

## What are the unique active ingredients in The Black Stuff

The Black Stuff is a naturally formed humate, the active ingredients being humic and fulvic acids. Humates form through the chemical and biological humification of plant and animal matter in anaerobic conditions.



Figure 1 Permian type forests

All decomposing organic matter is composed of humates and humic acids. Composts break down quickly and in the incomplete decomposing stage absorb nutrients rather than release nutrients. Stable forms of humate are sourced from peats and brown coals.

Humification is the process that over millions of years leads to the formation of coal. Humic matter is a precursor to coal. Humic matter forms peat that over time becomes Leonardite, then brown coal, then lignite, and eventually progresses to black coals. Peat has a number of stages from sphagnum peat, which is light and fluffy, through to black sedge type peat, that is a rich loam like organic matter.

Most humates are sourced from Leonardites, lignite and brown coal. The Black Stuff source is a naturally occurring black sedge type peat that is chemically different to other sources of humic acids. The humic acids in The Black Stuff are naturally bio-active. This means that the humic acids are in a form that is active and available to plants. The key in humates is whether the humic acids are bio-active not the concentrations of the acids. Leonardites and brown coals are high in inactive humic acids that need to be processed in order to activate the humic acids. A high concentration of humic acids is not an indicator of the efficacy of the product. The best indicator of efficacy is the source of the humic acids and whether they are bio-active.

Leonardite differs from soft brown coal by the amount of oxidation that has occurred and the amount of humic acid it contains. Leonardite and brown coal need to be chemically treated to activate the humic acids chemically locked-up. Toxic strong alkaline and acidic solutions are applied to ground raw material. The success of the process is dependent upon the size of the raw material particles, the raw material chemical composition, the degree of blending/agitation and treatment. Each step needs to be calibrated to the varying chemical compositions of the raw input material.

The end-product from the processing of Leonardite or soft brown coals is humic substances in liquid or soluble powder form. Depending upon the manufacturing process and raw

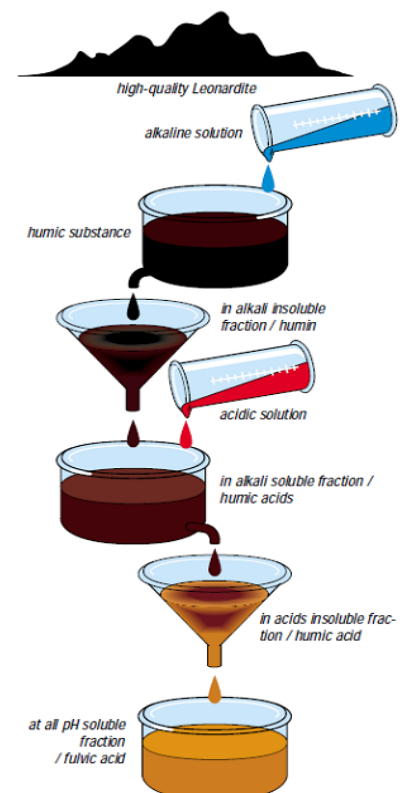


Figure 2 Chemical Processing of Leonardite

material and the end application, the humate needs to be applied frequently. Humates in this form have little persistency.

Humic acids are complex naturally occurring molecules that are essential for healthy plant growth. Humates are not fertilisers and are not taken up by plants to grow. Humates are the chemical pathway that allows plants to take up nutrients by stimulating the beneficial micro-biome and suppressing pathogens. The humic acids in The Black Stuff act as soil conditioners, biocatalysts and bio-stimulants. Plant growth and soil fertility are enhanced.

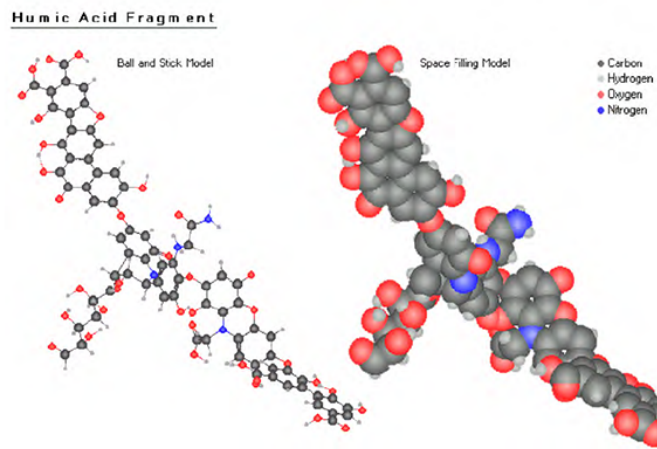


Figure 3 Humic acid molecule

Unlike composted material and liquid manufactured humates, The Black Stuff has persistency. In the Wet Tropics where The Black Stuff is sourced, the humic acids have persisted for length periods of time. In agricultural settings The Black Stuff has been shown to be present and active after five years.

Soil fertility to a large extent is determined by the humic acid content of the soil. The humates in The Black Stuff have a high cation-exchange capacity (CEC), and increase water and fertiliser holding capacity. Humic acids bind insoluble metal ions, oxides and hydroxides, to release them slowly as plants need them.

