

# HEALTH VALUE OF HUMIC SUBSTANCES

## Blood Properties

It has been found that humic acid in dose levels of 100-300 milligrams per kilogram body weight has no effect on bleeding time, clotting time, thrombin time, plate count, or induced platelet aggregation (49). Red blood cells and hemoglobin stay on normal levels under the influence of humate in comparison with control groups (15). Literature has indicated that the red blood cells have the capability of carrying higher percentages of oxygen when in the presence of humate. Human subjects taking humate have reported feelings of euphoria, similar to hyperventilating, during the first few days of taking humate. This euphoria is a result of additional oxygen. Healing of injuries, as a result of additional oxygen, is much quicker. Cutting horses have ankle inflammations frequently from their rigorous training programs. Healing times for these injuries have been reduced by the usage of humates.

## Mineral Transfer

Humates contain both humic and fulvic acids. The fulvic acid is the chelator that carries the minerals. The humic acid acts as dilator increasing the cell wall permeability. This increased permeability allows easier transfer of minerals from the blood to the bone and cells. Testing on cows has indicated an increase of 16% more calcium <sup>(48)</sup>. It has been shown that incubation of cultured human umbilical vein endothelial cells with natural or synthetic humic acid results in an enhanced surface expression of tissue factor activity. There are also changes in intracellular divalent calcium levels <sup>(1)</sup>. Literature reports additional transport of iodine from foods into the thyroid glands <sup>(2)</sup>. Just as fulvic acid carries life-sustaining minerals to the body, it also captures and removes toxic metals from the body. Detoxification takes place within first three to four days of usage. Both human and animal have reported looseness of bowels due to detoxification during this period and return to more solid manure after the third to fourth day.

## Stress Management

Literature has reported that humates block or reduce the production of stress causing hormones. This has been observed in animal behavior, in particular with show calves first entering the arena. Animals on humate are less affected by the outside stimulus of the crowds or confining areas of the arena. This effect has been noted on sheep, horses, cattle and hogs. In dairy operations, those animals not on humate aggressively eat their feed rations while humate animals leisurely graze. Laboratory testing at Penn State physically restrained rats by binding them to artificially create stress and measured hormones known to cause stress. Those rats fed humate showed significantly less amounts of those hormones.

## Cell Mutation

Humates within the body work with DNA and cellular division. It has been noted that the humate tends to prevent cellular mutation during reproduction. Several technical papers were noted during literature research for this paper regarding cancer research with humates. Natural humic acid administered prophylactically to rats can decrease significantly the amount of gastric mucus

damage induced with ethanol. Humic acid also significantly accelerated the healing process of experimentally induced ulcers <sup>(52)</sup>.

### **Microbial Interaction**

Humates are known to stimulate microbial activity. In soil testing for microbial activity, levels increased 400 to 5000 times with the introduction of humate (300 ppm) into the soil. Humates added to feed rations stimulate the microbial growth and the extent can be quite large depending upon the species, the culture medium, and the environment (45).

Humic substances have been also known to exhibit anti-microbial properties.

Species for which natural humic substances have been shown to be inhibitory include *C. albican*, *Ent. Cloacac*, *Prot. Vulgaris*, *Ps. Aeruginosa*, *S. typhimurium*, *St. aureus*, *St. epidermidis*, and *Str pyogenes* <sup>(12)</sup>. It seems that within the body, humates stimulate the "good" microbes while suppressing the "bad" microbes. Testing of milk during field trials indicated a large increase of microbes within the milk. This is usually an indication to the dairyman of impending mastitis (tit infection). The opposite actually happened. Mastitis cases within the milking herd dropped from an average of 3 to 4 cases daily to 4 cases in a month <sup>(26)</sup>. Additional conformation of reduction of mastitis was observed in lactating female goats. Three female goats with severe mastitis were administered doses of humate over a two-week period. At the end of 7 days, swelling of the mammary glands had subsided and the goats were back to normal activity allowing the kids to nurse without discomfort.

### **Immune System**

Humates bolster the immune system. Dr. Daryl See, MD, formerly an Immunologist of UCI Medical School, suggests that the mechanism is related to the humates ability to complex (assemble) sugars within the body. The abundance of these complexed sugars allows the body to manufacture glycoproteins that attach to the killer and T cell acting as a modulator or communication link between the cells. This regulates the immune system cells and prevents either the T or Killer cells from becoming out of balance. Excessive killer cells can attack bone and joints causing arthritis. Conversely, excessive T cells can cause auto-immune diseases.

