



HALOGEN GREENS



# RESEARCH REPORT 2026

## Magtasium Preliminary Trial Results: Potatoes

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*Reviewed by*

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**Life AgriScience**  
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# FOREWORD



## KEY TAKEAWAYS

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- **The Test:** We asked an independent expert, Prof. Wayne Truter, to grow potatoes under controlled conditions - with and without MAGTASIUM, and with and without fertilizer. Some batches received only water, some only fertilizer, and others a combination.
- **The Bottom Line:** The potatoes that received MAGTASIUM were consistently healthier, greener, and showed improved growth performance.
- **The Big Finding:** Even without fertilizer, potatoes treated with MAGTASIUM significantly outperformed untreated crops - closing much of the gap with fully fertilized plants.
- **What's Next:** This controlled trial shows a clear biological effect. The next step is to validate these results under real-world, large-scale farming conditions - like yours.



# WHY THE RESEARCH?



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We believe in transparency. Instead of making claims, we asked an independent research team to find the plain truth:

## **What does MAGTASIUM actually do for a crop?**

The research question was simple:

"What is the true plant growth response to MAGTASIUM without the use of pesticides and an intensive nutrient management programme?"

Two Soil Types:

- Sandy Loam
- Clay

**Moisture:** Non-limiting throughout the trial.

# THE CHEAT SHEET



Before viewing the graphs, understand what the six treatments (T1–T6) represent - they're the key to interpreting the study.

Treatment	Fertilizer?	MAGTASIUM?	What It Represents
<b>T1: Negative Control</b>	None	None	The "Do Nothing" Baseline. This shows what happens when you plant potatoes and give them nothing - no fertilizer, no MAGTASIUM. It is the bottom line.
<b>T2: Positive Control</b>	<b>Full Program</b>	None	The "Good Farming" Benchmark. This received a standard fertilizer once per week, weekly.
<b>T3: PC + A</b>	<b>Full Program</b>	Lower Dose	The "Enhancement" Test (Lower Dose). This shows what happens when you add a lower dose of MAGTASIUM with a fertilizer.
<b>T4: NC + A</b>	None	Lower Dose	The "Rescue" Test (Lower Dose). This shows what a lower dose of MAGTASIUM can do on its own, with no fertilizer.
<b>T5: PC + B</b>	<b>Full Program</b>	Higher Dose	The "Enhancement" Test (Higher Dose). This shows what happens when you add a higher dose of MAGTASIUM with a fertilizer.
<b>T6: NC + B</b>	None	Higher Dose	The "Rescue" Test (Higher Dose). This shows what a higher dose of MAGTASIUM can do on its own, with no fertilizer.

## Dose Key:

- **Treatment A:** Lower Dose (20 ml/L foliar + 5 ml/L drench weekly)
- **Treatment B:** Higher Dose (40 ml/L foliar + 10 ml/L drench weekly)

# THE RESULTS



The research tracked three things that matter to your bottom line: **Plant Health, Growth Rate, and Final Yield.**

## Why this setup was powerful:

It answered two critical questions every farmer asks:

1. **"Will MAGTASIUM help my crop if I'm already doing everything right?"** (Compare T2 vs. T3 and T5)
2. **"Will MAGTASIUM help my crop when conditions aren't perfect or soil is variable?"** (Compare T1 vs. T4 and T6)

## 1. Plant Health: The "Greenness" Test (SPAD Values)

Figure 3 in the research paper is a line graph that tracks the "greenness" (SPAD value) of the leaves over the 4-month trial. A higher line means a healthier, more nitrogen-rich plant. Downward trend of SPAD values shows senescence of a potato plant lifestyle. Transitioning from active growth to "shutting down"- moving all the resources into its tubers.

### Follow the lines from top to bottom:

- **T2 (Orange Line - Fertilizer Only):** These plants were on a weekly fertilizer program without MAGTASIUM. They started strong and finished strong. This is your benchmark for ideal nutrition.
- **T1 (Dark Blue Line - Nothing):** The struggler. These plants received nothing - no fertilizer, no MAGTASIUM. This line sits at the bottom the entire time. It never catches up. This is the cost of doing nothing.
- **T4 (Light Blue Line - No Fertilizer + MAGTASIUM A) and T6 (Light Green Line - No Fertilizer + MAGTASIUM B):** These lines start low, similar to T1. But as the season progresses, both lines climb away from T1. They rise toward the top of the graph. By the end, T4 and T6 have closed much of the gap with the fully fertilized plants (T2). They took barren ground and, using only MAGTASIUM, grew plants that rivalled their fertilized neighbours. **T6 (the higher dose) shows the strongest climb.**
- **T3 (Dark Green Line - Fertilizer + MAGTASIUM A) and T5 (Purple Line - Fertilizer + MAGTASIUM B):** These lines hold steady at the peak of plant health. Because they were already at maximum health, the graph can't show them going "higher." But the yield data shows they produced **more potatoes** from that same peak health. T3 also gave us the highest SPAD readings.