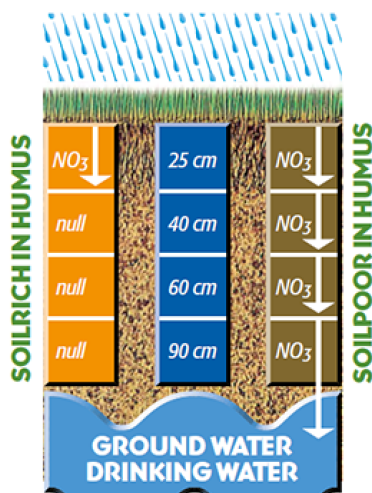


Figure 4 Nitrogen saturation

Farmers can give a quick hit to crops by applying lots of nitrogen. Plants will initially respond quickly with fast growth. The more nitrogen applied the less plants can take up the nitrogen and the more that needs to be applied to achieve the same results. Plants become nitrogen saturated, unhealthy and susceptible to soil pathogens. It is like you having a sugar hit. Sugar will give you immediate quick energy. The more sugar you have the less affect experienced and excess sugar leads to diabetes. The human body is saturated in sugar and is sick and unhealthy just like plants saturated in nitrogen. Humic acids moderate a plants uptake of nutrients to forms that are beneficial to the plant. Healthy and productive plant result.

Humic acids in The Black Stuff, improve soils, change the soil fixation properties and stimulate plants.

### Soil Improvement

The Black Stuff physically changes the soil structure by:

- increasing the water holding capacity, reducing the water needed in irrigation;
- reducing water use by up to 30%;
- increasing fertiliser holding capacity, reducing leaching of fertilisers into waterways and the environment;
- improving soil structure by preventing water and nutrient leaching in light and sandy soils;
- converting sandy soils to healthy productive soils;
- increasing aeration and water holding in heavy compacted soils; &
- increasing the ability of soil colloids to combine preventing soil cracking, surface water run-off and erosion.

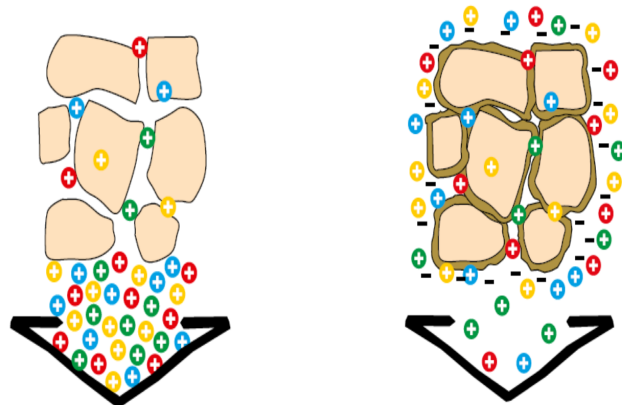


Figure 5 The Black Stuff reduces leaching

### Soil Fixation

The Black Stuff changes to fixation properties of soil by:

- enhancing and moderating nitrogen uptake by plants;
- optimising nutrient and water uptake by plants;
- chelate metal ions to promote uptake by plant roots;
- reducing fertiliser use by up to 30%
- increasing the buffering properties of the soil;
- retaining water soluble fertilisers in root zones reducing leaching;
- promoting the conversion of trace elements to forms available to plants; &
- reducing toxic substances in soils.

### Plant stimulation

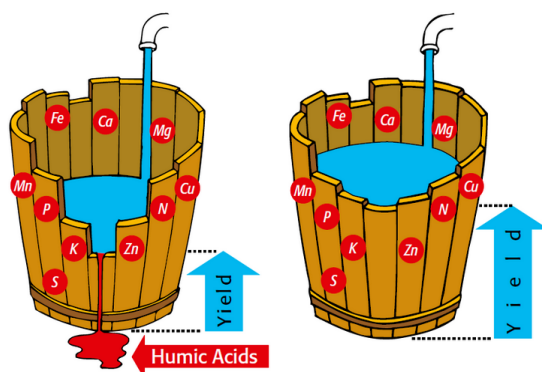


Figure 6 Yield is controlled by the scarcest resource

The Black Stuff stimulates the micro-biome that:

- stimulates growth and beneficial micro-organisms in soil;
- stimulates plant enzymes and increases plant production;
- stimulates root growth, especially vertical growth that enables enhanced nutrient uptake;

- improves yield and quality of crops;
- increases crop yields up to 70%;
- inhibits pathogens and aids plant resistance to disease and pests; &
- increases germination and viability of seeds.

### **The Environment and Humic Acids**

Fertiliser saturating leads to leaching and poor plant health. Nitrate leaching to creeks and rivers stimulate algae blooms and kill coral reefs. The Black Stuff reduces nutrient needs and optimises nutrient efficiency. Every algae bloom is farmers' wasting their fertiliser dollars. The Black Stuff reduces nutrient need and leaching to the environment.

Prolonged use of water-soluble mineral fertilisers leads to salination. This salinity is directly toxic to young plants and leaching introduces toxicity into the environment. The Black Stuff binds with the mineral ions reducing root burn and salinity. Leaching is reduced or eliminated.

Soil erosion, clogs dams and rivers and silt blooms smoother and kill reefs. The Black Stuff is an effective means of reducing soil erosion. The humic acids increase combining of soil colloids that prevent soils cracking and erosion. Enhanced root development holds soils together.



*Figure 7 Silt bloom Great Barrier Reef*