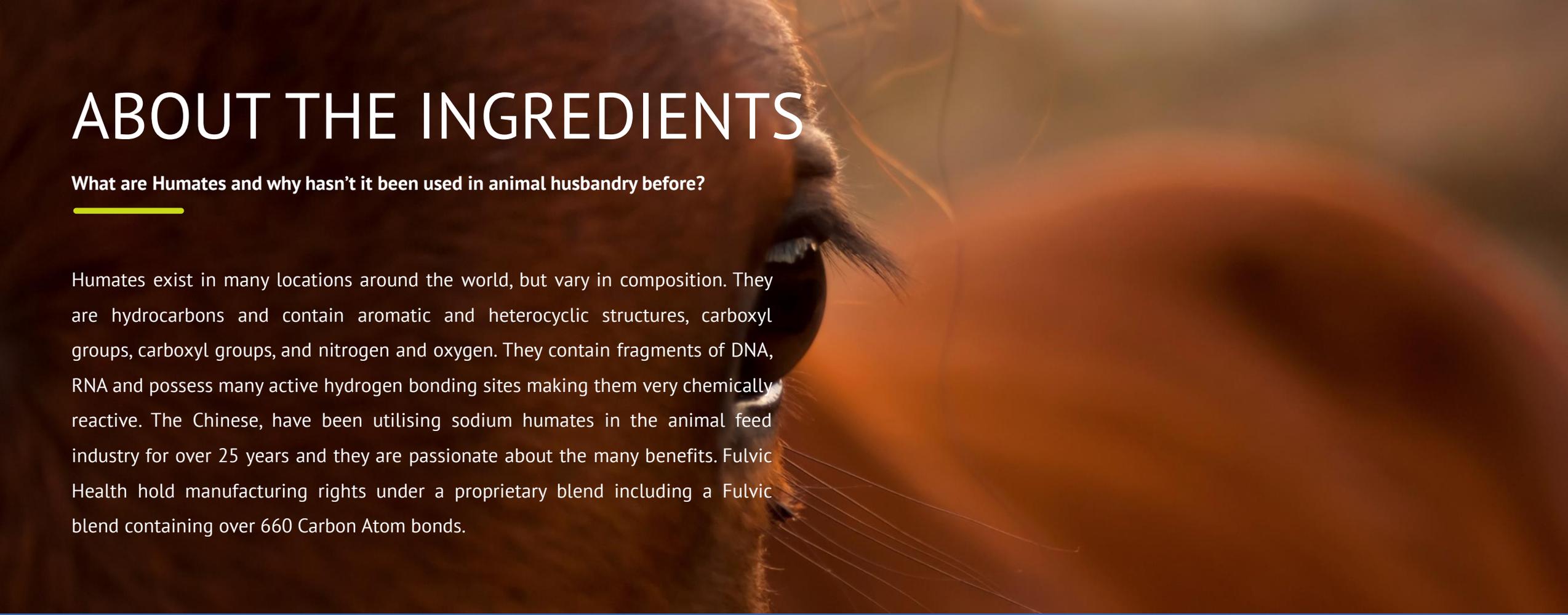


FULVIC  
HEALTH



# EQUINE FAQ

# ABOUT THE INGREDIENTS



## What are Humates and why hasn't it been used in animal husbandry before?

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Humates exist in many locations around the world, but vary in composition. They are hydrocarbons and contain aromatic and heterocyclic structures, carboxyl groups, carboxyl groups, and nitrogen and oxygen. They contain fragments of DNA, RNA and possess many active hydrogen bonding sites making them very chemically reactive. The Chinese, have been utilising sodium humates in the animal feed industry for over 25 years and they are passionate about the many benefits. Fulvic Health hold manufacturing rights under a proprietary blend including a Fulvic blend containing over 660 Carbon Atom bonds.

(This Vitritinic Report is available from Fulvic Health) and we hold patent rights 2011/201567 in Class 5 : Pharmaceutical and Veterinary Preparations and Class 35: Business Services, Research and Information, Import-Export Agencies in relation to veterinary and pharmaceutical products and nutritional supplements of all kinds. In recent years the interest in the use of humic substances has increased. Nowadays, humic substances are used in agriculture, industry, environmental and bio-medicine in many parts of the world.



## **What are the specific properties of our product?**

The specific properties of our Fulvic Enhanced™ humic and fulvic products enable their application in agriculture and biomedicine for both animal and human use. It is important to know that Humic Substances from different sources vary somewhat in the elemental composition. A complete characterization of our raw material is from result of microbiological and pedological studies and confirmed to have over 690 listed excipients. It is a macrocolloidal molecule and a polyelectrolyte which contains an easily hydrolysable protein and carbohydrate fraction attached to a highly condensed core which is partly aromatic in character with structural elements derived from phenols, carboxyl, carbonyl and quinoid groups together with aliphatic hydroxyl groups as well as heterocyclic nitrogen and oxygen and hydrogen. Fulvic acid is extracted by an oxidation process in an aqueous medium. The acid aqueous medium contains the fulvic acid after the oxidation reaction (Extraction). The residue contains insoluble humic acid which is extracted with aqueous potassium hydroxide. The basic aqueous solution now contains potassium humate. Potassium humate has been tested in an evaluation of the anti-allergic and anti-inflammatory properties at the University of Pretoria with an additional publication done on our derivative through the Pharmacology Department in the Faculty of Health Sciences.

The HS have been used as an antidiarrheal, analgesic, immunostimulatory, and antimicrobial agent in veterinary practices in Europe (Huck et al., 1991). In addition, HS can improve the economy and ecology of animal production by increasing growth rate and improving feed efficiency and immunity, as well as diminishing the risk of disease (Islam et al., 2005; Tohid et al., 2010; Vucskits et al., 2010).



