World's Finest Electrolyte (1)
Fulvic acid is an organic natural electrolyte that can balance and energize biological properties. It is capable of being soluble in water (2) and conducting electrical current. (3)
The power of an electrolyte that has been shown in separate tests on animal cells (giant amoebae); to be able to restore life in what researchers termed "a beautiful demonstration" and "astonishing."

When the electrolyte potential was taken away during the test, the cell ruptured and disintegrated into surrounding fluids causing death. These studies showed convincingly that the physical well-being of cells depended upon cells having electrical potential enabling cells reconstruction to become healthy and active. (4)

It was also determined from these same studies, that similar results could be expected of the progressive weakness among humans resulting from: unchecked hemorrhages, overwhelming emotional stress, uncontrolled infections, unbalanced diet, prolonged loss of sleep, and surgical shock. These examples are all accompanied by a steady decrease in electrical potential that can eventually be reduced to zero at death. These studies show convincingly that the physical well-being of plants, animals, and humans is determined by proper electrical potential. (5)

Fulvic acid has proven to be a powerful organic electrolyte, serving to balance CELL LIFE. If the individual cell is restored to its normal chemical balance thereby turning its electrical potential, we will have given life where death and disintegration would normally occur within plant and animal cell. (6) Fulvic acid has the outstanding ability to accomplish this objective in numerous ways. (7)

(1) Senesi, N. (1990). Analytica Chimica Acts, 232, 51-75. Amsterdam, The Netherlands. Elsevier
(2) Vital electrolytes-Baker, W.E. (1973). Geochimilen at Casmochtulon Acts, 37, 269-281.
(3) Gamble, D.S., & Schnitzer, M. (1974). Trace Metals and Metal-Organic Interactions in Natural Waters. Ann Arbor Science.
(4) Power of an electrolyte – Crile, G. (1926) A bipolar theory of living processes. New York: McMillen.
(5) Decrease in electrical potential – Crile, G (1926). A bipolar theory of living processes. New York. McMillen.
(6) Powerful electrical – Jackson, William R. (1993) Humic, Fulvic and Microbial Balance: Organic Soil Conditioning 329. Evergreen, Colorado: Jackson Research Center.
(7) New Electronic Encylopedia. (1991) Photosynthesis. Grolier Electronic Publishing.

Promotes ElectroChemical Balance as Donor or Receptor
Fulvic acid is available at times as an electron donor and at other times as an electron acceptor,

based on the cells requirement for balance. (8) One reaction that occurs is when the chemical species lose electrons as a donor. The other reaction is a reduction in which the active species gains electrons as an acceptor. (9)

A recent study of the binding donor molecule to Fulvic acid in a solution revealed direct evidence for donor-acceptor charge transfer mechanisms. (10) trace minerals in the fulvic acid electrolyte could also be beneficial in this process by serving as electrode. (11)

(8) Donor and acceptor – Jackson, William R. (19930 Humic, Fulvic and Microbial Balance: Organic Soil Conditioning. Evergreen, Colorado: Jackson Research Center.

(9) Donor and Receptor – Rashid, M.A. (1985) Geochemistry of marine humic substances. New York: Springer-Vertag.

(10) Donor, receptor-Sposito, G., Holtaclaw, K.M., LeVesque, C.S., & Johnson, C.T. (1982). Trace metal chemistry in arid-zone filed soils amended with sewage sludge. ll. Comparative study of the fulvic and fraction. Soil Science Society America Journal, 45, 265-270.
(11) Mineral complexes in fulvic may serve as electrodes- Rashid, M.A. (1985) Geochemistry of marine humic substances. New York: Springer-Vertag.

Most Powerful Natural Free Radical Scavenger & Antioxidant Known (12)
Free radicals of Fulvic acid behave as electron donors or acceptors, depending upon the need for balance in the situation. (13) Fulvic acid can in some ways take part in oxidation-reduction with transition metals reactions. (14)

(12) Free radical-Senesi N. (1990) Analytion Chimica Acts, 232, 51-75. Amsterdam, The Netherlands: Elaevierl
(13) Free radical – Senesi, N., Chen, Y., & Schnitzer, M. (1977b) The role of humic acids in extracellular electron transport and chemical determination of p/H in natural waters. Soil Biology and Biochemistry, 9, 397-403.
(14) Oxidation reduction – Senesi, N., Chen, Y., & Schnitzer, M. (1977b) The role of humic acids in extracellular electron and chemical determination of p/H in natural waters. Soil Biology and Biochemistry, 9, 396-403.

