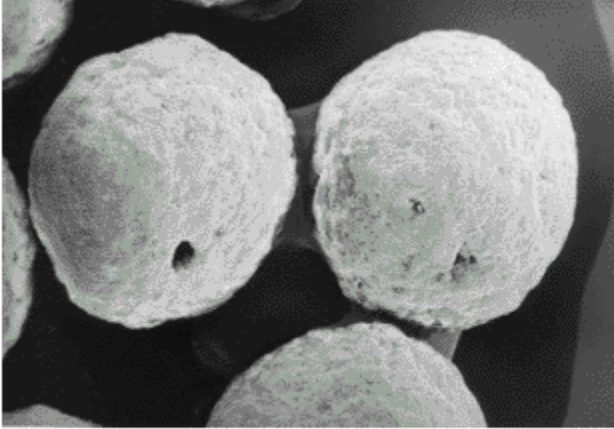


Are you getting what you paid for?

By Jerry Spencer, Business Development Manager, Paton Fertilizers

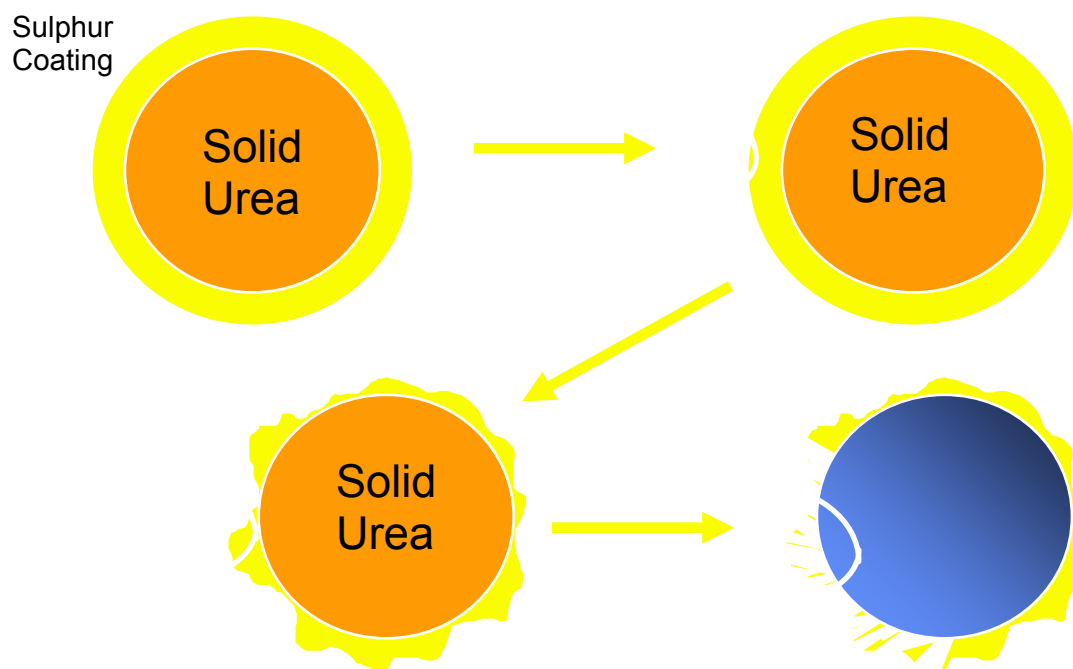
In the Australian turf market there are a number of brands of coated urea all of which make claims regarding longevity etc. However the differentiation between these can basically be split into Polymer Coated Sulphur coated urea (PCSCU), Sulphur coated urea (SCU) and Polymer coated urea (PCU).



Electron Microscopy of Sulphur coated urea

The mechanism of N release from PCSCU and SCU is by water penetration through micropores and imperfections, i.e., cracks or incomplete sulphur coverage, in the coating. This is followed by a rapid release of the dissolved urea from the core of the particle. When wax sealants are used, a dual release mechanism is created. Microbes in the soil environment must attack the sealant to reveal the imperfections in the sulphur coating. Because microbial populations vary with temperature, the release properties of the wax-sealed SCUs are also temperature dependent.

