



# MICROSOIL

biological mineral fertiliser

Microsoil has a range of biological liquid fertiliser products containing unique combinations of microorganisms, trace minerals, plant hormones and added nutrients that balance soils, unlock soil bound nutrients and allow for the effective uptake of these nutrients by crops, pastures and livestock.

## What is Microsoil?

Microsoil is a combination of four key components:

- Microorganisms – aerobic and anaerobic bugs
- Nutrients - Macro, Secondary and Micro nutrients – natural and synthetic minerals
- Plant Hormones – three natural plant hormones, Auxins, Cytokinins and Gibberellins
- Acids – three of the key plant acids, Fulvic, Humic and Amino.

## How Does Microsoil Work?

Microsoil works using a combination of functions:

- Efficiency – liquid compounds are readily available to the plant
- Multiplication – increasing microorganisms, organic carbon and nutrient uptake
- Conversion – converting nutrients into organic compounds and changing soil characteristics.

## What are the Microsoil Bugs?

The microorganisms are a combination of various beneficial, naturally occurring microorganisms mostly used for or found in foods. Microsoil contains beneficial organisms from three main genera: photosynthetic bacteria; lactic acid bacteria and yeast. Microsoil products uniquely utilise both aerobic and anaerobic microorganisms that carry out beneficial roles at various depths of the soil profile.

These effective microorganisms secrete beneficial substances such as vitamins, organic acids, chelated minerals and antioxidants when in contact with organic matter. They change soil micro flora and fauna so that disease inducing soil becomes disease suppressing soil, which in turn has the capability to develop into a zymogene soil. The anti-oxidation effects of these microorganisms pass directly to the soil or indirectly to plants maintaining their NPK and CN ratio. This process increases the humus content of the soil and is capable of sustaining high quality food production.

## Nutrients

There are twelve essential nutrients which plants must take up from the soil. For convenience, scientists have assigned symbols to each nutrient. Plants need large amounts of N, P and K therefore these nutrients are called macronutrients. They need smaller amounts of Ca, Mg and S and these are called secondary nutrients. Fe, Mn, Zn, B, Cu and Mo are needed in very small amounts and are called micronutrients. Chlorine is also an essential nutrient, but not much attention has been paid to it until recently. There is a current debate as to whether silicon, nickel and cobalt should also be considered as essential nutrients.

Although plants need more of some nutrients than others, they are all equally important. A shortage of any one will limit crop growth. Because plants only need very small amounts of micronutrients, we often overlook them in a fertiliser program. Once upon a time, our native soils were rich in micronutrients, but we have used them up over the years and now most soils benefit from a micronutrient boost.

Plants grown for food can extract up to 70 minerals and this can leave the soil depleted if that plant matter (food) is exported off farm and not recycled in-situ as it would be in a natural forest or grassland. We don't need to be putting large amounts back into the soil, just a tiny bit works wonders. Microsoil contains a complete balance of all of the above mentioned nutrients.

## Plant Hormones

Plant hormones are communicators, or agents, which help regulate plant development and their response to the surrounding environment playing vital roles in Microsoil's efficacy.

**Auxins** are compounds that positively influence cell enlargement, bud formation and root initiation. They also promote the production of other hormones and in conjunction with Cytokinins, they control the growth of stems, roots, and fruits and convert stems into flowers.

**Cytokinins** are a group of chemicals that influence cell division and shoot formation. They also help delay senescence or the ageing of tissues, are responsible for mediating Auxin transport throughout the plant and affect internodal length and leaf growth.

**Gibberellins** include a large range of chemicals that are produced naturally within plants and by fungi. Gibberellins are important in seed germination, affecting enzyme production that mobilises food production used for growth of new cells.

## Plant Acids

**Fulvic acid** is a naturally occurring organic product derived from humus, produced by the decomposition of organic matter in soil. Fulvic acid is the most plant-active of the Humic substances. It is a plant growth stimulator that increases plant metabolism, nutrient intake, and improves root development.

**Humic acid** is a naturally occurring product that promotes antioxidant production in plants. In the soil it helps to improve water retention, increases the soil's overall structure and helps to maintain soil stability. Humic acids readily form salts with inorganic trace minerals in a form that can be more easily utilised by plants. Humic acids promote vigor, disease resistance and root development in plants.

**Amino acid** - every plant (like any organism) needs certain components for growth over and above soil, sun, water and air. The basic component of living cells are Proteins, with building block materials of Amino acids. The requirement of Amino acids in essential quantities is well known as a means to increase yield and overall quality of crops.

## **Efficiency**

Fertilisers in liquid form are more uniform in their mixture of nutrients. All plants source nutrients via soil moisture and liquid fertilisers are therefore more readily available to the plant in comparison to granular fertilisers. Since there is a strong correlation between water content and nutrient availability, the use of liquid organic fertilisers may be a more efficient way of enhancing nutrient uptake.

Water and minerals are taken up through the root system by root hairs that increase the surface area of roots providing better uptake of water and minerals from the soil.

## **Multiplication**

Microsoil's microorganisms are a combination of various beneficial, naturally occurring plant and soil microorganisms and with organic carbon they increase the overall population of beneficial microorganisms in the soil.

## **Conversion**

Mineralisation of nutrients and decomposition of soil organic matter or crop residues involves the activity of organisms across different groups. Organic matter in the soil is the most important fraction that supports microbial populations, especially the biologically available portion of soil organic matter.

Microbial biomass, the living component of soil organic matter, constitutes 2-7% of the organic carbon in soils. Microbial biomass acts as the engine for organic matter turnover and nutrient release.

## **Conclusion**

Soil is one of our most precious non-renewable resources and soil organisms represent a large portion of the earth's biodiversity. Soil organisms carry out a wide range of ecosystem processes that are essential for crop production, soil resource quality and environmental health in both natural and managed agricultural soils. Production by both crops and pastures is supported and enhanced by soil biological processes.

Soil biota consists of the micro flora and soil fauna groups such as nematodes, mites, earthworms, bacteria and fungi. These groups influence the availability of nutrients for crop production via a range of activities such as the decomposition of crop residues, immobilisation (microbial uptake) of nutrients, mineralisation (transformation of organic nutrients into plant available inorganic forms) and biological nitrogen fixation.

Fertilisers are an integral component of agricultural production systems and are applied with the main goal of maximising yields and achieving economic returns. While the application of fertilisers usually aims at meeting plant demands, it can also have an impact on soil biota.

Microsoil biological liquid fertiliser range has been developed over many years to ensure that it is not only beneficial to fragile soil microorganism and soil biota, but also efficient enough to meet crop and pasture nutrient requirements.

*For further information on Microsoil products and trial results contact can be made at [www.microsoil.com.au](http://www.microsoil.com.au)*