Complexes Dissolve Minerals & Trace Elements (15)
Fulvic acid is especially active in dissolving minerals and metals when solutions are in water. The metallic minerals simply dissolve into ionic form, and disappear into the Fulvic structure becoming bio-chemically reactive and mobile. The Fulvic acid actually transforms these minerals and metals into elaborate Fulvic acid molecular complexes that have vastly different characteristics from their previous metallic mineral form. Fulvic acid is nature's way of "chelating" metallic minerals, turning them into a readily absorbable bio-available form.
Fulvic acid also has the unique ability to weather and dissolve SILICA that it comes in contact with.

(15) Dissolves metals and minerals – Ong, H.L. Swanson, V.D., & Bisque, R.E. (1970) Natural organic acids as agents of chemical weathering (130-170). U.S. Geological Survey

Professional Paper 700 C. Washington, DC: U.S. Geological Survey.

Enhances Nutrients (16)
Fulvic acid enhances the availability of nutrients and makes them more readily absorbable, allowing minerals to regenerate and prolong time of essential nutrients. It prepares minerals to react with cells and allows minerals to inter-react with one another, breaking them down into the simplest ionic form, chelated by the Fulvic acid electrolytes.

(16) Enhance and transport nutrients – Christman, R.F., & Gjessing, E.T. (1983). Aquatic and terrestrial humic materials. The Butterworth Grove, kent, England: Ann Arbor Science. Also: Prakish, A. (1971). Terrigenous organic matter and coastal phytoplankton fertility. In J.D. Costlow
(Ed.) Fertility of the sea, 2, 351-368. (Proceedings of an international Symposium of Fertility of the Sea, Sao Paulo, Brazil, London, and New York: Gordon and Breach Science)

Transports Nutrients (17)
Fulvic acid readily forms complexes with minerals and metals making them available to plant roots and easily absorbable through cell walls. It makes It makes minerals such as IRON, that are not usually very mobile, easily transported through plant structures. Fulvic acids dissolve and transpose vitamins, coenzymes, amines, hormones, and natural antibiotics. (18) that are generally found throughout the soil making them available.

These substances are effective in stimulating even more vigorous and healthy growth, producing certain bacteria, fungal, and actinomyceles in decomposing vegetation in the soil. It has been determined that all known vitamins can be present in healthy soil. (20)

Plants manufacture many of their own vitamins, yet these from the soil further supplement the plant. Upon ingestion animals and humans easily absorb these nutrients, due to the fact that they are in the perfect natural plant form as nature intended. Fulvic acid can often transport many times its weight in dissolved mineral elements. (21)

(17) Enhance and transport nutrients – Prakash, A. (1971). Fertility of the Sea, 2, 351-368.
(18) Williams, S.T. (1963). Are antibiotics produced in soil? Pedobiologia, 23, 426, 435
(19) Stimulate Growth – Kanonova, M.M. (1966). Soil organic matter. Elmsford, NY: Pergamon.
(20) All known vitamins in soil – Kanonova, M.M. (1966). Soil organic matter. Elmsford, NY: Pergamon.
(21) Many times its weight – Deb, B.C. 1949). The movement and precipitation of iron oxides in podzol soils. Journal of Soil Sciences, 1, 112-122

Catalyzes Enzyme Reactions
Fulvic acid has close association with enzymes (23) that increases activity of enzymes and especially influences respiratory catalysts. Fulvic acids increase the activity of several enzymes including alkaline phosphates, transaminase, and invertase.

