

Green Urea NV for summer crop 2022-23

Bede O'Mara

IPF Technical Agronomist

It has been a very wet start to the summer cropping season. Very little nitrogen was applied pre-plant as paddocks were either too wet or inaccessible. This means that more nitrogen than usual may need to be applied in-crop.

Given the forecast is for above-average rainfall, there may be limited opportunities to apply and incorporate nitrogenous fertilisers. Losses of applied nitrogen to volatilisation are also likely. So, growers and agronomists will need to plan and make timely decisions to ensure developing crops have adequate nitrogen and yield potential isn't limited.

The key is the 4Rs of nutrient management (right product, right time, right place, right rate). If in-crop nitrogen is needed, consider upgrading to Green Urea NV[®], IPF's enhanced efficiency urease inhibitor fertiliser.

GREEN UREA NV – THE RIGHT PRODUCT

Green Urea NV contains 46% nitrogen. It is urea coated with IPF's proprietary urease inhibitor formulation using the active ingredient NBPT (N-(n-Butyl)-thiophosphoric triamide) to protect against volatilisation losses.

NBPT inhibits the activity of the urease enzyme for up to 14 days which slows the conversion of urea to ammonium. This buys you time to receive the required rainfall or irrigation to incorporate the applied urea into the soil to just 3-5cm depth.

To initiate the conversion of urea to ammonium, urea granules must start to dissolve, which requires adequate moisture. As ammonium levels increase so does the production of ammonia gas. If ammonia gas is not trapped by the soil or crop canopy, it can be lost from the soil surface and blown offsite by wind.

If nitrogen needs to be broadcast and volatilisation is a risk, Green Urea NV has a significant role to play in managing the risk.

Green Urea NV, if stored out of direct sunlight, will last up to 2 years. After 12 months the urease inhibitor will still provide reliable protection as 80% of the coating will remain. This means you can buy, store and use when needed for the season.

Green Urea NV makes perfect cents this season

Economics are a factor in the current conditions, so upgrading to Green Urea NV makes cents!

If we assume 110 kg of product (50 kgN/ha) broadcast applied, and a delivered farm urea price (\$1,330/t bulk or \$2.89/kgN), the



cost of upgrading to Green Urea NV would be between \$5.50 and \$6/ha, or 3.75% of the total per hectare spend. By way of comparison, if 10% of the applied N was lost (as estimated by Baird 2021) it would cost approximately \$15/ha in losses. So, mitigating the potential loss by upgrading to Green Urea NV would result in a 2.5-2.7% return on investment in this scenario.

The higher the cost of urea, the harder the hip pocket impacts of even low-magnitude volatilisation losses can be. Flexibility and time are what Green Urea NV offers.

RIGHT TIMING

Urea needs time to convert to plant-available nitrate, then move into the active root zone. If conditions are warm and wet the crops will be rapidly growing, and the demand for nitrogen will begin earlier. So, nitrogen should be applied early in the season, so it is available when the crop needs it. This is especially important if the soil-N level was low at planting and pre-plant applications were limited.

Using Green Urea NV will allow growers to start their program of broadcast urea applications earlier than the current practice with untreated urea (which is 48 hours before an incorporation rain event). It will also allow growers to cover more ground before the rain arrives – which may be critical in a wet season with limited application opportunities.

Rainfall or irrigation of 12-20 mm is required for adequate urea incorporation. The actual rainfall requirement depends on soil type, soil moisture, soil texture, surface slaking and dispersion/infiltration. Rainfall or irrigation must supply sufficient moisture to produce a moisture layer that will move down the soil profile. Be

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aware that in very wet conditions the soil's ability to receive rainfall can be limited. This can result in further nitrogen losses through runoff, which are not mitigated by the urease inhibitor.

Green Urea NV allows time to review the impending forecasts, assess crop stage, soil moisture and lead times.

As storm events in summer are less predictable with localised areas experiencing gusty wind conditions, all broadcast granular fertiliser applications may be adversely affected (especially swath width and coverage) by these hostile application conditions. Start earlier with Green Urea NV and apply in better conditions.

RIGHT PLACE

Broadcasting nitrogen fertiliser is one option if wet weather leaves little time to complete fertiliser applications and doesn't allow mechanical incorporation. This is not a widely adopted strategy in northern dryland summer crops, as in-crop rainfall to incorporate urea is generally difficult to accurately predict. The reason is the varying risk of volatilisation and the ability to reduce that risk.

Broadcasting is more widely used in irrigated systems, where surface-applied urea can be incorporated by controlled and timely irrigation.

However, nitrogen fertilisers can be surface soil broadcast, provided an appropriate rate is applied well in advance of crop nitrogen demand. Make sure you consider the equipment needed, labour required and product lead-time, especially if you don't usually surface apply urea on your farm. If using a spreader be realistic with swath widths and work rates appropriate for the likely conditions at the time of application. Also, remember to coordinate with your contractor to ensure timely applications.

Volatilisation losses from surface broadcast applications are real!

Volatilisation is the gaseous loss of nitrogen to the atmosphere that can occur if surface-applied urea is not incorporated into the soil by rainfall or irrigation within 36-48 hours following application.

Whilst not a direct greenhouse gas, ammonia loss via volatilisation still results in an economic loss to the grower. Research in Northern NSW measured the volatilisation loss of from nitrogen applied in spring to a fallow. The average loss was 11.7% of the total N applied, but a range of 5.4 to 27% was observed (Schwenke, 2021 & 2014). Earlier reviews of global

research by Schwenke (2011) reported a range of 14.5% to 64% losses from various enterprise segments. CottonInfo reported losses of up to 20% of applied N in the worst-case scenarios when adverse conditions coincide, and adequate incorporation is not achieved (Baird, 2021).

There is a higher risk of volatilisation when a few of the following factors coincide:

- Warm and windy conditions,
- Moist surface soils, heavy dews and high relative humidity,
- Surface soil is drying rapidly,
- High soil pH (alkaline soils),
- Low cation exchange capacity (CEC),
- Soil cover (bare, stubble or crop canopy),
- Fertiliser granules are hung up in heavy stubbles preventing soil contact,
- The presence of organic matter (therefore abundant urease enzyme) present.

The important influence of soil temperature has its biggest bearing on the speed of these reactions – so for summer crops, events conducive to volatilisation losses can be rapid, high in magnitude but short in duration, leading up to a weather event.

RIGHT RATE

When determining the appropriate nitrogen application rate for your crop's targeted yield and protein outcomes you should consider:

- Soil profile nitrogen status (from a depth segment sampled)
- Pre-plant or residual nitrogen applications
- Fallow and in-crop mineralisation estimations

Be aware that applying more nitrogen to account for nitrogen losses does not mitigate the anticipated loss, but in most cases exacerbates the potential for greater loss. Green Urea NV should be considered especially where high broadcast application rates are being considered, as the pH reaction on the soil surface can be reduced by delaying hydrolysis (Suter et al., 2013).

If practical, you can consider applying lower rates more often – it can be more agronomically advantageous but isn't always executable.

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So, consider upgrading to IPF's Green Urea NV for your summer crop today.

REFERENCES

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Suter H (2013) "Impact of urease inhibitors on ammonia loss". GRDC, Canberra. <https://bitly.co/F1KU>

FURTHER INFORMATION

For more information or advice about Green Urea NV or nitrogen strategies, feel free to contact me on 0417 896 377 or bede.omara@incitecpivot.com.au.

You can also contact: David McRae at david.mcrae@incitecpivot.com.au.



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