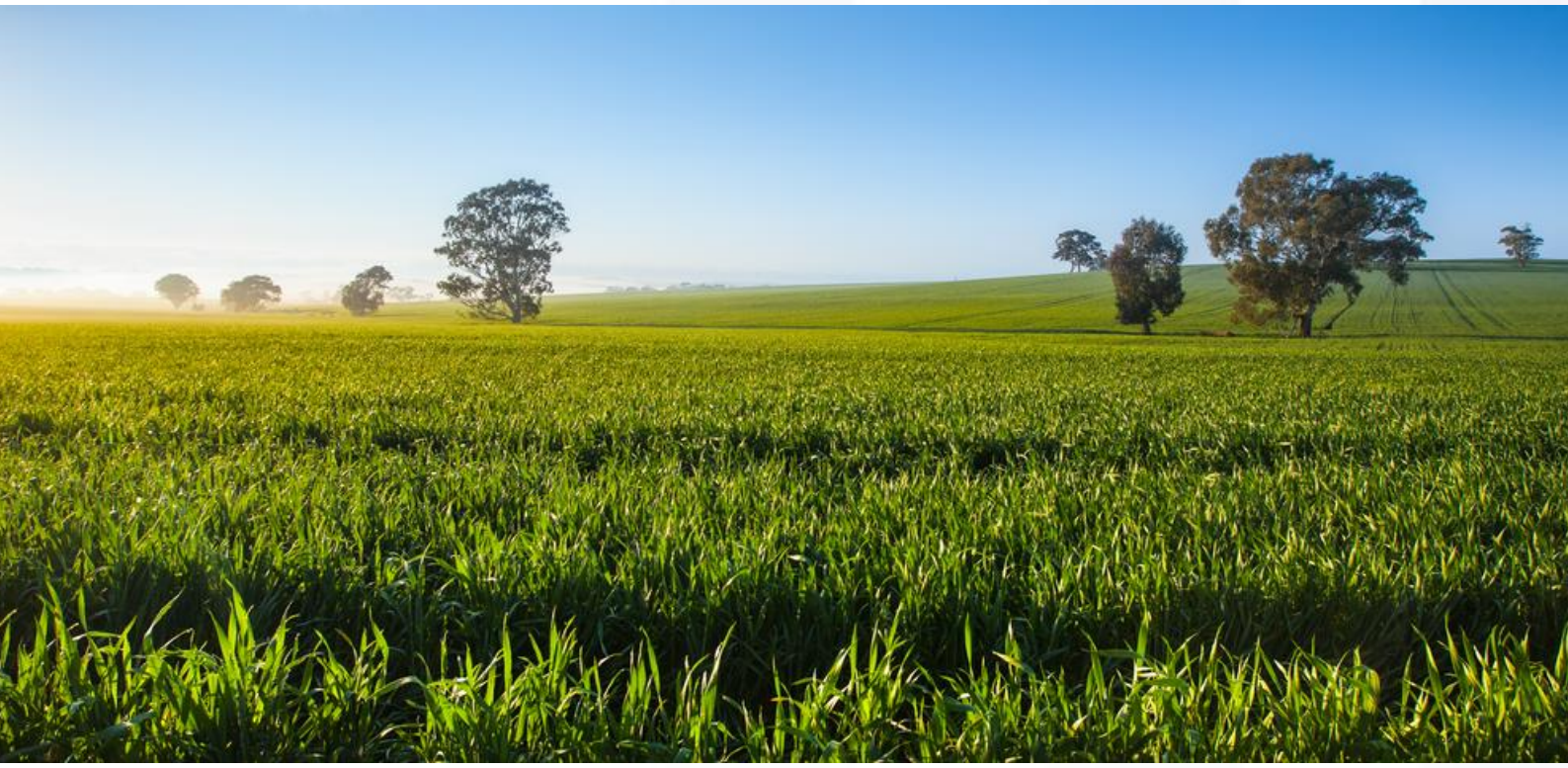
TRIAL SUMMARY

Independent Field Trial Summary

Grow Safe® Mineral Fertilisers & Microbial Products



AUSTRALIAN MINERAL FERTILISERS
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Company Profile

