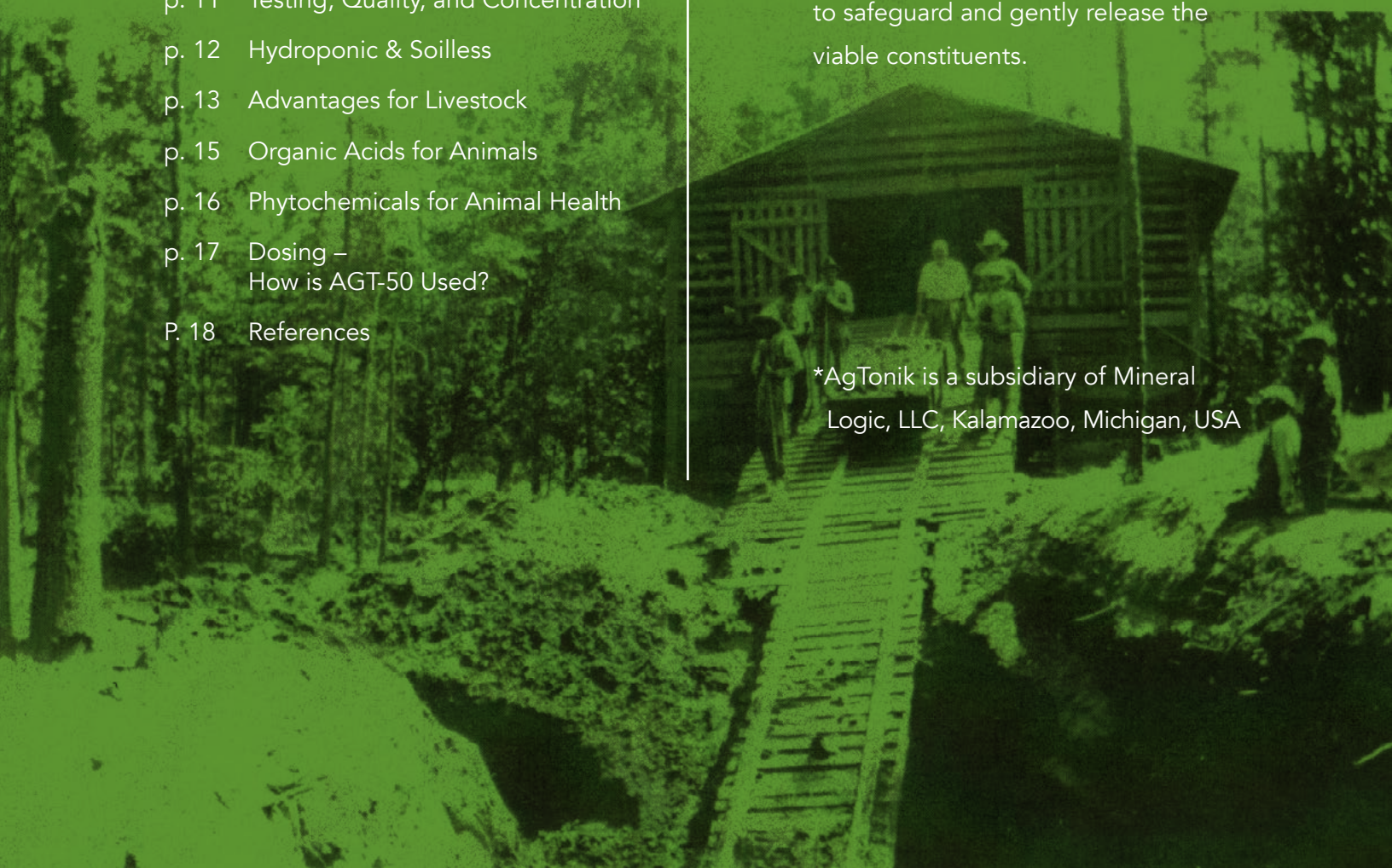
AGT 50

AgTonik

CONTENTS:

AGT-50™ is sourced in the United States from a humate deposit owned directly by AgTonik*. Roughly 34 million-years-old, the deposit contains a base layer of marine life particulates covered by a layer of freshwater and terrestrial life material preserved from degradation for millennia by a layer of iron ore.

Commercial mineral mining began in the early 1900s at this location, using groundwater and wooden barrels for extraction. Today AgTonik uses chemical-free extraction techniques to safeguard and gently release the viable constituents.



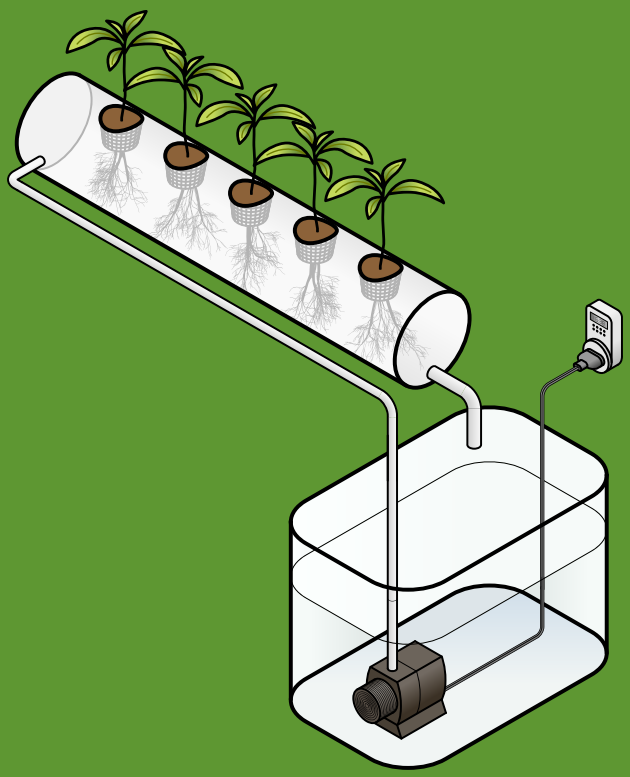
*AgTonik is a subsidiary of Mineral Logic, LLC, Kalamazoo, Michigan, USA

WHAT IS AGT-50™?