### The Official Interpretation:

"T2 exhibited higher SPAD values than T1. T4 and T6 improved SPAD values relative to T1. T6 slightly exceeded T4 in chlorophyll enhancement. T3 and T5 showed minimal improvement beyond T2. MAGTASIUM improves chlorophyll content under nutrient limitation, indicating improved nitrogen uptake or utilisation. The limited response under fertilised conditions suggests that the treatment enhances efficiency rather than increasing nutrient supply beyond sufficiency."

If your crop is...	MAGTASIUM does this...	Look at...
<b>Stressed or Nutrient-Limited</b>	Helps the plant access nitrogen and recover health.	T4 and T6 climbing toward the top
<b>Already Healthy and Well-Fed</b>	Helps the plant use that nutrition more efficiently to build yield.	T3 and T5 holding steady at the top

## 2. Growth Rate: Faster, More Vigorous Plants

Figure 4 in the research paper shows the treatment effects on plant growth rate - how fast the plants grew over time in height, leaf amount, and canopy density.

### What the data shows:

**T1 (Nothing):** The lowest growth rate. Plants stalled without nutrition or MAGTASIUM.

**T2 (Fertilizer Only):** A significant jump in growth rate.

**T4 (MAGTASIUM A Only) and T6 (MAGTASIUM B Only):** Both treatments enhanced growth compared to T1. **T6 (the higher dose) showed a slightly stronger recovery**, pulling the plants up toward the fertilized benchmark.

**T3 and T5 (Fertilizer + MAGTASIUM):** Growth stimulation beyond T2 was minimal - because T2 was already growing at a strong, healthy rate.

### The Official Interpretation:

"T1 showed the lowest growth rate. T2 significantly increased vegetative growth. T4 and T6 enhanced growth compared to T1. Treatment B showed slightly stronger growth recovery. Growth stimulation beyond T2 was minimal. MAGTASIUM stimulates vegetative growth primarily under nutrient-limited conditions. The response pattern confirms stress alleviation and improved nutrient-use efficiency rather than strong growth amplification under optimal fertility."

**What this means for you:** MAGTASIUM acts as a growth stimulant, particularly when a plant is under stress. It helps the plant push through tough conditions and maintain momentum.



### 3. Yield: More Potatoes, Bigger Potatoes

Figures 5, 6, and 7 in the research paper show the treatment effects on tuber number, size (circumference), and mass (weight). This is the data that matters most.

#### What the data shows:

- **T1 (Nothing):** The lowest tuber number, smallest size, and lowest mass. This is the baseline of doing nothing.
- **T2 (Fertilizer Only):** Improved all yield components significantly. This confirms that nutrition is the primary driver of yield.
- **T4 and T6 (MAGTASIUM Only):** Both treatments increased tuber number, size, and mass compared to T1. **T6 (the higher dose) generally showed the strongest improvement** under these nutrient-limited conditions.
- **T3 and T5 (Fertilizer + MAGTASIUM):** Both treatments provided enhancement beyond T2. The gains were "modest" compared to the dramatic rescue seen in T4 and T6, but they are present. **MAGTASIUM added value along with the fertilizer program.**

#### The Official Interpretation:

"T1 recorded the lowest tuber number, size, and mass. T2 improved all yield components as expected. T4 and T6 increased tuber number and size relative to T1. T6 generally showed the strongest improvement under nutrient limitation. T3 and T5 provided limited enhancement beyond T2. MAGTASIUM improves tuber formation and size under nutrient stress conditions. Enhanced assimilate partitioning and improved nutrient-use efficiency likely contributed to increased tuber mass. However, when fertility is nonlimiting, additional yield gains are modest."

**What this means for you:** MAGTASIUM improves "assimilate partitioning" - the plant's ability to send energy to the part you harvest. It doesn't just help struggling crops catch up; it helps healthy crops exceed their normal potential.



