

Protected urea cuts costs and GHG emissions

Extensive research has proven the reliability and cost benefits of protected urea as a nitrogen fertiliser source

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Urea fertiliser is the most widely used N source in the world. Protecting urea with a urease inhibitor (NPBT / NPPT) reduces ammonia N (NH₃) losses by up to 80% leaving more nitrogen for the crop.

By replacing nitrate-based fertilisers (e.g. CAN) with protected urea we reduce N O losses by 70%. This is a major, ready to go, technology which can help us meet our 2030 target, by delivering a three to 8% reduction in GHG emissions

on livestock farms.

Over the last 24 months fertiliser N prices have reached unprecedented heights.

This has resulted in a large price differential between protected urea and CAN. Urea delivers significantly better value due to the larger market than for CAN and large quantities are traded globally.

Over the last six months, fertiliser prices have dropped steadily but remain higher than before Russia's illegal invasion of Ukraine.

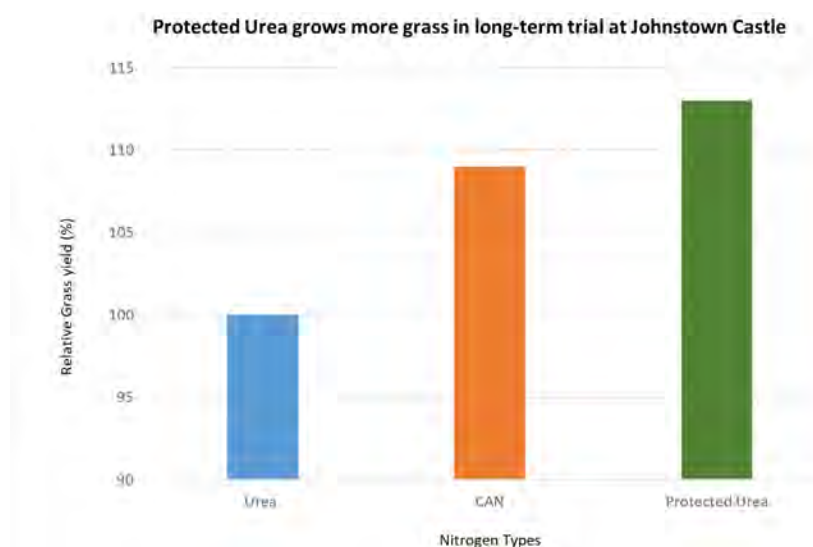
Lower costs

Average fertiliser prices to date in 2023 (Table 1) show that protected urea offers a 30% lower cost per kilo

Table 1:- Average price of fertiliser nitrogen in 2023

	CAN 27%	Standard urea 46%	Protected urea 46%
Kg N/ tonne	270	460	460
€/tonne	€680	€750	€810
€ / kg	€2.52	€1.63	€1.76

Figure 1:- Protected urea trial at Teagasc Johnstown Castle



compared to CAN (27% N).

Standard urea losses are 15%, losses from protected urea are just 3% thus retaining 12% effective N. With reduced and more regulated chemical fertiliser N use, retaining more effective N in the soil allows adjustments to N rates while still maintaining yield compared to standard urea.

A 50ha dairy farm switching from applying 210kg N/ha as all standard urea to protected urea, N rates can be reduced by 12% equating to a reduction of 22kg N/ha giving a farm fertiliser N saving of €1,936.

Reducing farm emissions

By switching to 100% protected urea on dairy farms, total farm emissions have the potential to be reduced by 7-8% at a spreading rate of between 200 to 250 kg N / ha.

The equivalent savings on total emissions on suckler farms is 1-2%, at a spreading rate of 60 to 80 kg N / ha. To achieve a 100% switch to protected urea, the use of high P-K products such as 18-6-12 +S is required to deliver balanced P, K & S nutrition.

On-going research at Teagasc Johnstown Castle is showing that fertiliser blends containing N with a high ratio of ammonium-N to nitrate-N (generally high P blends) are more stable and



Richard Starrett, a Signpost Farmer based in Lifford, Co Donegal, switched to exclusive usage of protected urea in 2019

environmentally friendly.

For example, the N form in 10-10-20 / 18-6-12 is mainly ammonium N resulting in a 40% reduction in N_2O emissions relative to CAN 27% N or high Nitrate – N based compounds such as 27-2.5-5 / 24-2.5-10.

More grass from less N

A long-term trial (see Figure 1) over eight years at Tegasc Johnstown Castle is consistently showing that the tonnage of grass grown by protected urea has been greater than standard urea in seven out of eight years.

Protected urea grew 13% more grass on average compared to standard urea.

The additional yield is similar in magnitude to the extra effective N level delivered to the plant by protected urea over standard urea. CAN yielded 9% more than standard urea.

At a time of more regulated chemical fertiliser N use, moving from standard urea to protected urea offers the opportunity to reduce fertiliser N rates by up to 10%.

Mark Plunkett is a soil and plant nutrition specialist at Teagasc, Johnstown Castle, Co Wexford

Farmer focus: Richard Starrett

‘Talk to your merchant and try it – you will end up with more money in your back pocket’

Richard Starrett is a Signpost Farmer, milking 160 cows outside Lifford, Co Donegal, and he moved to using exclusively protected urea in 2019, writes Liam Quinn.

When asked what motivated him to make the change, Richard says: “With 78% lower ammonia emissions than ordinary urea and 71% less nitrous oxide emissions than CAN it is the right fit for us.”

With protected urea applied as the main nitrogen source on the farm Richard emphasises the importance of maintaining soil fertility. “I have very good soil fertility across the farm and use NMP maps to monitor pH, and for targeting slurry to keep my indexes right.”

The farm averages 14t/DM/Ha each year, and Richard sees no effect on annual tonnage of grass grown since moving to protected urea. He primarily uses protected urea with 46% nitrogen and explains: “When sowing fertiliser, the 375 kg of protected urea goes a long way because of the strength of it.”

This results in less travelling especially beneficial where spreading fertiliser on

out-blocks or away from the home farm.

Richard regularly calibrates his fertiliser spreader to make sure the fertiliser is spreading as accurately as possible and is very happy with

how evenly the protected urea is spread.

On calibrating the spreader, Richard says: “It’s not any different calibrating protected urea from ordinary urea; we spread at 12m widths on the farm and don’t see any stripes in fields after spreading.”

He is making every effort to reduce the nitrogen input on the farm by improving soil fertility, testing slurry and incorporating clover but some nitrogen is required to support growth for the cows.

When asked would he have any advice for someone thinking of using protected urea he replied:

“Go ahead and contact your merchant and try it, you will end up with more money in your back pocket. It’s cheaper per kilo of nitrogen and you will have the same grass growth.”

Liam Quinn is a Signpost advisor at Teagasc, Athenry, Co Galway