(22) Catalyzes enzyme reactions – Khristeva, L.A., Luk Yaneko, M.V. (1962). Role of physiologically active substances in soil-humic acids, bitumens and vitamins B, C, P-PA and D

in the life of plantsand their replenishment. Soviet Sciences, 10-1137-1141.
(23) Fulvic and enzymes – Pardoe, H.L. Townshend, A., Clerc, J.T., Vender Linden (eds.), 1990, May1, 1-235 (Amsterdam, Netherlands: Elsevier Science Publishers)

Increases Assimilation (24)
Fulvic acid organic metal complexes are of a low molecular weight, (25) low molecular size, and capable of a high degree of penetration into cells. Fulvic acid complexes and chelates are able to readily pass through semi-permeable membranes such as cell walls. It is important to note its been determined that Fulvic acids not only have the ability to transport nutrients through cell membranes, but also sensitizes cell membranes and various physiological functions as well. (26)

(24) Increase assimilation – Buffle, J. (1988). Complexation Reactions in Aquatic Systems: An Analytical Approach. Chickester: Horwood
(25) Low molecular weight, Aiken, G.R. McKnight, D.M., & VacCarthy, P. (1985) Humic substances of soil, sediment and water, New York: Wiley-Interscience.
(26) Sensitize cell membranes – Rashid, R.A. 1985). Geochemistry of Marine Humic Substances. New York: Springer-Verlag.

Stimulates Metabolism (27)
Fulvic acid appears to cause the genetic mechanism of plants to function at higher level. It has been concluded that when plant cells are exposed to Fulvic acid it can improve growth. (28) Oxygen is absorbed more intensely in the presence of Fulvic acids. (29)

Fulvic acid aids in penetrating plant roots, (30) relieves oxygen deficiency, increases the vital activity of cells, and changes the pattern of the metabolism of carbohydrates, resulting in an accumulation of soluble sugars. These soluble sugars increase the pressure of osmosis inside the cell walls and enable plants to withstand wilting, which enhances growth stimulation to the immune system. (31)

(27) Stimulate metabolism – Rashid, M.A. (1985). Geochemistry of marine Humic substances. New York: Springer-Verlag
(28) Genetic and growth – Jackson, William R., (1993). Humic, Fulvic and Microbial Balance: Organic Soil Conditioning, 538. Evergreen, Colorado. Jackson Research Center.
(29) Oxygen is absorbed – Kononova, M.M. (1966). Soil Organic Matter. Elmsford, NY: Pergamon.
(30) Rapid transport to shoots – Kanonova, M.M. (1966) Soil organic matter. Elmsford, NY: Pergamon.

(31) Immune system – Syltie, P.W. (1985). Effects of very small amounts of highly active biological substances on plant growth. Biological Agriculture and Horticultures, 2, 245-269, and Research reports and studies, Appropriate Technology Ltd. Dallas, TX: Murray Sinks ll or ATL (publisher).

Detoxified Pollutants (32)
An important aspect of Fulvic acid is related to its absorptive interaction with environmental

chemicals, either before or after they reach concentrations toxic to living organisms. (33)

Fulvic acid (34) rapidly detoxifies the toxic herbicide known as Paraquat. It has a special function with respect to the demise of organic compounds applied to soil as pesticides. (35)

Fulvic acid is vital in helping form new species of metal ions, binding with organic pollutants such as pesticides and herbicides and catalyzing the breakdown of toxic pollutants. Radioactive substances react rapidly with Fulvic acid and only a brief time is required for equilibrium to be reached. (36) All radioactive elements are capable of reacting with Fulvic acid and thus forming organo-metal complexes of different absorptive stability and solubility.

(32) Modify damage by toxic compounds – Christman, R.F., & Gjessng, E.T. (1983). Aquatic and terrestrial humic materials. The Butterworth Grove, Kent, England: Ann Arbor Science. Also: Prakash, A. (1961). Terrigenous organic matter and coastal phytoplankton fertility. In J.D. Costlow (Ed), Fertility of thr sea, 2, 351-368. (Proceedings of an international Symposium on Fertility of the Sea, Sao Paulo, Brazil, London and New York: Gordon and Breach Science).
(33) Environmental chemicals
(34) Paraquat – Fischer, A.M., Winterie, J.S., & Mill, T. (1967). Primary phytochemical processes in photolysis mediated by humic substances. In R.G. Zika & W.J. Cooper (Eds). Photochemistry of environmental aquatic system (141-156). (ACS Symposium Series 327). Washington DC: American Chemical Society.
(35) Pesticides – Aiken, G.R. McKnight, D.M.., & McCarthy, P. (1985). Humic substances of soil, sediment and water. New York: Wiley – Interscience.
(36) Radioactive properties – Szalay, A. (1958). The significance of humus in the geochemical enrichment of uranium. Proceedings of the 2nd International Conference on the Peaseful Uses of Atomic Energy, 2 182-186. (London: Pergamon).

