



Trilogy Fulvic

TECHNICAL GUIDE



ORGANIC* FULVIC ACIDS FOR ENHANCED UPTAKE OF APPLIED FOLIAR NUTRIENTS WITH BENEFICIAL PHYTOHORMONES AND AMINO ACIDS



For more information,
please go to www.seasol.com.au

Seasol
a better way to grow



Trilogy Fulvic

TECHNICAL INFORMATION

OVERVIEW

Trilogy Fulvic brings together three plant beneficial products, Seasol, PowerFish and fulvic acid providing a custom made plant bio-stimulant intended for foliar application. Seasol provides exceptional root stimulation and plant stress mitigation. PowerFish delivers a diverse range of amino acids and fulvic acid provides enhanced foliar uptake capacity. This product is recommended where foliar application is the preferred application method. Trilogy Fulvic is manufactured by combining three key natural extracts:



Seasol Liquid Seaweed extract

- Root growth
- Stress tolerance



PowerFish Liquid Fish extract

- Proteins, amino acids for soil & plant
- Natural source of nutrition



Fulvic Acids

- Increased chlorophyll production
- Effective uptake

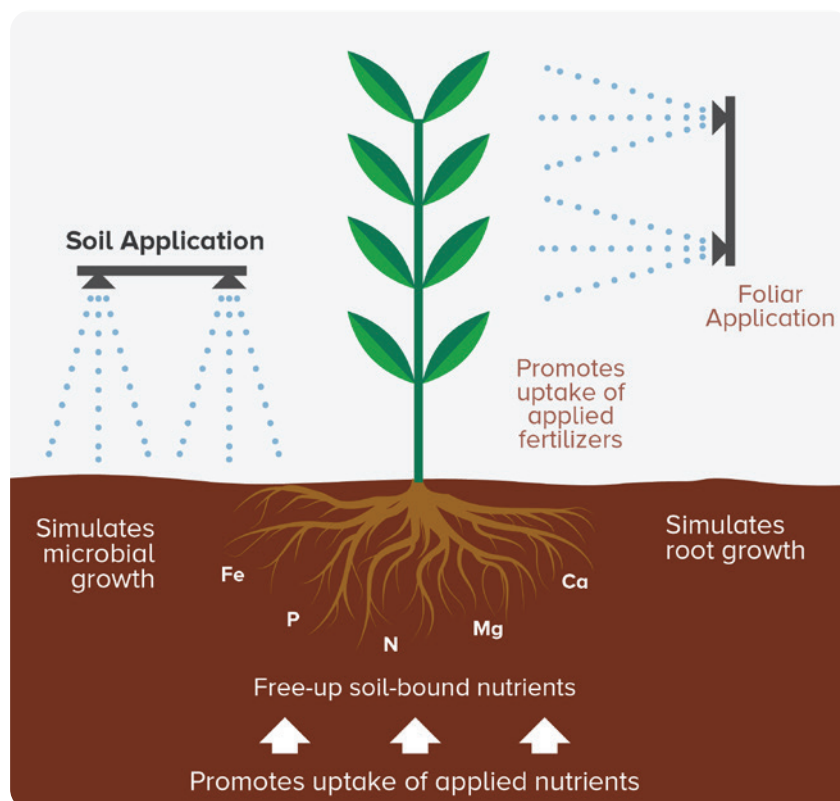


Each of the extracts have ingredients for specific roles:

- **Seasol Liquid Seaweed** extract for plant productivity and stress tolerance - providing an organically diverse and plant active composition.
- **PowerFish Liquid Fish** extract for available organic nitrogen - providing free amino acids.
- **Fulvic Acid** (Fulvic substances) - Natural chelators of small molecular size enabling excellent foliar uptake.

By stimulating and increasing plant productivity Seasol fulvic positively impacts soil fertility by:

- **Enhancing plant and root growth** - plants then pump additional root exudates (photosynthate carbon) into the soil and feed soil microbiology at the rhizosphere.
- **Supplying plants with amino acids** - and peptides for enhanced plant growth.