AGT-50™ is a liquid-concentrate, trace mineral and organic acid complex harvested and manufactured in the USA from a prehistoric deposit. It is used as a soil amendment, soilless nutrient activator, and animal feed supplement.

AGT-50™ Bio-effective Nutrient Profile

Humates	Minerals, Elements, Acids	pH	Phytochemicals
4.50 % Fulvic Acid 0.15 % Humic Acid	70 Trace Minerals and Elements Macro Minerals 13 Carboxylic Acids 18 Amino Acids 22 Terpenoids/Flavonoids 38 Antioxidants	pH 2.9	Natural Sterols, Hormones, Fatty Acids, Polyphenols, Ketones: Flavonoids, flavones, flavins, vanillin-catechins, tannins, quinones, isoflavones, tocopherols[1].



1. Including all other related molecules existing in various structures.

WHAT SETS AGT-50 APART?

Four features set AGT-50™ apart from other fulvic plant amendments and livestock feed additives.

#1 NATURAL SOURCE + NATURAL EXTRACTION = ORGANIC COMPLIANCE

At our deposit, the humate is excavated using low-impact equipment such as a small backhoe. Once excavated, the raw material goes through a lengthy preparation process. The material is then extracted with purified water only. By eliminating harsh chemicals in the manufacturing process, the final product – while not USDA certified organic since it is a mineral and isn't cultivated like crops or raised like livestock - complies with organic standards.

Most fulvic acid products are extracted from leonardite or lignite coal, making them the by-product of fossil fuels. These products rely on fossil fuel reserves and require the use of chemical hydroxides to lift the fulvic fractions and minerals from the source material.

#2 HIGH FULVIC ACID CONTENT

AGT-50™ contains the highest fulvic acid content in a liquid product of 4.5%, as validated by the standardized Lamar AOAC Vol.97 test method*.

Most light yellow or black fulvic acid mineral varieties contain less than 1% fulvic acid. Extractions from black coals are predominately humic acid and rarely contain more than 1% fulvic acid; typically extracted by a chemical hydroxide.

By contrast AGT-50™ is low in humic acid; it is an ideal product to combine with fertilizer or feed as an enhancement across different plant and animal applications and nutrient schedules.

The short-chain molecule of fulvic acid will not clog equipment.

OMRI LISTED For Organic Use

AGT-50™ is listed in the USA with Organic Materials Review Institute (OMRI) as an approved product for use in certified organic production, processing, and handling in accordance with the USDA National Organic Program Standards.

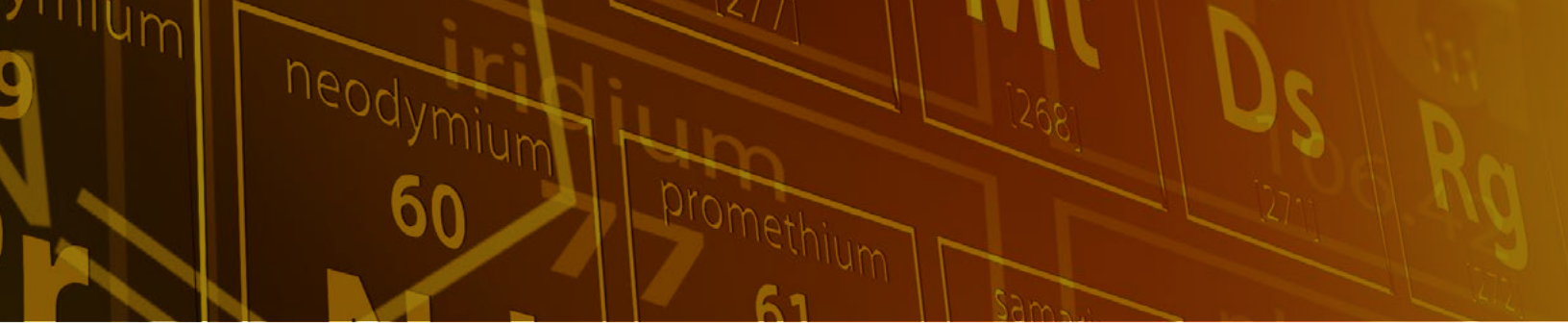
AOAC INTERNATIONAL

The Association of Official Agricultural Chemists

FiBL

AGT-50™ is listed with the Research Institute of Organic Agriculture for the European Union (FIBL) as an approved product for use in certified organic production across Europe.

**Many fulvic companies utilize older analytical methods. Dr. Lamar, and a group of scientists, made it possible through technological advances to separate fulvic acids from humic acids and other properties in order to quantify them accurately.*



#3 NUTRIENT DENSITY

AGT-50™ contains a complex array of total dissolved solids that far surpass the number of components in other fulvic acid products. (See p.2)

AGT-50™ is not diluted with water, which allows the farmer to adjust accordingly for crop varieties or animal weight.

A Discovery in 2019

In 2019, twenty-two organic origin flavones, such as: Huperzine-A, Genistein, Naringin, and Resveratrol were identified by a third-party lab using Mass-Spec instrumentation.

This unprecedented identification of flavones further confirms the organic origin of our material and AgTonik's clean propriety process that transfers the constituents from our deposit into our final product.

Phytochemicals contribute to both plant and animal defense mechanisms including an enhanced immune response and metabolic stimulation.