Along this same line, burn victims and radiation sickness experience immune system responses that attack the bodies dead cells creating unwanted infections. Humates cause the immune system to recognize its own dead cells thereby reducing infection. Baylor Medical School is currently researching humates both topically applied and internally dosed for burn victims to reduce infections. Russian scientists are using the same principle for the treatment of radiation sickness. Sodium humate has been found to increase the lifespan of mongrel rats exposed to lethal doses of cobalt radiation <sup>(8)</sup>.

### **Anti-inflammatory Properties**

Humic acids isolated from peat exhibited significant efficacy for adhesions when tested on female rats that had standardized lesions placed on both uterine horns and the peritoneum of the

anterior abdominal wall<sup>(1)</sup>. Humic substances, including peat and sodium humates, are known to exhibit anti-inflammatory properties<sup>(47)</sup>. Inflammatory states of the cervix, especially cervical erosion (generally known as cervicitis) can be treated with humic preparations<sup>(41)</sup>.

Not only does the humate relieve swelling from joint inflammation, it has been shown to bond to the collagen fibers to aid in repair of damaged tendons and bone. Tendon strength has been shown to increase by as much as 75%<sup>(9)(48)</sup>.

### Anti-Viral Properties

Humates are effective media additives for the production of antibiotics in the soil<sup>(45)</sup>. Humic substances have long been known to exhibit antiviral properties<sup>(44)</sup> in particular rhinoviruses<sup>(35)</sup>. Viral pathogens for which soil-extract materials have been shown to be effective include in particular Coxsackie virus A9<sup>(34)</sup>, herpes simplex virus type 1 and 2<sup>(10)(11)(21)(29)(36)</sup>, and<sup>(37)</sup>, human immunodeficiency virus (HIV)<sup>(22)(30)(31)(38)</sup>, and<sup>(39)</sup>, influenza type A and B<sup>(22)(35)(38)</sup>, and<sup>(40)</sup>, as well as other respiratory tract infections.<sup>(33)(34)(35)(37)</sup>, and<sup>(41)</sup>.

**The mechanism whereby humic substances inhibit the cytopathicity of a number of viruses has been studied in some depth. It is thought that the materials prevent viral replicating by sorbing onto the viral envelope protein and thereby blocking the sorption of viral particles to cell surfaces<sup>(31)</sup>.**

Humic acids have also been employed as veterinary medicine therapy successfully employing peat mull (extracted humic acid) to prevent the transmission of foot and mouth disease in pigs<sup>(33)</sup>. Humate is a pharmacy that raises non-specific organism resistance. This fact was confirmed by using such models as atoxic anemia, toxic hepatitis, peptic ulcer and hypercholesterolemia<sup>(15)</sup>.

### Liver Effects

The effect of natural humic acid on the regenerative response of liver tissue has been examined in rats submitted to two-thirds hepatectomy. Long term application of humic acid resulted in the stimulation of ornithine decarboxylase, an increase in spermidine and histamine as well as DNA and RNA levels, and in overall liver mass<sup>(50)</sup>. Humic as well as fulvic acids extracted from peat have been shown to stimulate respiration in rat liver mitochondria when present at concentrations of 40-360 micrograms per ml. Humic substances at concentrations of 40-400 micrograms per ml. also increased the efficiency of oxidative phosphorylation in mitochondria in vitro, particularly after contact periods of over 1 hour<sup>(51)</sup>.

A large part of the humate takes an active part in the liver metabolism. The use of humate plays a role in the liver function and protects it somewhat from disease and/or disturbances<sup>(15)</sup>.

### Detoxifying Properties

Fulvic acid, a component of humate, is a strong chelator. It is unique in its chelating ability. Life sustaining minerals, when chelated by fulvic, are placed in a chemical state (phyto-state) such

that they are readily absorbed by the cell or organism. Toxic heavy metals are also chelated but placed in a chemical state that is difficult for cellular absorption. Fulvic acid in the soil acts as a filter for toxic metals. It will grab the a toxic metal and immobilize it which prevents it from migrating or chemically reacting. When crops are grown on soils deficient in fulvic acid, toxic metals can be absorbed by the plant and passed into the food chain. Many of our foods present today are grown under conditions of "worn out" soil. As a result, more toxic metals are being ingested. Fulvic acid has the capability of removing these toxic metals from the body.