## What is the difference between the two blends?

Humic substances are the most common forms of organic carbon in the natural environment. Both products contain this hidden secret. The difference is in the ingredients. The two most active fractions of HS are humic acid (HA) and fulvic acid (FA). Fulvic acid can be extracted from HS and contains many reactive functional groups, including carboxyls, hydroxyls, carbonyls, phenols, quinones, and semiquinones (Aiken et al., 1985). These reactive groups make FA a candidate for both metal chelating and antioxidant activity (Glynn, 1995; Plaza et al., 2005). The FA is soluble in both acid and alkali solutions. Fulvic acid also has lower molecular weight and greater biological activity compared with other HS. Many reports indicated that the FA formed a film on the mucus epithelium of the gastrointestinal tract, protected against infections and toxins, and improved utilization of nutrients in animal feed (Islam et al., 2005; Trckova et al., 2005). Kunavue and Lien (2012) reported that dietary supplementation with FA improved feed efficiency and immunity as well. Recently, the positive effect of FA on meat quality in growing-finishing pig has been reported by Bai et al. (2013).

## ***Why is our derivative ingredient known to be better for horses?***

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Soluble humic acid is available as either potassium humates or sodium humates (i.e. humic acid is only soluble in an alkaline base). Potassium humates are the product of choice for the soil because extra sodium is rarely required here. Sodium humates are preferable for animals as sodium is an important inorganic electrolyte for animal health and good levels should be maintained at all times.

### ***What Chondroitin is used in Fulvic Excel?***

The Chondroitin Sulfate in our formula is produced from enzymatic digestion of bovine animal tissues and provides better benefits than manufactured Chondroitin (CTPP, 2002; Klinkenborg, 2001; Roy, 1998). It is a normal constituent of cartilage. It is a GAG consisting of alternating disaccharide subunits of glucuronic acid and sulphated N-acetylgalactosamine to form chondroitin-4-sulfate and chondroitin-6-sulfate.

### ***Does our product contain Hyaluronic Acid and if not is there a reason?***

Hyaluronic acid is a glycosaminoglycan. In osteoarthritis, changes occur in the hyaluronic acid found in cartilage leading to degradation of the cartilage. With continued use, Fulvic Enhanced™ products are able to aid the natural manufacture process of glycosaminoglycan to firm cartilage tissue. As published in WebMed “There isn’t enough information about hyaluronic acid to know if it is safe when taken orally”. Under joint health information by Ray Sahelian, M.D

### ***Why do we add digestive enzymes on both our blends?***

Digestive enzymes are complex proteins involved in digestion that stimulate chemical changes in other substances. Digestive enzymes help break down these complex sugars into simple sugars that are more easily digestible. Nutrition in animals relies on digestive enzymes. Different enzymes have different functions. Therefore you get the benefit of a product that has plant-derived enzymes as in Fulvic and Humic Acid, as well as Bromelain which is a mixture of sulfur-containing protein-digesting enzymes, called proteolytic enzymes or proteases, and lastly, Papain which hydrolyzes proteins to form oligopeptides and amino acids and protein digesting properties. Digestive enzymes purpose is to break down components of food so that they can be taken up by the organism. Enzymes are necessary within biological cells because most chemical reactions required by the cell would occur too slowly to sustain life. Enzymes are essential to living organisms.

### ***Can the product change in colour and does it smell?***

Complexed into the Fulvic, nucleic and amino acid team are innumerable and essential minerals and rare earth elements. They are amorphous high molecular weight substances. They are not manufactured and they are natural compounds-micro and macronutrients from plants, phytochemicals. They are concentrated and transformed and are rock like, inert or fossilized. From yellow to brown to dark coloured they remain truly organic. They also contain silica as a part of their excipients. The flavonoid structure comes entirely from microbial action on ancient plant deposits. They contain sodium, ammonium or potassium humates and are highly hygroscopic. They will therefore never have the same colour. The ureza of ammonium chloride, which assists with increased elimination of toxins and to prevent kidney stones or bladder stones (listed in the veterinary drug handbook as favourable), may give the product a slight smell upon opening the container. We however use a sodium Fulvic Acid and a smell is unlikely and not offensive to a horse.

### ***What does the Humic Acid-KHAVT(KOH) that is found in Fulvic Enhanced products actually do?***

Humic acids are able to form a protective film on the mucous epithelium of the gastro-intestinal tract against infections and toxins. Reduces or fully prevents the resorption of toxic metabolites after infections in case of residues of harmful substances in animal feed or when it is switched to new feeds. Furthermore, humic acids also help to prevent excessive loss of water through the intestine. Humic acids have the ability specifically to influence microbial metabolism of proteins and carbohydrates.

### ***How do we get the Calcium to work after assimilation?***

The Fulvic Enhanced™ ingredient is bonded to a calcium molecule which supply a chelated form of calcium with improved absorption. Interestingly, Humic Acids act as a dilator increasing the cell wall permeability. This increased permeability allows easier transfer of minerals from the blood to the bone and cells. There are noted changes in intracellular divalent calcium levels. ( Yang et al., 1996)

### ***What is MSM and how does it work?***

MSM stands for Methyl Sulfonyl Methane and is a supplementary source of sulfur. Sulfur is the third most abundant mineral in the body and is an essential component of many compounds in the body, particularly connective tissue. It has been shown that arthritic cartilage in horses contains one-third less sulfur than normal cartilage and MSM is recommended as a supplement in joint disease in horses. MSM appears to have an anti-inflammatory action and has been shown to reduce symptoms of joint disease in horses and humans. Fulvic Excel contains MSM as well as other chondro-protective ingredients including but more importantly it has natural chelated sulfur within the Fulvic excipient.