Sulphur Coatings Break Down

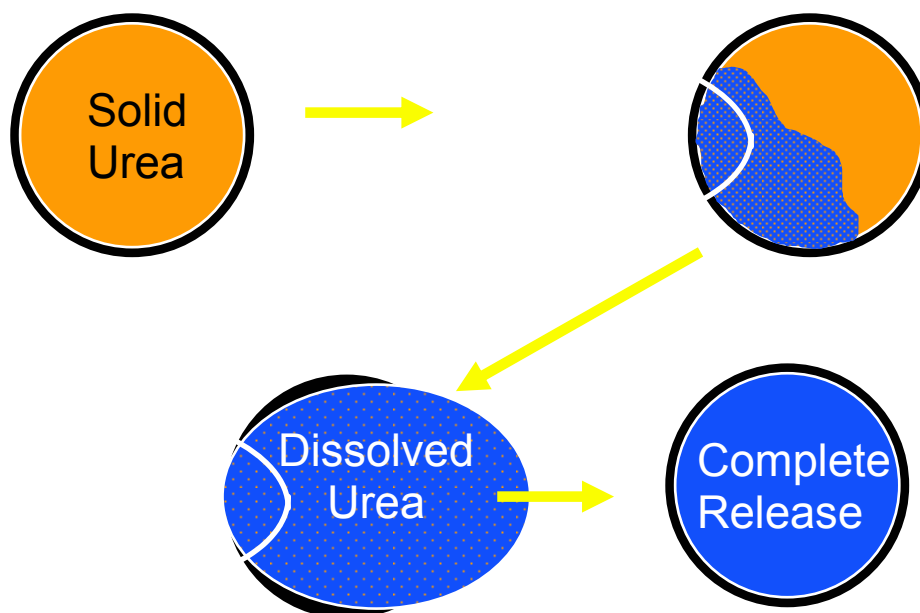


The release rate of a sulphur coated particles is directly affected by the coating thickness and the coating quality. Particles with higher sulphur loads, i.e., thick sulphur coatings, typically show fewer imperfections than particles with lighter coatings. There is a risk, however, that particles with too-thick sulphur coatings will exhibit lock-off, i.e., they may never effectively release their N.

Depending on the coating weight, N application rate, and environmental conditions, sulphur coated ureas can have residual characteristics which provide agronomic response from 6 to 12 weeks in turfgrass applications. Because of the differential release of N due to the lack of uniformity in coating thickness and the influence of temperature on N release, severe mottling has been observed in turfgrass when some brands of sulphur coated ureas have been applied during the cool-season growth period.

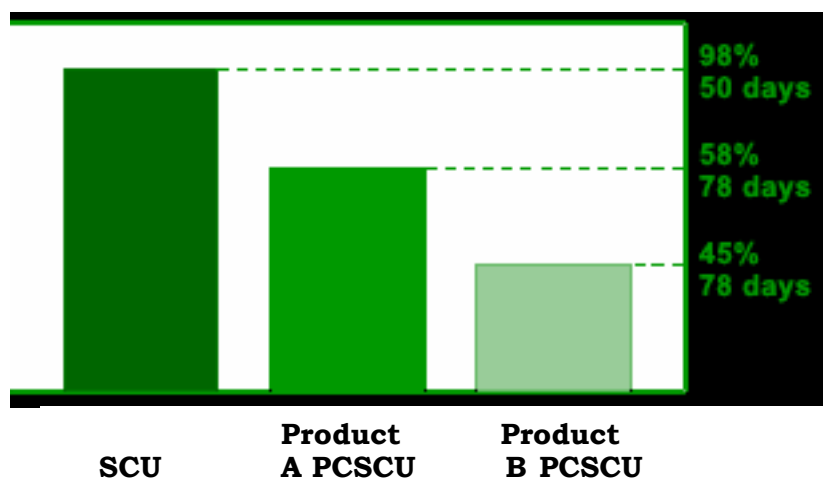
In contrast with PCU the coating does not break down as shown diagrammatically below.

