

BIOLOGICAL THERAPEUTICS REJUVENATE™

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CELL
THERAPY



Fulvic Acid and Your health

Introduction:

Fulvic acid (not to be confused with folic acid) is rapidly being recognized as one of the key elements in many outstanding health and scientific breakthroughs of the 21st century. Scientists and doctors throughout the world are beginning to discover fulvic acid and are starting to recognize its extraordinary potential. At Biological Therapeutics, we have no doubt that this interest will increase dramatically as ongoing findings are released to the world, and as word-of-mouth spreads the amazing news about this phenomenal element.

Fulvic acid has always occurred naturally in organic plants and soils, yet its recent discovery and tremendous value is now just beginning to be recognized. It can balance and energize cell life and biological properties it comes into contact with¹. If the individual cell is restored to its normal chemical balance and electrical potential, we have given cells life where death and disintegration would normally occur².

Doctors have known for years that everyone needs at least 90 nutrients to maintain optimum health. But eating good tasting food and swallowing a lot of vitamin pills does not guarantee absorption or utilization of these vital nutrients. When the body does not absorb nutrients the door is open for disease.

Scientists have found that fulvic acid is the element that makes nutrients absorbable, which gives it the ability to make a dramatic impact on all kinds of diseases and health problems that afflict us today. They call it the elixir of life and theorize that without it, nothing would live.

Fulvic Acid—The Miracle Molecule

“If I had to choose between the liquid mineral and electricity, electricity would have to go.”

Dr. Clyde Sandgrin

Vital Earth Fulvic acid is being called Nature’s Miracle Molecule, because it does so many things ... it wears so many hats. Reported claims of benefits are a little short of astonishing. For internal use they are:

Increased energy. It’s a ferocious antioxidant and free radical scavenger. Chelates heavy metals and body toxins, removing them from the system. Transports nutrients into the cells. Extends the time nutrients remain active—potentiates the availability of essential nutrients. Increases metabolism of proteins, contributing to DNA and RNA synthesis. It’s a powerful natural electrolyte. Restores electrochemical balance. Increases activity of a host of enzyme systems. Helps rebuild the immune system. Increases bioavailability of nutrients and minerals.

Reported beneficial claims for external use:

Treating open wounds, cuts and abrasions. Healing burns with minimum pain or scarring. Eliminating discoloration due to skin bruises. Killing pathogens responsible for athlete’s foot. Acting as a wide spectrum anti-microbial and fungicide. Treating rashes, skin irritations, insect and spider bites. Neutralizing poison ivy and poison oak.

The agricultural benefits of fulvic acid have enormous potential to heal soils of the world and to neutralize radioactive and toxic wastes.



Fulvic Acid, Origin and Overview

In the Beginning In the beginning the earth was blessed with optimum organic growing conditions. The soil had a wealth of minerals, trace elements and rich humus soil teeming with microbes. The earth’s minerals had not been depleted from over-farming, therefore the soil was exceptionally

The vegetation was very lush and abundant, as is evidenced by ancient remains that geologists call humic deposits. These deposits are quite rare and can be found in various areas of

the world. Even more rare are deposits of humic substance that are exceedingly rich in a little known substance called fulvic acid.

Fulvic Acid—Supercharged Electrolyte: Fulvic Acid has been called one of the most important natural miracles related to life itself. It is an acid³ created in extremely small amounts by millions of beneficial microbes working on decaying plant matter⁴.

Because of fulvic acid’s low molecular weight⁵ (small molecules) it has the ability to readily dissolve and bond minerals and nutritional elements into its molecular structure. Nutrients that have been chelated by fulvic acid are in an ideal natural form to interact with and be absorbed by living cells⁶. Fulvic Acid is so powerful that one single fulvic acid molecule is capable of carrying 60 or more minerals and trace elements into the cells.

Fulvic Acid is Lacking in Food Crops: It is a well known and publicized fact that our soils are sick from poor agricultural practices. The sterile soil conditions brought on by the overuse of pesticides, chemical fertilizers and erosion prohibit microbial activity and the formation of fulvic acid.