### ***Why is Peat different to our form of Fulvic Acid?***

Peat contains a large number of water-soluble components. The risk of feeding animals with peat as a supplement has only been thoroughly studied from the aspect of the effect of humic substances. Humic substances are natural constituents of the food chain, present in all plant and animal organisms. Humic acids do not induce goitre, but may enhance the goitrogenic effect of low iodine (Huang et al., 1994). HAs are the most widespread natural polymers derived from biological, chemical and microbial decomposition of organic matter. According to the summary by Yang et al. (2004), Ha's represent a group of natural high molecular weight macro- molecules composed of aromatic rings forming a very complex structure in the presence of phenolic, hydroxyl, phenolic hydroxyl, ketonyl, quinone, semiquinone, carboxyl, carbonyl and alkoxy groups. The HAs often form complexes with a mixture of metallic elements. Because of the above-mentioned data, one cannot expect that two separate natural sources of HAs can contain identical molecules. Humic substances of medicinal importance are found abundantly in peat, sapropel, and other humified sources Ref: Laub, R. J. Process for preparing synthetic soil-extract materials and medicaments based thereon. U.S. Patent 5,945,446, 999. The biological effects of humic substances can be different, depending on their chemical structure and physicochemical properties and the quinone functional group of Fulvic acid. Chemical composition, structure, and functional groups can vary greatly, depending on the origin and age of the humic substance and the conditions of the humification process (humidity, aeration, temperature, mineral microenvironment, etc. Ref: Chen, J.; Gu, B.; LeBoeuf, E. J.; Pan, H.; Dai, S. Spectroscopic characterization of the structural and functional properties of natural organic matter fractions. Chemosphere 2002, 48, 59-68.

### ***Fulvic Health has never had a complaint that the product goes "mouldy", why?***

Soluble humic acid is available as either potassium humates or sodium humates (i.e. humic acid is only soluble in an alkaline base). Sodium humates are preferable for animals as sodium is an important inorganic electrolyte for animal health and good levels should be maintained at all times. We use Sodium humates and it is dried and packed to guarantee shelf life. Once the bag is opened the product should not have any exposure to water or sunlight. The bag should be re-sealed especially if in a moist room and the bucket closed in between use.





### ***What is Leonardite?***

The difference between Leonardite and other sources of humic acids lies in the fact that Leonardite is extremely bioactive through its molecular structure. This biological activity is said to be about five times stronger than other humic matter. Leonardite is organic matter, which has not reached the state of coal and differs from soft brown coal by its high oxidation degree, a result of the process of coal formation. This may have an over chelating effect in horses.

### ***Is there chloride present in the product and how can this be beneficial for animals?***

The chloride (Cl) present is a macro-mineral commonly referred to as an “electrolyte” because it helps to maintain the body’s acid/base balance and hydration status. It is also known as “salt” when combined with its partner Sodium. Chloride is an essential component of two intestinal secretions necessary for digestion and absorption of nutrients namely bile and hydrochloric acid (HCl), better known as “stomach acid”.

### ***Are Fulvic and Humic “acids” actually acids?***

Minerals with a negative electrical charge are attracted to the H<sup>+</sup> ion. These are called acid minerals. Acid minerals include: chlorine (Cl<sup>-</sup>), sulfur (S<sup>-</sup>), phosphorus (P<sup>-</sup>), and they form hydrochloric acid (HCl), sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), and phosphoric acid (H<sub>3</sub>PO<sub>4</sub>). Minerals with a positive electrical charge are attracted to the negatively charged OH<sup>-</sup> ion. These are called alkaline minerals. Nutritionally important alkaline minerals include calcium (Ca<sup>+</sup>), potassium (K<sup>+</sup>), magnesium (Mg<sup>+</sup>), and sodium (Na<sup>+</sup>). To determine if a food is acid or alkaline, it is burned and the ash is mixed with water. If the solution is acid or alkaline then the food is called acid or alkaline. Ash is the mineral content of the food.

### ***What analysis tests have been done on the product?***

Two separate SANAS approved laboratories have conducted analysis and identified the safety levels of all trace minerals present and to ensure there are no heavy metals present in the product at any unsafe level. As the product still falls within a category D, this medicine has not been evaluated by the Medicines Control Council until call up notice is notified. This medicine is not intended to diagnose, treat, cure or prevent any disease. Regulation 40(1) (g) by regulation 22 of Government Notice R870 in Government Gazette 37032 dated 15 November 2013.

# ABOUT THE BENEFITS:

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## **Fulvic Excel help with Joint support?**