If you have been following the data closely, one question stands out:

**Why did T6 consistently show the strongest response throughout the entire trial?**

Let's look at the evidence again:

Metric	T6 Performance
<b>Chlorophyll (SPAD) - Figure 3</b>	T6 showed the strongest climb away from T1, slightly exceeding T4 in chlorophyll enhancement.
<b>Growth Rate - Figure 4</b>	T6 (Treatment B) showed slightly stronger growth recovery than T4 (Treatment A).
<b>Tuber Number - Figure 5</b>	T6 generally showed the strongest improvement under nutrient limitation.
<b>Tuber Size - Figure 6</b>	T6 consistently drove size increases in unfertilized ground.
<b>Tuber Mass - Figure 7</b>	T6 delivered the highest mass among the unfertilized treatments.

**The report's own words:**

"T6 generally showed the strongest improvement under nutrient limitation."

"Treatment B demonstrated slightly stronger recovery responses compared to Treatment A, suggesting a modest dose-response effect."

# THE EXPLANATION: THREE LAYERS



## Layer 1: The Dose-Response Effect

Treatment B (40 ml/L foliar + 10 ml/L drench) is twice the strength of Treatment A. The research explicitly states there was a "modest dose-response effect." In plain language: **when the plant is under stress, giving it more MAGTASIUM helps it recover more strongly.** T6 received the higher dose in a stressed environment, so it responded more vigorously than T4.

## Layer 2: The Law of Diminishing Returns

Now look at T5. T5 received the same high dose as T6 (Treatment B), but it was applied on top of a full fertilizer program. Did T5 dramatically outperform T2? No. The gains were present, but "modest."

This tells us something critical: **MAGTASIUM is not a straight-line "more input = more output" product.** In fertile ground, the plant already has most of what it needs. The high dose in T5 provided efficiency gains, but it couldn't trigger the dramatic rescue effect seen in T6 because T5 wasn't in distress.

## Layer 3: The "Perfect Storm" for T6

T6 occupied the unique position of being:

1. **In nutrient-limited soil** (No fertilizer, so the plant was hungry and responsive).
2. **Receiving the higher dose** (Treatment B rate).
3. **Given time to respond** (The 4-month trial allowed the rescue effect to fully develop).

This combination created the "perfect storm" for MAGTASIUM to demonstrate its full potential. T6 had room to improve, and it was given the tools and the time to do so.

## The Plain Truth About T6:

T6 is not proof that "more MAGTASIUM is always better." If that were true, T5 would have dramatically outperformed T2 and T3, and it didn't.

T6 is proof that **MAGTASIUM delivers its greatest value when the plant has something to gain.** In T6, the plant was hungry, stressed, and primed for a response. MAGTASIUM at the higher dose fed that hunger by unlocking nutrients the plant couldn't otherwise access and improving how those scarce nutrients were used.

Think of it this way:

- **T5 (Fertilizer + High Dose MAGTASIUM):** A healthy athlete taking a supplement. Gains are real but incremental.
- **T6 (No Fertilizer + High Dose MAGTASIUM):** A fatigued athlete getting proper nutrition and support. Gains are dramatic because the starting point was low.

# THE CORE TAKEAWAY



This research confirms that MAGTASIUM is not a replacement for sound agronomy.

It is something potentially more valuable:

**A tool that makes your entire fertility program work efficiently.**

**The report's own summary states it clearly:**

"This preliminary potato trial confirms that nutrient availability remains the primary determinant of plant growth and tuber yield. The positive control (T2) consistently outperformed the negative control (T1), validating nutrient limitation as the dominant growth constraint."

"MAGTASIUM Treatments A and B: Improved chlorophyll status (SPAD), Increased vegetative growth rate, Enhanced tuber number and tuber mass under nutrient limitation."

"Treatment B demonstrated slightly stronger recovery responses compared to Treatment A, suggesting a modest dose-response effect. Importantly, under fertilised conditions, MAGTASIUM increased the yield beyond the positive control, and this indicates that the product functions primarily as: A nutrient-use efficiency enhancer, A physiological growth stimulant, A stress mitigator, A compensatory input under sub-optimal fertility."

"The agronomic value of MAGTASIUM appeared highest in the nutrient-constrained production systems, where it improves performance toward the fertilised benchmark. Under optimal fertility, benefits are present."

"Overall, the trial demonstrates that MAGTASIUM acts predominantly as a corrective and efficiency-enhancing treatment and yield stimulant in sub optimal production systems."

# REPORT



## MAGTASIUM PRELIMINARY TRIAL RESULTS: POTATOES

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### RESEARCH QUESTION

What is the true plant growth response to **MAGTASIUM** without the use of pesticides (*insecticides and fungicides*) and an intensive nutrient management programme?