Fulvic acid that is essential for maximum human health has been missing from our diets for generations.

Re-mineralization of our bodies without the fulvic acid (that should be in the plants we eat), has little benefit. People are sick with degenerative and deficiency related diseases now more than ever. Fulvic acid supplementation is a good start toward reversing this situation.

Supercharged Electrolyte, Antioxidant, and Free Radical Scavenger

Cellular electrical energy could be called the life force of the body. When electrical energy is reduced in cells, they disintegrate and die. It is believed that electrical and chemical balances within the cell can be created and controlled by electrolytes ... the body's mini battery chargers.

Scientists tell us fulvic acid is one of the most powerful natural electrolytes known to man. These supercharged molecules balance cellular life ... restoring the electrical potential that was once normal to the cell by charging, regenerating, regulating and delivering their living energies to the living cells.



Fulvic acid maintains the ideal environment⁷ for dissolved mineral complexes, elements, and cells to bio-react electrically with one another causing electron transfer, catalytic reactions, and transmutations into new minerals⁸.

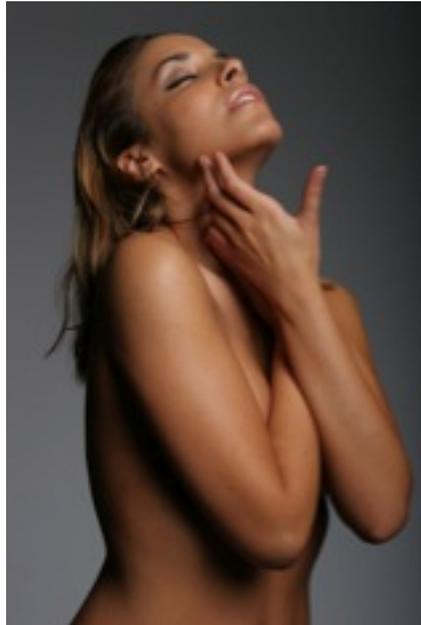
It helps with human enzyme production, hormone structures, and is necessary for the utilization of vitamins. It has been found to be essential to living cells in carrying on metabolic processes.

It is also one of the most powerful natural antioxidants and free radical scavengers known. It has the unique ability to react with both negatively and positively charged unpaired electrons and render free radicals harmless. It can either alter them into new useable compounds or eliminate them as waste. Fulvic acid can similarly scavenge heavy metals and detoxify pollutants.

Fulvic Acid Mineral Complexes are Better than True Colloidal Minerals

You may have heard all the excitement about colloidal minerals. But true colloidal minerals by themselves are not readily useable by cells. It is the fulvic acid in conjunction with minerals that makes them effective. Many colloidal minerals on the market contain a small amount of fulvic acid, which is responsible for any results they may produce. Vital Earth Fulvic Mineral Complex contains a whopping 42% fulvic acid.

Fulvic Acids Further Defined: Individual cells when properly nourished, are capable of producing many of their own amino acids, enzymes, and other factors necessary for all metabolic processes. Each cell, in addition to other processes, burns its own energy, maintains itself, manufactures its own enzymes, creates its own proteins, and duplicates itself⁹. It is essential to understand that the total metabolism of the body is the sum of the metabolic operations carried on in each individual cell.



Growth & Maintenance Nutrients Scientists have identified at least 90 growth and maintenance nutrients which must be continuously supplied to the body to sustain healthful life. These nutrients include amino acids, major and trace minerals, vitamins and other nutritional factors¹⁰. When these factors are supplied to our cells, the cells then create the building blocks of our life process. The building blocks present in the metabolic machinery are, in the great majority of cases, the same in other organisms of extremely different types¹¹.

Humans can produce all but eight amino acids within their cells. The very complex process of all metabolic functions are carried on within the cell. If we fail to supply the cell with essential growth and maintenance nutrients we will experience a breakdown of these functions. When the breakdown is substantial we have the onset of disease or the manifestation of some related defect.