SEASOL

For improved plant growth and stress tolerance

Seasol seaweed extract is rich in organic* content, has a high molecular diversity and contains a range of trace elements. Seasol seaweed extract has 17% total solids content and 3.7% (w/v) Potassium (*Typical Analysis April 2017*). Seasol seaweed extract is manufactured from two types of seaweeds producing a refined liquid seaweed extract and filtered to 150micron for agricultural use.

Seaweed extracts are effective across a wide variety of plants and soils, and have many beneficial plant growth and plant health properties (*Arioli et al, 2015; Shukla et al, 2019; Islam et al, 2020*):

Increases plant productivity - Field trials have been used extensively to demonstrate that seaweed extracts improve plant growth, yield and fruit quality. The benefits have been found across a wide variety of crops such as grapes, sugarcane, almond, potatoes, tomatoes, strawberries, and garden plants.

Increase tolerance to plant stress - Seaweed extracts offer increased tolerance to a diversity of non-lethal stresses including heat, drought and cold stresses, and to pathogen stresses. Seaweed extracts increase plant tolerance to

stress by earlier triggering of natural plant responses and associated gene expression networks.

Increase root growth - Plant roots are used to capture soil nutrients for plant growth and interaction with functionally important microbes that benefit plant growth and soil ecosystems. Seaweed extracts increase root structure and particularly root length. This ability enables plants to better utilise the nutrients in their soils and feed microbes with exudates released by the expanded root system.

Seaweed meal is liquefied by chemical hydrolysis using alkaline extraction. Seaweed extracts are complex and heterogenous in nature which makes their precise characterisation limited. The complex seaweed extracts are biologically rich activating multiple plant responses and growth systems. Rather than chemical composition, Seaweed extracts rely on plant and field testing to demonstrate their beneficial plant and soil properties. Chemical composition tends to be used for quality control in the manufacturing of seaweed extracts.

Their ability of seaweed extracts to promote root structure expands the beneficial root interactions associated with the soil carbon and nitrogen ecosystem processes.

PowerFish

For organic* nitrogen

PowerFish is a fish extract rich in organic* nitrogen and composed of free amino acids and partially digested protein (polypeptides). PowerFish has 2.8% (w/v) organic* nitrogen and 28% total solids content (*PowerFish Technical Analysis April 2017*). The amino acids are in a biologically active form to the plant and soil microbes. PowerFish is made from dried fish meal producing a refined fish extract with low oil content and filtered to 150micron for agricultural use.

Fish extracts are useful in agriculture because they increase plant growth, productivity, and quality across a wide range of crops (*Madende et al, 2020; Colla et al, 2017*). Fish extracts increase root mass, shoot length, leaf area, total chlorophyll content and photosynthetic rate.

Fish extracts are manufactured using chemical hydrolysis to liberate free amino acids and short proteins (polypeptides) (*Adamczyle et al, 2010; Paungfoo.Lohienne et al 2008; Waterworth & Bray 2006*).

Plants can use a wide range of organic* nitrogen sources for growth (*Adamczyle et al, 2010; Paungfoo.Lohienne et al 2008; Waterworth & Bray 2006*) such as amino acids, peptides (short proteins) and proteins.

- **Amino acids** are ready-for-uptake by plants and this feature helps plants to save energy on amino acid synthesis.

- **Amino acids** are ready-to-use and be made into plant proteins.

- **Peptides and proteins** are assimilated by plants after root exudates (containing proteases) are used to cleave proteins into smaller peptides and individual amino acids that can be assimilated by plants.

- The combination of smaller peptides and individual amino acids provide a steady and dynamic pool of accessible nitrogen for plant growth.

Plants assimilate amino acids with varying efficiencies. The process is influenced by the type of plant and their root architecture, the composition of the root exudates, the amino acid concentration in the soil and soil microbe composition and abundance.

Organic* nitrogen in fish extracts is less prone to leaching because the amino acids are readily available to the plants and soil microbes for assimilation. Amino acids used by the soil microbiology (and food web) later become part of the soil organic* matter.