Polymer Coatings Remain Intact



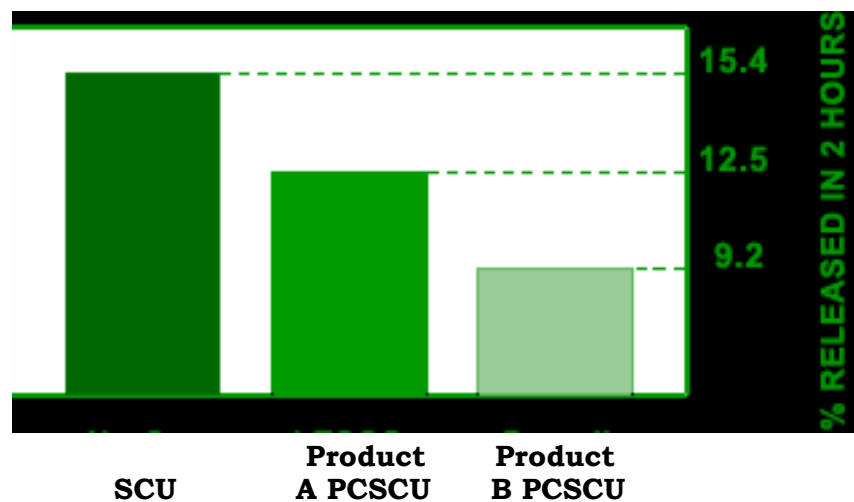
The immediately released nitrogen is determined by a two-hour water leaching test conducted at 21 degrees to 24 degrees per AOAC 970.04 test method, commonly referred to as the "Katz Test" approved by the Association of American Plant Food Control Officials (AAPFCO) and used by state regulatory officials to verify product label claims. The label guarantees for coated slow release nitrogen, CSR-N, is the percentage of unreleased (N), which is verified by this test method. The table below is from tests in the USA.

Release at 21°C for three leading brands of coated urea



An extended water immersion dissolution rate test (which is more severe than the Katz Test) is conducted for seven days at elevated temperature of 30 °C. The nitrogen remaining (unreleased) after this test, typically is about 40-70% of the total (N), and would be reported as having a seven-day DR of about 30-60 % (released). Typically, regular-sized granules will be at the low-end DR range and mini-sized granules will be in the middle of the DR range. The graph below is from tests in the USA. If a product has a 30% dissolution rate, then 30% of the nitrogen acts as a quickly available source of nitrogen and 70% as a slow release source of nitrogen. Dissolution rates of 25% to 35% are considered best for turfgrass fertilization.

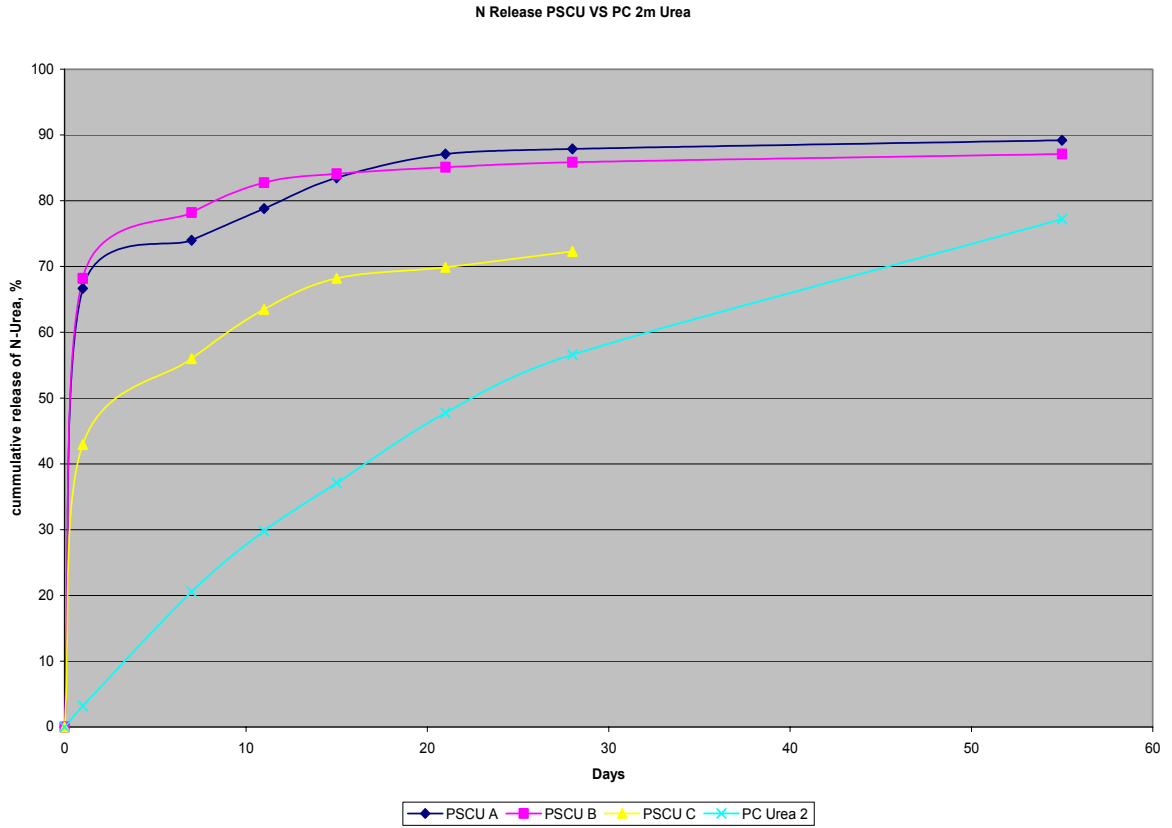
Release at 30°C for three leading brands of coated urea