Sick Soils, Sick Plants, Sick People In the beginning, our naturally fertile soils contained adequate amounts of humic and fulvic acids produced by resident microbes within the soil. They delivered nutrients and minerals to the plants.

Largely our modern agriculture aims at one goal ... an abundance of saleable products. Food quality is sacrificed for food quantity. Since the farmer is paid by the bushel, yield is more important than nutritional content. To control disease and force yield, excessive amounts of nitrate fertilizers are applied to the soil. Such practices stun and destroy the indigenous microbial life within the soil, which destroys vital humic and fulvic acids.

Gone Are The Minerals: When microbes are depleted from the soils, they are no longer present to convert inorganic minerals into organic minerals needed by plants. Excessive use of nitrate fertilizers inhibits the formation of normal plant proteins and stimulates an over-abundance of unused amino acids that attracts insects¹². Since pests were created to eat diseased plants this introduces the ideal environment for increased infestation because of increased insect food supply. The farmers reaction is to apply more pesticides and fungicides to save his infested crop. This in turn inhibits or destroys even more vital microorganisms that are essential in converting minerals to plant nutrients.

Unsafe Foods: These deficient, pesticide laden products are turned into "cash", which the farmer thinks is the bottom line. Lacking in organic trace elements and other nutritional factors, but long on chemical residues from pesticides, insecticides and herbicides, these nutritionally hollow product end up on the table of America. Without taste, and deficient in organic minerals and nutrients, we peel , boil and overcook what remains and then ask "why am I sick".

The Vitamin Connection: New breakthroughs are just beginning to emerge in the use of increased dosages of vitamins and minerals for treatment of some ailments. However, it is crucial to remember that vitamins cannot complete their function in the cell's metabolism without the presence of the appropriate and specific mineral co-factor and fulvic acid.

Cell Wall Permeability and Absorption: One of the strongest advantages of fulvic acid minerals is that absorption greatly exceeds traditional tablet supplements. As with any nutrient or supplement, the only way your body can benefit, is if it is absorbed. Fulvic acid enhances this process.

Fulvic acid makes elemental minerals and vitamins more absorbable by complexing them (refines, purifies, combines and re-refines) into organic, ionic forms that are easily transported into

and through membranes and cell walls. Once the nutrients meld into the fulvic acid complex, they become bioactive and bioavailable.

The Fulvic Acid Connection

Humic and fulvic acids have a fascinating effect on living organisms. Fulvic acid chelates and binds scores of minerals into a bio-available form used by cells. These trace minerals serve as catalysts to vitamins within the cell¹³. Additionally, fulvic acid is one of the most efficient transporters of vitamins into the cell.

The Enzyme Connection: An enzyme is a catalyst that does not enter into a reaction but speeds up or causes a reaction to take place. Enzymes are complex proteins. Enzymes are the life force behind vitamins and minerals. Without enzyme activation in the stomach, food would simply rot, elimination would not take place, thought would cease and we would die.

At the cellular level, the burning of glucose in cells for instance, requires the action of several enzymes, each working on the substrate of the previous reaction. Each cell of the body, when properly nourished, is capable of producing the enzymes needed for complete metabolism¹⁴. Research has shown that fulvic acid improves enzymatic reactions in cells and produces maximum stimulation of enzyme development¹⁵.



Free Radicals & Antioxidants

If a healthy body is your goal, then you must take action to protect yourself against free-radical attacks.

Dramatic increases of free radicals in our air, food and water in recent years have put a tremendous strain on the body's natural defense mechanisms. Our first line of defense against free radicals is a generous supply of free radical scavengers, called antioxidants.

Free radicals are highly reactive molecules or fragments of molecules that contain one or more unpaired electrons¹⁶. They circulate through the body causing great mischief in bonding to and injuring tissues. In addition to destroying tissue, they magnify the probability that injured cells will become susceptible to a great many infections and diseases, or mutate and cause cancer.

