

## Q & A on Protected Urea

Patrick Forrester & Mark Plunkett, Teagasc, Environment,  
Soils and Land Use Department, Johnstown Castle, Co. Wexford, 15<sup>th</sup> July, 2019

### 1. Why are urea based products better for reducing GHG emissions?

Based on Irish research urea based products have lower loss of the very potent GHG nitrous oxide (N<sub>2</sub>O) when applied to Irish grassland.

### 2. Why do we need to protect urea when going for its GHG benefit?

So that the urea does not lose a portion (Figure 1) of the applied N as ammonia-N gas which will create a problem because Ireland has committed to reduce ammonia gas loss by 5%.

### 3. What was the rate of NBPT used to protect urea in the Teagasc trials?

The rate NBPT used in the Teagasc trials was 660 mg/kg (Figure 1).

### 4. Why was the 660 mg/kg rate used?

Previous work (Watson et al., 2008) showed that the 660 mg/kg level gave near maximum ammonia-N loss reduction levels. It gives more assurance that the current regulatory minimum of 414 mg/kg will be present following storage (Figure 1).

### 5. What will happen if the NBPT level declines below 414 mg/kg?

As can be seen in Figure 1. the ammonia-N loss protection declines slowly to 100 mg/kg with the protected urea being much safer than unprotected urea. If the NBPT level declines below 100 mg/kg the protection declines sharply to reach the same performance as unprotected urea when NBPT is absent.

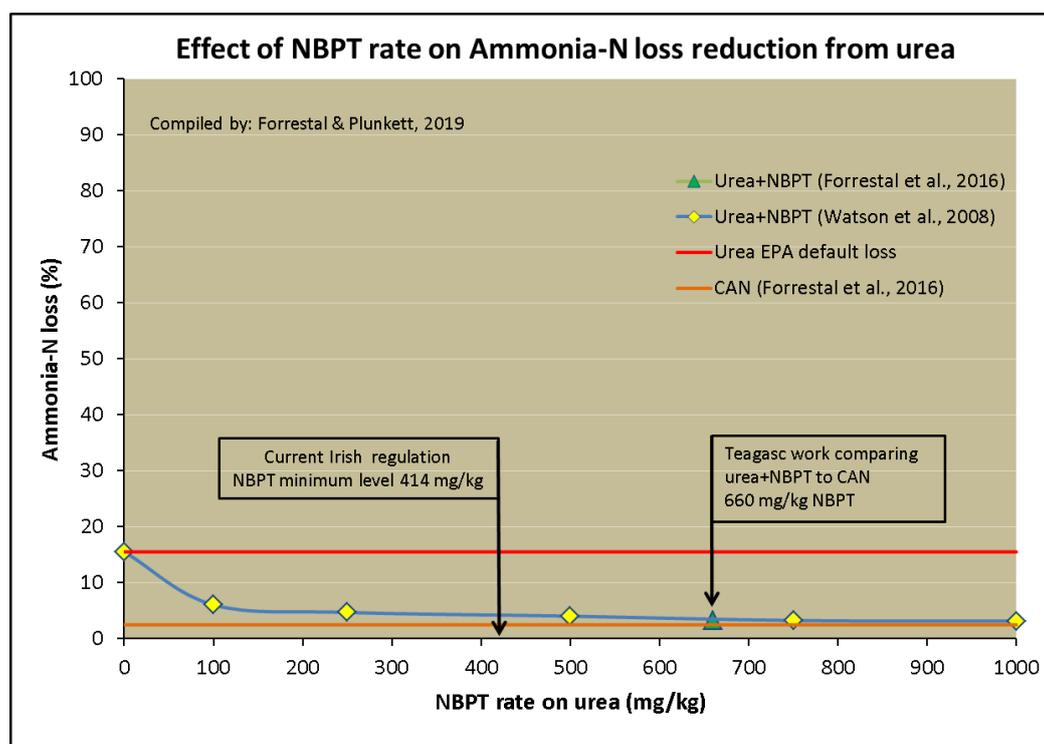


Figure 1. Effect of fertiliser type and NBPT level on Ammonia-N loss.

6. What is the shelf life of protected urea?

NBPT will degrade over time in storage, this is true. However, protected urea treated and used within 6 – 12 months should still have very high efficacy. As can be seen in Figure 1 even where degradation decreases NBPT below the current regulatory minimum inclusion level the urea will still be protected. When NBPT has completely degraded ammonia-N loss will be the same as unprotected urea.

7. Will protected urea give the same performance as CAN fertiliser applied in dry conditions?

Yes, the Irish trial results show no significant yield or N recovery difference between CAN and urea protected with NBPT. However, if conditions are dry and remain so, response to any N fertiliser will be limited. So if you are hesitant to spread CAN you should also be hesitant to spread protected urea. Consider waiting for rain and growth conditions to return.

8. Is urea more corrosive on fertiliser spreaders?

It is more hygroscopic than other fertilisers which causes it to draw moisture if the spreader is not washed out.

9. How long will the inhibitor protect the urea for?

The job of the inhibitor is to protect urea during the first few days after the urea granule melts. This is when the main loss of ammonia-N gas occurs. In Irish conditions the urea granule melt often begins as soon as the fertiliser granule lands. Even in dry conditions melt tends to occur overnight because urea is hygroscopic drawing humidity and dew towards it. Where S is included using ammonium sulphate the ammonia sulphate portion may be slower to melt. It is this first period after granule melt which is critical for protection of the urea component. During this first period urea is converting over to the solid ammonium-N form. It is during this conversion that we want to protect from ammonia-N gas loss. Once all the urea has converted to ammonium the inhibitor has done its work. However, remember if it remains dry moisture will limit response to all N fertilisers.

10. What are the types of protected urea's on the market?

Urea protected with the active ingredients NBPT, 2-NPT and NBPT+NPPT have been shown to be effective in protecting urea in Irish and/ or International Research.

11. Can P be blended with protected urea products?

If the inhibitor can be protected from exposure to the acidity which often comes along with P blending, then possibly yes. Ask your supplier to show you evidence that P blending has not affected the protection if in doubt.

12. Can K be blended with protected urea?

Yes

13. Can S be blended with protected urea?

Yes, subject to the ammonium sulphate used to deliver the S being of good quality for this use case.

14. How wide can protected urea be applied by a fertiliser spreader?

It depends on the spreader settings and vane selection. Do you know how uniformly your spreader can spread standard products too? If so protected and untreated urea will be some metres less using the same vanes due to the lower density of urea. A different spreader setting and/or vanes may be required to achieve the same spread width as for standard nitrogen, consult your spreader manual/ supplier.

15. What is the difference between 2 – NPT and NBPT or are they the same?

They are both urease inhibitors which protect urea from ammonia-N loss. Teagasc have conducted extensive published work on NBPT. 2-NPT is a newer active and consequently less trial work is available but international work has shown that it reduces ammonia-N loss from urea.

16. Will protecting urea delay how fast the N works?

In practical terms no, why? Grass or other crops take up the applied N over several weeks. Once the protected urea melts, urea is beginning to convert over to ammonium feeding the initial grass requirements.