

# 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,

- Detoxify 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 Leonardite 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.

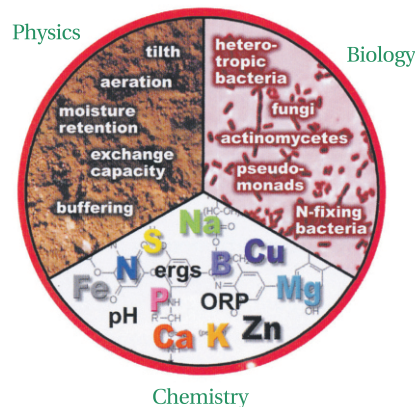
Farming practices with high urea applications burn up the humus substances resulting in loss of organic matter, nutrient holding and water holding capacity which results in more water requirements, more nitrogen needed to sustain production, loss of more organic matter and finally leaching of nitrates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

**Top Soils**  
TOTAL SOIL FERTILITY SOLUTIONS

### 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/acre
	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/acre	
	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.

Reprinted from  
**AGRES**  
A Voice for Soil Amendment  
Jan-Feb 2004 • Vol. 34, No. 182

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An application of Dolomite presents magnesium to your stock through your pasture every day. This will reduce the need for current animal health remedies that are costly and indeed time consuming. This magnesium can be released through the pasture in as little as 14 days.

### Liming Effect

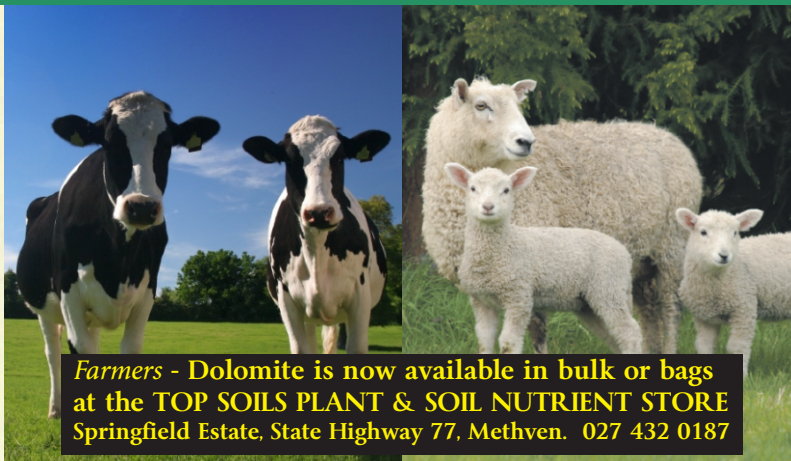
Provides enough lime to lessen your current pastures liming rates. Golden Bay natural magnesium Dolomite is typically Calcium (59% Calcium Carbonate, 24% Elemental Calcium) and Magnesium (39% Magnesium Carbonate, 11.5% Elemental Magnesium).

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Insure a steady supply of plant available phosphate at all times. The magnesium in Golden Bay Dolomite acts as a carrier for phosphate.

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