According to Sesesi, Y. Chen and M. Schnitzer, fulvic acid has the ability to dramatically reduce the oxidative effects of free-radicals. This means fulvic acid could potentially help your body ward-off disorders such as cancer, premature aging, wrinkling of the skin and arthritis ... all of which are thought to be hastened by oxidation.

Antioxidants: In recent years frantic efforts have been made to locate and isolate compounds with an extraordinary affinity for free radicals. Entire industries have evolved around such efforts, with nearly every vendor of health food products offering possible solutions. There are three identified categories of free radicals, and numerous identified free-radical scavengers, Vitamin A, C, E, Gamma-Linoleic Acid, L-Cysteine, L-Glutathione, Selenium, and CoQ10 are the best known. Each one of the free-radical scavengers eradicate a different category of free-radicals. Its very complicated to get the right form of nutrients, in the correct amounts, along with all the co-factors needed to make them work.

How Antioxidants Work

For an antioxidant to bind a free radical, the antioxidant molecule must have unpaired electrons of equal and opposite charge to that of the unpaired electrons of the free radical.

We have found that fulvic acid is a powerful, super-Antioxidant and natural electrolyte that can eradicate any form of free-radical. It can act as an acceptor or as a donor in the creation of electrochemical balance. If it encounters free radicals with unpaired positive electrons, it supplies an equal and opposite negative charge to neutralize the bad effects of the free radicals. Likewise, if the free radicals carry a negative charge, the fulvic acid molecule can supply positive unpaired electrons to nullify that charge. Fulvic acid plays the role as a bi-directional super antioxidant.

In Summary Fulvic acid is a bio-available chelated molecule that can also chelate. As a refiner and transporter of organic minerals and other cell nutrients, it has the ability to turn bad guys into good guys by chelating and humanizing free radicals. Depending upon the chemical makeup of the free radical, they can be incorporated into and become a part of life sustaining bio-available nutrients. In the event that the chemical makeup of the free radical is of no particular benefit, it is chelated, mobilized and carried out of the body as a waste product

Many of the substances that make up humic matter have yet to be discovered and catalogued among the known and documented organic chemicals. We are beginning to realize that what we know about Fulvic Acid is just the tip of the iceberg.

Information Concerning Possible Toxic Minerals

"Poisons in small doses are the best medicines; and the best medicine in too large doses are poisonous." –Wm. Withering

Consumption of plant derived mineral fulvic complexes by humans for many years has shown that they will not build up in the body tissues as do metallic minerals. The following observations and theories describe the reasons why: Cells have the ability to accept or reject minerals, including aluminum, lead, arsenic, mercury, etc., at their discretion when presented as organic fulvic acid complexes. It should be considered that these minerals may not necessarily be present to "nourish" cells, but are needed to act as "electrodes" in the fulvic electrolyte solution. In that capacity they are probably most essential for bio-reactions, electron transfer, catalytic reactions and transmutations.

Fulvic acid carries complexed minerals in "trace" amounts only, and should not be confused with metallic minerals. Fulvic acid has the ability to complex and remove toxic metals and other minerals from the system. Fulvic acid mineral solutions have been ingested by people for many years, yet have never been shown to cause toxic mineral build-up in humans.

It is obvious that when metals, minerals and trace elements become complexed into fulvic acid, they take on an entirely new property of availability, unlike their original form.

It is when fulvic acid is not present that one should seriously worry about toxic buildup from any source. This could account for the health problems that are causing concern today in our "fulvic starved" society.

Aluminum makes up 12% of the Earth's crust, and is the most abundant metallic element. Aluminum is found in biological quantities in most plants grown in soil. Most of our food crops contain 20–200 ppm or more of aluminum. In crops today this concentration would normally be in the absence of fulvic acid.

Known biological function of Aluminum is to activate the enzymes succinic dehydrogenase. It increases survival rate of newborn infants, and according to professor Gerhard Schrauzer, head of the department of chemistry at UCSD, is an essential mineral for human nutrition.