#4 CONCENTRATED – 4x More Value

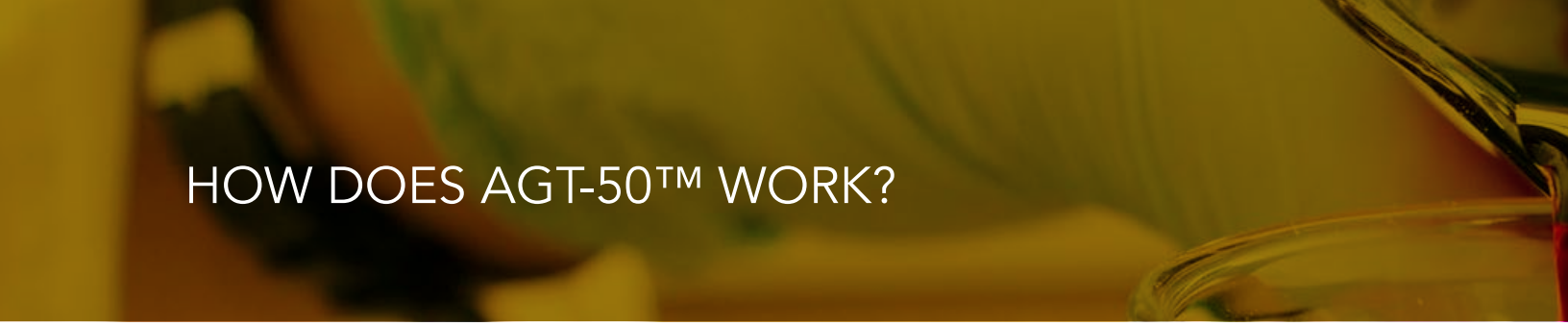
AGT-50™'s cost per elemental serving is significantly less expensive than any other fulvic acid product on the market.

Competing products contain approximately 1% elemental FA* compared to a fulvic acid content of 4.5% in AGT-50™ and they are lower in overall nutrient density. (See the comparison on page 12)

AGT-50™ is 30x more concentrated than a popular US brand! Obviously this means your money is spent on product, and less on packaging, shipping, and fuel cost.

Buying a concentrated product has a lower carbon footprint, which is good for the planet.

MORE PRODUCT (CONCENTRATED)
LESS PLASTIC BOTTLES
LESS SHIPPING COSTS
NO CHEMICALS
ORGANIC COMPLIANT
BROAD USE
CRITICAL MICRONUTRIENTS
COMPATIBLE WITH COMMERCIAL FEEDS



HOW DOES AGT-50™ WORK?

There are six key actions for plants and animals:

1. Molecular Size

In nature, the microbial breakdown of organic matter in soils creates a spectrum of humic substances. The most abundant is humic acid. As humic acid matures, a subset of smaller molecules develops known as the fulvic fraction of humic acid. AGT-50™ is unique in that it has minimal humic acid and an abundance of fulvic acid.

The small mineral salts of fulvic acid are readily absorbed into root hairs by cation exchange, diffusion, and active transport.

Fulvic acids form colloidal aggregates in solution that are held together by weak intermolecular forces. These aggregates are continually rearranging and reconfiguring in solution, creating smaller molecular weight structures that can react quickly to the needs of the plant or animal biology. Colloids can passively diffuse through cellular membranes delivering the chelated minerals with them where they are needed most.

FULVIC ACID INCREASES THE EFFECT OF FEED FORMULAS FOR BOTH PLANTS AND ANIMALS AND REMAINS ACTIVE IN A WIDE PH RANGE.

2. Trace Elements

Trace element nutrition is becoming more important in agriculture as continuous cropping is depleting soils of these nutrients. Adding trace elements into a feed program reduces the phenomenon known as "hidden hunger" in plants – the area on a yield curve where deficiency symptoms are not yet visible but yield reductions are already occurring. (See diagram page 6.)

There is a similar occurrence in animals where micronutrients support so many biological processes that, when missing in the diet, an animal's health may be compromised before symptoms are evident.

3. Chelated Minerals

Some Fulvic molecules chelate (trap) minerals creating fulvates that transport and release minerals within the cell.

Fulvic molecules also exist in a free-form state, or an acid that has no mineral attached. Free-form fulvic is ideal as a nutrient activator because it optimizes the nutrients in an existing feed program.

There are also many forms of minerals in AGT-50™. For example, the iron in AGT-50™ includes iron oxide, iron sulfate, iron amino acid chelates, iron fulvate, and more. This means AGT-50™ cannot be synthesized, copied, or reverse engineered.

4. Organic Acids

Organic acids perform specialized functions that support biologic survival. They promote the delivery of minerals and elements, stimulate root development, hasten growth for efficient nutrient uptake and processes, reduce stress response from drought and temperature changes, and promote stronger stalks, stems and larger fruit.

Organic acids aid in the solubilization of mineral elements bound in the soil making them available through chelation. The presence of carboxylate and phenolate groups gives fulvic acids the ability to form chelate mineral complexes with cations such as Mg^{2+}, Ca^{2+}, Fe^{2+}, and Fe^{3+} which can then be absorbed by plant roots.

In animals, they enhance feed conversion for weight gain, lower infant mortality, boost stronger immune response and fertility.

5. Phytochemicals

Phytochemicals have critical functions in both plants and animals, playing important roles in growth and defense against pathogens.

They are needed for plants to create vitamins, enzymes, proteins, and biosynthesize additional phytochemicals.

Many phytochemicals function as activators of enzymatic reactions, gene expression and mitochondrial genesis for both plants and animals. They are powerful antioxidants that neutralize oxidative stress.