### **Odor Reduction**

Texas A&M University System researchers have discovered that using humate decreases volatile ammonia in animal waste by 64%, reduces odor, and improves the nitrogen to phosphorus ration in the waste. Scientists are developing ration formulations to enhance manure characteristics while maintaining animal performance as well as devising other approaches to maintain feedlot efficiency and manage waste<sup>(25)</sup>. Observations from field trials on dairy animals indicate a more complete digestion of feed as observed from the manure and urine. Manure from the humate test herd consisted of fine particle, low odor matter while control animals contained lumps of corn and straw and high ammonia odors. Urine from the test herd was clear and odorless while the control herd was amber with odor<sup>(25)</sup>. A similar effect has been observed on hogs. Hydrogen Sulfide (H<sub>2</sub>S) (rotten egg odor) has also been reduced by the addition of humate to the mix. Wagner Quarries Company has demonstrated reductions in H<sub>2</sub>S by humate interaction. The mechanism is not fully understood, but results indicate good odor reduction<sup>(23)</sup>.

### **Miscellaneous Properties**

Chemically (strophantinum) induced heart stoppage in frogs was examined. Frogs that were given humate continuously for 10 days prior to the drug increased the time of heart activity 48.7% in comparison with the control group. Additionally the protective property of the humate was revealed when toxic doses of strychnine (inhibits metabolism in the central nervous system) were administered to test mice. Those mice (70%) given humate 10 days prior to the treatment lived while 100% of the control died<sup>(15)</sup>.

## **CASE HISTORIES ANIMAL USE**

### **Beef Cattle**

Texas A&M under the leadership of Dr. Chirase performed humate feeding trials on steers at a feedlot in the Amarillo area. Reported results of the 56-day study indicated a 12% increase in feed efficiency. Manure samples were of a fine texture with reduced odor. Blood data indicated increases in hemoglobin and antioxidants<sup>(53)</sup>. Follow up testing on the odor indicated a 64% reduction in ammonia from the animal waste when humate was mixed into it<sup>(24)</sup>. A farmer in Waco, Texas, mixed humates into the rations of a mature cow and three calves. Reports after 60 days indicated coloration and health of the animals to be excellent. Weight gain on the calves was reported to be above the norm. Although no usable data was collected on this test, the cattleman did report something that was significant. He had been trying to breed the cow over a three-year period without success. During the testing period, the cow became pregnant.

## **Dairy Test**

Canton, Texas. This test was run on 500 high producing dairy cattle over a 28-day period. Milk, blood and animal waste were analyzed before, during and after the testing period. The introduction of the humate into the diet produced 1.9 pounds of extra milk daily per animal. The feed consumption dropped from 38 lbs. per day to 36 lbs. per day during the test. At the conclusion of the test period, consumption returned to 38 lbs. With these changes in feed quantities, it can be concluded that the animal was digesting its nutrient more completely, thus creating greater milk production. Additionally the humates produced a calming effect on the animals as exhibited by lowered aggressiveness in eating and reduced the effects of heat stresses produced by summer temperatures. Lactation decline curves flattened significantly during the testing period. This indicates that longer milking periods can be achieved raising the cumulative amounts of milk received from each cow. Odors from the animal wastes were reduced. Less volumes of manure and reductions in ammonia odor results in less waste and reduces the effects of potential insect born diseases <sup>(26)</sup>.

## **Goats**

Sunset, Texas. Nursing female goats were experiencing mastitis (tit infection) and would not allow the kids to nurse. Humate was introduced into the ration and within one week all infection had cleared up.

Brady, Texas. Angora goats are being fed humate to improve the quality of the wool. Reports from the wool buyers indicate that the humate fed goats have longer staple and more lanoline in the wool. Pricing on angora wool is based on quality.

## **Hogs**

Dr. Matt Colvin, DMV reports that he is using humates in the diet to treat scours in piglets. His experience with the humates indicates that it is a very effective treatment. Additionally, he is reporting additional weight gain with meat that is lean with good textured and excellent taste. Reproduction from the humate fed sows is excellent and produces larger than normal piglets.

## **Rattan (Ostrich, Emus)**

Clayton, New Mexico. A farmer raising ostrich has reported plumage development on young birds has been accelerated. Eggshell development is excellent and uniform. The yokes are reported to be firmer. A greater percentage of hatchings are being produced. The farmer also reported that hoof rotation has ceased to be a problem. Hoof rotation is a problem on long legged animals. It results when tendon and muscle grow faster than bone in young animal and results in a clubfoot. Prior to the humate, the farmer was experiencing about 5% of his young birds experiencing some degree of hoof rotation. Since the introduction of humate, bone growth has kept up with muscle grown and reduced hoof rotation problems to below 0.5%.

