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SAVING BIGGER SEED – P48
Growers using farm-saved seed see benefits of removing smaller seeds

SPUD STORAGE TIPS – P50
There could be problems ahead for storing potatoes after dry weather

MALTSTERS' WINTER NEEDS – P55
More winter malting barley could cut risks for growers and maltsters

Trial shows slurry additive boosts digestate N value

A slurry inoculant is boosting the nutrient content of digestate on one Lincolnshire farm. **Richard Allison** looks at the benefits

AD plant at AEL Biogas at East Kirby in Lincolnshire

A microbial additive developed for use in slurry has successfully increased the available nitrogen content of digestate and made it easier to handle at a Lincolnshire anaerobic digestion (AD) plant.

Digestate has always been seen as a valuable by-product of the AD process, and soaring fertiliser prices mean it has been especially prized in recent months as a fertiliser replacer. However, its value could be increased if more of the nitrogen was available to crops.

With spring applications, Agrii national technical manager Tom Land is seeing about 55% of the nitrogen being available to the growing crop for digestate from AEL Biogas' 1.2MW anaerobic digestion plant. "So if we can increase the readily available part and get closer to bagged fertiliser, it may help mitigate some fertiliser costs," he says.

Agrii national technical manager Tom Land

Furthermore, AEL Biogas AD manager Mark Wallace says the liquid by-product can be difficult to handle.

Circular system

The nine-year-old plant on the disused East Kirkby RAF base, Lincolnshire, complements the two farms run by the family firm, AE Lenton Group (AEL). Maize and rye is grown to feed the digester, while the arable area benefits from the digestate. Spent digestate is put through a separator, with the solids used as a soil conditioner on the organic farm near Boston.

The liquid is pumped into the lagoon, where it is stored until the spring, then used on the main farm after the nitrate vulnerable zone closed period. The plant produces 18,000cu m of liquid a year.

AEL farm manager Richard Hubbert says one problem seen in recent years has been the sediment settling out in the covered lagoon. "We have been seeing pockets of solid matter in the lagoon."

His concern is that eventually it will have to be dug out, as the plastic liner prevents the use of a stirrer. The floating roof is an added complication, as removing the solids would involve cutting the roof, at great expense.

Another problem is that the solids make the liquid difficult to handle, slowing down pumping and occasionally bunging up the spreader. So Mr Hubbert and Mr Wallace concluded that something had to be done.

Slurry additive

Origin Fertilisers believes it has the solution. Speciality sales manager Callum Norman points to a new slurry additive, Digest-it, launched by Origin in the past year. It is aimed at increasing the ammonia N content of slurry and reducing crusting on the top of stores, making it easier to pump.

Mr Land, who also does all the nutrient plans and fertiliser advice for AEL farms, says it's known that slurry and digestate are similar in terms of nutrient content and being anaerobic. Therefore, a trial was carried out at the Lincolnshire plant – the first time the product had been used in digestate.

Mr Norman explains that the Digest-it contains a mix of food for existing microbes as well as dormant aerobic bacteria. They feed on and break down the organic matter in slurry and use the ammonia gas as a source of nitrogen to grow, thus turning it into ammonium N.

It works in slurry within 8-12 weeks, so the trial started on 6 December 2021 and ran over a 13-week period until February 2022. The additive was applied at a rate of 20 litres/455cu m of liquid digestate, and the lagoon contents were sampled and tested every fortnight.

Results

Results show that using the product resulted in a 20% increase in ammonia N in digestate that is available to crops, says Mr Land (see "Economic value of extra nitrogen").

The total nitrogen content also fell from 4.3kg/cu m to 3.8kg/cu m, enabling higher application rates.

"It means you need 13% less land to dispose of the digestate," says Mr Norman. This could prove valuable where land is limiting.

Looking at the value of the extra available nitrogen in the digestate, Mr Norman calculates that it equates to an extra £36.47/ha.

Mr Wallace says it is easier to handle, having noted that the fill time for the tanker has fallen. "The consistency was nearer to water and with virtually no solids." This is backed up by the test results revealing 29% less solids.

