



AGRONOMIC INSIGHT

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Don't put up with denitrification



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ENTEC® is used by many cane growers to help minimise one of the most significant nitrogen loss pathways in cane - denitrification.

Not only can denitrification leave crops without the nitrogen they need to achieve their productive potential, it can also contribute to greenhouse gas emissions.

The issue is not limited to a particular soil type or region. It can happen in any cane crop where nitrate is present and the soil's pore spaces fill with water.

What is denitrification?

In simple terms, denitrification occurs because soil microbes require oxygen. When all the small air voids in the soil are taken up with water instead of air, they find it difficult to get oxygen.

In these situations, they move their focus to breaking down nitrate, which is made up of one part nitrogen and three parts oxygen.

Di-nitrogen and nitrous oxide is released to the atmosphere as the microbes consume the oxygen from nitrate.

Denitrification events can occur whenever the conditions are right and this is often multiple times in one season.

They can happen due to prolonged wet weather after fertiliser application, a single major rain event, or even unexpected rainfall after irrigation. Denitrification losses can occur even with small rainfall events if the soil is already moist.

What is at risk?

The size of denitrification losses will vary from season to season, but it is generally thought to be a major nitrogen loss pathway in cane.

Take the example of the trial conducted in a plant crop near Mackay in the 2010-11 season¹, where above average rainfall in the six months after fertiliser application meant the ground was saturated for prolonged periods.

Nitrous oxide losses were measured and they showed that the ENTEC urea treatment reduced overall nitrous oxide losses by 4.2 kg/ha compared with urea.

However, we know that nitrous oxide is only a small proportion of total denitrification losses.

It is estimated that di-nitrogen losses may be 10 times greater than nitrous oxide losses and even as much as 30 times greater on heavy soils, or on soils where the duration of saturation and soil oxygen depletion is greater than three to four days.

This means that ENTEC may have reduced nitrogen losses by more than 40 kg/ha in this trial.

Powerful protection

ENTEC offers a major step forward in reducing denitrification losses from nitrogen fertiliser.

By stabilising the applied nitrogen as ammonium, it puts a stop to denitrification losses from the fertiliser for a period of time.

There is little risk of denitrification from ammonium. The microbes can't use it to obtain the oxygen they need.

ENTEC can be effective in cane systems for an extended period of time depending on soil temperature, moisture and biological activity.

The beauty of ENTEC is that the crop still has access to ammonium nitrogen - there's no delay in availability to the crop.

For more information, check out [this explanation of how ENTEC works in sugarcane](#) or call your local ENTEC accredited fertiliser Dealer today.



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¹Proc Aust Soc Sugar Cane Technol Vol 34 2012, 'Nitrous oxide emissions from a sugarcane soil under different fallow and nitrogen fertiliser management regimes' by WJ Wang¹, B Salter², SH Reeves¹, TC Brieffies², J Perna². (1 Department of Environment and Resource Management, Dutton Park 2 BSES Limited, Mackay).

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