First advice from Fulvic Health is not to listen to misinformed people who have not studied the benefits of the Fulvic and Humic Acid used in Fulvic Enhanced products. As a nutraceutical with therapeutic agents the role of the added ingredients together with Fulvic and Humic Acid cannot be disputed. Not only does it relieve from inflammation, it has been shown to bond to collagen fibers to aid in the repair of damaged tendons and bone. It is proven to influence the metabolism of cartilage and mobility, joint effusion and swelling. The ingredients such as Glucosamine, Chondroitin Sulfate and our blend together stimulate proteoglycan and collagen synthesis and inhibit the production of cytokines involved in cartilage degradation. The wide spectrum main ingredient, Fulvic Acid-CaFAVT(CaOH), makes it possible to act as the transcellular transporter of almost any nutrient or mineral. Humates (Fulvic and Humic Acid) are hydrocarbons and contain aromatic and heterocyclic structures, carboxyl groups, and nitrogen. They possess many active hydrogen bonding sites making them very chemically reactive. Absorption it is more intensive and dynamic compared to pure physical adsorbents. Humic Acids act as a dilator increasing the cell wall permeability. This increased permeability allows easier transfer of minerals from the blood to the bone and cells. This is why the amount of Glucosamine, Chondroitin and MSM cannot be compared to other supplements as the addition of Fulvic and Humic makes these products way more absorbable. Adding any more would be over the safe level for use in horses in a double dose, as tested by SAHRASA. The minerals found in Fulvic and Humic Acid such as copper, manganese and zinc are important for normal cartilage and connective tissue formation and it is even further supported by the addition of MSM. The transmutation of vegetal silica and magnesium to form calcium in animal and human bones is a typical example of new syntheses of minerals that Fulvic initiates. Scientific claims have stated that Humates (Fulvic and Humic Acid) are shown to balance T Cells, which can attack joints and bones thus causing auto-immune diseases arthritis. Research shows that the red blood cells likely carry more oxygen with the presence of Humates, contributing to quicker healing times and swelling reduction.





### ***Is the Fulvic and Humic in Fulvic Enhanced products claimed to act as an anti-inflammatory?***

Dermal, oral or subcutaneous application of Humic Acids leads to the inhibitory effects on inflammation and this is directly related to the flavonoid groups contained in the Humic Acid. It can act as an anti-inflammatory by reducing the release of pro-inflammatory mediators from cells. It is a mixture of polyphenolic acid compounds and is an interesting phytochemical with a neuroprotective effect. As an antioxidant it is a powerful plant compound that can help neutralize foreign agents and free radicals. It modulates the immune system. Ours is not a highly processed and refined feed additive that reduces the antioxidants that should occur naturally in a horse's native diet.

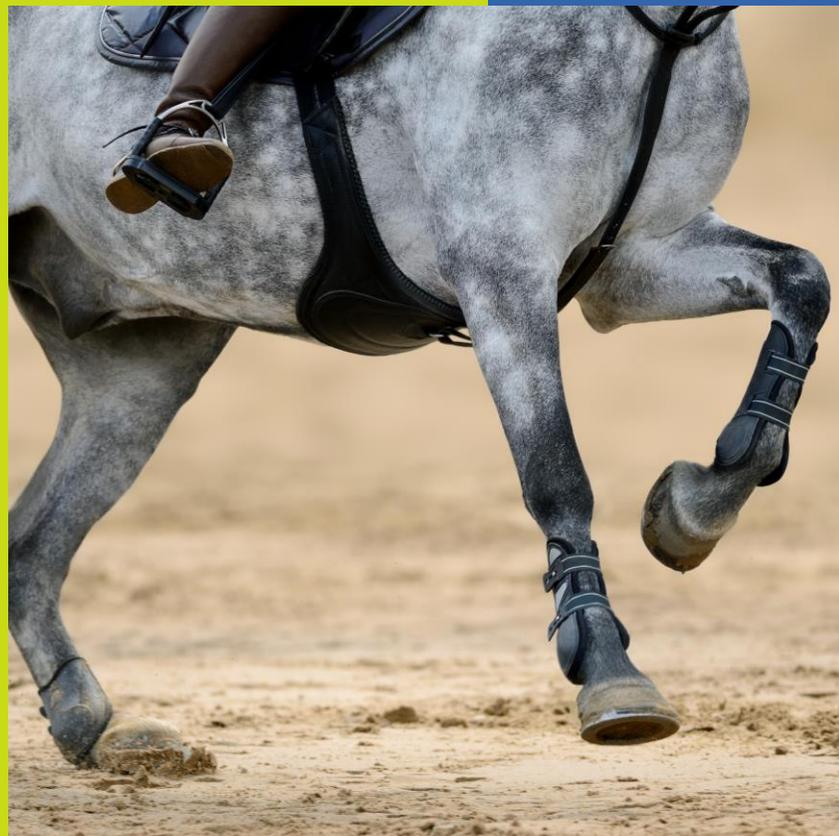
### ***How can our product improve the immunity of a horse or animal?***

Studies reveal that Humic acid dilates a healthy cell so it is permeable and can be entered by its partner, Fulvic acid. Once Humic acid finds a virus, it blocks it, preventing it from attacking a healthy cell and alerting the immune system of the invader. Once the virus is prohibited from reproducing, the body can focus on getting rid of the virus even before illness is exhibited in the horse. As there is indication of discriminate stimulation of "good" microbes while suppressing the "bad" this is a big plus for over-acid horses, such as is common with EPM (Equine Protozoal Myeloencephalitis), an environmental parasitic disease syndrome. Humic acid is also known to attack virus-laden cells. Immuno-compromised EPM horses can benefit from our unique formulation by regulating the immune system.

### ***Show horses are less affected by stress when fed Fulvic and Humic acids. Please explain how this may happen?***

Humates are reported to suppress, and even block, the production of stress hormones which otherwise might be produced in horses stressed by crowds and unfamiliar surroundings like trailers, temporary stalls and arenas. The overall demeanor of animals and humans improve when correctly balanced with Fulvic Enhanced products.





### ***How can our product aid performance horses?***

With regular use, the intake enhances liver function, assists with natural cell division without mutation, and helps to maintain and enhance the balance of minerals and trace elements improves calcium transfer to the skeleton and bones. Fulvic acid is one of the most powerful natural electrolytes known to exist. It charges, regenerates, regulates and delivers its energies to living cells this improved circulation while super-oxygenating the blood. Elevated muscle energy helps the horse perform harder, faster and longer during endurance events. During exercise, the metabolism produces oxidants which can damage cells and tissues and thus the need for an anti-oxidant is so much stronger in a performance horse.