As you can see **not all Polymer coated Sulphur coated ureas** are the same and when sulphur coated urea is taken into consideration dramatic differences exist in the longevities that can be achieved.

This in turn directly effects the value for money that products offer you as at 30°C in 2 hours an additional 6% of the nitrogen can be released from sulphur coated urea in contrast to premium quality polymer sulphur coated urea. In hotter weather this figure will be greater, and be directly linked to an increased likelihood for turf damage possibly occurring.

Considerable work has been carried out into release characteristics of other coatings as shown graphically below from work carried out in Italy.



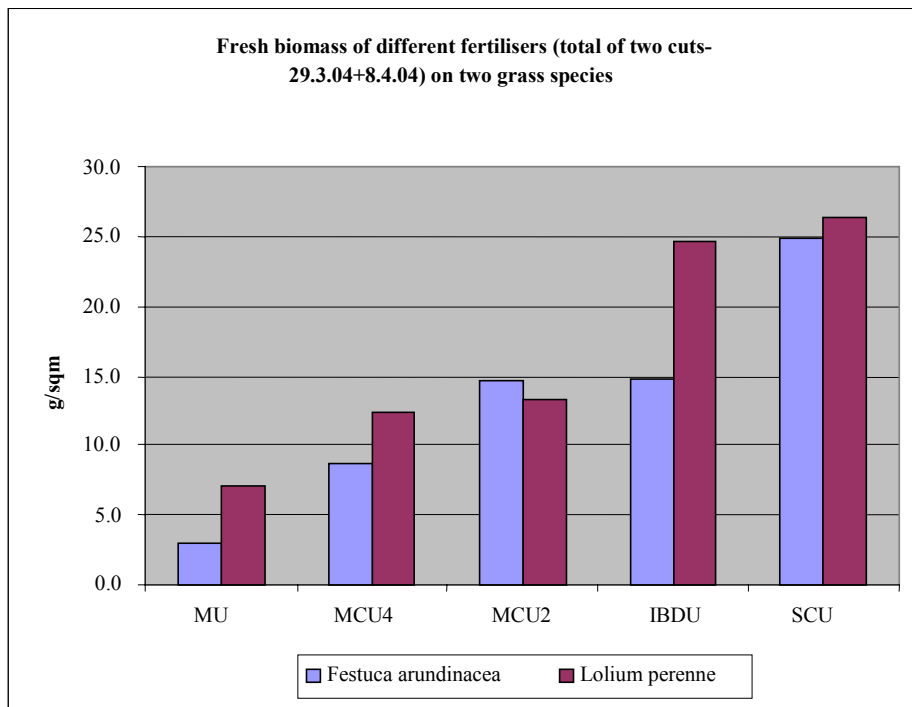
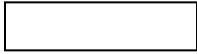
PSCU C released over 40% of its available nitrogen within the first 24 hours before steadily releasing a further 30% over the next 30 days. At day 55 no N was recorded indicating possible 'lock off' from this product.

Other PSCU samples tested showed even poorer results, releasing almost 70% of their available N in the first day.

A steady release of N from Multicote® coated Urea was recorded for the whole of the experiment. This is the predicted outcome from Multicote® granules and basically demonstrates the difference between these products in regard to consistency of release and value for money compared to sulphur coated products.

Charts 2 and 3 are based on 3 years turf nutrition research in Vichanza Italy, performed at Agronomi Associati Research Station.

Chart 2: Cumulative biomass from two cuttings of Perennial Ryegrass (*Lolium Perenne*), and Tall Fescue (*Festuca Arundinacea*) after treatments of different fertilizers.



