobic bacteria and existing microbes within the digestate, and requires between eight and 12 weeks after application to work effectively.

The concentration rate trialled was the same as slurry, so 20 litres of Digest-It treated 454,000 litres of digestate. The lagoon was sampled every two weeks following application, with the final test in February before field applications began. Mr Norman explains how Digest-It made a difference.

"The organic matter is broken down by the bacteria within Digest-It, which use the ammonia gas as a source of nitrogen. This is turned into ammonium nitrogen, which increased from 89kg/ha to 121kg/ha in the treated digestate."

This increase not only helps nutrient recovery but lowers the risk of losses to the atmosphere. At the time of the trial, the value of adding Digest-It translated into a £36.47/ha saving and returned an investment benefit of 2:1. There were further advantages when looking at storage and application.

"The 29% reduction in dry solids occurred in the first eight weeks after Digest-It application and nitrogen content fell from 4.3kg/m<sup>3</sup> to 3.8kg/m<sup>3</sup>. This means 13% more Digest-It treated product could be spread over the same acreage, which could help growers farming smaller areas or limited by NVZ restrictions."

A further gain is that Digest-It only requires one application as the live bacteria within the product continually multiply by feeding on the organic matter and breaking down the solid content.

### **Maximising digestate's value**

The average nitrogen content in the digestate remained at 6kg/N/per tonne and didn't vary between the liquid or the solid product due to the forage rye and maize feedstock remaining consistent.

Spring applications offer the greatest efficiency from digestate as up to 55% of the nitrogen is available to the growing crop. With the readily available nitrogen increased through the addition of Digest-It, the accessible nitrogen in the digestate is offering farmers extra options regarding fertiliser use.

"Anaerobic digestate can take longer to be consumed into the soil as the solid material needs to break down after early season applications, especially in dry periods. But changing it to a more aerobic state and closer to a liquid fertiliser consistency, the soil and plants aren't working as hard to access the nutrients as it is more mobile at the point of application."

### **Farmer viewpoint**

The trial took place at AEL Biogas near Boston, Lincolnshire. Mark Wallace has managed the AD plant since it was installed nine years ago and has noticed the build-up of solid digestate under the lagoon's roof becoming more of an issue.

"Even though we separate solid and liquid digestate before the latter enters the lagoon, we were noticing pockets of solid material under the lagoon's roof as it emptied. It has a soft liner so we can't mechanically stir it, and removing the roof has huge cost implications. It was also becoming difficult to pump the liquid once the lagoon was down at 30% capacity."

The digestate is applied across the 1,800ha farm as a top dressing onto wheat, pre application to maize, and a starter fertiliser for brassicas.

"Since adding Digest-It we have seen a marked improvement in the consistency of the product, it is now like water as opposed to slurry, which makes it easier to pump, reduces fuel use, and fills the Claas Xerion tanker nearly three minutes quicker than before," comments Mr Wallace.

"This year we didn't reach the point where we couldn't pump any more, and the lagoon is the lowest we've ever seen it at, between 15-20%. This is due to Digest-It converting the solid organic material into liquid digestate."

Mr Wallace said that digestate has been applied to all the sugar beet crops this year as more is available in the lagoon, which has halved the fertiliser cost across the acreage. He has also seen that crops nourished with digestate during the dry spring absorbed nutrients quicker and were visibly stronger earlier in the season as a result.

The pleasing results have meant Mr Wallace plans to use Digest-It again this year and he will add it in October to offer a longer working period to further reduce the solid content that has built up.