Mr Hubbert adds that this spring was the emptiest they have seen the lagoon, with just 15-20% remaining that could not be pumped out. Hopefully, this will decrease with time, with routine use of the additive.

In fact, Mr Norman says the benefits may be greater next time, as they plan to apply the additive earlier in October. This will give it more time to work before spreading starts in spring 2023. ■

ECONOMIC VALUE OF EXTRA NITROGEN

	Pre-treatment	Post-treatment
Digestate applied (cu m) to 250kg/ha total N	58.14	65.79
Ammonium N applied (kg/ha)	89.42	121.71
Ammonium value (£/ha valued at £2.25/kg N)	201.20	273.85
Value of additional ammonia N (£/ha)		72.65
Cost of additive (£/ha)		36.18
Net benefit (£/ha)		36.47

EFFECT OF ADDITIVE IN DIGESTATE

Additive applied 2021-22	Dry solids (%)	Ammonia nitrogen (kg/cu m)
6 December	6.7	1.538
20 December	5.87	1.786
5 January	5.07	1.976
14 January	4.93	1.814
5 February	4.76	1.85

PHOTOGRAPHY: EDWARD MOWBRAY

DIGESTATE USE ON AEL FARMS

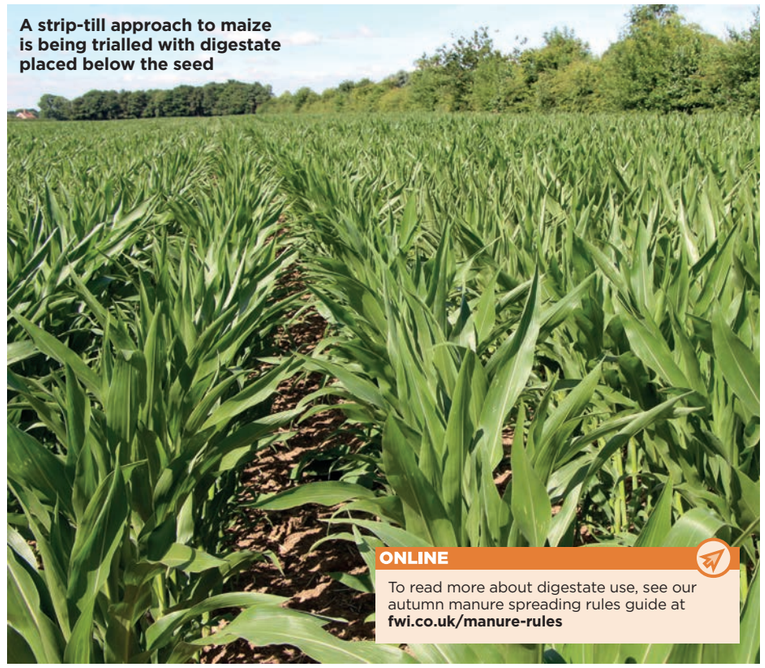
Digestate is a valuable fertiliser replacer on the 1,818ha main farm, which grows maize and rye for the digester, along with wheat, barley, sugar beet, brassicas and potatoes.

The liquid digestate is applied in spring before maize and brassicas, and also as a top dressing on wheat.

Richard Hubbert has seen particular success in sugar beet. Two years ago, in a lower yielding year, the field with digestate had a normal yield, outperforming the rest of the crop. All sugar beet now gets digestate pre-drilling, halving fertiliser costs.

The digestate is fairly consistent in total N content, typically about 6kg/t N. It is normally applied at a rate of 30-40cu m/ha.

This year, the farm is trialling a strip-till approach to maize, placing the digestate about 23cm below the seed to make better use of it. Initial observations show crops established this way have double the root mass, compared with those planted with a precision drill and digestate applied across the whole area.



A strip-till approach to maize is being trialled with digestate placed below the seed

ONLINE

To read more about digestate use, see our autumn manure spreading rules guide at **fwi.co.uk/manure-rules**