The premium mineral and microbial Grow Safe® products by AM Fertilisers have been the culmination consistent performance in over 45 scientific investigative trials - statistically designed with replications and randomisations both on paddocks and in pots - conducted by independent agencies including the University of Western Australia (UWA), involving commercial broad acre and pasture production systems. Ever since its inception in the farm nutrition market, AM Fertilisers have developed a range of premium granular fertilisers combined with millions of beneficial soil microbes including that of Bacillus, Pseudomonas, Trichoderma, Azospirillum, Rhizobia and Mycorrhizae (VAM) species. Their performance and long-term benefits of sustainably improved productivity –both in terms of quantity and quality.

Over the past 23 years the Grow Safe® products have been designed to be compatible with wider soil and plant types (beyond pasture and cropping) to include horticulture, turf and home garden applications. Grow Safe® products have been designed to establish a healthy rhizosphere with balanced biology along with sixty trace minerals (locally sourced through silicate minerals) that help replenish critically important micro-nutrients that ensure the health and productivity of various systems encompassing surrounded ecology. The obvious outcomes of incremental yields of better qualities at significantly reduced production costs along with the added benefits of improved soil health, Nutrient Use Efficiency (NUE), Soil Organic Carbon, improved Root: Shoot ratios & enhanced Biomass - all that constitute the Natural Capital (NC) of land – realised in majority of the cases can be easily translated across the other vistas as all the grasses are basically cereals. Some of the trial highlights are mentioned here for the perusal of end-users and for reference purpose and their details can be supplied on request. These trails were conducted in large scale cereal crops which enables consistent growing conditions, inputs and growth which are all comparable for product efficacy.

Grow Safe® Trial Partners

R.A.I.N Ravensthorpe Agricultural Initiative Network

living farm

FACEY GROUP Shaping the Future

MEAG SOIL SCIENCE

THE UNIVERSITY OF WESTERN AUSTRALIA

GOVERNMENT OF WESTERN AUSTRALIA

Department of Primary Industries and Regional Development

Grow Safe® Trial Summary

The majority of the eleven on-field evaluation multi-year trials (conducted by 6 independent agencies like DPIRD, Living Farm Ag- Research, MEAG Soil consultancy, Ferti-Tech, FACEY & RAIN groups) run for assessing the performance of Grow Safe® 'Mineral + Microbe products' have significantly resulted in higher NUE (Nutrient Use Efficiency) and yielded at least equally well as any of the 'Acid Fertiliser Products'(e.g., conventional products like DAP, MAP, Urea and Liquid N, with various crop protecting chemicals including seed pickling) despite the fact of having half the amount of major nutrients, viz., Nitrogen and Phosphorus compared to the latter programs.

Esperance wheat trial (2009) had highlighted the superiority of Grow Safe® mineral fertiliser with a seed coating of beneficial soil microbes in terms of enhanced NUE (113%-N & 110%-P) and improved Yield (8 %) over the compared DAP product. It confirmed Grow Safe® products' ability to boost the NUE of Nitrogen and Phosphorus; reduce the crop fertiliser requirement compared to the conventional products. This considerably reduced the production cost and improved the crop quality & yield. All these benefits were realised despite the paddock being acidic (pH=4.8) and depleted with low soil organic carbon (1.2 %) pointing at the greater efficiency and efficacy of Grow Safe® product.

Tincurrin trial on wheat (2008) through Ferti-Tech had demonstrated enhanced Root: Shoot ratios (≈ 0.3-0.4) in all the treatments with GrowSafe® mineral and microbial fertiliser while their counter treatments with conventional product (MAP) had the least (≈ 0.18-0.2) indicating their ability to enhance the greater volumes of root-biomass that in turn enabled the wheat plants to establish well and yield better (34 to 46.8 % increment) over their conventional counter product. The significant jump (nearly doubled) in the plant uptake of Phosphorus (0.35%) along with the other trace mineral nutrients like Zn & Mn among the plants treated with Grow Safe® products from the average conventional P uptake (0.19%) and ending up in 46 -63% additional gross marginal return ($$) over the conventionally fed crop.

