



HALOGEN GREENS



MAGTASIUM

Scientific Foundations &
Product Development Report

Halogen Greens (Pty) Ltd



MAGTASIUM

From Application to Absorption. The Difference That Changes Everything.

GROUP 3 BIOSTIMULANT

Product Status: Magtasium is in trial phase, intended for registration as a Group 3 biostimulant under Act 36 of 1947. Patent application in final stages of filing.

Registration anticipated Q3 2026.



WHAT MAKES IT DIFFERENT

Produced through water chemistry. Contains Potassium and Magnesium - no organic material. Functions as both a nutrient source and a biostimulant. Patent-pending.



SAFETY

Tested by Mérieux NutriSciences/HortC. Multi-GC and multi-LC residue tests confirmed: **no residues detected above the limit of quantification.** Safe when used as directed.



INDEPENDENT TRIALS

Prof. Wayne Truter, CEO of AgriVitality (associated with University of Pretoria) - citrus, potatoes, tomatoes. Prof. Johann Strauss, Western Cape Dept. of Agriculture - wheat. Full trial reports available on request. Peer-reviewed publications in preparation.



APPLICATION GUIDELINES (CROP DEPENDENT)

| Method | Dilution Rate |
|----------------------|-----------------------------|
| Fertigation / Drench | 5ml Magtasium per 1L water |
| Foliar Application | 20ml Magtasium per 1L water |

Crop-specific protocols for citrus, potatoes, tomatoes, and wheat available on request. Our agronomy team will work with you to develop a programme suited to your operation.

The Starting Point

Most fertilisers supply Magnesium and Potassium. But supplying an element and delivering it are two different things.

Magtasium does both. It functions as a **trigger** that kickstarts the plant's physiological processes, sparking a rapid improvement in nutrient uptake efficiency - while simultaneously supplying Magnesium and Potassium in a highly available form. The plant absorbs them rapidly. From that single difference, everything that matters follows.



1 BRIX - The Quality Indicator

Brix measures dissolved solids in sap - sugars, minerals, and amino acids. A high Brix reading means photosynthesis is working and nutrients are where they should be [1].

When Brix Rises:

- **Fewer Pests:** Research demonstrates a clear Brix-pest susceptibility scale. Aphids at Brix 6-8. Chewing insects, including grasshoppers, at 9-12. Above Brix 12, insects find the sap indigestible and largely avoid the plant. Significantly reduced pest susceptibility [2, 20]. While not universal for every pest, practical field protection is significant [3].
- **Less Disease:** K and Mg activate plant defense enzymes. Balanced nutrition induces resistance against a range of fungal and bacterial pathogens [4, 21]. A fortified plant is harder to infect.
- **Weather Protection:** Higher soluble solids lower sap freezing point. The plant builds its own buffer against frost and drought [5, 22].
- **Better Flavour:** °Brix directly correlates with sugar content - sweeter fruit, richer vegetables, premium market quality [1, 6, 18, 23].
- **Longer Shelf Life:** Higher Brix means lower water activity and stronger cell walls. Produce stays firm and fresh longer. That shelf life extension is money in the bank [7, 24].

2 CHLOROPHYLL (SPAD) - The Engine of Growth

Chlorophyll turns sunlight into yield. A SPAD meter measures chlorophyll density, revealing how well your crop converts inputs into energy [8, 25]. SPAD readings share a strong linear correlation ($R^2 > 0.9$) with leaf nitrogen concentration [10, 27], though readings do vary across crop types - chlorophyll content and nitrogen allocation differ among species. For Magtasium trials, SPAD is our primary measurement tool. It tells us, directly and non-destructively, whether Magnesium is reaching the chlorophyll molecule and driving photosynthesis. When SPAD values rise and hold steady through the season, we know the plant's engine is running at full capacity.