Fish extracts and seaweed extracts are synergistic. The rhizosphere, where growing roots interface with soil and microbes, is an important niche for amino acid and nutrient uptake. Seaweed extracts promote root growth which enables the effective utilisation of the organic* nitrogen supplied by the fish extracts.

FULVIC ACIDS

For effective uptake

Fulvic acids are organic* compounds usually derived from deposits of ancient decomposed organic* material. Along with humic acids, they are often found within or near deposits of lignite (brown coal) or leonardite (weathered brown coal). As they have been formed through long processes of natural decomposition from a range of substances they are comprised of groups of organic* molecules as opposed to a single compound. They contain a high carbon content.

Fulvic substances are therefore natural in origin and have been found to be beneficial to plants. These benefits include root stimulation, increased leaf chlorophyll content and increased productivity and yield. The small molecular structure of fulvic acids allows them to be easily absorbed by plant leaf surfaces.

Fulvic acids are recognized as natural chelators. Chelating agents are attracted to, and protect, elements from being chemically bound to each other (e.g. phosphorous and iron). Fulvic acids are also highly water soluble.

These combined attributes of ready uptake by the leaf surface and an ability to chelate make fulvic acid a natural partner for foliar nutrient applications. Fulvic acids are lightly coloured, compared to humic acids, making fulvic acids unlikely to stain when applied over foliage. Fulvic acids can also be successfully applied to soil but typically the larger humic acid substances used for applications to soil.

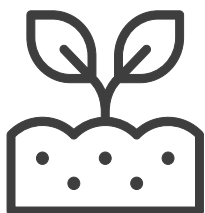
Convenient to use liquid formulations of fulvic and humic acids are obtained by processing the raw resource to obtain a uniform product. The refined filtered liquid is without impurities that may exist in the raw material. Seasol's fulvic acid product is organically certified.

BENEFITS OF FOLIAR APPLICATION

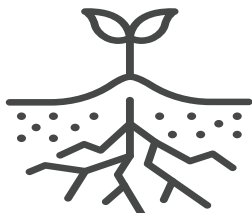
Healthy and productive plants and crops require a complete and balanced supply of nutrients throughout their growth cycle. Often much of this nutrient is delivered via the soil, or growing media, through the plant root system. However, foliar application of crop nutrients offers a method of providing specific nutritional inputs when soil application is inadequate or limited.

This could be due to unusual soil conditions such as waterlogging, nutrient lock-up or deficiency, or simply due to very high crop demand for one or more essential elements. Foliar application offers a method of rapidly addressing specific crop requirements by directly applying the required nutrient to the target plants. This can form part of a complete nutrient management package often based around known crop requirement with soil and plant testing providing additional guidance.

FEATURES & BENEFITS



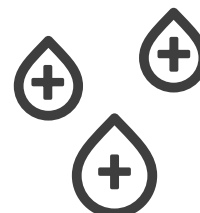
Enhanced uptake of foliar applied nutrients.



Added benefits of root growth and stress tolerance.



Increased plant vigour and productivity.



Provides plants with proteins, vitamins and amino acids.

References: Visit our website for the full list of references

**This product is allowable for use on farms (or in facilities) certified to the Australian Certified Organic Standard.*

Seasol[®]
**HORT
& AG**



Trilogy Fulvic

FOR A BETTER WAY TO GROW!



3 IN 1 DRUM!

Seasol

- Root growth
- Stress protection

PowerFish

- Proteins, amino acids for soil & plant
- Natural source of nutrition

Fulvic Acids

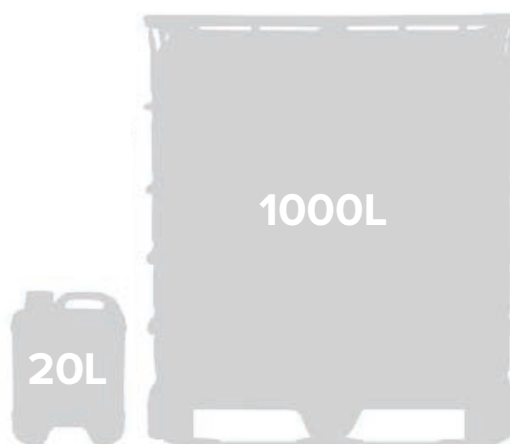
- Increased chlorophyll production
- Effective uptake

AVAILABLE IN 2 SIZES

Whatever your requirements, we now have sizes to suit your needs. Seasol Trilogy Fulvic is available in 20L & 1000L quantities.