In a study that appeared November 5, 1992 in the science journal, NATURE, Frank Watt, et al (University of Oxford) used a highly accurate laboratory technique to quantify the levels of aluminum in the brains of Alzheimer's patients. To their great surprise, they found the same levels of aluminum in the brains of the non-Alzheimer's control as they did in their Alzheimer's patients. Watts believes that aluminum contaminated stains gave faulty results in the early studies that highlighted aluminum as a health risk.

Science is just learning about other supposedly toxic minerals.

Arsenic

It is now generally accepted that arsenic in trace levels, is an essential element for optimal health and longevity. The levels of arsenic that most people ingest in food or water are not usually considered to be of health concern.

Despite all the adverse health effects associated with arsenic exposure, there is some evidence that low levels of exposure may be beneficial to good health. Test animals maintained on a diet deficient in arsenic did not gain weight normally, and they became pregnant less frequently than the control animals maintained on a diet containing a more normal (but low concentration) of arsenic.

Arsenic has been found to be essential for survivability of newborn babies and also neonatal growth. Arsenic has been shown to promote the growth rate in animals and prevent carpal tunnel syndrome in humans.

Smokers and cadmium. Like most plants, tobacco contains trace amounts of cadmium and lead. It is interesting to note that people that smoke tobacco have about twice as much cadmium in their bodies as do nonsmokers. Higher levels of lead are also found in smokers. It would stand to reason that burning converts the natural organic plant forms to a metallic or toxic form causing buildup in the body. This also could be direct evidence proving the safety of natural organic plant forms of these metals.

Mercury and Selenium

The metabolic antagonism between mercury and selenium results in the protection from selenium poisoning by mercury, and the protection against mercury poisoning by selenium.

Zinc Taking too little zinc is at least as important a health problem as taking in too much zinc. Without enough zinc in the diet, people can experience loss of appetite, decreased sense of taste and smell, slow wound healing, and skin lesions. In severe cases in children, too little zinc can cause poorly developed sex organs and dwarfism.

References:

Agency for Toxic Substances and Disease Registry, Public Health Statements: Arsenic, Aluminum, Mercury, Zinc, Selenium, Cadmium, Lead.

Kehoe, R.A., et al.: Manganese, Lead, Tin, Aluminum, Copper and Silver in Normal Biological Material. J. Nutr. July 1940. Pages 85–98.

Human Experiments With Fulvic: The Healing & Regenerative Influences of Low Molecular Weight Humic Substances (Fulvic Acid) On Human Tissues and Cells

Tests¹⁷ were conducted by Dr. W. Schlickewei¹⁸ and five associates¹⁹ at the University Hospital in Freiburg, Germany, on human patients requiring transplantation or replacement of bone during surgery. The transplantation of bone tissue is required in about 15% of all cases of replacement surgery of the locomotor apparatus, and it is generally applied to reconstitute and repair actual defects in bone.

Human donor tissues have become scarce due to special legal requirements and necessary additional testing because such tissues have a high danger of transmitting the HIV virus and hepatitis. There are also obvious disadvantages to using bone grafts from other areas of the same patient's body because they require a second operation and prolong the length of time in surgery. The only other known substitute source available in large enough quantities for clinical use, was animal bone in the form of inorganic calcium compounds (bovine calcium hydroxyapatite), and although these were well tolerated by the body, they showed no signs of being resorbed.



Remarkable bone regeneration and re- sorption characteristics were identified when the animal bone implants were impregnated with a low molecular weight humic substance (fulvic acid) prior to transplant into patients. The bone im- plant then became highly osteoconduc- tive, and served the host tissue as a “guide-line” for the deposition of newly developing bone tissue. The same transplant procedure without the fulvic acid showed no signs of regeneration during the course of the experiment.

