

## Are Humic Substances Ubiquitous?

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Humic substances are compounds that are naturally present in fertile soils and give soils their characteristic dark color.

Humic substances have existed throughout nature for hundreds of millions of years. They are created when microbes decompose organic debris for carbon and energy as far as they can. The remaining 2% of the original biomass is very resistant to further degradation and tends to accumulate in favorable soil environments. Humic substances also exist in lake sediments, peat and weathered coal.

Humic substances have the greatest beneficial effects on soil properties, including increased water and nutrient holding capacity, aeration and support for microorganisms. They stimulate plant growth and yield via a variety of mechanisms. Plants absorb the lighter or smaller molecules of humic substances, along with the nutrients they transport, and carry it throughout the plant. When we eat plant food, we absorb any light humics contained in the plant. Therefore humic substances are very old and exist inside us and all around us.

Because we use non-carbon based fertilizers, and because soil humus levels are lower than in the distant past, conventionally produced crops are lower in light humics. Therefore our dietary intake of humic substances is also lower than in the past. In one study it was found that the determination of DNA in ancient bone was impeded by higher levels of fulvic acid (light humics), which interferes with the analysis. More modern bones were found to be lower in light humics (Toross, 1994.)

The Gippsland region of Australia produced immense amounts of biomass over several million years. The biomass was locked into wet anaerobic environments, and has been accumulating over that entire period. In a few places, the most recent deposits are within the aerobic biological zone. Here soil microbes have extracted (oxidized) the energy from it, and what remains is much like the organic matter in fertile soils. Hence it is called oxidized lignite. Oxidized lignite is high in humic substances of varying size. The smaller molecules are the most bioactive. Our material contains smaller molecules which we separate by gentle physical processes. Our "light humics" are clean, low in salts, and can be used in nutraceutical and skin formulations.

Humic substances have been well researched by hundreds of scientists in North America and internationally over the last several decades. These studies have documented results that provide evidence to its potential benefits to plant and animal as well as for human health and wellbeing.

Tuross, N. (1994, Jun 15). The biochemistry of ancient DNA in bone. *Experientia* 50(6), 530-535.

***Abstract***

The amount of DNA in ancient bone was determined by ethidium bromide staining after the removal of the potent Taq inhibitor, fulvic acid. A complete decalcification and a perfusion protocol were used to recover DNA from bone. A variety of purification techniques including molecular sieve, hydroxyapatite binding and "Magic"

preparations yielded DNA that spanned from 3.4 <sup>14</sup>g/g of bone to below detectable limits. Fulvic acid was shown to interfere with the quantification of DNA derived from ancient human skeletal material one hundred to over seven thousand years old. Scanning UV in the 300 to 230 nm range is a simple and sensitive technique for documenting fulvic acid contamination in ancient bone extracts.