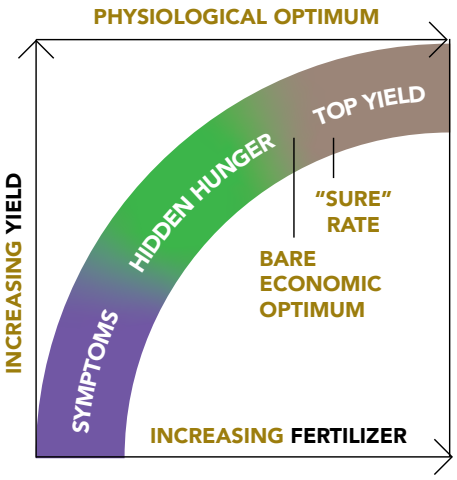
6. pH – CEC – Electrolytes – Polyelectrolytes

The pH of AGT-50™ is within a range of 2.9—3.8 that resists growth of microbes, fungus, and bacteria. Unlike humic acid, fulvic acid is viable throughout a broad pH spectrum making it compatible with all nutrient formulas, soil conditions, and feedstock.

CEC (Cation Exchange Capacity) facilitates the absorption of mineral salts into plants via root hairs. The ionic charge of fulvic acid also produces electrolytes and polyelectrolytes that assist in permeating cell walls, osmoregulation, and mitochondria genesis.

Fulvic acid in its purified form has a CEC of 1400 mEq, much higher than humic acid. When in the presence of other acids, minerals, and polyphenols such as in AGT-50™, that number will be lower, as expected.

HIDDEN HUNGER IN PLANTS



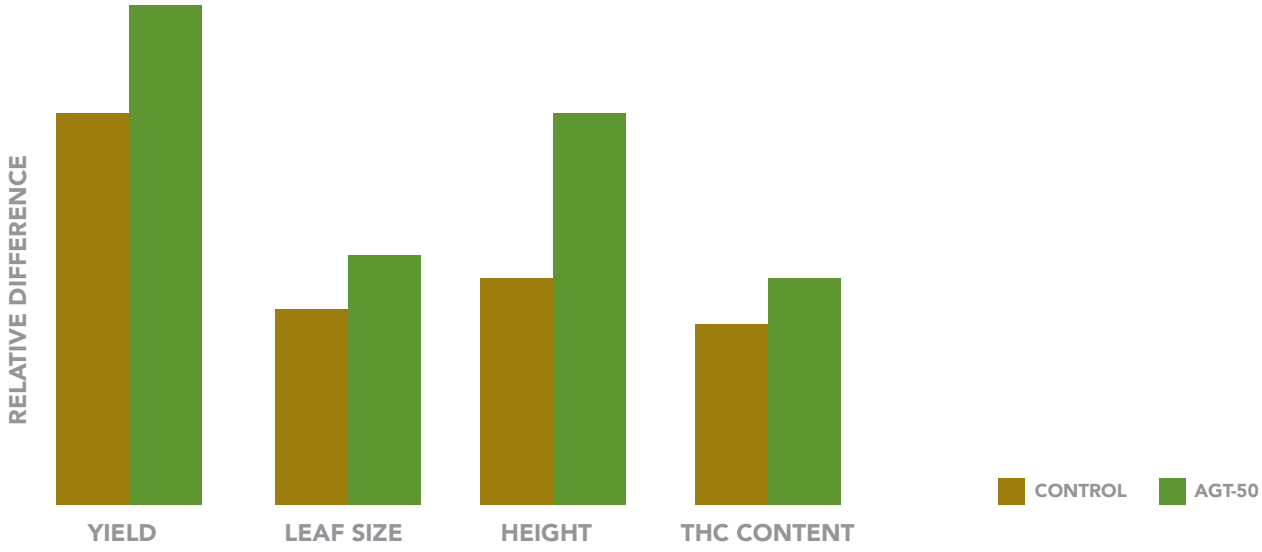
ADVANTAGES FOR PLANTS

AGT-50™ stimulates and improves plant metabolism affecting nutrient absorption, water uptake, and stress responses.

In tight commercial operations like golf courses and specialty crops, where profit margins are narrow or susceptible to other industry factors, users can utilize this clean, affordable product to balance the cost of operations with exceptional results.

The constituents of AGT-50™ have decades of science proving their positive effect on plant health and vigor, boosting not only yield but overall quality and potency. In cannabis studies performed by AgTonik, treated plants showed 20% improved yield and consumed approximately 32%[1] more water than untreated plants.

EFFECT OF AGT-50™ ON HYDROPONICALLY GROWN CANNABIS



2016 Study: Effects of AgTonik's AGT-50 Organic Acid Trace Mineral Complex on Hydroponically Grown Cannabis. Ostertag, R. AgTonik[1]

BENEFITS OF PHYTOCHEMICALS FOR PLANTS

Phytosterols
Phytosterols regulate membrane fluidity, permeability, and modulate the activity of membrane-bound enzymes. Linked to plant adaptation to temperature variabilities and immunity against pathogens.

Hormones
Hormones regulate cellular processes and differentiation, regulating the formation of the roots, stems, leaves, and flowers, and the ripening of mature fruit.

Fatty Acids
Fatty acids provide structural integrity and energy for metabolic process and function as signal transduction mediators.

Polyphenols
Polyphenols defend against ultraviolet radiation, and aggression by pathogens. They contribute to oxidative stability, improve taste, color, flavor, odor of the plant and its resulting yield.

Ketones
Keytones protect plants from abiotic and biotic stresses, provide antioxidant capabilities, and contribute to the synthesis of aromatic and physiologically important compounds.

Flavones
Flavones are antioxidants that provide oxidative protection in plants.

