



Silicon Release from Biogenic Amorphous Silica (Mineral Magic™)

Proven Benefits for Turf and Agricultural Systems

Beyond its remarkable water-holding and nutrient-retention capacity, Biogenic Amorphous Silica (BAS) — known in Australia as Mineral Magic™ — provides another powerful advantage that's transforming plant resilience and soil health across both turf and broadacre/agricultural applications.

Decades of research confirm that silicon released from BAS plays a critical role in plant defence, physiology, and stress management — helping turf managers, farmers, and growers achieve stronger, more productive plants with fewer chemical inputs.

1. Strengthens Cell Walls for Natural Defence

Silicon fortifies the plant's structure by increasing the production of cellulose and hemicellulose, strengthening cell walls and creating a physical barrier against fungal pathogens and chewing or sucking insects.

In turf systems, this translates to improved resistance to disease and pest pressure, reducing the need for frequent fungicide and pesticide applications.

 *Reference - Journal of Experimental Botany (2013)* <https://academic.oup.com/jxb/article/64/5/1281/630847>

2. Enhances Drought Tolerance and Water Efficiency

Under drought or moisture stress, silicon helps plants maintain function by:

- Reducing leaf transpiration
- Increasing stomatal conductance
- Maintaining chlorophyll concentration and photosynthetic activity

For turf, this means longer-lasting colour and density between irrigations. For broadacre crops, it supports yield stability under limited water conditions.

 *Reference - Plant Production Science (1998)* <https://www.tandfonline.com/doi/abs/10.1626/pps.1.89>

3. Stimulates Root Growth and Nutrient Uptake

Silicon promotes deeper, denser root systems, improving nutrient absorption and anchorage. The enhanced root surface area also increases microbial activity and nutrient cycling — vital for both turf establishment and crop productivity.

 *Reference - Journal of Experimental Botany (2001):* <https://academic.oup.com/jxb/article-pdf/52/361/1703/9431719/521703.pdf>



4. ***Shields Against Biotic and Abiotic Stress***

Silicon has been shown to protect plants from a wide range of environmental and biological stresses, including:

- Fungal and bacterial diseases
- Salt and drought stress
- Heavy metal toxicity
- Temperature extremes (heat or frost)
- Nutrient imbalances and radiation damage

For growers, this means stronger, more resilient plants; for turf managers, it means more consistent playing surfaces with fewer inputs.

 *Reference - Soil Science & Plant Nutrition (2004)* <https://www.tandfonline.com/doi/pdf/10.1080/00380768.2004.10408447>

5. ***Reduces Salinity Damage***

In saline conditions — increasingly common in irrigated turf and cropping systems — silicon plays a critical protective role by:

- Reducing sodium translocation within plant tissues
- Maintaining photosynthetic efficiency
- Supporting osmotic balance and water use efficiency

This makes Mineral Magic™ particularly valuable for irrigated turf, vegetable production, and coastal or salt-affected soils.

 *Reference - Plant Stress & Drought Tolerance Study (2015):* https://www.researchgate.net/publication/271632768_Beneficial_effects_of_silicon_on_sal_t_and_drought_tolerance_in_plants

6. ***Detoxifies Heavy Metals***

Silicon released from BAS helps immobilise and neutralise toxic metals such as aluminium, arsenic, and cadmium by forming stable complexes or co-precipitates in the soil.

This reduces plant uptake of harmful elements, protecting both crop safety and soil health over time.

 *Reference - Environmental Science & Pollution Research (2018):* https://www.researchgate.net/publication/323756357_Silicon_Mechanisms_to_Ameliorate_Heavy_Metal_Stress_in_Plants

In Summary

Mineral Magic™ is more than just a waterwise soil conditioner — it's a silicon delivery system proven to strengthen plants, reduce stress, and improve long-term productivity.

From sports turf and golf greens to broadacre cropping and horticultural soils, the benefits of BAS extend from the ground up — supporting healthier soils, stronger plants, and more sustainable management practices.

Suppliers of Professional Turf Care Products and Services

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