Gran-Am

FACT SHEET

April 2017

Fully granulated ammonium sulfate fertiliser containing:

- **20.5% Nitrogen (N);**
- **23.9% Sulfur (S).**

AMMONIUM SULFATE

Since the advent of the Industrial Revolution and up to the 1960s, ammonium sulfate (Sulfate of Ammonia), obtained as a by-product from industry, including the coking of coal, was the most commonly used nitrogen fertiliser in Australia, and elsewhere in the world. This was a fine crystalline product.

Since then, synthesised nitrogen fertilisers including anhydrous ammonia, urea, ammonium nitrate and urea ammonium nitrate (UAN) solutions have been produced and used in greater quantity in response to the rapidly escalating demand for nitrogen fertilisers as the world's population grew. There was insufficient by-product ammonium sulfate to meet demand.

Urea (46% N) is now the most commonly used nitrogen fertiliser in the world.

Most fertilisers are now granular. They are free flowing and less prone to caking and setting in storage. This makes them easier to store, handle and apply, more suited to modern application equipment, and more suitable for use in blends with one another.

Gran-am is a granulated ammonium sulfate fertiliser. It is manufactured in Brisbane by reacting ammonia with sulfuric acid. The process, which was developed by Incitec Pivot in the 1970s, involves the use of a specially designed pipe reactor and mixing tee. The process proved superior to the previously used neutraliser based techniques as the corrosive ammonium sulfate slurry is confined to the reactor.

While Gran-am was, and continues to be used as a nitrogen (N) fertiliser, a major use nowadays is as a source of sulfur (S) in fertiliser programs. The sulfur it contains is in the sulfate form, which is readily available for plant uptake as this is the form in which plants take up sulfur from the soil.

When by-product ammonium sulfate (21% N, 24% S) and single superphosphate [8.8% phosphorus (P), 11% S] were the main nitrogen and phosphorus fertilisers, there was no need to worry about sulfur in fertiliser programs. More than enough sulfur was being applied. Sulfur deficiency was almost unheard of. Plants take up phosphorus and sulfur in approximately equal amounts, and about ten times as much nitrogen as sulfur.

Nowadays, the popularity of urea and the ammonium phosphate fertilisers (DAP and MAP) means that often little or no sulfur is being applied. Sulfur deficiency has emerged and with it a need to incorporate sulfur in fertiliser programs. This has been exacerbated by higher crop yields, the inclusion of high sulfur-demanding crops such as canola in crop rotations, and the adoption of reduced tillage practices meaning that less sulfur is mineralised from the soil organic matter.

USE IN FERTILISER PROGRAMS

Gran-am can be used on its own as a nitrogen fertiliser, or as a source of nitrogen in blended fertilisers. Many NPK Blends used in horticulture are based on, or contain a good part of their nitrogen as Gran-am, e.g. Incitec Pivot CK88, Multigro, Complete Mix 1, Complete Mix 3 and Complete Mix 7.

When used as a sulfur fertiliser, Gran-am can be substituted for straight nitrogen fertilisers such as Urea periodically in fertiliser programs, e.g. in intensively grazed irrigated nitrogen fertilised pastures and forage crops.

Gran-am can also be blended with straight nitrogen fertilisers such as Urea or phosphorus fertilisers such as MAP, to provide the desired N:S or P:S ratio. Examples are listed in the following table:

Incitec Pivot Product	% N	% P	% S
Urea S	40.8		4.8
Extra Sul	31.8		13.2
Croplift 15	14.6	12.0	11.6
Starter 15	14.2	12.9	10.7
Croplift 12	12.0	17.5	6.0

Where Gran-am is used as a source of sulfur in fertiliser programs, the rate at which other nitrogen fertilisers are applied can be reduced, so the overall amount of nitrogen applied remains the same.

USE IN SOLUTION

While Gran-am is granulated with the intent that it be used as a free-flowing dry fertiliser for direct application to the soil on its own or in blends, some use is made of Gran-am in solution, in fertigation programs and in the preparation of mineral supplements (licks) for livestock (ruminants).

It is recommended that Gran-am be trialled in small quantities before fully committing to its use in solutions. A coating and granulation agents added to Gran-am during the manufacturing process may cause a scum to form on the surface of fertiliser solutions and the walls of mixing tanks, or sediment to form that will eventually fall to the bottom of the tank. These may cause blockages in fine filters and nozzles, e.g. emitters in micro-irrigation systems.

Gran-am might be used through travelling irrigators and centre pivots, but is not recommended for use through drip and trickle irrigation systems, or under-tree sprinklers.

As in plants and fertiliser programs, about ten times as much nitrogen as sulfur is required in dietary supplements. This ratio can be achieved by adding one part Gran-am for every five parts Urea in the mix.

Where molasses is used as an energy source in stock licks, additional sulfur is unlikely to be required. Australian molasses is typically high in sulfur.