Similarly, the trial conducted at **Mt Madden** (2006) has also endorsed the benefit of Grow Safe® mineral and microbial fertiliser in increasing plant root-biomass volume (≈ 50% vs 27%) and their surface area in comparison to their conventional (MAP) fertilisers (890 vs 360) reflecting their better accessing of the nutrients like Phosphorus due to their volume and increased Mycorrhizal colonisation (>10 times) and obvious additional yield increment (15%) and gross returns $$/ha (>36% over conventional program).

The latest **UWA** wheat trials (2019 – 2022) identified significant improvements to Nutrient Use Efficiency (NUE), mycorrhizal colonization and yield response with Grow Safe® mineral fertilisers and microbial products.

Grow Safe® Trial List

1. Trials on Grow Safe® AMF Minerals + Microbes vs Conventional Fertiliser Programs

Treatments: **AMF NPK Crop Plus + seed dressing microbes** vs **DAP/MAP & other products**

Findings: significantly **higher NUE** and **yielded at least equally as well** as 'Traditional Fertiliser Programs' with **half the units of Nitrogen and Phosphorus**

- 2006-07 (Lake King), 2008-10 (Esperance), 2008 (Goomalling & Hyden) – MEAG Soil Consultancy.
- 2008-09 (Bruce Rock), 2009 (Pithara), 2010 (East Maya), 2011 (Buntine), 2011 (Dowerin) – Living Farm Ag Research.
- 2008 (Tincurrin) – Ferti-Tech and FACEY Group.
- 2007 (Ravensthorpe) – RAIN Group.
- 2005 (Pindar), 2006 (Pithara) –DAFWA.

2. Trials of Grow Safe® Microbes for crop yield

Treatments: **Mineral fertilisers +/- Grow Safe® Microbes**
Findings: Increased yield (**up to 24.5%**) and **NUE** response (particularly nitrogen & phosphorus) .

- 2014 (Cranbrook- Gillamii, non-wetting soils) - Living Farm Ag Research.
- 2009 (Esperance) – MEAG Soil Consultancy.
- 2008 (Bruce Rock), 2009 (Katanning), 2011 (Dowerin) – Living Farm Ag Research.
- 2007 (Gairdner - Barley) –FertiTech.
- 2004-06 (Buntine) – Liebe Group.

3. Trials of Grow Safe® (AMF Minerals + Microbes) and Nitrogen Management

Treatments: **Mineral Fertilisers & Grow Safe® Microbes** with no additional N vs various N inputs such as **Liq-N, Urea, SOA, DAP or AMF-N.**
Findings: Grow Safe® programs **improved NUE** and **increased N mineralisation** due to enhanced microbial activity; **WMF-N** was the preferred choice over **SOA > Urea > Liquid-N** in that order

- 2014 (Tenterden – wheat + canola) – Living Farm Ag Research.
- 2007 (Lake King), 2008-10 (Esperance), 2008 (Goomalling & Hyden) –MEAG Soil Consultancy.
- 2008-09 (Bruce Rock), 2009 (Katanning), 2009 (Pithara), 2010 (East Maya), 2011 (Buntine), 2011 (Dowerin) – Living Farm Ag Research.
- 2008 (Tincurrin) –FertiTech and FACEY group.

4. Trials of **Root: Shoot ratios** in **Grow Safe® (AMF Minerals + Microbes)** and **Conventional Programs** in pasture

Treatments: **AMF NPK Crop Plus + Microbial seed dressing** VS **Conventional (DAP/MAP) pasture products.**
Findings: Grow Safe® programs **significantly increased Root: Shoot ratios, biomass** and **dry weights** compared to DAP/MAP programs.

