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 [(48)]. 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 [(1)]. Literature reports additional transport of iodine from foods into the thyroid glands [(2)]. 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 forth 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 prophylacticly 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 [(52)].

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 [(12)]. 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 [(26)]. 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 [(8)].

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

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% [9] [48].

Anti-Viral Properties

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

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 [31].

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 [33]. 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 [15].

Liver Effects

The effect of natural humic acid on the regenerative response of liver tissue has been examined in rats submitted to two-thirds hipatectomy. Long term application of humic acid resulted in the stimulation of omithine decarboxylase, an increase in spermidine and histamine as well as DNA and RNA levels, and in overall liver mass [50]. 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 [51].

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 [15].

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 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. Scientist are developing ration formulations to enhance manure characteristics while maintaining animal performance as well as devising other approached to maintain feedlot efficiency and manage waste [25]. 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 [25]. A similar effect has been observed on hogs. Hydrogen Sulfide (H2S) (rotten egg odor) has also been reduced by the addition of humate to the mix. Wagner Quarries Company has demonstrated reductions in H2S by humate interaction. The mechanism is not fully understood, but results indicate good odor reduction [23].

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 [15].

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