TURF TRIAL INFORMATION

Eqo.s coated fertilizer improves nitrogen efficiency by reducing loss through volatilization

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SUMMARY

- One-year Masters-by-Research examining **eqo.**s coated fertilizer in turf grass systems.
- Independent glasshouse project completed at Bangor University
- Using **eqo.**s coated nitrogen significantly reduces nitrogen losses to the environment compared with uncoated nitrogen.
- Losses of NO_3^- and NH_4^+ through leaching were low (non-significant), suggesting that a mature turfgrass system in a sand-based rootzone is efficient at capturing these nitrogen ions (data not presented).
- Losses of NH_3 by volatilization from **eqo.**s were significantly ($P<0.01$) reduced by 58% compared with uncoated urea, providing a calculated emission factor for **eqo.**s of 2.4%.

METHODS

One year of laboratory and glasshouse trials completed at Bangor University Environment Centre Wales under the supervision of Professor Dave Chadwick allowed MRes candidate Elin Thompson to complete her Masters on nitrogen use efficiency benefits of a new biodegradable controlled release fertilizer coating (**eqo.**s). A range of experiments were completed focussed on **eqo.**s coated controlled release fertilizer (CRF) and how use of a coated urea fertilizer reduces losses of N and improves nitrogen use efficiency.
A bench scale ammonia emission experiment was completed which captured NH_3 from an established *Lolium perenne* sward growing in a 90:10 (sand:soil) sports turf rootzone. Applications of uncoated urea were compared with applications of coated urea (**eqo.**s) at a rate of 100 kg N/ha equivalent.

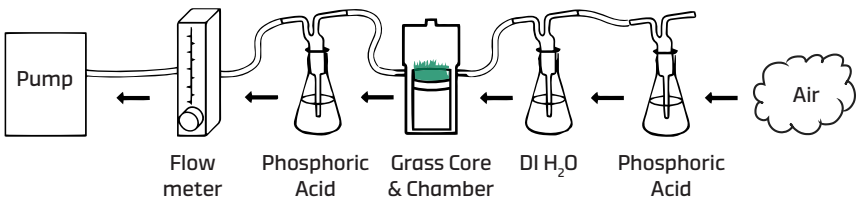

Image 1. Experimental set up.

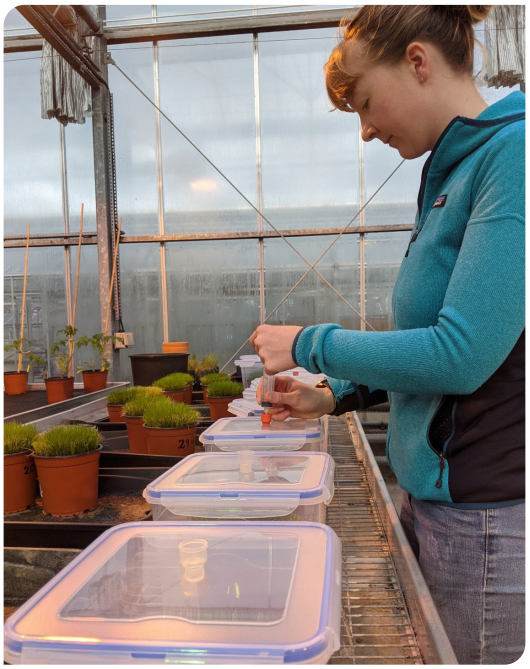

Image 2. Collection of gas samples for analysis

RESULTS

A large pulse of NH_3 was measured from the uncoated urea treatment over the first 96 hours (figure 1) clearly demonstrating how urea can transform quickly to NH_3 on application to turf. **Eqo.**s coated urea showed NH_3 volatilization to a much lower extent, rising more slowly to 72 hours and then remaining relatively consistent for the duration of the experiment (18 days).