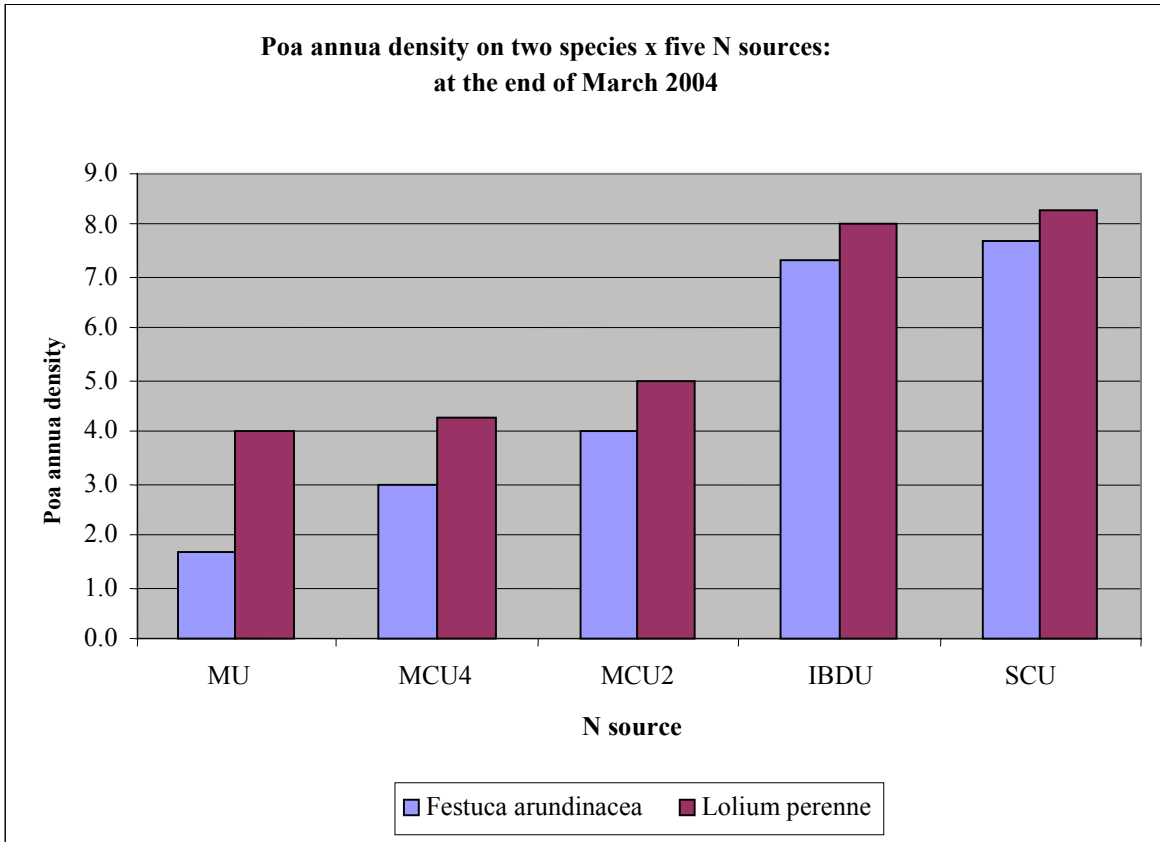
From the sum of the two cuttings, sulphur coated products provided large amounts of nutrient immediately to promote the most vegetative growth of both plant species, requiring greater cutting frequency.

Isobutylidene Diurea (IBDU) treated turf would require the second most amount of cutting for both grass species, although there is a large difference between the Ryegrass and the Fescue varieties with this fertilizer.

Multicote® Polymer coated products tested provided enough nutrient for adequate growth and reduced cuttings.

Chart 3: Fertilizer treatment effect on Bluegrass (*Poa Annua*) density in turfgrass populations

Chart 3



The SCU and IBDU treatments provided too much N and allowed the *Poa Annua* to grow prolifically, and provide greater competition to the desired turf grass varieties, essentially wasting fertilizer nutrients.

The bottom line is if you are purchasing a slow release fertilizer and it claims to contain SCU firstly make sure it is a premium quality PCSCU and secondly if possible even more preferably use Multicote® polymer coated urea as the N source.

Remember in order of preference:

