FERTIKEY

Unlocking Australia's Soil Potential

Bio-Life-Key+

Product Information & Safety Data

Intended Use: Soil Nutrient Aid (At Planting)
Product Type: Agricultural Biological Farming Aid

Microbial Consortium (Dormant Micro-organisms 5 x 10^9 CFU/g):
Bacillus licheniformis, Bacillus subtilis, Bacillus amyloliquefaciens, Bacillus pumilus, Bacillus megaterium, Bacillus thuringiensis, Pseudomonas fluorescens, Bacillus clausii, Bacillus coagulans, Azotobacter chroococcum, Trichoderma harzianum, Paenibacillus polymyxa, Rhizophagus irregularis, Rhodopseudomonas palustris

Bio-Life-Key+ is a comprehensive microbial inoculant designed for seedling vigour and early root establishment in vegetable, grain, and orchard crops. Its synergistic blend of bacteria, fungi, and actinomycetes is formulated to colonise the rhizosphere immediately after planting, improving nutrient access, stimulating root growth, and offering bioprotection against soil-borne pathogens.
The product is also designed to assist in the suppression of fungal pathogens in soil and on root surfaces. It is particularly effective in controlling *Fusarium*, *Rhizoctonia*, *Pythium*, and *Phytophthora spp.* through competitive exclusion, antimicrobial compound production, and enhanced rhizosphere immunity. The product is suited for use on vegetable, grain, and orchard crops.

Bacillus spp. (licheniformis, subtilis, amyloliquefaciens, pumilus, megaterium, thuringiensis, clausii, coagulans)

- Secretes phytohormones (IAA, gibberellins), enzymes (proteases, cellulases), and antibiotics.
- Solubilise phosphorus and other nutrients.
- Provide biocontrol against pathogens like Fusarium, Pythium, and Rhizoctonia through competitive exclusion and antimicrobial production.
- Secreted lipopeptides (e.g., surfactin, iturin, fengycin) with strong antifungal properties.
- Form biofilms that colonise root surfaces and exclude fungal pathogens.
- Induce systemic resistance (ISR) in host plants, enhancing natural plant defences.
- Contribute to microbial balance in the rhizosphere and help resist colonisation by pathogens.
- Enhances phosphorus availability and root vigor, indirectly reducing susceptibility to root-invading fungi.

Pseudomonas fluorescens

- Produces siderophores, antifungal metabolites, and biofilms that support root colonisation.
- Improves disease resistance and nutrient uptake efficiency.
- Produces siderophores and antifungal metabolites (e.g., 2,4-diacetylphloroglucinol, hydrogen cyanide) to inhibit fungal growth.
- Facilitates early root protection through rhizosphere colonisation.

Azotobacter chroococcum & Paenibacillus polymyxa

- Fix atmospheric nitrogen and solubilise phosphorus and potassium.
- Produce plant growth-promoting substances and exopolysaccharides that enhance soil structure.
- Azotobacter also fixes nitrogen, enhancing plant health under pathogen stress.

Trichoderma harzianum

- A mycoparasitic fungus that protects emerging seedlings from fungal pathogens.
- Promotes plant growth through improved root architecture and nutrient solubilisation.

Rhodopseudomonas palustris

- Improves seedling vigour under low-nutrient conditions via IAA production and nitrogen fixation.
- Enhances root photosynthetic and metabolic efficiency.

Rhizophagus irregularis

- Arbuscular mycorrhizal fungus that forms symbiotic associations with young roots.
- Increases absorption of water, phosphorus, nitrogen, and trace minerals.

Application Benefit Summary:

- Promotes rapid and uniform seedling emergence.
- Enhances nutrient uptake from early root development.
- Increases resilience against early-season soil pathogens.
- Improves crop establishment and yield potential.
- Provides early and sustained suppression of common fungal pathogens.
- Enhances natural plant defences through microbial elicitation.
- Promotes beneficial microbial colonisation of roots.
- Improves seedling establishment and reduces disease incidence.

Scientific References:

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2. Woo, S. L., Ruocco, M., Vinale, F., et al. (2014). Trichoderma-based products and their widespread use in agriculture. Open Mycology Journal, 8, 71–126. https://benthamopen.com/contents/pdf/TOMYCJ/TOMYCJ-8-71.pdf
3. Lugtenberg, B., & Kamilova, F. (2009). Plant-growth-promoting rhizobacteria. Annual Review of Microbiology, 63, 541–556. https://www.annualreviews.org/content/journals/10.1146/annurev.micro.62.081307.162918
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5. Ongena, M., & Jacques, P. (2008). Bacillus lipopeptides: versatile weapons for plant disease biocontrol. Trends in Microbiology, 16(3), 115–125. https://pubmed.ncbi.nlm.nih.gov/18289856/
6. Weller, D. M. (2007). Pseudomonas biocontrol agents of soilborne pathogens: looking back over 30 years. Phytopathology, 97(2), 250–256. https://apsjournals.apsnet.org/doi/10.1094/PHYTO-97-2-0250
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8. Cawoy, H., Debois, D., Franzil, L., et al. (2015). Lipopeptides as main ingredients for inhibition of fungal phytopathogens by Bacillus subtilis and B. amyloliquefaciens. Applied Microbiology and Biotechnology, 99(3), 1233–1244. https://pmc.ncbi.nlm.nih.gov/articles/PMC4353342/

Sirenco Australia T/A Fertikey www.fertikey.com.au +61 461 514 791 338 Redhill farms road, Gin Gin, QLD, 4671

Bio-Life-Key+

1. IDENTIFICATION:

GHS Product Identifier

Product Name:	Bio-Life-Key+
Product Number:	Bio-Life-Key+

Other Means of Identification

Agricultural and Horticultural use as a plant growth enhancer

Recommended Use of The Chemical and Restrictions on Use

Agricultural and Horticultural use as a plant growth enhancer

Supplier's Details

Product Name:	Sirenco Australia T/A Fertikey
Address:	338 Redhill farms road, Gin Gin, QLD, 4671
Telephone:	+61 461 514 791
Emergency Phone Number:	+61 461 514 791

2. HAZARD IDENTIFICATION:

General Hazard Statement

Not classified, the classification criteria are not met.

GHS Classification in Accordance with: OSHA (29 CFR 1910.1200)

Not a hazardous substance or mixture.

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2. HAZARD IDENTIFICATION (CONTINUED):

GHS Label Elements, Including Precautionary Statements

Not a hazardous substance or mixture.

Other Hazards Which Do Not Result in Classification

Not a hazardous substance or mixture.

3. COMPOSITION/INFORMATION ON INGREDIENTS:

Substances/Components

Component	CAS Registry No	Weight (g)	% of Product
Bacillus coagulans	686038-65-3	0.045 g	0.02%
Bacillus megaterium	68038-67-5	0.045 g	0.02%
Rhodopseudomonas palustris	119699-80-8	0.5 g	0.25%
Pseudomonas fluorescens	68332-93-4	0.045 g	0.02%
Rhizophagus irregularis	Not applicable	0.01 g	0.01%
Bacillus licheniformis	68038-66-4	0.045 g	0.02%
Paenibacillus polymyxa	68038-68-6	0.33 g	0.17%
Bacillus subtilis	68038-70-0	0.045 g	0.02%
Bacillus amyloliquefaciens	68038-60-8	0.295 g	0.15%
Bacillus pumilus	1383428-50-9	0.625 g	0.13%
Bacillus thuringiensis	68038-71-1	0.045 g	0.02%
Bacillus clausii	Not available	0.045 g	0.02%

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3. COMPOSITION/INFORMATION ON INGREDIENTS (CONTINUED):

Substances/Components

Component	CAS Registry No	Weight (g)	% of Product
Azotobacter chroococcum	68038-58-4	0.375 g	0.19%
Trichoderma harzianum	67892-31-3	0.25 g	0.13%
Maltodextrin	9050-36-6	195.3 g	97.65%
Food grade proprietary colour blend	Not applicable	2.0 g	1.0%

4. FIRST-AID MEASURES:

Description of Necessary First-aid Measures

General Advice:	Consult a physician. Show this safety data sheet to the doctor in attendance.
If inhaled:	Move to fresh air. Keep the patient warm and at rest. If symptoms persist, call a physician.
In case of skin contact:	Wash off thoroughly with plenty of soap and water, if available with polyethylene glycol 400, and subsequently rinse with water. If symptoms persist, call a physician.
In case of eye contact:	Wash off immediately with plenty of water for at least 15 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. Get medical attention if irritation develops and persists.
If swallowed:	Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.
Personal protective equipment for first-aid responders:	None

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4. FIRST-AID MEASURES (CONTINUED):

Most Important Symptoms/eEffects, Acute and Delayed

No symptoms known or expected.

Indication of Immediate Medical Attention and Special Treatment Needed, if Necessary

Treat symptomatically. There is no specific antidote.

5. FIRE-FIGHTING MEASURES:

Suitable Extinguishing Media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Specific Hazards Arising From The Chemical

Dangerous gasses are evolved in the event of a fire.

Special Protective Actions For Fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

Further Information

Contain the spread of firefighting media. Do not allow run-off from firefighting to enter drains or water courses.

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6. ACCIDENTAL RELEASE MEASURES:

Personal Precautions, Protective Equipment and Emergency Procedures

Avoid dust formation. Avoid breathing vapours, mist or gas. For personal protection see section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION.

Environmental Precautions

Should not be released into the environment. See section 12. ECOLOGICAL INFORMATION for additional ecological information.

Methods and Materials for Containment and Cleaning Up

Sweep up and shovel. Keep in suitable, closed containers for disposal.
Clean with disinfectants.

Reference to Other Sections

Information regarding safe handling, see Section 7. HANDLING AND STORAGE.
Information regarding personal protective equipment, see Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION.
Information regarding waste disposal, see Section 13. DISPOSABLE CONSIDERATIONS.

7. HANDLING AND STORAGE:

Precautions for Safe Handling

No specific precautions required when handling unopened packs/containers; follow relevant manual handling advice.
Ensure adequate ventilation.

Conditions for Safe Storage, Including any Incompatibilities

Store in a place accessible by authorised persons only. Store in original container. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from direct sunlight. Protect from frost. Keep away from food, drink and animal feed.

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7. HANDLING AND STORAGE (CONTINUED):

Specific end Use(s)

Keep away from food, drink and animal feeding stuffs.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

Appropriate Engineering Controls

None required

Individual Protection Measures, Such as Personal Protective Equipment (PPE):

Pictograms:

Eye/Face Protection

Safety Glasses

Skin Protection

Nitrile Gloves

Body Protection

Refer to COSHH assessment (Control of Substances and Hazardous to Health (Amendment) Regulations 2004.)
Engineering controls should be used in preference to personal protective equipment whenever practicable. Refer also to COSHH Essentials.

Personal Protective Equipment

In normal use and handling conditions, please refer to the label and/or leaflet. In all other cases the following recommendations would apply.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED):

Respiratory Protection

Respiratory protection should only be used to control residual risk or short duration activities, when all reasonably practicable steps have been taken to reduce exposure at source e.g., containment and/or local extract ventilation.
Always follow respirator manufacturer's instructions regarding wearing and maintenance. Wear respirator with a particle filter mask (protection factor 20) conforming to European Norm EN149FFP3 or EN140P3 or equivalent.

Thermal Hazards

Not applicable

Control Banding Approach

No data available

Environmental Exposure Controls

No data available

9. PHYSICAL AND CHEMICAL PROPERTIES AND SAFETY CHARACTERISTICS:

Physical state:	Solid
Appearance:	Powdery substance with no fixed shape
Colour:	Orange
Odour:	Odourless
Odour threshold:	No data available

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9. PHYSICAL AND CHEMICAL PROPERTIES AND SAFETY CHARACTERISTICS (CONTINUED):

pH:	5.7 at 10% solution
Melting point/freezing point:	No data available
Boiling point or initial boiling point and boiling range:	No data available
Flash point:	No flash point
Evaporation rate:	No data available
Flammability:	>91°C, No flash point
Lower and upper explosion limit/flammability limit:	No data available
Vapor pressure:	No data available
Relative vapor density:	No data available
Density and/or relative density:	ca. 2.53 g/cm3
Solubility:	Soluble to a certain extent in water
Partition coefficient n-octanol/water (log value)	Not applicable
Auto-ignition temperature:	No oxidising properties
Decomposition temperature:	No information available on product
Kinematic viscosity:	N/A
Explosive properties:	Not explosive 92/69/EEC, A.14 / OECD 113
Oxidising properties:	No oxidising properties

Particle Characteristics

Not applicable

Further Safety Characteristics (Supplemental)

Not known

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10. STABILITY AND REACTIVITY:

Reactivity

Thermal decomposition. Stable under normal conditions.

Chemical Stability

Stable under recommended storage conditions.

Possibility of Hazardous Reactions

No hazardous reactions when stored and handled according to prescribed instructions.

Conditions to Avoid

Freezing, extreme temperature and direct sunlight.

Incompatible Materials

Store only in the original container.

Hazardous Decomposition Products

No decomposition products expected under normal conditions of use.

11. TOXICOLOGICAL INFORMATION:

Information on Toxicological Effects:

Acute Toxicity

Non-toxic

Skin Corrosion/Irritation

Based on available data, classification data are not met.

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11. TOXICOLOGICAL INFORMATION (CONTINUED):

Serious Eye Damage/Irritation

No known significant effects or critical hazards. May cause irritation due to mechanical action.

Respiratory or Skin Sensitization

Based on available data, classification criteria are not met.

Germ Cell Mutagenicity

Based on available data, classification criteria are not met.

Carcinogenicity

Did not cause specific target organ toxicity in experimental animal studies.

Reproductive toxicity

Test not required for microorganisms.

Summary of evaluation of the CMR properties

Test not required for microorganisms.

STOT-single exposure

Based on available data, classification data are not met.

STOT-repeated exposure

Based on available data, classification data are not met.

Aspiration hazard

Based on available data, classification data are not met.

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12. ECOLOGICAL INFORMATION:

Toxicity

A natural occurring consortium of soil bacteria. Produces cytolytic enzymes, proteases, and other enzymes that degrade a variety of natural substrates and contribute to nutrient recycling.

Persistence and Degradability

According to OECD method 302B, this product is classified as inherently biodegradable and therefore unlikely to persist in the environment.

Bio Accumulative Potential

According to OECD method 302B, this product is classified as inherently biodegradable and therefore unlikely to persist in the environment.

Mobility in Soil

Due to water solubility, mobile in soil.

Results of PBT and vPvB Assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not concluded.

Endocrine Disrupting Properties

Is a naturally occurring soil bacteria.

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13. DISPOSABLE CONSIDERATIONS:

Disposable Methods:

Product Disposal

In accordance with current regulations and, if necessary, after consultation with the site operator and/or with the responsible authority, the product may be taken to a waste disposal site or incineration plant. Advice may be obtained from the local waste regulation authority.

Packaging Disposal

Small containers (<10 L or <10 kg) should be rinsed thoroughly using an integrated pressure rinsing device, or, by manually rinsing three times. Add washings to sprayer at time of filling. Dispose of empty and cleaned packaging safely. Follow advice on product and/or leaflet.

Waste Treatment

Dispose according to local authority regulations and rules.

Sewage Disposal

Dispose according to local authority regulations and rules.

14. TRANSPORT INFORMATION:

UN Number:	None
UN Proper Shipping Name:	None
Transport Hazard Class(es):	None
Packing Group:	None
Environmental Hazards:	None
Special Precautions for User:	None
Transport in bulk according to IMO instruments:	None

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15. REGULATORY INFORMATION:

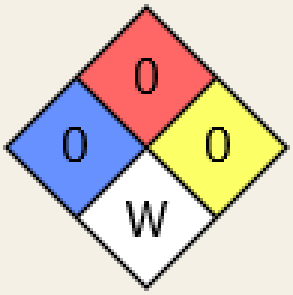
Chemical Safety Assessment

A chemical safety assessment is not required for this product.

HMIS Rating

Bio-Life-Key+	
HEALTH	0
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	B

NFPA Rating



16. OTHER INFORMATION:

We support worldwide Responsible Care initiatives. We value the health and safety of our employees, customers, suppliers and neighbours, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, and minimising the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

Further Information/Disclaimer

DISCLAIMER: The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, concerning such information, and we assume no liability resulting from its use. Users should make their own investigation to determine the suitability of information for their particular purposes. In no event shall Sirenco Australia T/A Fertikey be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, whatsoever arising, even if Sirenco Australia T/A Fertikey has been advised of the possibility of such damages.

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