GROWTH PRODUCTS

OMRI Listed

USDA CERTIFIED BIOBASED PRODUCT

ESSENTIAL PLUS 1-0-1

OBSERVE NATURE AND BE INSPIRED - BIOMIMICRY

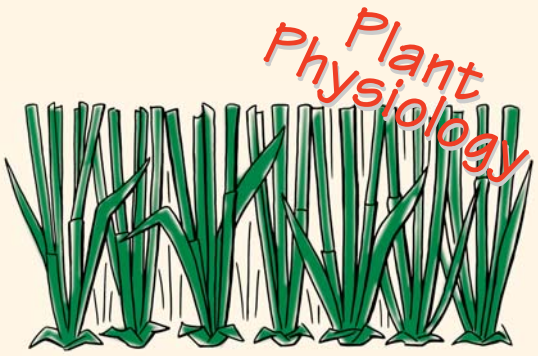
"Biomimicry: bio (life) and mimicry (to copy). To be inspired by what occurs in nature, and see what applications we can apply to plant health care."
— *Clare Reinbergen, President, Growth Products, Ltd.*

Nature has gone through a long process of trial and error to refine the living organisms, processes and materials on earth. Consequently, nature has long history of inspiring people to artistic and practical creativity. Just as Leonardo da Vinci was inspired to create his "Flying Machine" after studying birds, the researchers at Growth Products were inspired by studying natural processes to create products – including Essential – that mimic nature's most beneficial and healing processes.

TOGETHER, ESSENTIAL'S INGREDIENTS ARE STRONGER

Because one ingredient can boost the properties of another, Growth Products biochemists are constantly looking to create the highest performing combination of ingredients.

Essential is the best example of this science of dosage and mixing. It combines, in one formula, essential amino acids, sea kelp, humic acid, yucca extract, rooting hormones, fermented plant extracts, vitamins, enzymes, magnesium, calcium and more. Each ingredient is of the highest quality and was selected for its complementary and synergetic treatment benefits.



GROWTH PRODUCTS TURF LINE

Another quality product from: Growth Products, Ltd.
80 Lafayette Ave., White Plains, NY 10603 USA
Questions? Call (800) 648-7626
www.growthproducts.com • questions@growthproducts.com

ESSENTIAL® PLUS 1-0-1

COMPLETE FORMULA FOR OPTIMAL EFFICACY

Essential is the most complete soil amendment and biological stimulant in the turfgrass industry. It unites in one, easy-to-use liquid formula an array of ingredients that will:

- Hasten seed germination
- Improve rooting
- Feed beneficial soil microbes
- Improve plant physiology
- Reduce excess salinity in soils
- Improve a soil's nutrient holding capacity
- Reduce environmental stress

Compare Essential with other competitive products, and you'll see that their ingredient lists don't begin to compare to Essential's comprehensive list of synergistic products – all of which are 100% organic.

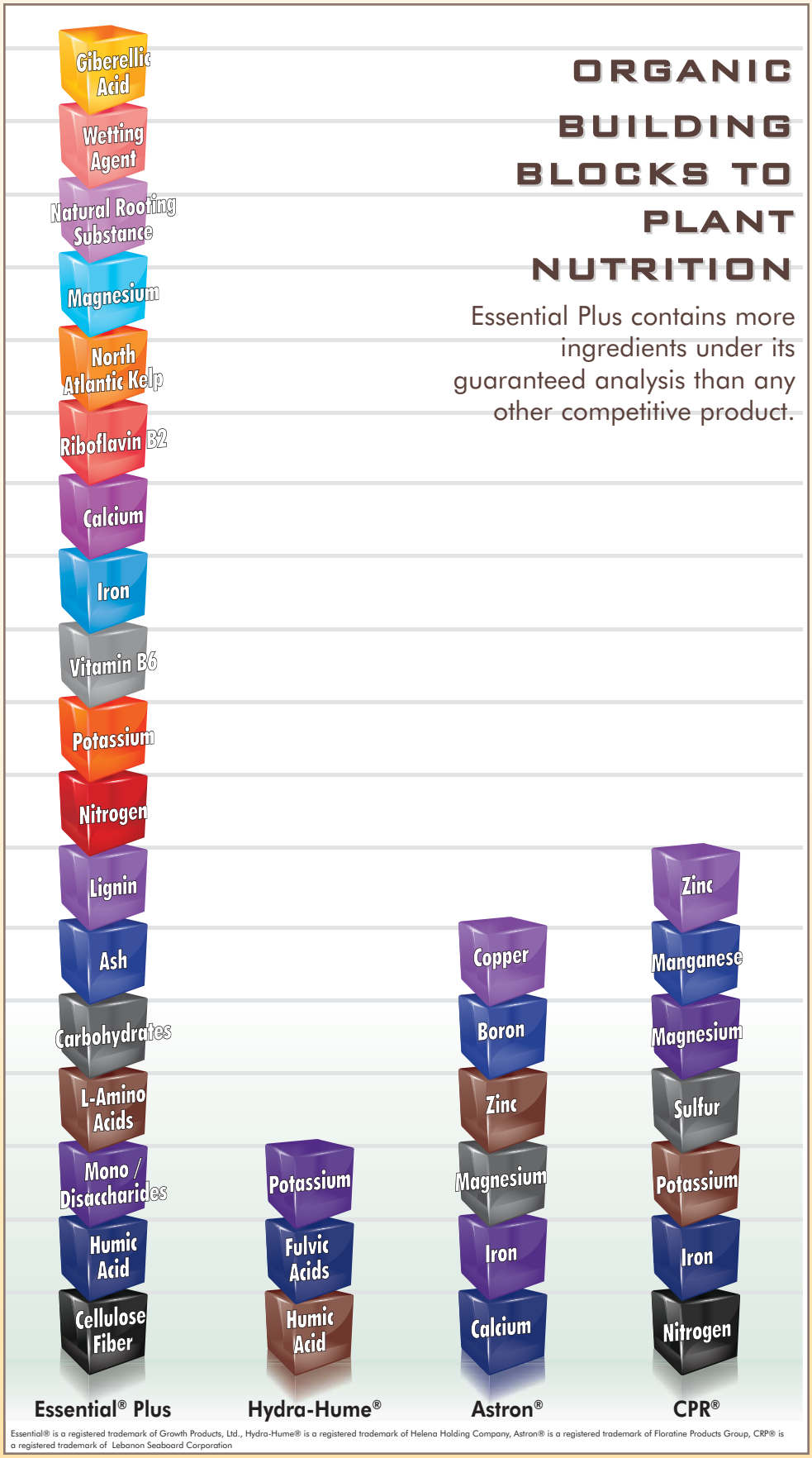
BIOBASED

- Essential is biobased for sustainable, environmentally friendly turf growth. Biobased is a term refers to organic materials that are carbon-bases and that are available on either a renewable or recurring basis.

- Essential contains 64% biobased solids – an exceptionally high percentage.

ORGANIC BUILDING BLOCKS TO PLANT NUTRITION

Essential Plus contains more ingredients under its guaranteed analysis than any other competitive product.



Together Essential's ingredients boost the properties of the others!

Guaranteed Analysis:

Total Nitrogen (N)	1%
1% Other Water Insoluble Nitrogen	
Soluble Potash (K_2O)	1%
Iron (Fe)	0.29%
Sulfur (S)	0.18%
Magnesium (Mg)	0.07%
Calcium (Ca)	0.10%
Zinc (Zn)	0.11%
Molybdenum	0.19%
Boron (B)	0.07%
Manganese (Mn)	0.05%

Derived From: Kelp (Ascophyllum nodosum), Fish Hydrolysate, Plant Extracts, Simple and Complex Sugars, Iron Glucoheptonate.

Also Contains Non-Plant Food Ingredients

7%	Humic Acid (derived from Leonardite)
10%	Cellulose Fiber
0.1%	Kelp Extract
2%	Carbohydrates
0.0025%	Natural Wetting Agent
1.2%	Lignin
3%	Mono / Disaccharide
2%	Ash Content
13.17 mg/ lb.	Riboflavin (B2)
0.314%	Vitamin (B6)
0.001%	Gibberellic Acid
0.01%	Natural Rooting Substance
4.45%	Total L-Amino Acid

0.77% L-Glutamic Acid	0.16% L-Phenylalanine
0.42% L-Proline	0.16% L-Isoleucine
0.40% L-Leucine	0.15% L-Tyrosine
0.37% L-Aspartic Acid	0.13% L-Histidine
0.32% L-Alanine	0.11% L-Cystine
0.28% L-Arginine	0.10% L-Methionine
0.25% Glycine	Trace% L-Carnosine
0.23% L-Valine	Trace% L-Citrulline
0.21% L-Lysine	Trace% L-Beta-Alanine
0.21% L-Serine	Trace% L-Taurine
0.18% L-Threonine	

ESSENTIAL GOES PLACES STANDARD N-P-K FERTILIZERS CANNOT

Essential is a 100% natural organic liquid solution that provides key ingredients not available in standard N-P-K fertilizers. Essential contains more than 43 nutrients and soil supplements that are formulated to feed plants, supply a food source for beneficial microbes, and refine the condition of the soil.

Over the past few decades, customers have used **Essential Plus** in a broad variety of applications, on hundreds of different plant materials, and in some very unusual situations -- **all with astonishing results**. From turf grass to hydroponics, and from the transplanting of large redwoods to the reclamation of natural sea grass, Essential has proven its effectiveness with **success after success.**

A THREE FOLD APPROACH, A SURPRISING EXAMPLE OF BIOMIMICRY

No. 1: Rejuvenates the Soil.

All-organic Essential contains a high concentration of active humates, plant extracts, cellulose fiber, kelp extracts, natural plant biostimulants, and yucca extracts, each of which are important requirements for maintaining soil health. Intensely carbon-rich, Essential revitalizes soil structure and texture by replenishing a soil's organic matter. This reduces compaction from heavy traffic, improves water absorption, and increases the ability of the soil to retain other consequential nutrients in an available form.

No. 2: Boosts and Invigorates Plant Physiology.

Turf, trees, and flowers need more than just the macronutrients found in synthetic N-P-K fertilizers to stay in superior health. Essential's vast array of highest quality all-natural ingredients provides important micronutrients and much, much more. Essential's ingredients are absorbed and utilized by the plant to augment healthy plant growth, vitality, and resistance to environmental stress.

No. 3: Food And Energy Source for Microbes.

Beneficial soil microorganisms need organic matter as a food source to survive and increase in population. Essential's high carbon content slowly decomposes, restores, and refines organic matter back into soil. This soil replenishment is especially valuable in over-worked urban settings, such as golf courses. A good population of beneficial microorganisms can diminish disease and decrease the need for chemical sprays.

SATISFIED ESSENTIAL CUSTOMERS

"I have been using Essential Plus for about 5 years. It has worked well in my program and it gives my greens and tees a great color and vigor when the weather is not on my side. Thanks to Essential Plus I can provide championship conditions for my club."

Brian Golaski
Noyac Golf Club
Sag Harbor, NY

Dreyfus Estate, Mt. Kisco, NY

"Tree spade companies up and down the Pacific coast choose Essential as a critical part of their transplant process. With extra-large 90"-106" inch tree spades, these companies do some serious transplanting. A few days before spading a tree they drench the root area with Essential. After the tree is moved and planted they follow up with a second drench. Why? Essential reduces transplant shock, stimulates quicker rooting, and improves survivability. Essential is critical to the companies' success, since many requests for transplanting come at the worst time of the year – during the summer when trees have already leafed out. If a company is providing a customer with a guarantee on the tree survival or a free replacement, the company is almost sure to use Essential."

Keith Giertych
Growth Products West Coast Sales and Nutrition Specialist

Waikato Stadium, Hamilton, New Zealand

"I have been using Essential for approximately 6 years in the Fort Collins, Colorado, parks system. I use it mostly as part of my sports field fertilization program and to provide a healthy growing medium for newly seeded areas. I apply Essential at a rate of 3 – 4 oz/1,000 sq. ft, and make seven applications per season – once a month from April to October. One of the successes is a noticeable improvement in the thickness and the overall verdure of the turf. Another success story comes from the results I witnessed when Essential was applied to a newly seeded plot. The germination rate was ahead of schedule and treating the plot every three weeks for 9 weeks produced an incredible stand of bluegrass. I believe that feeding soil microorganisms is the key to healthy turf, and the fact that Essential is a 100% natural organic soil amendment is very appealing. I would recommend the use of Essential for a healthier and thicker turf."

Roger Daigle
Sports Turf Crew Chief
City of Fort Collins, Colorado

Kau Sai Chau, Public Golf Course , Hong Kong, China

"We spray Essential once a month to provide all the 'other' things needed for soil and plant health. In an effort to be as thorough as possible with our greens program, we started using it because it provides both amino and humic acids as well as microbial stimulants. It continues to be a part of our program because our overall greens health has never been better. It also doesn't hurt that we can truthfully say that we use many 100% organic products!"

John C. Crall
Wolfdancer Golf Club
Lost Pines, TX

Laurel Links Country Club, Long Island, NY

"The golf superintendents who use Essential Plus in my area are extremely pleased with the amount, length and the overall health of the vast white roots system that Essential helps produce. The superintendents also like Essential for the for stress relief it provides all types of turf. One superintendent says his bentgrass greens almost 'sigh in relief' every time Essential is applied, an if the grass could talk it would say 'thank you.'"

Frank Lopes
Turfnology
Watkinsville, GA

Academy of Sciences, San Franciso, CA

We have been using Growth Products' Essential, along with Companion, pH Reducer, and "TKO" Phosphite for the last 3 years with fantastic results. I would recommend these products to anyone.

Todd Fleishans, PHC Manager
Camelot Tree and Shrub Co
Grosse Pointe, MI

Essential is the one product I've counted on to put back into urban soils what is commonly found in forest soils. This natural organic soil amendment increases the health, vigor and vitality of trees and plants thereby strengthening them to ward off insects and diseases, decreasing the amount of pesticides needed to maintain healthy landscapes. In the high pH soils I work with, Essential helps buffer the soil, releasing Iron and other elements tied up in the soil. Providing a healthier tomorrow by working together with nature to create sustainable landscapes and to save our trees is my goal. In my pursuit, I've been using Essential for over 15 years in all of my tree health programs and I don't know of another product that does as much to create natural health in soils, trees and landscapes!

Tom Wiens, Owner
Modern Arboriculture
Bayard, NE

Singapore Turf Club,

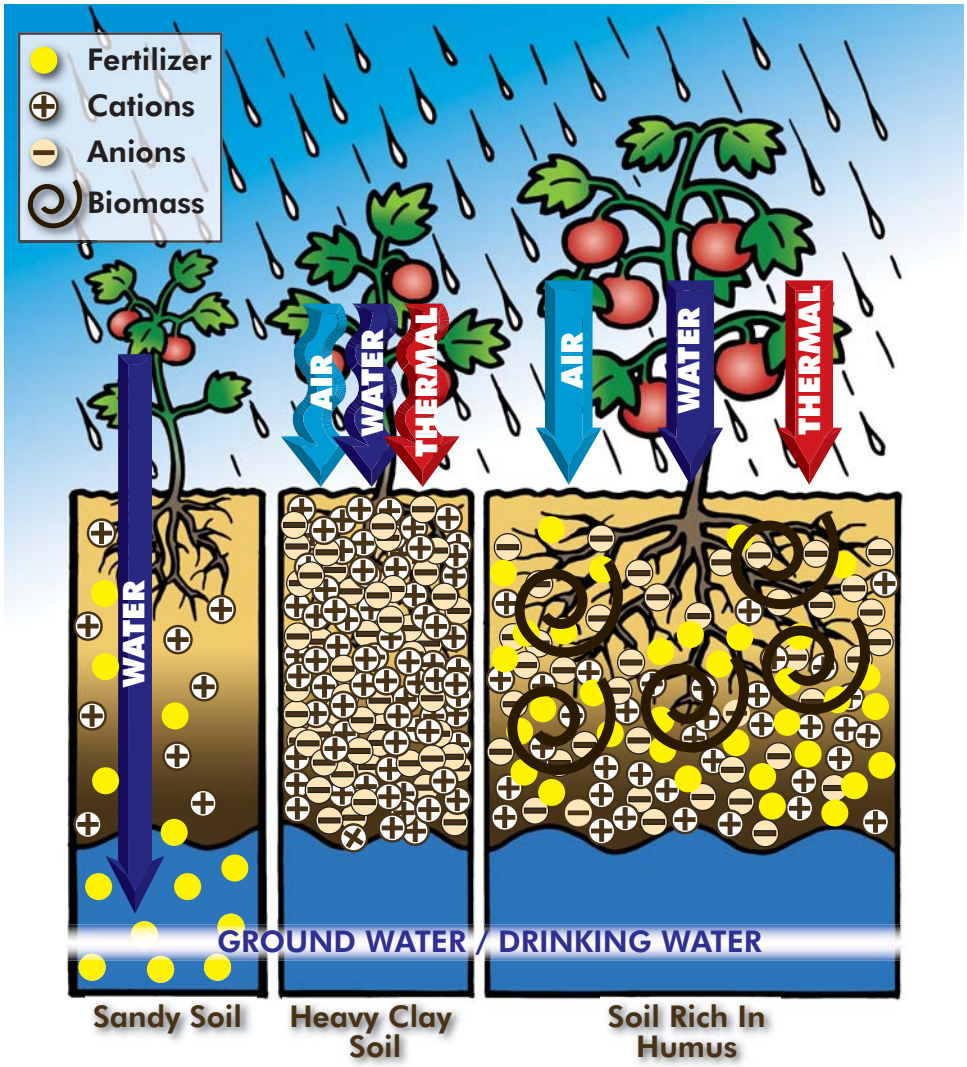


Fig. 1: Comparative effects of different soil types to ground water, fertilizers, and soil biomass.

HUMIC ACID'S EFFECT IN SOILS

Light Sandy Soils

In soils low in humus, Essential Plus coats the sand particles, increases the cation exchange capacity (CEC), and increases the ability of the soil to retain nutrients and water. Nutrients, in particular nitrogen, would normally be washed away in sandy soils. But by adding humic acid, Essential prevents nutrients from leaching into the groundwater and instead keeps nutrients in the soil where they are readily available to plants.

Compacted Clay Soils

Essential Plus aerates compacted soils and improves soil structure. With Essential, soil can be more easily penetrated by water, nutrients, oxygen and roots.

Soils Rich in Humus

Adding Essential to your turf program creates a healthy soil structure with the proper flow of air and water, an improved cation exchange capacity, and a healthy soil biodiversity that allows good microorganisms to flourish. Nutrients are retained in the soil and remain available for plant uptake.

Soil pH

Adding Essential buffers difficult soils to create a more neutral pH range, thus releasing nutrients in a soluble form for plant uptake.

ROOT GROWTH IN TRANSPLANTS

A series of rooting stimulation studies (fig. 2) were conducted and root growth was recorded as the number of cm of new growth since the last measurement. Measurements were taken weekly over 10 weeks. The treatments were applied 2 weeks after transplanting and again 6 weeks later. Essential demonstrated improved rooting on the transplants, as well as ODRM (Oven Dried Root Mass).

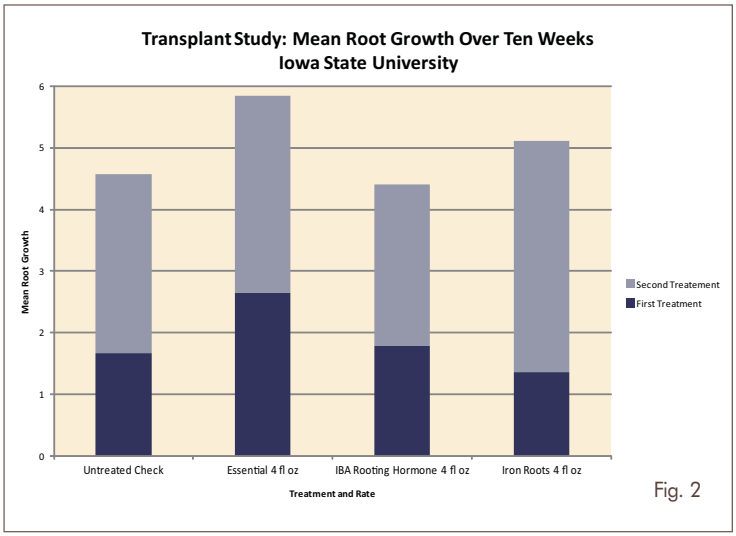


Fig. 2

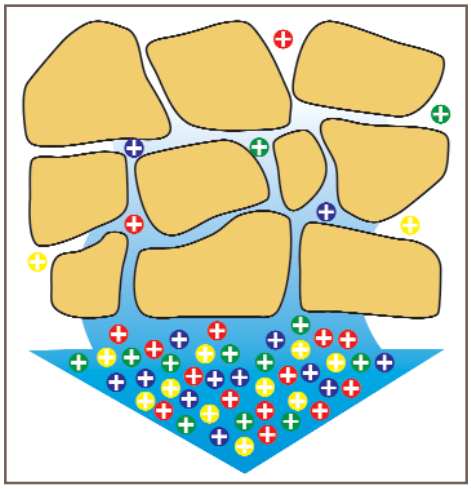


Fig. 3: Sandy soils poor in humus can't retain nutrients.

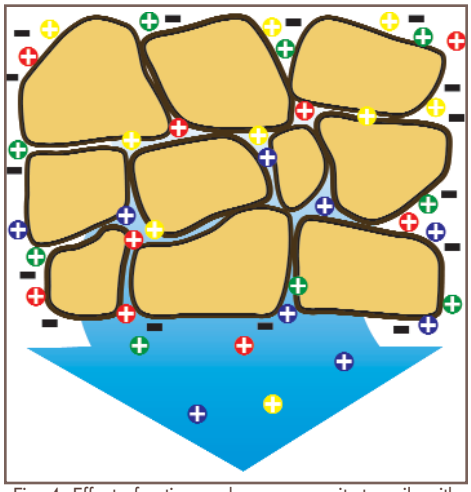


Fig. 4: Effect of cation exchange capacity to soils with the addition of humic acid.

Soil conditions on sand-built tees and greens (fig. 3) are often difficult. Such soils typically lack the cation exchange capacity to retain nutrients, and the majority of nutrients leach into the groundwater. By adding Essential to a standard fertility program, the cation exchange capacity in the soils is improved (fig. 4) and the efficiency of the NPK fertilizers can be increased as much as 30%. That's good for the environment and provides savings for the budget.

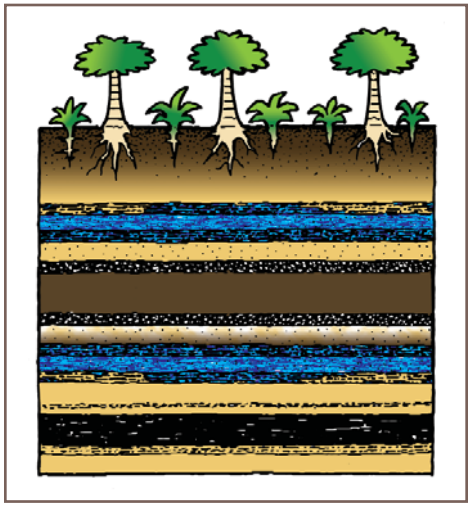


Fig. 5: Scheme of the Carbonization Process. (Moor -> Peat -> Leonardite -> Lignite)

Humic substances are formed by the microbial degradation of dead plant matter (fig. 5). Humus can be found in many soils and in a wide variety of concentrations, but the most concentrated source is from Leonardite, a rich layer of soft brown coal. Humic acid is extracted from Leonardite by means of an alkaline solution. This complex dark colored polymer is highly reactive in the soil — more than any other naturally occurring organic polymer — and it provides soils with an incredible boost. Soils rich in humus are healthy and promote superb root and plant growth.