BENEFITS OF ORGANIC ACIDS FOR PLANTS

FULVIC

Enhances nutrient uptake, cell division and elongation, improves seed germination, assists in respiration and protein metabolism.

CAFFEIC

Increases the N fixation rate, seed weight, soil respiration, biomass, and other plant productivity measures.

SUCCINIC

Decreases fungal and pathogenic growth.

HUMIC

Increases nutrient uptake, chelates soil toxins, improves soil structure and microbial populations.

FERULIC

Improves soil respiration and microbial biomass.

SHIKIMIC

Improves transpiration rate, stomatal conductance, NPK fractions, sugar content and leaf size; prevents oxidation.

GALLIC

Insect and pathogen killer, activates the plant against pathogenic infections.

PHENYLACETIC

Possesses antimicrobial activity, enhances the formation of roots and shoots.

PROTOCATECHUIC

Antioxidant activity.

CINNAMIC

Antioxidant activity and drought tolerance.

FUMARIC

Supports plant mitochondria, energy production, significant form of fixed carbon contributing to plant growth.

LACTIC

Efficiency of plant growth.

MALIC

Develops plant height, leaf count, shoot, and root weights.

BENZOIC

Growth of shoots, the biomass and increases the number of branches per plant.

ACETIC

Stimulates chloroplast development and the photosynthetic system in plants.

FEATURES OF AGT-50™

OMRI & FIBL compliant.

Biodegradable

Water extracted, free of harsh chemicals.

Non-toxic and non-irritating to humans and animals.

Concentrated – saves shipping and container expense.

Convenient to use – easily add to watering schedule.

Anti-microbial, anti-bacterial, anti-fungal.

Small molecular chain reduces equipment clogging.

Desirable aroma.

BENEFITS OF AGT-50™

Improves nutrient use efficiency.

Better water uptake.

Binds and solubilizes inorganic minerals.

Builds soil micro-organisms.

Develops a dense root network.

Stimulates early leafing flowering, and fruit development.

Stimulates photosynthesis.

Enhances drought and blight resistance.

Improves capacity to withstand temperature fluctuations.

Enhances sugar accumulation for nutrient density.

Relieves oxygen deficiencies.

Increases produce taste and smell including terpene content.

SOIL INTEGRITY

A soil's capacity to support plant root growth depends not only on its nutrient concentration but also the soil's texture, depth, organic matter content, microbial development, acidity, and water-retention capacity.

The clay particles, organic matter, and humates found in soil all have a negative charge that attracts and adsorbs nutrient cations onto their surface, holding them in the soil and making them readily available for uptake by plant roots.

A sandy soil with low organic matter will have a low cation exchange capacity (CEC) in the range of 1-10 milliequivalents (mEq); soils with higher clay content and more organic matter range from 10-50 mEq. In comparison, humic acid has a CEC of 450 mEq while fulvic acid has a huge CEC of 1400 mEq. Using these substances as soil amendments in conjunction with fertilizer applications makes a big impact on the overall CEC of soil[3], greatly enhancing nutrient availability to plants.

Robust microbes aid in more efficient nutrient uptake by plants and facilitate a healthier, more extensive, root system. AGT-50™ enhances soil fertility particularly by fostering the development of complementary soil microorganisms.

The addition of humic substances to several degraded soil types has been shown to significantly increase the available water-retention capacity and to improve the aggregate stability by 40-120%[4]. Water use becomes more efficient with AGT-50™.

WHY THIRD PARTY TESTING MATTERS TO AGTONIK

The Lamar method (AOAC v.97) is the modern standard for testing fulvic acid content. The V&B (Verploegh and Brandvold) method has been a benchmark in the ag industry. It is an older method and not as accurate for quantifying fulvic acid.

Several market leaders still rely on the V&B method, which quantifies *both* humic and fulvic acid. Humic acid content is valuable in soil applications, but is not applicable with hydroponic or foliar applications due to the molecular size and functions of humic acid.

By contrast, Lamar is specifically designed to quantify the fulvic fraction by purification of the chemical reagents used to separate the humic and fulvic acids. Thus, it removes inflated fulvic acid content readings since amino acids, lipids, carbohydrates and lignin sulfates are all separated out and only fulvic acid remains.

AgTonik certifies by third-party laboratory testing our FA content, minerals, trace elements and purity on every batch of AGT-50™.

