

## MICROORGANISMS PLUS BIO-STIMULANT FOR MASTER GARDENERS

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The most nutritionally-charged soils in the world are produced by microorganisms and earthworms.

Microorganisms live entirely on organic material.

Microorganisms produce their weight in humus everyday.

Microorganisms help normalize pH which increases uptake of soil nutrients by roots.

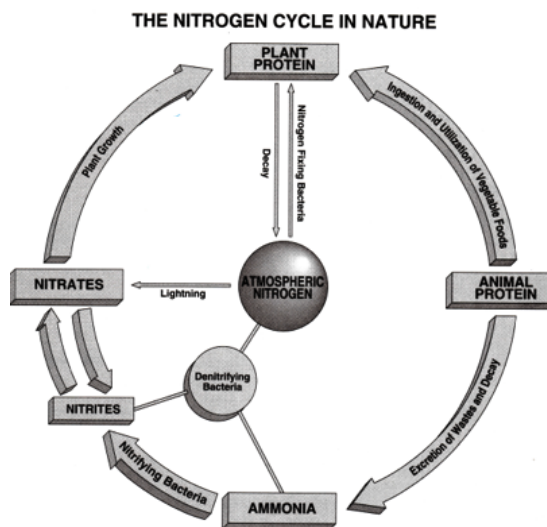
The majority of microorganisms (i.e., bacteria) retreat into a spore form. Picture this result as hibernation, or a type of suspended animation. When these microorganisms are confronted with hostile conditions (e.g., lack of adequate moisture or toxic conditions), the microorganism will retreat and become dormant. Dormant microbial life forms (various spores) were found in recent years in Egyptian pyramids. Many were not dead; they were just "asleep."

Can microbial life be awakened on cue? Is it possible to "bring them back," to rekindle their dynamic usefulness? What can be done this army's powerful effectiveness? Thereby indigenous microbial life would be sufficient, and the imported, questionable live microbial life would not be required.

The microorganisms in our environment act by initiating humification through biochemical transformation of complex carbonaceous substances. They are involved in a series of reactions caused by their enzymes' actions and reactions that decompose dead plant and animal tissues, thus disintegrating parts from complex polymers into simple segments. All biochemically produced organic compounds can be digested by microorganisms.

Consider for a moment what the diagram to the right would look like if you eliminated each step in the cycle that involves microorganisms in the soil or those related in any way to the soil. What would happen to spaceship earth's natural nitrogen cycle if anything caused our soil to become sterile of microorganisms?

Basically, all living tissue is made up of a collection of biomolecules that are unstable in use and production of heat (thermodynamics). When no longer engaged in the life process (including secretions, excretions, or the death of the organism), bio-molecules usually lose their original composition and are ultimately transformed into simple stable components. This breaking down of organic compounds involves physicochemical processes such as oxidation, photolysis, and thermolysis. However, the majority of these changes are initiated biologically.



THE NITROGEN CYCLE IN

With its own natural balancing ability nature can heal itself when left alone. Nature practices multiple methods of preventing deficiencies subject to the availability of natural microbial life. What threatens the existence of microorganisms? In many cases microbial life may be removed from the soil, or forced into a state of dormancy by various toxic chemicals which may include the over-application of herbicides, pesticides, or any other application of fertilizer salts in the form of chemical fertilizers.

Is it possible that bio-life could function as an "atom smasher," allowing microorganisms to exist as the power source to maintain balance? How else do we expect to achieve balance in nature if we are not willing to allow it to happen naturally? For example, would this natural balance make our crops less susceptible to harmful insects and parasites, thus affording more freedom from the required use of pesticides? Have we developed a collection of problems which are actually man-made consequences of biological imbalance?

Bio-Stimulant, a complete system of microorganism stimulation, serves as multifactorial inducer molecules to accelerate the rate of reproduction of microorganisms such as bacteria, fungi, algae, and actinomycetes, and thus greatly expands the process governing bio-degradation. A completely balanced bio-ecosystem of Bio-Stimulant provides a significantly good concentration of highly effective enzymes, coenzymes, exoenzymes, and multifactorial inducer molecules that improve digestion rates.

Bio-Stimulant contains a carefully developed system that keeps its water medium in a constant state of oxygen saturation. It is during aerobic respiration that organic carbon is converted to carbon dioxide, nitrogen to nitrates, sulfur to sulfates, and phosphorus to phosphates. It has been studied and proven that the use of soil microbes becomes increasingly important in revitalizing the soil rapidly, safely, and economically. For example, earthworm and microorganism castings and residuals contain increased amounts of plant nutrients. The United States Department of Agriculture experiments have shown that in some areas earthworms convert 700 pounds of soil per acre, per day, into earthworm castings. These castings are generally mixed with the upper few inches of the native soil causing a build-up of topsoil. Other experiments have shown that microorganisms and earthworms increase the relative rate of infiltration from zero inches per minute to 1.5 inches per minute in clay soil, and can increase the water stability of various types of soils by 3.5 to 27 percent. Chemical analysis of parent soil without microorganisms and earthworms, and of the same soil after it is worked by microorganisms and earthworms showed the following increases:

| <u>Nutrient</u>          | <u>Percent Increase</u> |
|--------------------------|-------------------------|
| • Nitrate increase       | 500%                    |
| • Available phosphorus   | 700%                    |
| • Exchangeable potassium | 1200%                   |
| • Exchangeable calcium   | 150%                    |
| • Organic carbon         | 200%                    |
| • Available magnesium    | 200%                    |

Microorganism activity in one acre of soil uses about the same amount of energy in soil preparation as 10,000 people would burn for the same work, for the same period of time. Microorganisms must be protected, nourished, and further stimulated when required.

Jackson, William R., PhD. (1993). Humic, Fulvic and Microbial Balance: Organic Soil Conditioning. Evergreen, CO: Jackson Research Center.

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