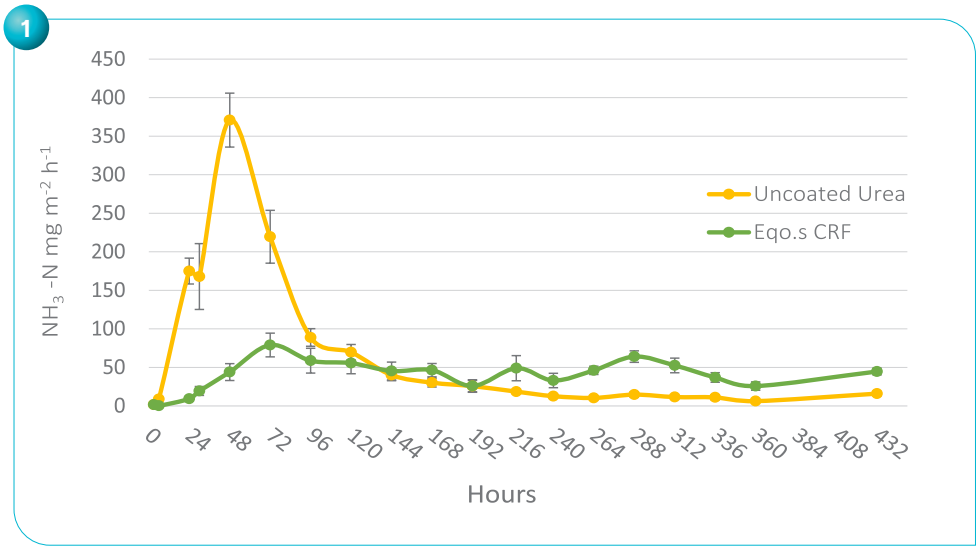

Figure 1. NH_3 emissions over a 18-day period from 2 fertiliser treatments. Values represent means ± SEM (n = 4).

An examination of the cumulative NH_3 emissions clearly illustrates the difference between uncoated and coated urea over the 18 day experimental period (figure 2), the NH_3 release from urea happens quickly and then evens off as the N source solubilises, whereas **eqo.**s coated urea shows a significantly ($P<0.01$) lower NH_3 emission, linearly increasing over the experimental period. With less nitrogen lost to volatilization more is available for supporting plant growth and development. Only 2.4% of the nitrogen applied as **eqo.**s was lost through NH_3 volatilization, a 58% reduction from uncoated urea.

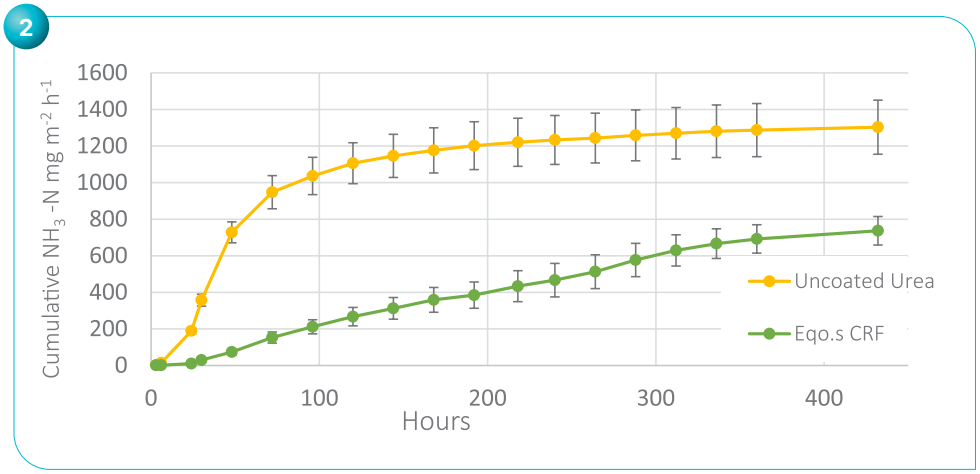

Figure 2. Cumulative NH_3 emissions over 18-day period. Values represent means ± SEM (n = 4).

CONCLUSION

The trial work demonstrates that urea can potentially volatilize to NH_3 quickly after application, reducing nitrogen efficiency and increasing potential for nitrogen pollution. Coating urea to produce a CRF such as **eqo.**s significantly reduces this volatilization and improves nitrogen use efficiency. Where uncoated urea is used on turf it would be important to irrigate after application to solubilise the urea and make it available for uptake and reduce potential losses to the atmosphere through NH_3 volatilization.

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