### ***How can Fulvic Enhanced claim to improve feed efficiency?***

Humic acids have been hailed as the most powerful detoxifying agents available for the soil but they can perform a similar function in the sick animal. Humic acid has a CEC (cation exchange capacity) of 450, which can provide an adsorptive capacity similar to activated charcoal to soak up and isolate toxins (before they can cause cellular damage). The physical manifestation of disease is often a negative response to the toxins released by the infectious microbes. When humic acid is used to bind these toxins there is often a dramatic reduction in toxicity. The benefits of humates in animal health are remarkably similar to those in the soil. Where humic acids help to balance the critical fungal: bacteria ratio in the soil they can also stabilise the animal's intestinal flora to improve feed efficiency (5% to 15% weight gains have been reported in cattle, pigs and poultry). Where humic acids are similar, buffering agents in the soil they can also offer a protective mechanism in the animal where they are able to form a protective film on the mucous lining of the gastro-intestinal tract. This film also helps to prevent excessive losses of water via the intestine. Poor quality foods and grasses burden digestion. Digestively, Fulvic acids can chelate heavy metal build-up which results in fewer burdens on your horse's intestinal tract. Animal studies also reveal an increase in feed efficiency when Humates are included. Excel with Fulvic has been shown to substantially reduce the incidence of diarrhea and other digestive upsets as well as to improve animals' defenses against pathogens such as E. coli. (Studies on the antimicrobial effect of natural and synthetic humic acids. Ansorg R. 1978.)





### ***Why is it good to use the product when you change feeds?***

The macro-colloidal structure of humic acid ensures good shielding on the mucous membrane of the stomach and gut, the capillaries and damaged mucous cells. AS a result, the resorption of toxic metabolites is reduced or fully prevented, especially after infections, in case of residues of harmful substances in animal feed or when it is switched to new feeds.

### ***How can Fulvic assist with the build-up of lactic acid after anaerobic exercise on animals?***

Lactic acids and Carbon Dioxide are by products that can affect performance and recovery in different ways and both can be remedied with oxygen. Following strenuous exercise, the Lactic acid may further contribute to the pain and soreness experienced. Supplementation immediately after sprints as a part of the “warm down” process may assist to re-introduce oxygen to the muscle cells thus relieving pain. Fulvic acid naturally contains around 45% oxygen which is delivered directly to the body. This will help to train and perform longer and will also reduce the oxygen debt after exercise with great rejuvenation benefits. It must be noted though that you will need to supplement with The Fulvic Enhanced for at least two months before this effect is fully noticed.

### ***Why is the product claimed as a digestive support as well as a joint and immune product?***

Both our blends contain Humic Acid in a sodium form which differentiated it from all other Fulvic products. Humic acids are able to form a protective film on the mucous epithelium of the gastro-intestinal tract against infections and toxins. Reduces or fully prevents the resorption of toxic metabolites after infections in case of residues of harmful substances in animal feed or when it is switched to new feeds. Furthermore, humic acids also help to prevent excessive loss of water through the intestine. Humic acids have the ability specifically to influence microbial metabolism of proteins and carbohydrates. It is a recognised digestive aid that promotes a healthy gut microflora as it stimulates microbial activity, enabling the gut to digest food more efficiently and resulting in less loss of nutrients through faeces, with the added benefit of less ammonia and other odour causing elements in manure.



A photograph showing two women in a field, one pointing at the back of a horse. The scene is outdoors with a clear sky and greenery in the background.

## **Is it necessary to supplement with Salt blocks while on Fulvic Enhanced?**

*Outside of clean water, adequate pasture and/or hay, and the amount of concentrate required for your horse's level of activity or growth, the best recommended supplement for free choice salt is within a Fulvic Acid complex of Sodium. EG: The risk with salt licks is that a stalled horse may consume salt out of boredom, leading to an increased water consumption and subsequent increased urine excretion. Our Trace minerals are those required in very small amounts by the animal in contrast to macro-minerals which are required in larger amounts. It is vital to provide trace mineral salt free-choice to horses that live in hot and humid climates and/or are worked hard. In their sweat, horses will lose electrolytes; they must be replaced by eating additional dietary salt. The need for additional minerals in rations formulated for exercising horses is largely related to the increased mineral loss through sweat. Sweat contains appreciable amounts of sodium, potassium, chloride, calcium, and magnesium. As such, recommendations call for increases in these minerals for horses in environments or exercise conditions which promote sweating. Fulvic Enhanced™ has undergone specific analysis study to show that all these elements are found in our product and within the minimum safety levels.*





### ***What other functional enzyme compound does Fulvic Acid offer?***

Superoxide dismutases help protect many types of cells from the free radical damage that is important in aging, senescence, and ischemic tissue damage. Noted in pharmacological studies is that Fulvic and humic substances are powerful superoxide dismutases (SODs) and metalloenzymes of every conceivable kind. References: Visser, S.A; Effects of humic substances on higher animals and man; the possible use of humic compounds in medical treatments; 1988; which was presented at the International Humic Substances Society meeting in Sevilla, Spain.