SOILLESS: HYDROPONIC & AQUAPONIC

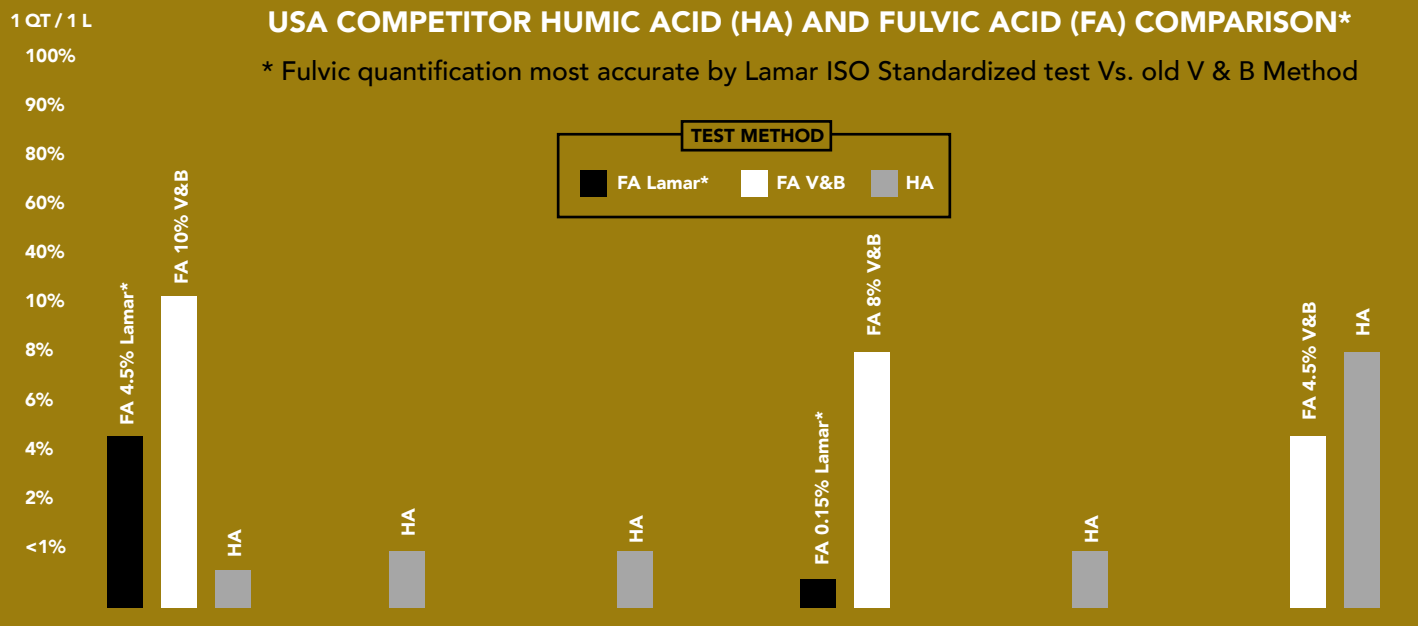
The productivity of soilless systems, whether hydroponic or aquaponic, relies heavily on nutrient availability. AGT-50™ substantially increases nutrient availability both to plants and fish when a small amount is added daily. The ability of fulvic acid to form chelates with the metallic micronutrients iron, copper, zinc, and manganese is greater than peat moss and soil humus keeping these nutrients readily available for uptake and utilization.

AGT-50™ is easy to use, helping growers to conveniently dial in their system's nutritional needs and aqueous pH level for optimum performance. Less time and money are spent adjusting nutrient concentrations and pH.

Growers enjoy a reduction in shipping and storage costs by purchasing a concentrated product. There is no extra water in AGT-50™, keeping product packaging smaller to lower the carbon footprint and pass savings along to customers.

USA COMPETITOR HUMIC ACID (HA) AND FULVIC ACID (FA) COMPARISON*

* Fulvic quantification most accurate by Lamar ISO Standardized test Vs. old V & B Method

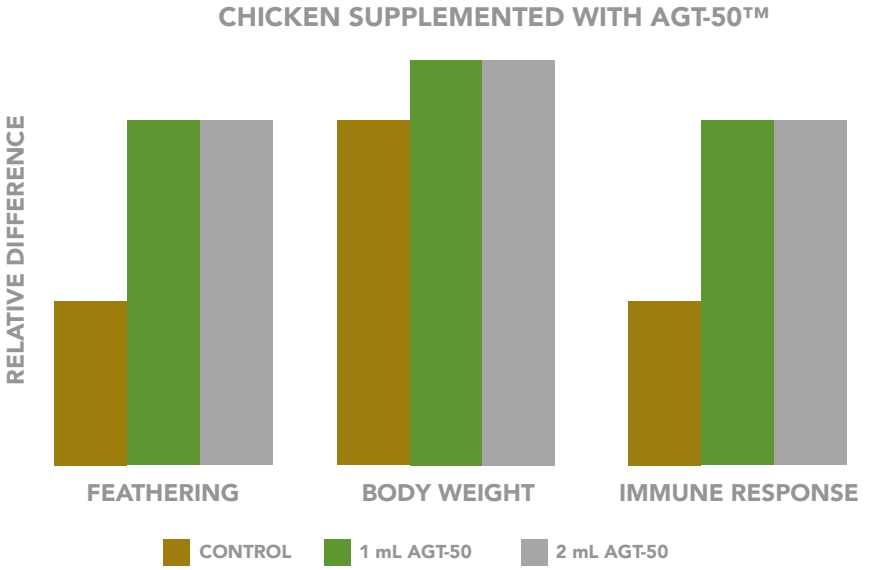


Brand	AGT-50	DIAMOND NECTAR	FULVEX	FUL-POWER	ANCIENT EARTH	ROOT HUME
Source	Prehistoric Compost	Leonardite Brown Coal	Unknown Source	Leonardite Brown Coal	Leonardite Brown Coal	Leonardite Brown Coal
Dose	1mL/3.78L	5mL/3.78L	5mL/3.78L	30 mL/3.78L	8 mL/3.78L	15 mL/3.78L

1 US quart = .95 Liter. Data is approximate and based on product manufacturers web site and label information

ADVANTAGES FOR LIVESTOCK

AGT-50™ has been used for well over a hundred years in animal husbandry and poultry farming. Applicable from conception to market, the complex components of AGT-50™ optimize the health of animals, lowers mortality, and supports early developmental markers, immunity, weight gain, muscle, bone strength, and fertility.



2014 Broiler Study[1]
Dr. Walter Wilborn, PhD. Structural Research Center, Mobile, AL USA

Increased Nutrient Absorption

AGT-50™ assists the gastrointestinal tract function by stimulating the development of intestinal villi and enzyme activity. This actuates body metabolism and improves calcium and trace element absorption -- enhancing the assimilation of nutrients to provide an improved feed conversion.