When Chlorophyll Climbs:

- **Faster Growth:** More chlorophyll captures more light, creating more energy and faster biomass accumulation [9, 26].
- **No Wasted Nitrogen:** A high SPAD reading is direct evidence your plant is using nitrogen productively - not leaving expensive fertiliser sitting idle in the soil [10, 27].
- **Green for Longer:** Magnesium is the central atom of chlorophyll. Available Mg preserves chlorophyll, slowing leaf yellowing during critical grain-fill and fruiting stages [11, 28].
- **Maximum ROI:** High SPAD values link directly to yield - fruit set, grain weight, total harvest. Every Rand you spent on inputs works harder [12, 29].

The Thread That Connects Them

Brix measures the fuel. Chlorophyll measures the engine. Magtasium is the trigger that activates both. It kickstarts the plant's uptake efficiency while supplying the Magnesium and Potassium needed for photosynthesis and sugar transport. Sap that resists pests and disease. Leaves that capture more light. Produce that tastes better and lasts longer.



3 THE RIGHT WAY TO TEST: BRIX & SPAD VS. SOIL & LEAF SAMPLES

If you have previously tested soil and leaf samples and found the results did not show what you expected, there is a clear scientific reason. You were measuring the wrong thing.

The Problem with Soil Tests

A standard soil test measures the total extractable pool of nutrients present in the soil. It tells you what is there. It cannot tell you what the plant can actually access. Magtasium enhances uptake efficiency - it does not simply change total soil nutrient quantity. The soil test sees the same pool. It cannot see the improved rate of flow into the plant **[13, 30]**.

Soil tests measure potential supply, not actual delivery. The difference between supply and delivery is exactly what Magtasium addresses.

The Problem with Leaf Tissue Tests

A leaf tissue test measures the total concentration of an element inside the leaf - both what is actively working and what is simply being stored. Plants routinely take up more Potassium than they immediately need, storing the excess in cell vacuoles. This is called luxury consumption **[14, 31]**. The tissue test cannot tell you whether the Potassium inside that leaf is actively transporting sugars, strengthening cell walls, or regulating stomata. It only confirms the element is present, not that it is performing **[15, 32]**.

Tissue tests measure presence. Magtasium addresses performance. A leaf can be full of Potassium and still not be functioning at its peak.

Why Brix is the Correct Test

A Brix refractometer measures dissolved solids in plant sap - largely sugars produced by photosynthesis. This is a direct measurement of plant function, not a chemical inventory. Potassium is directly responsible for loading sugars into the phloem and transporting them to fruit and storage organs **[16, 33]**. Magnesium drives the photosynthesis that creates those sugars in the first place **[11, 28]**. When nutrient uptake is enhanced, the measurable result is more sugar production and more sugar movement - exactly what the Brix meter reads. A rising Brix number confirms the nutrients are not just present. They are working **[1, 18]**.

Why SPAD is the Correct Test

A SPAD meter measures chlorophyll density in the leaf. Magnesium is the central atom of every chlorophyll molecule. Without Magnesium, there is no chlorophyll **[11, 28]**. SPAD readings provide a scientifically validated, non-destructive measurement of chlorophyll density, linked to photosynthetic capacity **[10, 27]**. When Magnesium availability is enhanced, the direct result is maintained or increased chlorophyll density - exactly what the SPAD meter reads. A rising or stable SPAD number confirms Magnesium is actively building the green pigment that drives yield **[12, 29]**.

Note: Brix and SPAD are influenced by multiple factors including light, water, and overall nutrition. Optimising Mg and K availability removes a primary limiting factor. Product-specific application protocols are being developed through ongoing field trials.

How We Work

We do not hand you a bottle and walk away. We walk alongside you. We conduct trials in conjunction with farmers. We measure. We observe. We learn together. That is how we prove what Magtasium can do **[17, 34]**.