### ***Superoxide dismutases (SOD) is a metal-containing antioxidant, so does this make Fulvic and Antioxidant?***

Humic extracts (Fulvic acids) are nature's most powerful antioxidants throughout the world have shown that various mechanisms within the humic molecular structure make it both a donor and acceptor free radical scavenger and antioxidant. References: Yuan, Shenyan; et al; Application of Fulvic acid and its derivatives in the fields of agriculture and medicine; First Edition: June 1993 and Inglot, AD; Zielinksa-Jencylyk, J; Piasecki, E; Arch. Immunol. Ther. Exp. (Warsz) 1993, 41(1), 73-80)

### ***It is often believed that your horse may not need supplementation. Is this a wise decision?***

Yearlings and 2-year-olds need protein for maintenance and growth of muscle tissue. Exercise may increase the rate of muscle deposition, thus increasing the protein demand in young, exercising horses 10 to 20 percent above amounts needed for maintenance and normal growth. Proteins are large compounds made of individual amino acids. Several of the amino acids necessary for muscle deposition cannot be synthesized by the horse's body, and they must be supplied by the diet. As such, the balance of these amino acids or protein quality is an important consideration for exercising horse diets. Fulvic and Humic acids provide essential organic minerals such as selenium, copper, zinc, iron and substances, within the safety limits as prescribed by the Medicines Control Council, that provide ideal bone muscle cartilage hoof and hair growth as well as essential Amino Acids and Enzymes. Don't overlook our start-up maintenance blend (Renew with Fulvic) which provides excellent growth stimulating effects. Fulvic acids become individually unique molecules or multi-mineral compounds that plants, and animals, absorb, assimilate and utilize to support growth and health. Reference: Recent research shows that humic acid can be used as animal feed thanks to its growth-promoting effect (e.g. Kocabagli et al. 2002).

### ***Can a horse over supplement on minerals?***

Cells have the ability to accept or reject minerals, including aluminium, lead, arsenic, mercury, etc., at their discretion when presented as organic fulvic acid complexes. It should be considered that these minerals may not necessarily be present to “nourish” cells, but are needed to act as “electrodes” in the fulvic electrolyte solution. In that capacity they are probably most essential for bio-reactions, electron transfer, catalytic reactions and transmutations. Fulvic acid carries complexed minerals in “trace” amounts only, and should not be confused with metallic minerals.

### ***Explain Fulvic Acid and Iron Toxicity***

Environmental pollution raises our requirements for minerals, especially zinc, calcium, and iron. However essential trace elements are “essential” only when used in trace amounts. When used in excess they become toxic. The same is true with “major” elements such as iron. As an electrolyte, Fulvic Acid increases the permeability of cell membranes. Excesses of certain minerals can interfere with absorption of other minerals. It is obvious that when metals, minerals and trace elements become complexed into fulvic acid, they take on an entirely new property of availability, unlike their original form. It is when fulvic acid is not present that one should seriously worry about toxic build-up from any source. The amounts of minerals and trace elements used in this product are considered safe, for which estimated safe and adequate daily dietary intakes and recommended dietary allowances are available. A cumulative body of evidence points to the safety of each ingredient in the standardised Fulvic Enhanced™ based multi-mineral powder concentrate for its use as a dietary supplement by horses.

### ***How does Fulvic act as a Nutrient Enhancer?***

Scientists have found that Fulvic Acid makes nutrients more available from the food/feed ingested and thus corrects deficiencies quickly and safely. Fulvic acts as a vehicle that carries nutrient. When minerals and trace elements from feed sources come into contact with Fulvic Acid, they are dissolved into a form that makes them more active and available to the body by acting as a catalyst. A catalyst is a compound that facilitates a chemical reaction. Fulvic is often referred to as “nature’s miracle molecule”.





### ***How is absorption improved?***

Minerals need to be chelated, bound to a protein molecule, to be bio-available. (Mineral assimilation without chelation is only about 10%.) This makes our product highly assimilative. When our humates (fulvic and humic acid dry mixes) are exposed in the system the sulfide, sulfur compounds, hydrogen, carboxylic acids, amines react with moisture, hydrolyzes. These are then in ideal natural form to be absorbed and interact with living cells.

### ***How does Fulvic act in Cellular Nutrition?***

Each cell when properly nourished is capable of producing their own amino acids, enzymes and other factors necessary for all metabolic processes. Each cell maintains itself, burns its own energy, creates its own proteins, manufactures its own enzymes and duplicates itself. It is therefore important to understand that the total metabolism of the body is the sum total of metabolic operations which is carried on in each individual cell. The nutritional building blocks of these cells may then be considered as maintenance nutrients. These maintenance nutrients must be supplied to the body continually; they are amino acids, major and trace minerals, vitamins and other nutritional factors. The human body can only produce 8 of the amino acids in their body and only one vitamin. It should be noted that vitamins cannot complete their function in the cells' metabolism without the presence of certain minerals. This is where Fulvic Acid makes the difference as it chelated and binds scores of minerals into bio-available form to be used by the cells, it also is known as an efficient transporter of vitamins into the cell.

### ***Explain the relationship with Enzymes and Cell Health***

The Fulvic Acid Molecule often contains within it structure coenzymes and important factors which the cells utilize in stimulation the manufacturing of enzyme development. (Reference: Williams Dr Roger J 1977)