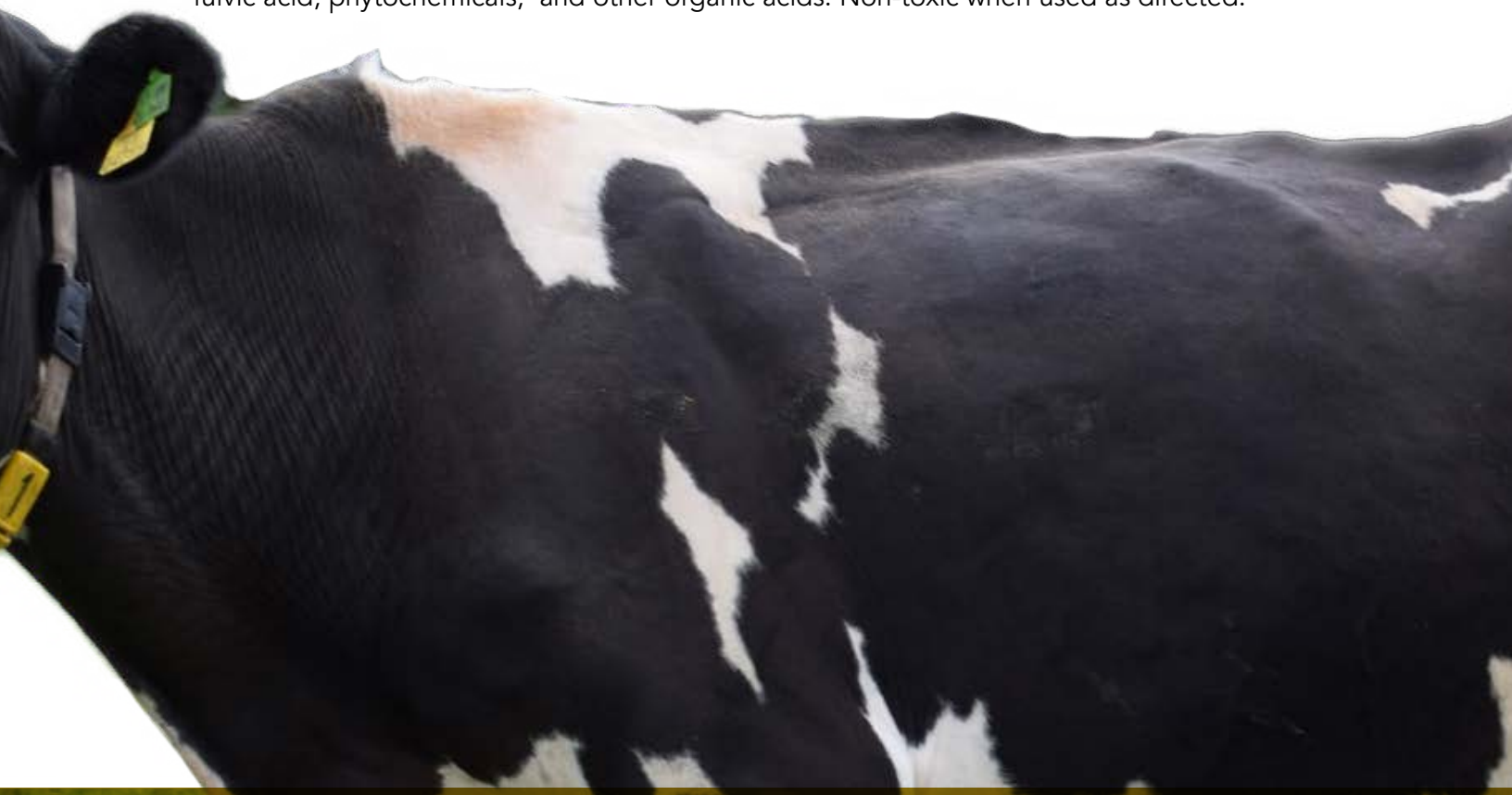
Absorbs Toxins

Known as an entero-absorbent, AGT-50™ works in the gastrointestinal system to bind toxins, mycotoxins, and pesticide residuals which causes them to become inactivated.

Increased Stress Resistance

Enhances resistance to environmental stressors such as: hauling sickness, nutritional deficiencies, sudden temperature extremes, viral/bacterial, and oxidative stress.

AGT-50™ is composed of phytochemicals, trace minerals, elements, and organic acids, also found in the worldwide food supply of fruits, nuts, seeds, vegetables and grains. The information in this booklet is based on numerous scientific studies published on fulvic acid, phytochemicals, and other organic acids. Non-toxic when used as directed.



Reduced Antibiotic Use

Anti-viral, anti-bacterial, and anti-inflammatory properties in AGT-50™ help reduce the need for antibiotics.

Hepatoprotective Effect

Fulvic acid and phytochemicals improve biochemical blood parameters to within normal limits, preventing damage to the liver.

Ammonia Reduction

Increased efficiency in digestion of proteins and nitrogen resulting in the reduction of ammonia emissions and volatilization from litter and manure.

Disclaimer –
THESE STATEMENTS HAVE NOT BEEN EVALUATED BY THE U.S. FOOD AND DRUG ADMINISTRATION (FDA). THIS PRODUCT IS NOT INTENDED TO DIAGNOSE, TREAT, CURE OR PREVENT ANY DISEASE.

BENEFITS OF ORGANIC ACIDS FOR ANIMALS

FULVIC

Antioxidant activity, strengthens immune system, gut health, and improved fertility.

CAFFEIC

Anti-inflammatory, may resist tumor growth, antioxidant.

SUCCINIC

Anti-coagulant, viral inhibitor, promotes brain function and wellbeing.

HUMIC

Gut health, nutrient absorption, immune response.

FERULIC

Liver and neuro-protective, antioxidant, enhances sperm vitality and motility, promotes carbohydrate metabolism.