The Fundamental Difference

| | Soil & Tissue Tests | Brix & SPAD |
|--------------------------------|-------------------------|---------------------------|
| Measures | Nutrient quantity | Plant function |
| Question Answered | "Is the element there?" | "Is the element working?" |
| Sees Availability | No | Yes |
| Sees Luxury Storage | Yes, misleadingly | No, only active function |
| Correlates with Yield | Weak | Strong |
| Correlates with Quality | Weak | Strong |

TECHNICAL NOTES

SPAD: Soil Plant Analysis Development - non-destructive measurement of leaf greenness correlating directly with chlorophyll content and photosynthetic capacity [8, 10, 25, 27].

Brix & Insects: Dr. Thomas Dykstra, leading authority on plant health and insect resistance. Validated scale: aphids at Brix 6–8, chewing insects at Brix 9–11, grasshoppers at Brix 10–12+. Above 12, insects find sap indigestible and avoid the plant [2, 19]. Supported by peer-reviewed research [20]. Not universal for all pests such as leafhoppers [3].

Brix & Disease: Balanced K, Ca, and Mg activate plant immune pathways [4, 21].

Brix & Shelf Life: Higher Brix links to lower water activity, stronger cells, and longer shelf life [7, 24].

Chlorophyll & Nitrogen: SPAD readings share strong linear correlation ($R^2 > 0.9$) with leaf nitrogen concentration [10, 12, 27, 29]. Readings do vary across crop types. Chlorophyll content and nitrogen allocation differ among species.

Magnesium & Chlorophyll: Mg is the central coordinating ion of the chlorophyll porphyrin ring. Without it, the molecule cannot capture light [11, 28].

Mechanism: Water chemistry. Potassium and Magnesium only - no organic material. Functions as nutrient source and physiological trigger, kickstarting uptake systems while supplying essential elements.

Cost: R35 per litre (25L drum). Crop-specific protocols available on request.

Safety: Mérieux NutriSciences/HortC multi-GC and multi-LC residue testing - no residues above limit of quantification. Safe when used as directed.

Trial Data: Prof. Wayne Truter, CEO AgriVitality (citrus, potatoes, tomatoes). Prof. Johann Strauss, Western Cape Dept. of Agriculture Sustainable Cropping Systems (wheat). Note: the Western Cape Department of Agriculture does not endorse this product. Trial results alone do not constitute endorsement. All data available on request. Peer-reviewed publications in preparation.

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Magtasium. Trigger the potential. Harvest the result.

Document prepared by Halogen Greens (Pty) Ltd. Magtasium is intended for registration as a Group 3 biostimulant under Act 36 of 1947. Registration anticipated Q3 2026, subject to Registrar approval. All claims subject to field trials, patent grant, and product registration. Independent trial data, safety data, and toxicology reports available on request. Efficacy may vary by soil type, crop species, and environmental conditions. Mérieux NutriSciences/HortC residue testing confirmed no residues above limit of quantification. The Western Cape Department of Agriculture does not endorse this product. Independent trial results alone do not constitute endorsement of efficacy.

TOUCH BASE WITH US

● Head Office

- Roodepoort - Gauteng

● Manufacturing Plants

- Tarlton - Gauteng
- Citrusdal - Western Cape

● Depots

- George - Western Cape
- Groblersdal - Limpopo
- Nelspruit - Mpumalanga
- Kirkwood - Eastern Cape
- Polokwane - Limpopo



CORPORATE IDENTITY



HALOGEN GREENS

ELEVATING CROP PROTECTION, NATURALLY

SPECIALIZATION

Group 3 Bio Stimulant
(Trials Underway for Registration)

STATUS

- Pending Worldwide Patent
- Conducting Trials



CONTACT INFORMATION



+ (27) 87 474 6149



www.halogengreens.com



info@halogengreens.com



- Roodepoort, Gauteng, South Africa (H/O)
- Tarlton, Gauteng, South Africa
- Citrusdal, Western Cape, South Africa
- Fredericton, New Brunswick, Canada

