



7. NUTRITION

7.12 Inorganic nitrogen fertilisers

Common N carriers

Urea (46% N)

Urea is the most commonly used N fertiliser in the sugar industry. The high N concentration in this carrier results in relatively low transport and application costs. Available mainly in granular but also in prilled form, urea flows easily but is hygroscopic, more so in prilled than granular form. As volatilisation losses occur in alkaline soils, its use is not recommended when the soil pH is above 7,5.

Limestone ammonium nitrate (LAN) (28% N)

This medium N concentration fertiliser is suitable for use in most parts of the sugar industry. It is available in granular form, flows easily and is not excessively hygroscopic. There is no limitation regarding soil pH.

Ammonium sulphate (21% N)

This carrier has the lowest N concentration. It is more commonly used on alkaline soils where the acidifying effect of accumulating sulphate ions in the soil is beneficial. It is crystalline in form, is hygroscopic and is not as easy to apply as the other carriers.

Anhydrous ammonia (82% N)

Although this carrier has the highest N concentration of all the fertiliser carriers, it needs specialised equipment for application. It can only be used in the absence of a trash blanket and is not recommended where soil texture makes sealing of the tine furrow difficult; for example, on very heavy or sandy soils.

Differences between N carriers

It has generally been found that there is no yield advantage associated with the use of any one of the above in preference to another. Nonetheless,

there are some limitations regarding the use of the four carriers detailed. Trials indicate that:

- Although there is some advantage to burying urea in the cane row rather than applying it as a normal top-dressing on trashed ratoon cane, the yield differences are not large enough to cover the increased application costs.
- The presence of a trash blanket appears to enhance N loss, but an amount of 5 mm of rainfall after application will be sufficient to substantially reduce volatilisation.
- The highest loss by volatilisation (about 20% of the N applied) occurs when N is applied to trash or bare soil followed by less than 1 mm of rainfall (or heavy dew simulations).
- Volatilisation losses from LAN and ammonium sulphate were consistently low (less than 5% of the N applied) irrespective of the presence of trash and/or the amount of precipitation.
- Volatilisation losses from all carriers, including urea, were very small when applied to dry soil.

Recommendations

Because some carriers appear to be better suited to specific circumstances, growers are encouraged to manage their choice of fertiliser N to suit their conditions.

- Apply ammonium sulphate if the soil pH is above 7,5.
- Use LAN on acid soils, or ammonium sulphate on neutral to alkaline soils, in preference to urea when a top-dressing is to be applied to trash or bare soil early in the season and there is little likelihood of enough rain falling to wash the urea into the ground.
- Losses from urea can be substantial when applied as a top-dressing to a moist soil (and/or trash blanket) if there is no further rainfall or irrigation following the application.

- Urea and LAN are equally effective if applied in spring when the rains are imminent.
- The cost of transport and application favours a high concentration fertiliser such as urea.

Split applications

Split applications are strongly recommended only when it is necessary to reduce the probability of losing N due to leaching and/or denitrification in sandy or waterlogged soils. The table indicates where splitting of N is applicable.

Soil type	Soil form
Sandy soils	Fernwood Hutton (Clansthal series)
Poorly drained sandy soils	Cartref Katspruit Longlands
Poorly drained clay soils	Rensberg Bonheim

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