SHIKIMIC

Anti-coagulant, anti-inflammatory, antioxidant, antibacterial, supports anti-viral.

GALLIC

Antioxidant, anti-inflammatory, neuroprotective.

PHENYLACETIC

Anti-inflammatory, anti-microbial, antioxidant.

PROTOCATECHUIC

Antioxidant activity.

CINNAMIC

Antioxidant, antiviral, anti-bacterial, antiparasitic. Liver and neuroprotective, supports well-being.

FUMARIC

Immunomodulatory, neuroprotectant, antioxidant, hepatic protectant.

LACTIC

Immune-boosting, lipid metabolism support, anti-inflammatory.

MALIC

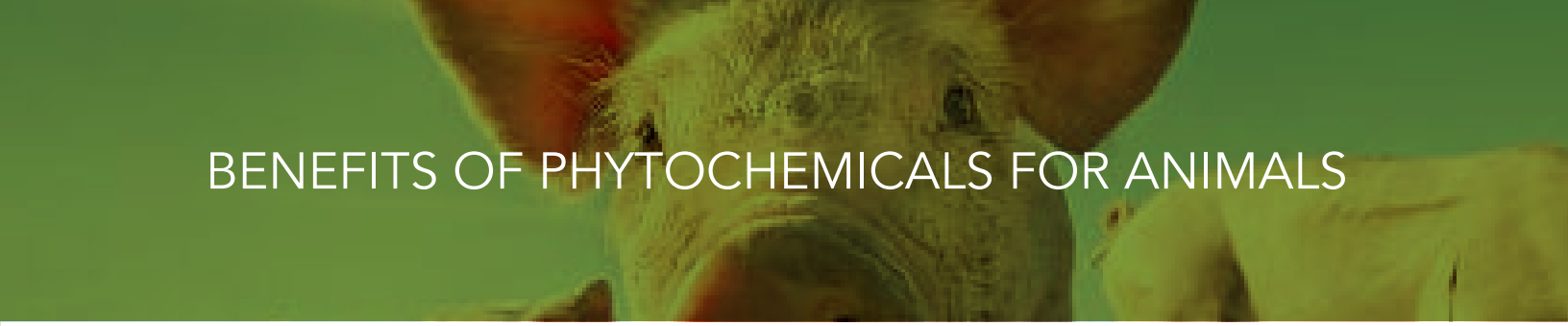
Improved nutrient digestion and ruminal environment.

BENZOIC

Antioxidant and anti-tumor.

ACETIC

Anti-inflammatory, wound healing, anti-bacterial, enhances glucose metabolism.



BENEFITS OF PHYTOCHEMICALS FOR ANIMALS

Phytosterol
Phytosterol reduce cholesterol levels, decrease risk of coronary heart diseases, perform anti-inflammatory activities, induce apoptosis in cancer cells, support disease prevention and treatment (5).

Hormones
Hormones impact physiological processes e.g. glucose assimilation, inflammation, and cell division (6).

Fatty Acids
Fatty acids are crucial components in immune health, they are the structural basis of all cell membranes, and provide a major substrate for energy production (7)

Polyphenols
Polyphenols prevent degenerative diseases, and have significant antioxidant properties, have the ability to help cardiovascular health, lower inflammation, pain, as well as reduce neurodegenerative diseases and a number of ailments (8).

Ketones
Ketones are known to regulate metabolism, and decrease oxidative stress (9).

Flavones
Flavones are antioxidants that lower inflammation (10).

References: Scientific published studies relating to the benefits of organic acids (p.15) are too numerous to cite here and may be provided upon request.

DOSING — HOW IS AGT-50™ USED?

AGT-50™ is compatible with all nutrient programs and is easy to use. AGT-50™ performs best when other growing factors are taken into consideration like soil structure and nutrients.

Please note that there is a learning curve to this product. To avoid any misuse or overuse, we recommend using 90% of fertilizer, especially nitrogen, on a feed schedule.

The chart below shows the maximum dose for plants per application. Start at half strength and work your way up to the maximum dose.

No special adjustments or tracking of dosage is required at the different stages of plant growth.

PLANTS

METRIC	RATIO	APPLICATIONS
0.25 mL / 1 liters (1 mL / 4 liters)	1 : 4000	Continuous Indoor Feed Systems Soil Building Vegetative and Flowering
1.25 mL / 1 liter	1 : 800	Rooting and Cloning
0.625 mL / 1 liter	1: 1600	Foliar spray*

*Apply once during vegetative growth and once during flowering. Apply outside of direct sun.

From previous side-by-side studies large row crops such as Soybeans, Corn, Wheat, Sugar Beets –

1 Liter per 75 Liters (or) 1 Quart per 20 Gallons

Soybeans apply during R4 to R5 | Corn apply during V6 to V7 | Wheat apply during rooting

LIVESTOCK

METRIC	RATIO	APPLICATIONS**
0.75 mL / 1 Liter	1 : 1333	Hatchlings Chicks Chickens
1.25 mL / 1 Liter	1 : 800	Horses and Cows

**If animals are stressed, unhealthy, or preparing to be transported, we suggest doubling the above dosage until the animal improves or reaches its final destination.

KEY: 1 Liter = 1000 mL

1 Gallon = 3.785 Liters (approx. 4 quarts or 4 liters)

1 Liter – 33.8 ounces (approx.. 1 quart or 32 ounces)

1 Ounce = 29.6 mL (approx. 30 milliliters)

6 Teaspoons = 1 oz

1 Teaspoon = 4.9 mL

.25 mL = 5 drops

1.25 mL = 25 drops

References

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Please contact AgTonik for more references relating to the information within this booklet.

7136 East N Avenue
Kalamazoo, Michigan, USA

AgTonik.com

800 342-6960

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