
FABULOUS
FULVIC
ELECTROLYTE

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No sources of support received by means of grants

Today, the intelligent pursuit of health will include an understanding of the multifunctional properties of fulvic acids.

- What are they?
- How do they work?
- What do they do?

Fulvic acids are low-molecular-weight (i.e., made up of small molecules) humic substances. They are involved in chemical reactions in living matter which influence the metabolic processes of cells. Scientists' analyses have established that fulvic and humic acids contain many of the same elements; however, fulvic acids contain less carbon and more oxygen. According to Schnitzer, fulvic acids can form through oxidation (enzymatic, chemical or both) of humic acids.

HUMIC SUBSTANCES OCCUR IN BOTH LIQUIDS AND SOLIDS

The majority of dissolved organic matter is liquid form—fresh or sea water—is composed predominately of substances like fulvic acid. Prakash generalized that the characteristic yellow-brown color of liquefied humus in lake, river, and inshore coastal marine waters almost totally is due to the presence of relatively low-molecular weight fulvic acid fractions, which are biologically active.

It is important to the science of living cells that fulvic acid can bring into water solution substantial amounts of potassium, iron, magnesium and silicon from micas. These mineral elements, as they become mobile in soils and waters, may:

- Become more usable to all living cells including humans
- Become an active part of the reactions associated with soil creations
- Participate in the synthesis or manufacture of new minerals

Among the humic materials, water-soluble fulvic are especially important because of their abundance, mobility, and ability to complex or chelate metal ions and interact with silica. It has been demonstrated that these interactions may increase the concentrations of metal ions ands silica found in water solutions to levels that are far in excess of their assumed dissolution ability. Thus, fulvic acids in water solutions not only may bring about the dissolution or degradation of existing minerals, but also may lead to the synthesis or manufacturing of new minerals by permitting the complexed and dissolved metals and silica to form new combinations.

CHELATION OF METALS

Christman and Gjessing, and Prakash, confirmed that the influence of humic substances on biological systems has been considered, in some circles, predominately in terms of beneficial effects. According to these researchers, the beneficial effects and responses of fulvic acids are explained in terms of chelation that:

- Enhance the availability of nutritionally important trace elements
- Regenerate and prolong the residence time of essential nutrients in the medium
- Modify the damage of toxic compounds
- Enhance permeability of cell membranes
- Increase metabolism of proteins (RNA and DNA)
- Increase activity of a number of enzymes that have been attributed to the presence of fulvic acids.

Fulvic acids are water based electrolytes. Their chelating ability demonstrates that they are capable of bonding essential minerals and enhancing the minerals for use by living organisms.

PHYSIOLOGICAL STIMULATION EFFECT OF FULVIC ACIDS

Various authors have proposed that humic compounds are taken up by plant's vascular system. In fact, fulvic acids have been used to augment cellular activity by increasing metabolism. Beyond the nutritional benefits of humic substances, fulvic acids affect the health and growth of cell life by stimulating various physiological and biochemical processes related to cell metabolism. The following is a short summary of some of the stimulations and mechanisms associated with the use of fulvic acids:

Literature repeatedly expresses that small concentrations of fulvic acids activate enzymatic systems within plants, most often influencing plant respiration. Kononova has reported studies conducted by several research groups that observed plants absorbing more oxygen in the presence of fulvic acids than untreated control plants. During initial plant growth periods and during the formation of reproductive organs, biochemical processes are most active. Rashid confirmed that plants removed from their fulvic acids source experience oxygen deficiency during these periods. They cannot handle the elaborate functions of the complex enzymes system that transfers hydrogen while activating the oxygen. The addition of fulvic acids during growth and formative periods increases the vital activity of plants and relieves the oxygen deficiency.

Fulvic acid is physiologically active in enhancing plant growth, in influencing enzyme activities and in providing selective effects on many biochemical processes. This low-molecular-weight substance has a positive effect on root initiation and growth that appears to be related to its metal chelating ability.

There is evidence that all humic compounds, especially those of the fulvic acid fraction, are excellent natural chelators and cation exchangers. These functional properties of fulvic acid are vitally important in the nutrition of all living cells.

MATTER AND ELECTRO-CHEMISTRY

Imagine Earth as a big kettle filled with soup. The soup contains a variety of ingredients that are combined by a broth. In this analogy, the soup ingredients represent matter, and the broth represents electrochemistry. Matter is held together by electro-chemistry.

Perhaps some basic points of reference ought to be established before proceeding.

MATTER is anything that takes up space and has mass or weight:

1. It can exist as a solid, liquid, or a gas. In fact, the water we drink and the air we breathe are matter.
2. All living and nonliving things are matter, which composed of substances known as elements.
3. The bonding of hydrogen, oxygen, nitrogen, and the other atoms to carbon atoms creates the molecules distinguished as organic molecules.
4. There are nearly 100 naturally occurring elements. Elements are substances that may not be separated by chemical means into simpler substances with different properties. A "property" is a chemical or physical characteristic like denseness, smell, taste, or reactivity.

ELECTROCHEMISTRY

ELECTROCHEMISTRY is the positive and negative "glue" for all matter:

1. Electrochemistry is the study of electrolyte solutions and the chemical changes associated with electric current.

    Ion: Any individual atom, molecule, or group of atoms having a net electrical charge. This charge may be positive or negative and can exist whether in an electrolyte solution or not. An electrolyte must consist of al least two ions.

    Cation: An ion carrying a positive electrical charge. Common examples of cations, important to cell restoration, are:

    a. Calcium (Ca++)
    b. Magnesium (Mg++)
    c. Potassium (K+)
    d. Sodium (Na+)
    e. Hydrogen (H+)

    Anion: An ion carrying a negative charge of electricity. It includes any negatively charged atom or group of atoms.

Electrolyte: A term derived from two Greek words meaning electric and to loose. It is a substance that dissolves in water or other suitable medium to produce a solution capable of conducting an electrical current. This electric current decomposes some of the molecular bodies and, in the process, electrons are set loose. Hence, the name electrolyte. It is important to note that elements that are anions in one electrolyte may, in another electrolyte or under different circumstances, become cations.

2. Atoms in a compound are held together by the attraction of unlike charges (positive and negative).

3. All chemical interactions are electric at the atomic level; so, in a sense, all chemistry is electrochemistry.

4. Charged atoms in solution possess a definite quantity of electric charge. This supports the fact that electricity is atomic in nature and that each atom contains a natural unit of electricity.

5. The chief requirement for all electrolyte processes is the presence of mobile ions for transporting electric charges.

6. In any electrochemical process (spontaneous or externally powered), the net chemical reaction is the sum of the two half-cell reactions that occur at the electrodes. Trace minerals, or like substances, may serve as electrodes. One of these reactions is always an oxidation reaction in which the donor loses electrons; the other is a reduction reaction in which the acceptor gains electrons.

Management of the cation and anion balance in our cells is very important, expecially in cases of known toxicity. When too much of any element is used and cations accumulate, cell toxicity may develop and ionic balance must be restored. Fulvic acids are beneficial in achieving and maintaining this cell balance.

RESTORING ELECTROCHEMICAL BALANCE TO CELLS

As life preservation trustees, our concern should be focused on the function and restoration of the chemical and electrical balance with the cells of living matter. In 1926, Dr. George Crile, in his book *A Bipolar Theory of Living Processes,* as well as a number of published and unpublished articles including "*The Phenomenon Life,"* expressed theories of that are generally accepted today. He related the concept of individual atoms to life itself.

Electrolytes in solution, especially in water or aqueous solution, conduct electrical current.

THE LIVING CELL IS AN ELECTRIC BATTERY

Each cell is a single, structural unit which also functions as a member of the living organism. Plants and animals are make up of diverse systems of separate cells capable of fulfilling multi-cell tasks. The plasma membrane in plants is surrounded by a cell wall for support but does not interfere with the functions of the plasma membrane. In plant cells, there are strands of cytoplasm that allow small molecules to travel between cells. In animal cells, the plasma membrane is joined by tight junctions referred to as desmonsomes. Although these connections are very close, they do have enough of a gap to allow small molecules to pass from one cell to another.

Crile pointed out that the nucleus of the cell is comparatively acidic, and the cytoplasm of the cell is comparatively alkaline. Within the cell, the nucleus and the cytoplasm are separated by semipermeable membrane.

In fact, the cell has been referred to as a bipolar mechanism, an electric battery if you will, with the nucleus acting as the positive element and cytoplasm functioning as the negative element. The rate of oxidation in the nucleus is greater than the rate of oxidation in the cytoplasm. Therefore, as the electric tension increases in the nucleus, the electricity passes through the nucleus membrane. At this point, the electrical potential falls and the current is interrupted. The potential is restored again by oxidation, reduction, and other chemical activity. An uninterrupted current continually passes through the battery from the positive post (nucleus) to the negative post (cytoplasm). Consequently, a charge is accumulated within the cellular battery (on the surface membranes). Keep in mind that a cell membrane is very, very thin and peculiarly adapted to the storage of energy and, yet, it also can adaptively discharge electrical energy.

CELLULAR RESEARCH

Crile developed two lines of evidence indicating that both the structure and the function of cells are dependent upon the maintenance of normal electrical potential. An omoeba and an autosynthetic cell were used for demonstration purposes. He believed there existed within cells, in their normal state, a sound potential for this electrical experiment. The amoeba had a normal potential of approximately 20 millivolts. Upon introduction of an equal but opposite charge (thereby depressing the normal voltage to zero), the researchers observed "astonishing" changes. These changes probably were comparable to the changes that occur in protoplasm or organs during the process of depression or death.

POTENTIAL DIFFERENCE

The first changes noted were functional. The amoeboid movement was arrested; then, the amoeba became spherical in form and all movement ceased. Following this, the researchers reported "a beautiful demonstration" of the amoeba's structural dependence on its internal electrical fields. When voltage was reduced to zero, the outer membrane of the amoeba ruptured at various places. Through these tears, granules could be seen floating out into the surrounding fluid, where they broke down. From this direct observation, it was concluded that the form and structure of a giant amoeba disintegrated.

When the granules began to float out, and before the tears in the membrane became excessive, the voltage increased by introducing electrical current. Then, an interesting phenomenon occurred. **The amoeba's form was reconstructed and it became active and healthy again. This demonstration of the power of an electrolyte was repeated many times. Confirming that reconstruction of form and resumption of function are dependent upon the restoration of the electrolyte.** It was reported that the auto synthetic cell reacted similarly, showing disintegration upon the loss of the electrical potential difference.

Three physiological constants were involved in this research:

- **The electric conductivity**
- **The electric capacity**
- **The electric potential of the cells**

The same is true for all living cells. These three constants are a measure of their power relative to:

- **Growth**
- **Function**
- **Resistance to infection in infestation**

AT THE DEATH OF ELECTRIC POTENTIAL, LIFE IS REDUCED TO ZERO AND THE BIOLOGICAL AND HISTOLOGICAL COMPONENTS OF PLANTS AND ANIMALS ARE RESOLVED BACK INTO SIMPLE ELEMENTS OF THE EARTH AND AIR.

DEATH, LIFE AND ELECTRIC POTENTIAL

If the cells of plants or animals disintegrate when the electrical potential is reduced to zero, then what is the effect on plant and animal cells if the electrical potential is reduced somewhat? Progressive weakness among humans and animals may; result from:

- Unchecked hemorrhage
- Overwhelming emotions or excessive stress
- Uncontrolled infections
- Prolonged loss of sleep
- Imbalanced diet
- Surgical shock

These examples are accompanied by a progressive decrease in electric conductivity, capacity, and potential, which is reduced to zero at death. Crile's research demonstrated convincingly that the physical well being of the organism, whether plant or animal, can be expressed in terms of electrical potential. Test results indicated that in the majority of organs and cell tissues, electrical stimulation is the equivalent of biological stimulation.

If electrical and chemical balance can be created by the application of electrolytes, then some of the answers for improving the quality of living things become evident. Fulvic acid is a powerful organic electrolyte that balances cellular life. When the individual cell is restored to its normal chemical balance, and thereby its electrical potential, life prevails where death and disintegration normally would have resulted - the fulvic phenomenon.

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SUMMARY

Fulvic acids contain electrolytes that are extremely beneficial to the electrical properties of all living things. They operate as a miniature battery charger, providing a constant trickle charge.

The addition of fulvic acid electrolyte, containing essential chemicals chelating minerals, and nutrients in bio-available form, serves as an outside electrical force. It charges and restores the potential that once was normal to the cell. Fulvic acid has proven to be a powerful organic electrolyte, serving to balance cell life. It is available at times as a donor and other times as an acceptor, based on the cell's requirement for balance. Because cells depend upon their own chemistry and available materials, additional fulvic acid electrolyte must be a water base, preferably containing all essential chemicals or minerals in a colloidal state, and available in a nontoxic form.

If we start with a cell sample, we understand that all living things are composed of small units of matter called atoms. The union of atoms forms molecules are organized into cells. Cells of the same sort form tissues, and various types of tissues make up this living sample. All living things are made up of chemical combinations, organized to provide an orderly structure and to perform specific functions necessary for life.

In general, multiple biochemical and geochemical processes develop as a result of physical and chemical modifications to the environment. The fulvic phenomenon is responsible for a surprising number of these modifications.

The purpose of this brochure is to foster an understanding of the multi-functional properties of fulvic acids and their effects. We now understand that fulvic acids contain electrolytes that are extremely beneficial to the electrical properties of all living things. They operate as a miniature battery charger, providing a constant trickle charge for each cell, helping it perform at its maximum potential. Along with the miracle of a dynamic electrolyte, fulvic acids create a natural balance for many life processes. Fulvic acids are participants in many oxidation-reduction, electron transfer, and catalytic reactions. An impressive number of field observations and substantial experimental evidence indicates the fulvic acid fraction of organic compounds influences the chemistry, physics, and biology of cell life. And, in fact, much of life on our planet is empowered by the fabulous fulvic phenomenon.

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