- 2012 (Pingelly) - DAFWA.
- 2009 (Glasshouse) - UWA.
- 2008 (Tincurrin) – FertiTech and FACEY group.
- 2007 (Gairdner - barley) - FertiTech.
- 2006 (Mt Madden/Lake King - wheat) - MEAG Soil Consultancy.

5. Trials of **Grow Safe® (AMF Minerals + Microbes)** vs **Conventional Pasture Programs**

Treatments: **Mineral Fertilisers & Grow Safe® Microbes** vs **DAP/MAP**
Findings: Increased dry matter in pasture and **improved production** with AMF Mineral Fertilisers and Microbes compared to DAP/MAP programs.

- 2014 (Mt Barker) – WICC, Living Farm Ag Research.
- 2012 (Pingelly) - DAFWA.
- 2007 (Dongara tropical perennial grasses) - DAFWA.
- 2007 (Pindar – Clover bioassays) - UWA.
- 2004 (Capel) - Ascension Soil Co and Iluka Mines.

6. Trials of **Grow Safe® (AMF Minerals + Microbes)** **vs** **Bio-Char**

Treatments: **Mineral fertilisers +/- Grow Safe® Microbes** +/- **BioChar & MAP**
Findings: Grow Safe® programs Increased **mycorrhizal colonisation by 204%** compared to MAP treated program and improved phosphorus NUE. Bio-char was effective at encouraging mycorrhizal colonisation in wheat root systems in sandy, low P soils when paired with Grow Safe® microbes.

- 2014 (Tenterden - wheat) - Living Farm Ag Research.
- 2009 (Bruce Rock), 2009 (Katanning) - Living Farm Ag Research
- 2009 (Glasshouse) - UWA.
- 2005 (Pindar), 2006 (South Pindar), 2007 (Dongara tropical perennial grasses) - DAFWA.
- 2007 (Pindar – Clover bioassays) - UWA.

7. Trials with **Ag-Chemicals on Soil Biology** and influence on **crop yield**

Treatments: **AMF programs** with **standard knockdowns** with commonly used **pre-emergent and post-emergent herbicides** at **different rates** and without herbicides (**control)** and similarly with fungicides.
Findings: Results indicated **positive** and / or **negative impacts** of various herbicides. Combinations and application rates varied microbial biomass, mycorrhizal status and soil microbial composition, impacting both Soil Carbon and Crop Yield (wheat: **2.645 - 5.092** t/ha) and also on the productivity of pasture (2012).

- 2010-12 (Pingelly -Knockdown + pre-emergent trial) – Living Farm Ag Research & DAFWA.
- 2012 (Dowerin- Post-emergent + Fungicide trial) – Living Farm Ag Research & DAFWA.

8. Additional **Trials & Projects**

- 2014 - 2017 ARC Linkage Grant – University of Western Australia, DAFWA & AMF
- 2014 Darkan (Pre-emergents on wheat & canola - AMF vs Conventional) –Icon Agriculture.
- 2015 Dowerin (P Response Curve trial) – Living Farm Ag Research & Farmanco.
- 2014 - 2016 (Kojonup and Wagin)- Bugs & Biology and DAFWA
- 2014 - 2015 (Darkan - wheat + canola) – through P-South.
- 2014 (Darkan- Pasture) - through Craig Lubcke
- 2014 (Cranbrook - Gillamii - non-wetting soils) - DAFWA, Living Farm Ag Research.
- 2014 (Dowerin - on Root Diseases) - Living Farm Ag Research & Farmanco.
- 2016 – 2018 ARC Linkage Grant – UWA, Kings Park, AMF (Mine-site rehabilitation through novel plant and microbial interactions).
- 2018 Response of Wheat to a Multiple Species Microbial Inoculant Compared to Fertiliser Application – UWA, Richgro & AMF
- 2014 - 2020 – Linkage Project – Characterisations of Soil Microbial interactions for increased efficacy of herbicides using novel fertiliser management practices – UWA, DIPRD & AMF.

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