### BASIC METHODOLOGY

#### Treatments:

T1	Negative Control (NC) - No treatment
T2	Positive Control (PC) – Standard nutrient treatment
T3	PC + A
T4	NC + A
T5	PC + B
T6	NC + B

#### TREATMENT A:

- 20 ml per litre water (foliar) weekly
- 5 ml per litre (drench) weekly

#### TREATMENT B:

- 40 ml per litre water (foliar) weekly
- 10 ml per litre (drench) weekly

**Moisture:** Non-limiting

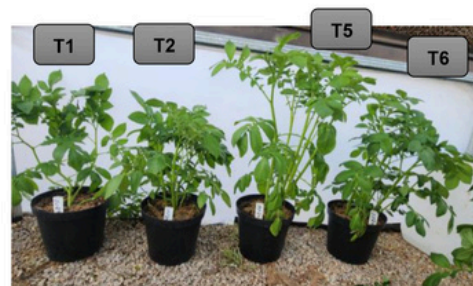
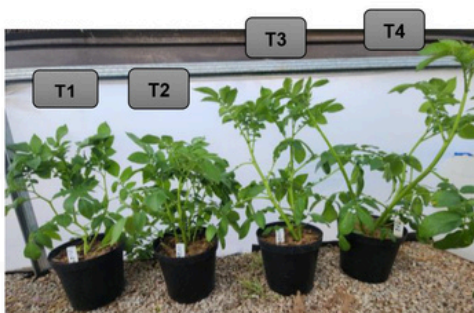
**Soil:** Two soil types

- Sandy loam
- Clay

#### Measurements:

- **SPAD (Soil Plant Analysis Development)** - refers to a non-destructive method, estimating leaf chlorophyll content and, by extension, Nitrogen (N) status, by measuring the greenness of a leaf. Indirect measure of stress
- **Plant growth rate (%)** – Change in plant growth parameters i.e. correlation of plant height change, leaf amount and canopy density over time.

### OBSERVATIONS



**Figure 1:** Treatment effects after 4 months in comparison to Negative Control (NC) - No treatment (T1) and Positive Control (PC) – Standard nutrient treatment (T2)



Figure 2: Tuber production from plants treated with **MAGTASIUM (T3-T6)** in comparison to treatment **T1 (no treatment)** and **T2 (Standard Nutrient Treatment)**

**PRELIMINARY RESULTS**

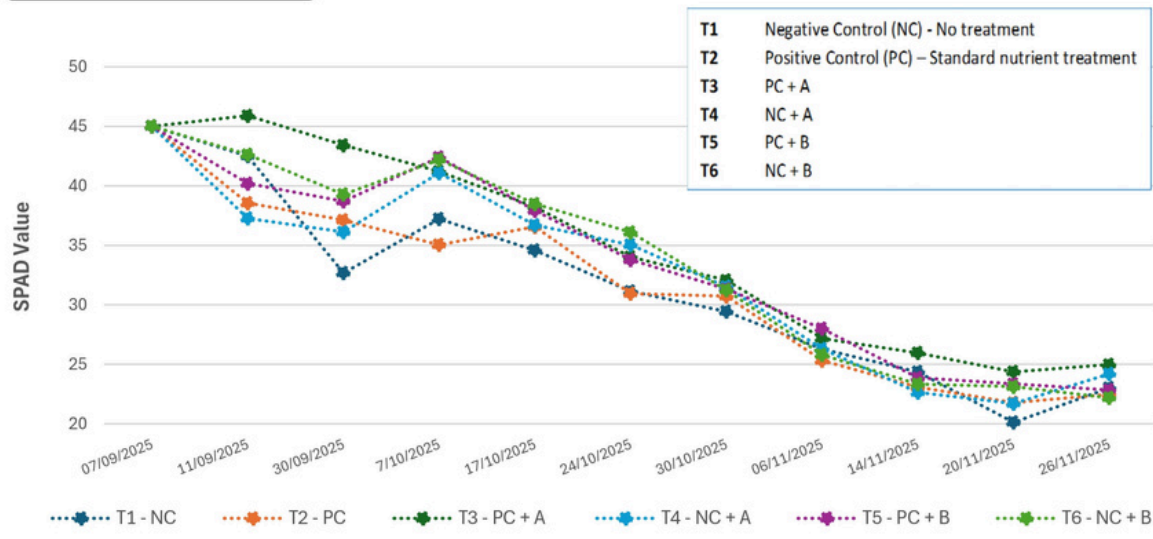


Figure 3: Treatment effects after 4 months on plant SPAD values

**Interpretation (Figure 3):**

- T2 exhibited higher SPAD values than T1.
- T4 and T6 improved SPAD values relative to T1.
- T6 slightly exceeded T4 in chlorophyll enhancement.
- T3 and T5 showed minimal improvement beyond T2.

