

Sustain

Sustain is a unique nitrogen fertiliser made by coating urea granules with AGROTAIN[®] nitrogen stabiliser, a patented urease inhibitor developed in the United States.

Sustain has been formulated for use in any situation where urea would otherwise be applied.

Sustain should be stored in cool, dry conditions and applied as needed. It may also be stored in a dedicated urea silo.

Advantages of Sustain

Retains more nitrogen: with Sustain, on average, around 50% less nitrogen is lost to the atmosphere, compared to standard urea. This nitrogen is retained in the soil, where it can be used by plants.

Grows more grass: in pastoral settings, the typical amount of nitrogen lost by volatilisation if urea is used is 10-20%. Since, on average, Sustain halves this loss, the additional nitrogen can be used for plant growth. Research has shown that, over a wide range of conditions, the average increase in pasture yield is 5% when using Sustain instead of urea.

Apply less or grow more: where high rates of nitrogen are broadcast, e.g. as side-dressings for crops, losses are typically in the order of 20-30%. Sustain halves this loss, on average, so rates of application can be reduced accordingly. For example, instead of applying urea at 100 kg N/ha (217 kg urea/ ha), Sustain could be applied at 90 kg N/ha (195 kg Sustain/ ha). After typical volatilisation losses, both applications would supply similar amounts of nitrogen. Alternatively, apply the same rate as you normally would and improve crop yield-as long as the rate of nitrogen normally applied does not exceed crop requirements.

Sustain

Nitrogen	46%
As urea	100%
Appearance	Pale green granules
Bulk density (tapped)	0.84 kg/litre
Pellet size range	
>4 mm	0%
2-4 mm	100%
<2 mm	0%
Size guide number (SGN)	364
Uniformity index (UI)	53
Fertmark registered	Yes



Sustain has evenly sized, pale green granules, sized between 2 and 4 mm in diameter



Using SustaiN

Pasture

- Use on pasture to boost growth to fill feed deficits
- Use instead of urea if <10 mm rainfall will fall within 8 hours of application

Maize crops

- Use if side-dressings of nitrogen are to be surface applied, rather than knifed in
- As there will be significant reductions in the amount of nitrogen lost when SustaiN is used, lower rates can be applied than if urea is used

Other crops

- Use on any crop that requires a broadcast side dressing of nitrogen
- Use in particular on crops that form a sparse canopy, as the rates of nitrogen loss through volatilisation will be greater than in crops with a dense canopy

How does it work?

When urea is broadcast and there is sufficient moisture, the granules will begin to dissolve. Moisture can come from within the soil, on the soil (dew) or from the air (humidity or rain). As the urea dissolves into the very top layers of the soil, it is attacked by urease, an enzyme that is released by bacteria in soil and on plant surfaces. The urease turns the urea into ammonium.

Once ammonium forms, it can be turned into ammonia gas, a reaction that occurs more readily in the high pH environment near urea granules. The ammonia gas can then escape into the air (see Figure 1).

When SustaiN is broadcast in the same conditions, some of the active ingredient (AGROTAIN®) dissolves into the soil along with the urea. The AGROTAIN® temporarily blocks the action of the urease enzyme, so there is much less ammonium formed. As a result, there is less nitrogen lost as ammonia gas. On average, SustaiN halves the amount of nitrogen lost as ammonia, compared to urea (see Figure 2).

A similar reduction in nitrogen loss can be achieved if urea is broadcast under favourable conditions, i.e. if it receives at least 10 mm of rain within 8 hours of application. This washes the dissolved urea deeper into the soil. There, it is still attacked by the urease enzyme, but the ammonia that forms is protected from loss as it is surrounded by soil (see Figure 3).

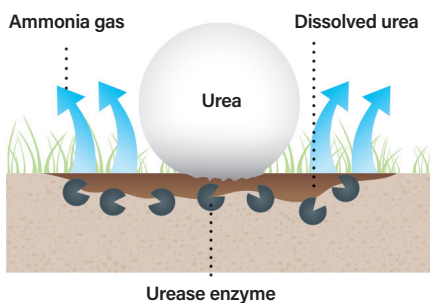


Figure 1: Urea granules broadcast onto moist soil, without sufficient rain (10 mm in 8 hours). Between 10 and 20% of the applied nitrogen is likely to be lost as ammonia gas.

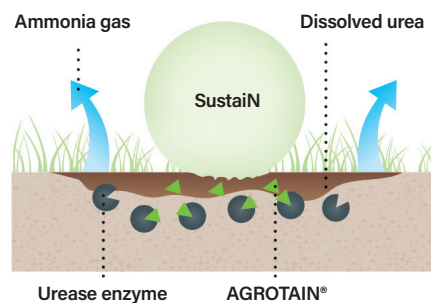


Figure 2: SustaiN granules broadcast onto moist soil, without sufficient rain (10 mm in 8 hours). Between 5 and 10% of the applied nitrogen is likely to be lost as ammonia gas.

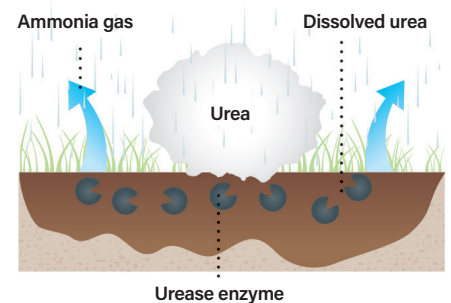


Figure 3: Urea granules broadcast with sufficient rain (10 mm in 8 hours). Between 5 and 10% of the applied nitrogen is likely to be lost as ammonia gas.

Economic advantages

The economic benefit of using SustaiN instead of urea will vary with the specific on-farm conditions.

In particular, the amount of rainfall or irrigation that follows application of urea will make a considerable difference. If at least 10 mm of rain will fall within 8 hours of application, then it will be more economically favourable to use Nrich Urea than SustaiN.

Where rainfall or irrigation is not certain, the use of SustaiN is recommended. The degree to which this will offer an economic benefit will vary.

For example: a dairy farmer applies nitrogen to pastures five times a year, with each application being 30 kg N/ha. The average pasture response is 10 kg DM/ kg N applied. This pasture has an 80% feed utilisation, and the feed conversion efficiency of his cows is 12.5 kg DM/kg MS. The dairy payout is \$6.00/kg MS.

- If 10 mm of rainfall (or irrigation) will occur within 8 hours of the nitrogen application, then Nrich Urea should be used. The net benefit of this (compared to using SustaiN) is \$4/ha.
- If less than 10 mm rainfall (or irrigation) will occur within 8 hours of the nitrogen application, then SustaiN should be used. The net benefit of this (compared to using Nrich Urea) is \$10/ha.
- If no rainfall or irrigation will occur within 8 hours of the nitrogen application, then SustaiN should be used. The net benefit of this (compared to using Nrich Urea) is \$39/ha.

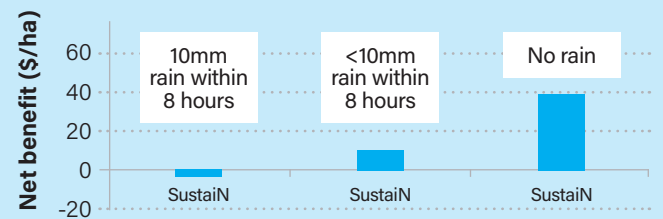


Figure 4: The relative economic benefit of using SustaiN or Nrich Urea varies with the amount of rainfall that follows application.