### ***Fulvic increase oxygenation and energy production, why is this important?***

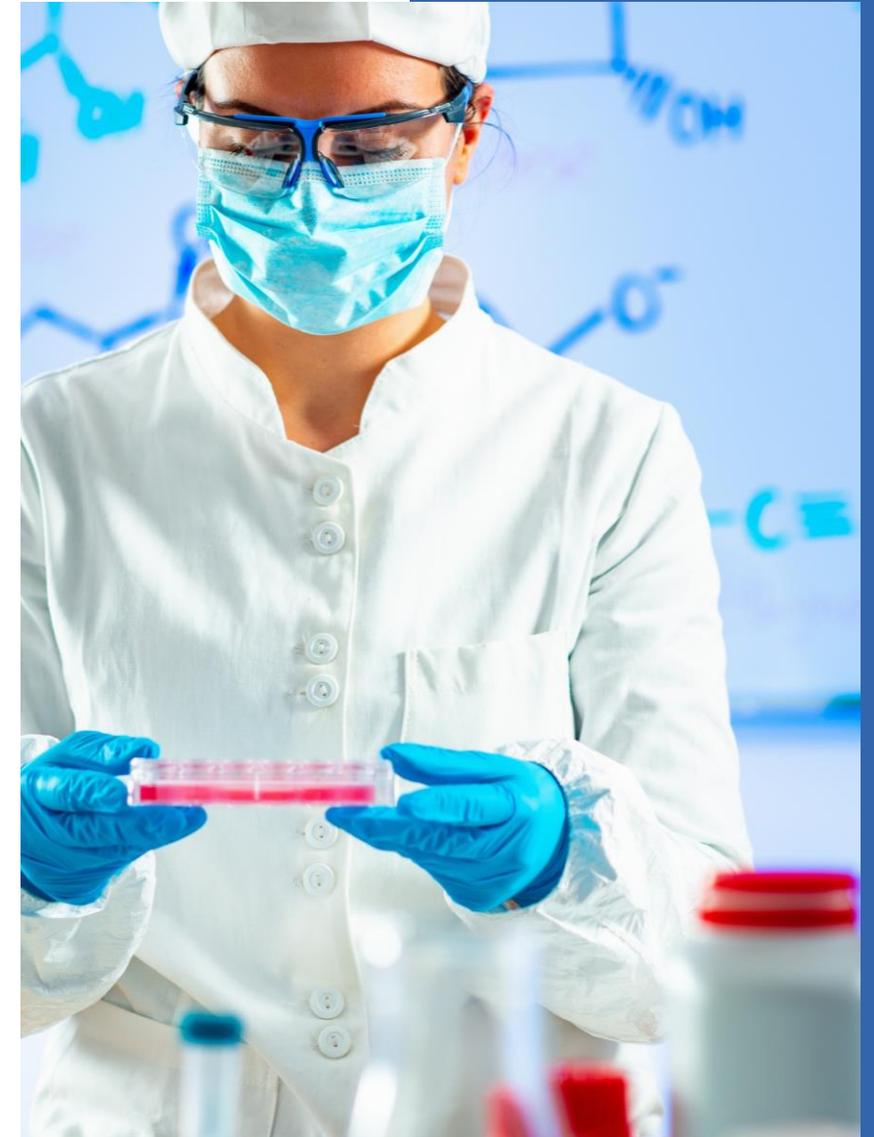
Oxygenating the cell is vital because it enhances energy production.



### ***What minerals are always present in Fulvic and Humic acids?***

Fulvic Acid usually carries 70 or more minerals and trace elements as part of its molecular complexes. Minerals are essential component in correct nutrition, particularly for young growing horses as a lack Fulvic Acids and Humic Acids shows that the major elements in their composition are Carbon, Hydrogen, Oxygen, Nitrogen, and Sulfur. (Gajdo-ová et al. 2001, Tan 2003, Kurková et al. 2004).

- ✔ The properties of carbon make it the backbone of organic molecules
- ✔ Hydrogen has the potential as a novel antioxidant, anti-inflammatory and anti-allergic effects
- ✔ Oxygen allows cellular respiration and muscle energy
- ✔ Nitrogen to prevent losing lean tissue after illness. Amino acids, which contain both nitrogen and sulphur which is needed for the repair of muscle tissue.
- ✔ Sulphur is a macro mineral and is an essential constituent of amino acids and is readily absorbed as this form is organic. The Fulvic Enhanced™ ingredient is bonded to a calcium molecule which supply a chelated form of calcium with improved absorption.



### ***How does our product Fulvic Excel enhance the Connective Tissue in horse health?***

The good news is that the Fulvic Acid in our “powder form” exists as an active substance in both basic or “alkaline” and “acidic” conditions, thus these Fulvic Acids carry molecules into the tissues to alkalise the tissues. Minerals such as copper, manganese and zinc found in Fulvic Acid are important for normal cartilage and connective tissue formation and even further supported by the MSM (Methyl Sulfonyl Methane) and Chondroitin Sulphate Bovine content. Fulvic already has the maximum amount of vegetable silica as a part of its excipients bonded to be absorbed quicker by the body. The transmutation of vegetal silica and magnesium to form calcium in animal and human bones is a typical example of new synthesis of minerals that Fulvic initiates.

### ***How can the biological effects of humic substances be different and why is this important when comparing Fulvic products?***

#### ***What are the key factors that make our animal feed additive unique?***

The product contains Fulvic and Humic substances which act as growth promoters, immune and stress- protectors and metabolism correctors.( References: 1. Stepchenko L. 2000. 11-th International Peat Congress, Quebec, Canada, pp. 921-927. 2. Stepchenko L. 2004. Naukoviy visnik NAU 78, 68-72.) The humic substances show Antiulcerogenic activity (Ref: Ghosal, S.; Singh, S. K.; Kumar, Y. Phytother. Res. 1988, 2, 187-191) and lastly the use of humic substances in feed improved gut health for better nutrient utilization as well as improved the health status by working against pathogens by developing immunity (Reference: Pakistan Journal of Nutrition 4 (3): 126-134, 2005 ISSN 1680-5194 © Asian Network for Scientific Information, 2005)



## ***What tests have been done on horses?***

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A review of the Equine testing indicates a lack of side effects from the ingestion of Fulvic Enhanced™. Dr SS De Kock Laboratory Director of the National Horse Racing Authority conducted a full analysis on blood and urine and indicated in the analysis that the specimens contained no substances which exceed allowed levels and also did not contain any other substances considered prohibited. An additional review done over a period of 2 years on sponsored product provided by Fulvic Health Pty Ltd confirmed the safety of this product for use as an oral multi-mineral electrolyte supplement. The safety in both the short-term and long-term use of the animals I treated is considered adequate and applicable to horses from colt/filly to mare/gelding/stallion, as is implied the same mechanism of action that is seen to occur in both animal and human studies.