While on the lookout for a new group of active agents with the ability to promote wound healing, the doctors came across the humic substances. The doctors said that the bone resorption is most easily explained by the known ability of humate to induce the activation of leucocytes. They said that previous experiments had established that the humic substances are able to bind to calcium- containing compounds, stimulate granulocytes, and block the infectivity of the HIV virus.

Summary: In this clinical test and previous experiments, fulvic acid has been shown to activate and stimulate white blood cells, promote healing, turn inorganic calcium into an organic bio-active cellular regenerative medium conducive to new bone growth, stimulate cellular growth and re- generate, and inhibit the HIV virus.

Animal Experiments with Fulvic

Early studies with livestock animals were conducted by Dr. Charles S. Hansen, D.V.M. in the state of California from the early 1960's through 1967 on an experimental basis. Dr. Hansen's test included a blend of fulvic and humic acid used as a feed additive. He also used fulvic acid alone as a treatment for specific ailments in livestock. The results of supplement feeding and treatment included:

Dairy Cows: After 2 months of supplement no bacterial or viral infections Herd of over 300, after 3 months on supplement increased butterfat production of 15%. Herd on supplement cut back on high protein rations with no decrease in production. All cows on supplement experienced more complete digestion. Cows with bacterial infection (mastitis) treated with 1 pint fulvic acid solution recovered to full production in 12 to 24 hours. When using antibiotics to treat mastitis the recovery was only 50% to 70% after 2 to 3 weeks.

Hogs: Animals on the supplement experienced better and more complete digestion. The free choice supplement in 36 hours acted as an excellent vermifuge (de-worming agent). The supple- ment completely eliminated Necro, a bloody diarrhea in hogs.

Mink: Animals on the supplement experienced more complete digestion. When on the supple- ment were less vicious, more docile. Supplemented animals ceased fur chewing. Successfully eliminated most diseases common to mink herds.

Poultry: Supplementing to feed acted as a vermifuge. Pullets given supplement were free of most diseases. Pullets on supplement experienced more complete digestion of other feeds in diet. Pullets on supplement produced eggs of superior shell hardness and quality.

The results of these early tests support the known benefits which fulvic acid provides to all living systems, plant or animal. They indicate that fulvic acid may very possibly become the most important factor in health management in the future.

1. Scenecsi, N (1990). *Analytica Chmiica Acta*, 232, 51-75. Amsterdam, The Netherlands Elsevier.
2. powerful electrolyte – Jackson, William R (1993) *Humic, Fulvic and Microbial Balance: Organic Soil Conditioning*, 329. Evergreen, Colorado: Jackson Research Center.
3. acidity of fulvic acid – Schnitzer, M (1977). recent findings of the characterization of humic substances extracted from soils from widely differing climatic zones. *Proceedings of the Symposium on Soil Organic Matter Studies, Braunsweig* (117-131)
4. environment with adequate oxygen - Schnitzer, M (1977). recent findings of the characterization of humic substances extracted from soils from widely differing climatic zones. *Proceedings of the Symposium on Soil Organic Matter Studies, Braunsweig* (117-131)
5. low molecular weight – Aiken, G.R., McKinght, D.M. & MacCarthy, P (1985). *Humic substances of soil, sediment and water*, New York: Wiley-Interscience.
6. absorption by cells – Azo, S. & Sakai, I (1963). studies on the physiological effects of humic acid. Part I. Uptake of humic acid by crop plants and its physiological effects. *Soil Science and Plant Nutrition*, 9(3), 1-91. (Tokyo)
7. effect on total Earth environment - Buffle, J. (1988). *Complexation reactions in aquatic systems: An analytical approach*. Chichester: Horwood.
8. transmutate or synthesis of new minerals – Schnitzer, M., & Dodama, H. (1977). Reactions of minerals with soil humic substances. In J.B. Dixon & S.B. Weed (Eds.), *Minerals in soil environments* (Chap. 21). Madison, WI: Soil Science Society of America.
9. and duplicates itself – Williams, Dr. Roger J. (1977). *The Wonderful World Within You*. Bio-Communications Press. Wichita, Kansas.
10. other nutritional factors – *ibid.*
11. extremely different types – *ibid.*
12. amino acids that attract insects – Chaboussou, F. (1980) *Les Plantes Malades des Pesticides—Bases Nouvelles D'une Prevention Contre Maladies et Parasites*. (Plants made sick by pesticides—New basis for the prevention of diseases and pests). Paris
13. catalyst to vitamins within the cell – Williams, Dr. Roger J. (1977). *The Wonderful World Within You*. Bio-Communications Press. Wichita, Kansas.
14. for complete metabolism – Williams, Dr. Roger J. (1977) *The Wonderful World Within You*. Bio-Communications Press. Wichita, Kansas.
15. maximum stimulation of enzyme development – Jackson, William R. PhD. (1993) *Humic, Fulvic and Microbial Balance: Organic Soil Conditioning*. Evergreen, Colorado
16. free radicals, Scncsi, N. (1990). Molecular and quantitative aspects of the chemistry of fulvic acid and its interaction with metal ions and organic chemicals: Bari, Italy. *Analytica Chimica Acta*, 232, 51–75. Amsterdam, The Netherlands: Elsevier.

