

Acid boosts slurry nutrition:

# Acid approach to slurry spreading

Legislation in Denmark means farmers will have to stop surface application of slurry to grassland unless they have a way of reducing ammonia emissions. At the recent Agromek event, BioCover unveiled its SyreN system for tackling these new rules

**S**lurry application is one area in which an ever thickening rule-book is actually resulting in new technology that gives practical benefits to farmers - and not just another bureaucratic headache.

One of the latest ideas to emerge from Denmark is SyreN, which uses sulphuric acid to lower the pH of slurry and convert ammonia gases to ammonium. This reduces total emissions and also boosts the nitrogen and sulphur availability in the slurry.

Morten Toft, of BioCover, has been working on the SyreN system for the past four years and during 2010 had five SyreN applicators operating with contractors in Denmark. The Aarhus University has also been carrying out trials to measure any increases in nitrogen and sulphur levels as a result of adopting the system, and these have shown that the sulphuric acid treatment lowers total ammonia emissions from cow slurry sufficiently to permit dribble bar spreading on grassland.

**So how does SyreN work? Typically, up to 2 litres of sulphuric acid are mixed with every 1m<sup>3</sup> of slurry, helping to lower the pH level and convert ammonia to ammonium.** Mr Toft explains that the target is a pH of six or less, because at this point ammonia emissions are almost zero. He adds that anything from 5 to 50kg/ha of nitrogen is lost

*To reduce the risks associated with working with acid, SyreN stores the product in IBC tanks that can be quickly and safely swapped over.*



through emissions, depending on slurry type, temperature, wind speed, plant cover, application rate, pH value and the amount of ammonia in the slurry. By using sulphuric acid, which is a by-product of refining fuel and therefore relatively cheap, he says that up to 50% of the N in the ammonia gas can be made available to the plant.

On top of this, there is also a benefit to sulphur levels. Every litre of sulphuric acid contains 577g of sulphur and costs €0.30 per litre in Denmark, which, Mr Toft points out, gives it a competitive edge over buying in and applying granular sulphur fertiliser. This sulphur gain needs to be added to the bonus of the extra nitrogen from the slurry.

**When it comes to working with acid, safety is clearly an issue of critical importance.**

With this in mind the SyreN set-up has a set of pallet forks, so that the sulphuric acid can be handled in an IBC tank, along with a protective frame that shuts like a grab over the tank. On either side of the main vessel are two additional tanks: a 300-litre container for odour-reducing iron sulphate or other additives such as manganese and selenium; and, on the opposite side, a 200-litre clean water tank for flushing through the system during maintenance. A dry coupler reduces the risk of the operator coming into contact with any sulphuric acid, and this is held in a parking coupler when swapping tanks.

The self-priming stainless steel pump has an output of 5-50l/min and is hydraulically powered, allowing pump output to be altered to match the dose rate which, in turn, is set

on the tractor's ISObus terminal. If the plan is to use the system as a method of sulphur fertiliser application, the operator just has to enter the required amount of sulphur per cubic metre. The system then relies on the tanker's flow meter to maintain the amount of sulphur in relation to the slurry rate.



*The applicator-mounted pH sensor determines the amount of acid that needs to be added to achieve the target level.*

Similarly, to lower the slurry's pH to control ammonia emissions, the required target value is set by the tanker operator. At the start of a new job the tanker will apply 3m<sup>3</sup> without any acid. Then an applicator-mounted pH sensor determines the amount of acid that is required to achieve the target and maintains this dose rate for the rest of the job. Alternatively, the operator can choose to set the system to continually adapt the acid dosage rate to match the required pH value.

For the iron sulphate the operator has to manually gauge the application rate – usually around 0.2l/m<sup>3</sup> or more. It's added at the tanker filling arm, as the iron sulphate takes up to 10mins to become effective.

In Denmark contractors are aiming for a €0.53/m<sup>3</sup> premium, which is about the same as the difference in the charge between a disc injector and a dribble bar. Importantly, Mr Toft stresses that both the contractor and farming customer retain the reduced-trafficking benefits of operating a wide dribble bar (up to 30m) – fewer wheelmarks left across the field – and, when compared to the disc injector, there is said to be far less crop damage.

**Summary:** Here, in the UK and Ireland, farmers have largely escaped the legislation applied to our European counterparts when it comes to the spreading of slurry – but for how much longer? Using acid to treat slurry brings many tangible benefits, and these could be reason enough to start looking at this SyreN system in closer detail, particularly if the wider working width offered by dribble bars is seen as an attraction. In Denmark, where 85% of slurry is applied by contractors, the SyreN carries a price tag of €67,000, and there is a grant for landowners who decide to try it.

*Mervyn Bailey*