The substance tested complied with Good Laboratory Practices (GLP) methods, was received in a tamper proof secure container. In a preliminary test, the dosage was given a suggested dosage. The oral acute toxicity study testing done over a period of 2 years shows no toxicity. All animals tested were continuously observed for six hours initially after the treatment and then three times a day during the post treatment. Results of the testing indicate that Fulvic Enhanced™ caused no toxic symptom or lethality during a the treatment observation period at the maximal tolerable dose (MTD) administered within 24 hours which was 50 ml per day and often up to 2 x 50 ml dose per day during endurance activity, thus providing a base of evidence that this product is non-toxic in applicable physiological doses.





## ***How can Fulvic Health products provide support in Kissing Spine cases?***

Each horse is different and has varying degrees of this condition however Fulvic customers have reported that Fulvic Health products have helped with Kissing Spine conditions. Combined with the vegetable silica content found in our formula, which may be incorporated into the Fulvic Acid, will assist with bone health and speed healing. Fulvic Acid reduces inflammation. Fulvic Acid encourages bone-forming cells called osteoblasts has been shown to decrease bone inflammation and the destructive process of the bone. It activates the cells of the bone, thus rebuilding any damage that has been caused. This may be an effective long term solution for your equine companion. There is reported decrease in pain. Results from various studies indicated that sodium and potassium humic substances, as found in Fulvic Health products, inhibits both the alternative and classical pathways. The complement system plays a major role as a powerful mediator of inflammation. An intact complement system is important for protection against infection, but also, for maintaining the internal inflammation homeostasis. Fulvic Acid studies show that it is able to modulate the immune system through specific pathways and mediators to inhibit inflammation. It selectively inhibits the complement cascade and pro-inflammatory cytokines. This way it serves as an anti-inflammatory.



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## 2.2 Research on fulvic acid

Fulvic acid also has interesting properties. Fulvic acid has anti-inflammatory and antimicrobial effects and lends itself particularly to topical applications, such as for psoriasis and eczema. The team at UP described the anti-inflammatory properties in a mouse model of contact hypersensitivity as well as in atopic dermal reactions in humans (Snyman et al. 2002, Van Rensburg, Malfeld, and Dekker 2001, Van Rensburg, Van Straten, and Dekker 2000). The MCC approved fulvic acid as a veterinary treatment for dogs and cats suffering from pyotraumatic dermatitis or eczema. This was a direct outcome of the team's research. Although it is not yet clear

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Commercially available medications based on humic acid are antibacterial, antitoxic, anti-ulcerogenic, anti-allergic, and anti-inflammatory (Shepetkin et al. 2002). Anti-arthritis effects are also known (Goel et al. 1990, Iubitska and Ivanov 1999, Kelginbaev et al. 1973, Kleinschmidt 1988, Soliev 1983, Suleimanov 1972), as is activity against the herpes simplex virus (Thiel et al. 1977) and several types of influenza type A and B viruses (Hils et al. 1986). However, none of these findings have been subjected to clinical trials.

Research on fulvic acid is much rarer. The UP team established antimicrobial, antiviral, and anti-inflammatory activity in a series of in vitro and in vivo trials (Van Rensburg et al. 2000, 2001, Snyman et al. 2002). The results suggested that fulvic acid, applied topically, might be a safe and effective treatment for skin infections caused by pathogenic bacteria and Herpes Simplex Virus-1 as well of inflammatory conditions of the skin. Only clinical trials can identify the effects on specific conditions such as fever blisters, urticaria, acute eczematous dermatitis, psoriasis and acne vulgaris.

Humic compounds play a role in redox reactions, absorption, complexation and transport of substances, supporting structure and formation of mud and control the carbon biogeochemistry in ecosystems [13]. Humic acids have an astringent effect, adrenaline and dopamine receptor agonist, anti-allergic, antibacterial, anticoagulant, anti-inflammatory, antiviral, estrogen, hemostatic, hyperemic, UVB-protective [14] and are heavy metal chelating agents [15, 16, 17].

Fulvic acids are oxidized substances with aromatic structures characterized by extensive lateral aliphatic chains having a lower nitrogen content compared to humic acids [18]. Fulvic acids have anti-allergic effect [19,20], antioxidant [21],

Fulvic acids are oxidized substances with aromatic structures characterized by extensive lateral aliphatic chains having a lower nitrogen content compared to humic acids [18]. Fulvic acids have anti-allergic effect [19,20], antioxidant [21], antimicrobial [22], reduces cutaneous immune response [23], antitumoral [24] antiseptic [25], acting in acid medium by inhibiting mitochondrial respiration in *Candida utilis* [26], being used in the treatment of eczema [27], have antiulcerogenic properties [28] and precognitive so can be used to treat Alzheimer's disease [29].

Lipid fraction is 0.2 to 5% of the mud and include fatty acids, sterols, terpenes, hydrocarbons, chlorophyll, fats, waxes and resins [30]. Another fraction of mud consists in protein hydrolysates, amino acids, enzymes (amylase, arylsulfatase, b-

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