For sales information or to order contact your local area sales manager by calling
1800 335 508

SEASOL INTERNATIONAL
1027 Mountain Highway, Bayswater, VIC, 3153
Toll Free (within Australia) **1800 335 508**
www.seasol.com.au





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PHYTOHORMONES AND AMINO ACIDS



INSTRUCTIONS FOR USE

1. Trilogy Fulvic must be diluted in water. Use sufficient water to achieve adequate coverage when applying as a foliar spray. **2.** Shake or agitate before use. **3.** Maintain agitation during dilution & application.

APPLICATION GUIDELINES

Crops	Purpose	Rate	Application / Critical Comments
Tree & Vine Crops	Increases plant tolerance and recovery from environmental stresses, stimulates root growth, improved nutrient absorption and increases chlorophyll levels and metabolism.	Apply 10L - 15L/ha. Dilute 1:50 up to 1:250 for low volume spraying	Foliar apply regularly during the growing season. Use lower rate if applying on a regular basis. Use higher rate for one off applications or on large trees with a high crop demand. Applications prior to & after periods of stress can improve protection and recovery.
Vegetable Crops		Apply 7L - 12L/ha. Dilute 1:50 up to 1:250 for low volume spraying	Foliar apply every 7-10 days during the growing period. Use lower rate from early emergence increasing to higher rate for one off applications or as crop matures. Applications prior to & after periods of stress can improve protection and recovery.
Turf		Apply 12L/ha. (1.2ml p/sq mt) Dilute 1:50 up to 1:250 for low volume boom spraying	Apply every 7-10 days during the growing period via boom or irrigator. Applications prior to & after periods of stress can improve protection and recovery.
Broadacre		Apply 7L - 12L/ha. Use sufficient water volume to achieve full coverage	Apply with every nutrient spray during the growing period. Use lower rate from early emergence increasing to higher rate for one off applications or as crop matures under high stress. Applications prior to & after periods of stress can improve protection and recovery.
Crop Fertiliser & Nutrient Uptake	For effective uptake of fertilisers, nutrients and trace elements via the foliage.	Apply in 10-20ml/ litre of water. Use higher solution rate for multiple product tank mix	Always start with a jar test at correct ratios prior to full scale tank mix. (Test with intended spray water) Apply with any water conditioners or buffers first prior to any actives or nutrient products.

Note: Physical compatibility does not guarantee biological compatibility.

GENERAL INSTRUCTIONS

Spray Application: Apply the product as soon as possible after mixing in the spray tank. Maintain agitation in spray tank if possible.

Fertigation: Agitate the product regularly in the fertigation tank. Use adequate flushing after fertigation to ensure product is removed from lines. For best results use the product on its own.

Trilogy Fulvic can be mixed with a number of agricultural chemicals.

STORAGE AND HANDLING

Always use safe work practices for lifting and handling drums. Once diluted, the product should be applied within 24 hours. Agitate the product prior to using and re-agitate if the product is left standing for an extended period of time.

SAFETY DIRECTIONS

Keep out of reach of children. Not for human consumption. Do not swallow. May cause irritation to the skin or eyes. If splashed, wash off with water. If swallowed or if irritation persists, seek prompt medical advice. Additional information is listed in the Safety Data Sheet.

CONDITIONS OF SALE

This product must be used strictly in accordance to the directions. The efficacy of the product may be influenced by environmental conditions and application procedures and no warranty, express or implied is offered.

**This product is allowable for use on farms (or in facilities) certified to the Australian Certified Organic Standard.*