**MAGTASIUM** improves chlorophyll content under nutrient limitation, indicating improved nitrogen uptake or utilisation. The limited response under fertilised conditions suggests that the treatment enhances efficiency rather than increasing nutrient supply beyond sufficiency.

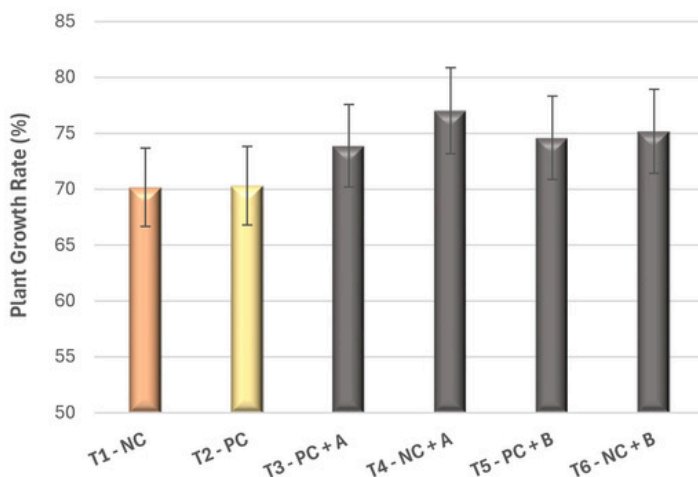


Figure 4: Treatment effects after 4 months plant growth rate

**Interpretation (Figure 4):**

- T1 showed the lowest growth rate.
- T2 significantly increased vegetative growth.
- T4 and T6 enhanced growth compared to T1.
- **Treatment B** showed slightly stronger growth recovery.
- Growth stimulation beyond T2 was minimal.

**MAGTASIMUM** stimulates vegetative growth primarily under nutrient-limited conditions. The response pattern confirms stress alleviation and improved nutrient-use efficiency rather than strong growth amplification under optimal fertility.

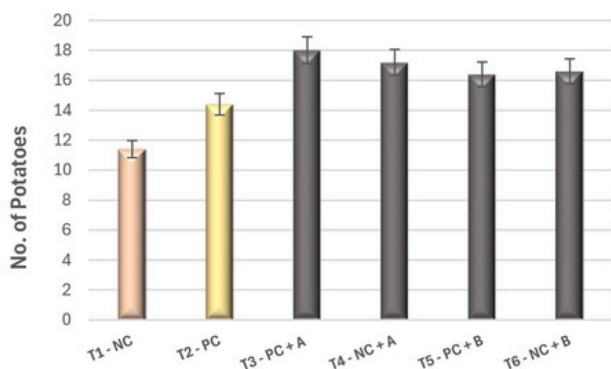


Figure 5: Treatment effects on the mean no. of potatoes produced

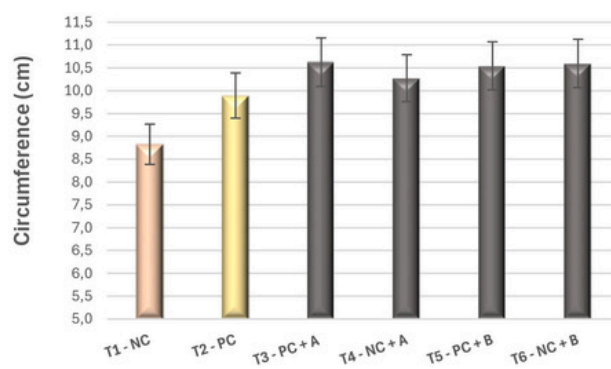


Figure 6: Treatment effects on the mean circumference of potatoes

**Interpretation (Figure 5-7):**

- T1 recorded the lowest tuber number, size, and mass.
- T2 improved all yield components as expected.
- T4 and T6 increased tuber number and size relative to T1.
- T6 generally showed the strongest improvement under nutrient limitation.
- T3 and T5 provided limited enhancement beyond T2.