17. Schlickewei, Dr. W., (1993). Arch Orthop Trauma Surg 112:275-279, influence of humate on calcium hydroxyapatite implants

18. W. Schlickewei, Dept. of Surgery (Traumatology), University Hospital, Freiburg, Germany

19. U.N. Riede, Dept. of Pathology, University Hospital, Freiburg, Germany, J. Yu, Dept of Pathology, University Hospital, Freiburg, Germany. W. Ziechmann, Ground Chemistry Research Group, University of Gorrinfen, Germany. E.H. Kuner, Dept. of Surgery (Traumatology), University Hospital Freiburg, Germany. B. Seubert, Weyl Chemicals, Mannheim, Germany.

Bibliography to Fulvic Free Radical Data

Mowrey, Daniel B., PH.D. (1993), p. 34, Herbal Tonic Therapies. Keats Publishing, Inc.

Todd, Gary Price, M.D., (1985)., p.20-24, 113-118. Nutrition Health & Disease. Whitford Press.

Steelenk, C.A. & Tollin, G. (1962) p. 59, 25-34. Biochimica Biophysica Acta

Senesi, N Chen, Y. & Schmitzer, M. (1977). Soil Biology and Biochemistry.

Vaughan, D., Malcolm, R.B. & Ord, 13.G (1985) Soil Organic Matter & Biological Activity. Dordrecht, Netherlands: Martinus Nijhoff.

Jackson, William R., Ph. D. (1995). p. 261-282 Humic, Fulvic and Microbial Balance: Organic Soil Condition. Evergreen, Colorado

The Colloidal Myth

A colloid is: "A state of matter in which the matter is dispersed in or distributed throughout some medium called the dispersion medium. The matter thus dispersed is called the disperse phase of the colloid system. The particles of the disperse phase are larger than the ordinary crystalloid molecule, but not large enough to settle out under the influence of gravity¹.

Colloids as defined in physical chemistry are: A. A colloidal system, one in which a finely divided solid is suspended in a liquid: such colloids range from solutions to gels. B. A colloidal suspension. C. A substance that when suspended in a liquid will not diffuse easily through vegetable or animal membrane².

According to Remington's Pharmaceutical Sciences: "colloidal mineral particles each consist of many aggregates, and each aggregate contains many molecules." Thus it stands to reason that colloidal minerals exist in particle sizes many time larger than some other mineral forms.

Because of their size, true colloidal minerals are not absorbed by the body³. Remember ... fulvic acid is the key to outstanding health benefits ... not colloidal minerals.

1. definition of a colloid – Dorland's Illustrated Dictionary, 24th Edition

2. definition of colloids – Random House Dictionary of the English Language

3. colloids and their size – Max Motyka, M.S.. Albion Laboratories