Dissolves Silica
Fulvic acid is especially important because of its ability to complex or chelate metal ions and interact with SILICA. (37) It has been shown that these interactions may increase the concentrations of metal ions and silica found in water solutions to levels that are far in excess of their assumed dissolution ability. (38)

(37) Dissolves and weathers silica – Huang, W.H., & Delier, W.D. (1970). Dissolution of rock forming silicate minerals in organic acids; simulated first stage weathering of fresh mineral surfaces. America Mineralogical Journal, 55, 2076-2097
(38) Dissolves silica – Kodmans, H., Schnitzer, M., & Jaakkimainen, M. (1983). Chlorite and biotite weathering by fulvic acid solutions in closed and open systems. Canadian Journal of Soil Science, 63, 619-629.

Syntheses (39)
Fulvic acid complexes have the ability to bio-react one with another, and also inter-react with cells to synthesize or transmute new mineral compounds. The transmutation of vegetal silica and magnesium to form calcium in animal and human bones is a typical example of new synthesis of minerals. (40)

(39) 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.
(40) See "The Fulvic Acid, Vegetal Silica Miracle" later in this report, and further documentation of Kervran, Lois C., Biological Transmutations.

Enhances Cell Division and Elongation (41)
Fulvic acid stimulates and balances cells, creating optimum growth and replication conditions.

(41) Cell elongation – Poapst, P.A., & Schnitzer, M. (1971). Fulvic acid and adventitious root formation. Soil Biology and Biochemistry, 3, 215-219.

Enhances the Permeability of Cell Membranes (42)
Fulvic acid acts as specific cell sensitizing agents and enhance the permeability of the cell membrane. (43)

(42) Enhance permeability of cell membranes – Christman, R.F.., & Gjessing, E.T. (1983). Aquatic and terrestrial humic materials. The Butterworth Grove, Kent, England: Ann Arbor Science. Also: Prakash, A. (1971). Terrigenous organic matter and coastal phytoplankton fertility. In J.D. Costlow (Ed), Fertility of the Sea, Sao Paulo, Brazil, London and New York: gordon and Breach Science) low molecular weight, Aiken, G.R. McKnight, D.M., & VacCarthy, P. 1985). Humic substances of soil, sediment and water, New York: Wiley-Interscience.
(43) Sensitizing agent – Prakash, A. (1971). Terrigenous organic matter and coastal phytoplankton fertility. In In J.D. Costlow (Ed), Fertility of the Sea, 2, 351-368. (Proceedings of an International Symposium of Fertility of the Sea, Sao Paulo, Brazil, London, and New York: Gordon & Breach Science.

Increases Metabolism of Proteins (44)
Fulvic acid intensifies the metabolism of proteins. (45) Definitely increases DNA content in cells (46) and increases and enhances the rate of RNA synthesis. (47)

(44) Increase metabolism of proteins – Christman, R.F., & Gjessing, E.T. (1983). Aquatic and terrestrial humic materials. The Butterworth Grove, Kent, England: Ann Arbor Science. Also: Prakash, A. (1971). Terrigenous organic matter and coastal phytoplankton fertility. In J.D. Costlow (Ed), Fertility of the sea, 2, 351-368. (Proceedings of an International Symposium on Fertility of the Sea, Sao Paulo, Brazil, London, and New York: Gordon and Breach Science).
(45) Proteins, DNA, RNA – Khristeve, L.A., Solocha, K.L., Dynkins R.L., Kovalenko, V.E. & Gorovaya, A.I. (1967) Influence of physiologically active substances of soil humus and fertilizers on nucleic acid metabolism, plant growth and subsequent quality of the seeds. Humus at Plants, 4, 272-276.
(46) Proteins, DNA, RNA – Jackson, William R. (1993). Humic, Fulvic and Microbial Balance: Organic Soil Conditioning, 569-570. Evergreen, Colorado: Jackson Research Center.

(47) Synthesis of RNA and DNA – Khristeva, L.A. (1968). About the nature of physiologically active substances of the soil humus and of organic fertilizers and their agricultural importance. In F.V. Hernando (Ed), Pontifica academec scientarium citta del vaticano (701-721). New York: