



APEX-10

A Peat Humic Substance



- Also Available in
- 55 Gallon Drum
 - 5 Gallon Pail
 - 2.5 Gallon Bottle

Overview



- APEX-10 is a Peat Humic Substance made from highly humified North American Peat.
- The Peat Humic Substance in APEX-10 is derived from a patent low pH extraction process that increases the products organic compounds, biological activity and produces a 100% soluble humic acid.
- The low pH extraction process and the natural evolution of selected peat found in APEX-10 provides the elements for a complete organic uniformed product.

Chemical Analysis



- Peat Humic Substance 10% @ 4.6 pH
- Humic Acid Level 14.42%
- Other Humic Substances (Polyhydroxy, and Carboxylic Acid) 5.5%
- 100% Soluble Humic Acid
- 88.7% Volatile Organic Matter
- 49.3% Soluble Carbon
- 0.91% Nitrogen
- Carbon to Nitrogen Ratio of 54:1

Testing, Certification & Registration



- Virginia Tech University
- Rutgers University
- Manhattan College
- Organic Materials Review Institute
- The Soil Foodweb
- New Jersey Institute of Technology
- The Academy of Agriculture of Armenia
- Registered for Organic Crop Production to USDA National Organic Program Rules

Peat Humic Substance (I)



- The Formation of Peat Humic Substances is by the complex humification of organic matter.
- Humification of peat causes complex organic compounds to break down into simpler forms.
- The mineralisation of peat converts the organic material into to a stable peat humic substance.
- All of this increases the peat density to a more compact humus with a greater mineral level, cation exchange capacity & calorific value.

Peat Humic Substance (II)



- The organic matter and transformation process is influenced by the properties within the peat.
- In low nutrient areas different microorganisms exist when compared to those in a very high nutrient area.
- In low nutrient areas humification is reduced and less organic matter will be degraded.
- In high nutrient areas rapid humification takes place creating a higher level of organic matter.

Peat Humic Substance (III)



- The humification of organic humus into peat humic substances provides nutrients to plants, stimulates microbial biomass and biomass activity in soil.
- This continued alteration of peat over millions of years is a precursor to coalification or the formation of coal creating lignite and leonardite.

Coalification (I)



- During coalification geological and chemical processes involving high pressures and temperatures, working over 70 million years compress and alter the peat, increasing the percentage of carbon present.
- Gaseous alterations expel moisture, oxygen, hydrogen and volatile organic matter from the peat and replaced by carbon as the other elements disperse thus forming the low rank coal of lignite and leonardite.

Coalification (II)



- Lignite, is classified as a soft brown coal, which is the first product of coalification and has been classified as a lowest rank of coal.
- Leonardite is a lower-grade, lower-rank coal formed above lignite deposits and undergone oxidation as a result of surface exposure.
- The Wilcox Group survey for the Louisiana Geological Survey found lignite to contain: 0.81% sulfur, 10.72 % ash, 27.08 % volatile organic matter, and 27.09% of fixed carbon.

APEX-10 compared to Leonardite



- Although the Industry claims lignite & leonardite contain greater Organics and Humic acid than Peat. Results from studies conducted at Virginia Tech and The New Jersey Institute of Technology are as follows.

Measured Difference of APEX-10 to Humic Acid of Leonardite			
• Less Solids by Volume	809 %	• Increase Total Nitrogen	17 %
• Lower Inorganic Content	172 %	• Increase in C/N Ratio	37 %
• Increase Volatile Organics	205 %	• Solubility of Humic Acid	25 %
• Increase in Soluble Carbon	41 %	• Reduction in pH	106 %

Peat and Leonardite



Humified Peat



Leonardite Coal



APEX-10 & Soil Microbes (I)



- APEX-10 increases soil biomass and biomass activity, which influences the availability of nutrients for plant growth by decomposing organic matter and releasing plant nutrients.
- These increases allow bacteria and fungi to retain large amounts of nutrients preventing them from leaching through the soil.
- This activity allow beneficial bacteria and fungi to out compete disease causing bacteria and fungi for food.
- Beneficial bacteria & fungi surround the root system producing certain chemicals that inhibit the growth of pathogenic species.

APEX-10 & Soil Microbes (II)



- APEX-10 aids in a plants mineral requirement by bacteria and fungi activity as they release enzymes & acids breaking down minerals as they become solubilized by mineralisation.
- In soil where nitrifying bacteria are able to grow APEX-10 aids these bacteria by increasing their biomass and activity, allowing them to remove ammonium and produce nitrate while aiding in their control of oxygen in the soil

Microbial Increases in Soil From APEX-10



- Bacterial Biomass Increase 39%
- Bacteria Activity Increase 67%
- Fungal Biomass Increase 35%
- Fungal Activity Increase 77%
- Flagellates 504% / Amoeba 3,091%
- Ciliates 650% / Beneficial Nematodes 15%
- Nitrogen Retention in soil by Microorganisms 667%

APEX-10 & Biostimulation



- Biostimulants are organic materials applied in small quantities, that enhance plant growth and development in a way that the response is not accredited to traditional plant nutrients.
- APEX-10 has been documented to condition plants to withstand environmental stress, increase plant & root growth, photosynthesis, chlorophyll and plant antioxidants in optimum growing conditions,

APEX-10 & Environmental Stress



- During times of environmental stress a plants photosynthesis process becomes interrupted and oxygen molecules that normally accept electrons to produce water, now produce toxic oxygen molecules referred to as Free Radicals, that destroy pant cells, chloroplast and slow down photosynthesis.
- APEX-10 aids in reversing this damaging process by assisting the plant to create higher levels of antioxidants, which attack Free Radicals and restore photosynthesis

APEX-10 With Zeolite & Dacite



- Slightly alkaline (pH 7.4) sandy loam clay soil poor in nitrogen with high cation exchange and adsorption capacity Aluminosilicates of Zeolite and Dacite were mixed with APEX-10.
- APEX-10 when applied with Zeolite & Dacite, will increase plant yields and plant growth

	Wheat	Tomato	Pepper	Corn
Zeolite	49.31%	49.38%	46.12%	127.9%
Dacite	64.81%	61.46%	51.28%	209.50%

APEX-10 Bent Grass & Drought



- APEX-10 was tested at Virginia Tech on Bentgrass grown with optimum fertility & irrigation conditions and with turf exposed to drought conditions.
- Results confirmed greater plant antioxidant activity which increased photochemical efficiency allowing for sustained root growth in turf when exposed to drought.

	Optimum Growing Conditions	Drought Stressed Conditions
Photosynthesis	11.32 %	51.22 %
Quality	4.28 %	36.00 %
Root Weight	9.30 %	69.63 %
Leaf Tissue Nitrogen	3.95 %	Antioxidant Production 27.26 %

Sod Establishment with APEX-10 Compared to Leonardite & Fertilizer



- Kentucky Bluegrass Sod a common Turfgrass used on athletic fields was treated with APEX-10 in two separate studies, and in each of the studies both Root Growth and Root Strength were measured.
- Results demonstrate the effects APEX-10 had on Sod establishment Compared to Fertilizer & Leonardite.

Data listed below indicates increase APEX-10 had over Fertilizer & Leonardite

	4/26 to 7/27		8/27 to 11/23	
	Fertilizer	Leonardite	Fertilizer	Leonardite
Root Mass	74 %	23 %	64 %	42 %
Root Strength	27 %	7 %	14 %	13 %

Conclusion



- Research on APEX-10 has clearly demonstrated when used in conjunction with a well balanced fertility program is beneficial to plant growth.
- APEX-10 increases soil microbes ability to metabolize organic matter, enhances the plants ability to mineralize nutrients and increases a plants ability to defend itself against stress.
- APEX-10 provides turf managers and growers with an additional tool to ensure quality turf and plants for all growing conditions.