

# Humate and Humic Substances

## Pathway to Sustainability

Humic substances are natural occurring materials, they are not processed, but are found in soils, compost and mines.

Humic substances arrive from micro-biological activity on the bio-matter and the bio-matter was at one time a living material and then gets broken down by micro-organisms.

Soil organic matter is the total of all naturally occurring carbon based matter found in soils that were once living, and the process of the breakdown from recognizable bits and pieces of plants, to dark coloured humus is called humification, somehow it then reorganises itself and goes through a series of phases of secondary synthesis reaction called condensation reactions.

This is a scientific supported principle of trying to define the process from which they come from, and is the end product of the carbon cycle.

The humification process is as far as carbon can get. Humification is the natural process of changing organic matter such as leaves into humic substances. Humic substances are in humus but humic substances and humus are different things.

### Benefits of humic substances

Humic substances are renowned for their ability to,

- Detoxing water and soils.
- Stimulate biological soil activity
- Improve nutrient uptake, especially phosphorous, sulphur, and nitrogen
- Reduce the need for nitrogen fertilisation
- Remove toxins from both soils and animals
- Chelate soil nutrients
- Solubilize minerals
- Improve soil structure
- Act as a storehouse of N, P, S and Zn
- Improve water-holding capacity for better drought resistance and reduction in water usage.

### How does it all get started

As described previously humic substances are natural occurring materials that are not processed and are found in soils and compost, but there is another way to receive the benefits of humic substances, Humate.

Humate's are mined from the Leonardites deposits

on top of coal and are naturally occurring materials. They are the natural humified remains of organic matter.

Humic substances have been associated with coal deposits, they are not coal but have been derived from coal. They are oxidised material exposed to weathering and oxygen and microbial activity, the result of having been reverted back to humic substances.

Finely ground coal has very little humic substances because it has not been subjected to oxidation and micro-biological activity and is not soluble.

Humic acids, Fulvic acids and Humin are all fractions of humic substances. Humic material is subjected to different extraction techniques and processes with the resultant product of humic acids and fulvic acids from humate material.

Humic substances, the natural dark-brown component of soil have been around for hundreds, or even thousands of years, yet they can be destroyed in less than 50 years by some agricultural practices.

The global movement away from chemical to biological agriculture has some of the best scientific minds developing sustainable practices to utilise these amazing substances.

So why are sustainable farmers using these products and how does this benefit and effect their farming operation?

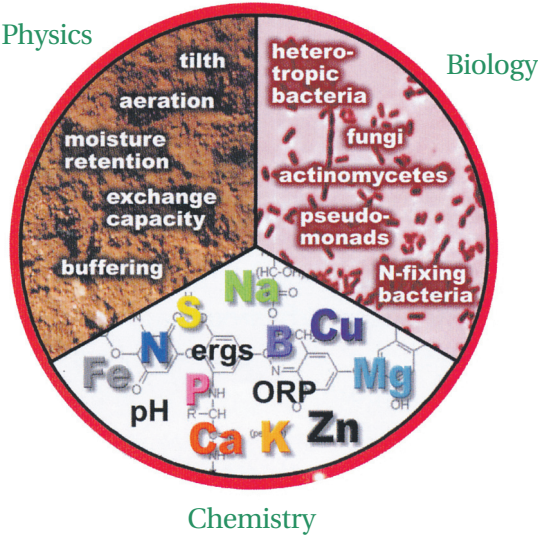
### Nitrogen Management

Carbon held in natural soils is very stable, conventional fertilisers rapidly age soil components resulting in acidification of soils and destroying humic material with soluble nitrogen. Urea is very effective at destroying humic substances.

Farming practices with high urea applications burn up the humus substances resulting in loss of organic matter, nutrient holding and water holding capacity which results in more water requirements, more nitrogen needed to sustain production, loss of more organic matter and finally leaching of nitrates and nutrients into water systems.

Humic substances stabilise nitrogen, up to 35 % of the soluble nitrogen applied to soils is retained in a biological form and preventing it from leaching and is available for future requirements. Mixing soluble nitrogen with Humates enables up to 35 % less having to be applied which has both economic and sustainable environmental positives with no loss in production, in most cases improved performance results.

ALL THREE ASPECTS IMPACT SOIL FERTILITY  
While conventional soil fertility programs focus on N, P, K. The balanced fertility approach considers not only the full spectrum of CHEMICAL elements necessary to optimise pasture or crop yields, but the BIOLOGICAL and PHYSICAL factors that impact production as well.



Numerous scientific results show how humic substances improve nitrogen utilisation and impact overall quality by increasing the efficiency of fertilisers when blended directly with fertilisers, which has both economic and environmental significance.

#### Barley Test

Fertilizer	Tissue Analysis		Plans/row	Yield bu/acere
	Nitrate ppm	Total N%		
16-20-6	1.275	4.4	68	47.3
15-22-5	945	4.8	84	47.6
10-10-5L	1.025	4.7	96	53.5

There was a 12 percent increase in yield in the barley test, despite the fact that the leonardite-treated crops had relatively low nitrate nitrogen. The significant yield advantage was attributed to increased tilling.

#### Potato Test

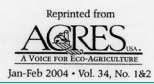
Fertilizer	Tissue Analysis		Specific Gravity	Yield bu/acere	
	Nitrate ppm	Total N%		Cwt.	Bu/acre
16-16-8	820	4.7	1.095	162	270
10-10-5L	1.600	5.2	1.096	134	224

The potato test plots reveal that a 95 percent increase in plant-tissue uptake of nitrogen was possible even though 35 percent less nitrogen was applied with the leonardite fertiliser combination.

#### Sugar Beet Test

Fertilizer	Seeding Emergence	Tons/acre	Yield	
			Sucrose%	Sucrose lbs./acre
5-45-5	175	8.873	17.0	3.010
10-10-5L	140	10.925	15.9	3.474

Sugar beets treated with the fertiliser-leonardite combination yielded 23 percent more tonnage per acre and 15 percent more sugar per acre.



## Some of the Healthy Soil products available

**PHOSPHATE.** Guano - 11.5 % Phosphorus. A fossilised seabird phosphate. Citrate soluble and slow release phosphate with Ca Silica, and trace elements all available (insoluble but available)

**PHOSPHATE.** Life Phos – 11.85% Phosphorus. A prilled rock phosphate with microbes, fish and seaweed.

**HUMATE.** A carbon source to improve fertilizer efficiency and nutrient release. Humate powder, Humic liquid, Fulvic Liquid, Carbohydrates.

**MYCORRHIZAE.** BIO SOLVAM (Vesicular Arbuscular Mycorrhizae) Fungi.

All seed should be sown with these amazing microbes, only requires 2kg per tonne of seed. The mycorrhizal fungi attach themselves to plant roots sequestering moisture and nutrients. They can unlock, retrieve and transport phosphorous. Free up copper, calcium, magnesium, zinc and iron. Also they are the frontline defense against soil borne diseases and pathogens.

**SOIL AND BIOLOGICAL NATURAL STIMULANTS.** Liquid fish fertilizer, compost liquid extract, stubble digesters, humic acid, fulvic acid, bio stimulants, seaweed and microbial foods, fertigation.

**ANIMAL PROBIOTIC AND NUTRITION SUPPLEMENTS**

**HEALTHY SOILS LIQUID FISH and the famous FOLIAFEED.** Others have tried unsuccessfully to copy, but cannot even get close in terms of value and nutrients.



Check out the web site [www.healthysoils.co.nz](http://www.healthysoils.co.nz) for more information on our products .

If you have an interest in Biological farming or wish to know more about our system or information on our products please call Don Hart 0274 320 187.