**MAGTASIMUM** improves tuber formation and size under nutrient stress conditions. Enhanced assimilate partitioning and improved nutrient-use efficiency likely contributed to increased tuber mass. However, when fertility is non-limiting, additional yield gains are modest.

T1	Negative Control (NC) - No treatment
T2	Positive Control (PC) - Standard nutrient treatment
T3	PC + A
T4	NC + A
T5	PC + B
T6	NC + B

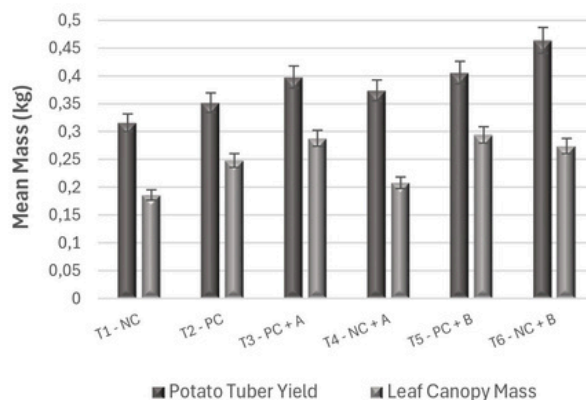


Figure 7: Treatment effects on the mean mass of plant components

## PRELIMINARY CONCLUSIONS

This preliminary potato trial confirms that nutrient availability remains the primary determinant of plant growth and tuber yield. The **positive control (T2) consistently** outperformed the **negative control (T1)**, validating nutrient limitation as the dominant growth constraint.

### **MAGTASIUM Treatments A and B:**

- Improved chlorophyll status (SPAD),
- Increased vegetative growth rate,
- Enhanced tuber number and tuber mass under nutrient limitation.

**Treatment B** demonstrated slightly stronger recovery responses compared to **Treatment A**, suggesting a modest dose-response effect. Importantly, under fertilised conditions, **MAGTASIUM** increased the yield beyond the positive control, and this indicates that the product functions primarily as:

- A nutrient-use efficiency enhancer,
- A physiological growth stimulant,
- A stress mitigator,
- A compensatory input under sub-optimal fertility.

The agronomic value of **MAGTASIUM** appeared highest in the nutrient-constrained production systems, where it improves performance toward the fertilised benchmark. Under optimal fertility, benefits are present.

Overall, the trial demonstrates that **MAGTASIUM** acts predominantly as a corrective and efficiency-enhancing treatment and yield stimulant in sub optimal production systems.

*Note: These trials were conducted to compare the true effect of **MAGTASIUM** on plant growth parameters. It is important to note that only T2 received fertiliser. Therefore, results reflect the intrinsic biological response to **MAGTASIUM** rather than typical commercial yield outcomes.*

# THE BOTTOM LINE



## **What this means for you and your farm:**

### **1. MAGTASIUM maximises your ROI on fertilizer.**

By improving Nutrient-Use Efficiency, it helps convert more of your applied fertilizer into actual yield. The data shows that when used with your standard program (T3 and T5), MAGTASIUM pushed yields beyond what fertilizer alone could achieve. It makes your existing nutrients work harder.

### **2. MAGTASIUM protects your yield potential.**

When your crop faces stress - whether from nutrient availability issues, soil variability, or environmental factors - MAGTASIUM helps maintain growth and development, keeping you closer to your yield goal. The rescue effect seen in T4 and T6 proves it can lift struggling ground.

### **3. The response to MAGTASIUM is dose-sensitive.**

Treatment B (the higher dose) consistently showed slightly stronger results than Treatment A, particularly under stress conditions. If you have ground that is variable, thin, or underperforming, the T6 response suggests that a higher rate of MAGTASIUM can help lift that ground closer to your best acres. If your ground is already highly productive, MAGTASIUM still adds value - but the response may look more like T3 and T5: steady, efficient, and yield-positive, just less dramatic.



# A FINAL NOTE

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This was a preliminary trial designed to measure the *biological* response to MAGTASIUM. It confirms the product's function as a nutrient-use efficiency enhancer.

## **Important context from the researchers:**

"Note: These trials were conducted to compare the true effect of MAGTASIUM on plant growth parameters. It is important to note that only T2 received fertiliser. Therefore, results reflect the intrinsic biological response to MAGTASIUM rather than typical commercial yield outcomes."

For us as growers, the implication is clear: by improving the plant's internal efficiency, MAGTASIUM offers a pathway to higher productivity from the same inputs. Whether you are fighting thin ground or pushing for a new yield record, this research shows MAGTASIUM delivers.

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## ● Depots

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- 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



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