Waco, Texas. The farmer was raising emus. Since the market price on emus had fallen, he was allowing the flock to forage and supplementing with millet (a low cost feed). At the time the

humates were introduced into the diet, the birds were in poor to fair shape. Hot summer temperatures had taken their toll on the birds and plumage and skin were in poor condition. Humate was fed over a 60-day period. The health of the birds greatly improved and plumage became excellent with bright coloring. Under hot dry conditions the females do not start the reproduction cycle until late fall when the summer heat breaks. The females in this flock started the reproduction cycle in mid September (still hot). The only way this can happen is for the bird to be in excellent health.

### **Chickens**

Purcell, Oklahoma. Two pens (20 each) of newly hatched chicks were used for a test and control. The test birds were fed humate in the diet while the control was not. Feather development came earlier on the humate birds. The test group was fully feathered a full week ahead of the control group. Weight gain of the test group after 30 days amounted to 1.5 pound more mass than the control group. Of notice was the calming factor of the humate. One could enter the test pen and the birds continued with their normal pecking and wanderings while those in the control pen would become extremely excited and run with wildness. The test was continued onward for a period of six months. The mature birds were monitored for egg production. Eggs shells from the humate group were thicker and more uniform in size. Hatchling chicks from the test group were larger and more active.

### **Horses**

Excerpt of letter from cutting horse owner in Boyd, Texas. "I started using humate in my horses 6 years ago. I have found that even in the winter when the animal's hair is long and coarse, that my horses have a deep, rich, shining coat and bright eyes. They are very alert but not hyper. I haven't had a sick horse in years and their hooves grow well and hold a shoe extremely well. My horses overall health and performance, since I have been feeding the humate is excellent."

Willow Springs, Texas. Willow Springs is the site of a large training area for racing and cutting horses for the Dallas Fort Worth metroplex. The training regimen for these animals is quite intense. Front ankle injuries with swelling are quite common and require several weeks of inactivity to heal properly. This inactivity extends the expensive training time. Several of the trainers tested the humates in their animals. They found that healing times for the ankle injuries were reduced by one to two weeks. In timing trials, the humate horses were performing better. It is not uncommon for a quarter horse on humate to be able to shed a few tenths of the second on his time. In quarter horse racing those few tenths can mean the difference between winning and losing. Fort Worth, Texas. This horse was a successful registered western pleasure paint that suddenly came up with severe degenerating hooves. The attending farrier hadn't seen such a severe case in years. On all four hooves, there was insufficient nail to place a shoe. Humate was introduced into the ration. Hoof grow out was immediately outstanding. Shoes were able to be put on in about 4 to 5 months and the horse was back in the show ring. The farrier was shocked at the improvement.

## HUMAN TESTIMONIALS

Excerpt from letters:

Male, aged 63, Boyd, Texas. "I feel I need to respond about the wonderful qualities I have found in my six plus years use of your natural humate product. I found my skin and complexion to improve; the graying in my hair changed to the deeper richer color of my original hair color and my all around health has improved greatly. I haven't been to the doctor in years, no colds, allergies, etc."

Male, aged 72, Fort Worth, Texas. This individual has been taking the humate for a period of 7 years. Before and during the period he has been taking the humate, he has taken a yearly physical under the same doctor. These physicals require two to three days in the hospital for testing, poking and probing. The doctor was notified of the humate and has watched for signs of body change from the 30 years of history accumulated on this individual. Yearly medical reports from the doctor indicate the overall health of the individual has improved. Blood oxygen has increased and fatty cholesterol levels have lowered without changes in diet. Heart functions have improved on a yearly basis. The doctor has noted no ill effects from the humate and has advised the individual to remain on his current regimen of humate. During the seven years, the individual has only experienced one case of sinusitis and no cases of flu or colds.

Female, aged 38. Raton, New Mexico. This individual has had a history of anemia. After 60 days on humate, the anemia conditions went away. That was five years ago and the condition has not returned. Her doctor has confirmed these facts and now recommends humate for his patients with anemia problems.

Female, aged 13. Cincinnati, Ohio. This young female was experiencing anemia. She had received the humate from a friend and began taking it without her parent's knowledge. Her father is a medical doctor and learned of her activities during a physical examination. The anemia was not present and he questioned her to see what lifestyle changes she may have made. The doctor, after researching, now commonly prescribes humate to help build up his patients health.

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