

## Reed-Sedge Peat (RSP) As a Feed Supplement for Animals

Reed-Sedge Peat (RSP) is all natural material and a source of biologically active substances, not only for agriculture but also in human and animal medicine. Various peat extracts have been successfully applied to a variety of clinical applications. RSP derivatives are viewed as a traditional preventive and therapeutic agent against gastric and digestive problems such as hyperacidity, diarrhoea, gastric ulcers, dysentery etc. (Kuhnert et al., 1989, 1991; Roost et al., 1990; Banaszekiewicz and Drobnik, 1994). Externally applied preparations are used for the treatment of dermatitis, haemorrhage, phlebitis, myorrhhexis, muscular induration and contusion, joint luxation, vertebral affliction (cervical and lumbar vertebrae), rheumatoid diseases, ischalgia, arthrosis, arthritis, osteomyelitis etc. (Kotwica et al., 1976a,b; Callies and Kaiser, 1978; Lotosh, 1991; Eichelsdorfer, 1992; Riede et al., 1992; Praetzel, 1993; Banaszekiewicz and Drobnik, 1994; Siderov and Mamiliaeva, 1994; Bellometti et al., 1997; Olivera et al., 1997; Beer et al., 2003a,b).

For farm animals, RSP derivatives are used on bedding. Its structure and soft characteristics exerts beneficial effects on the prophylaxis of animal limb abrasions (Lyons, 1996; During et al., 1998). Due to its absorbent capabilities, RSP can reduce the production of odorous emissions in farm environments as well as various environmental pollutants (Abbes et al., Logan et al., 1997; Jappsson, 1998; Rizzuti et al., Japsson, 1998, Rizzuti et al., 1999; Hartikainen et al., 2001; Martens et al., 2001; Picot et al., 2001; Choi et al., 2003; Heavey, 2003; Tymczynna et al., 2004).

Recent interest of farmers in the use of RSP as a feed supplement has increased leading to the emergence of peat preparations onto the market. RSP is especially recommended for the stimulation of growth and the immune system of piglets and sows (Pavlik et al., 2003). The high content of both beneficial humic substances in RSP other organic and mineral substances, easy application, absence of side effects of humic substances (allergy, resistance) and the absence of residues in products of animal origin (Kuhnert et al., 1989, 1991; Lange et al., 1996a,b) indicate that RSP can be used in animal nutrition. It does not provide calories, but has various health benefits.

RSP can be successfully used as an additive in animal feed. Various research trials conducted worldwide have all showed positive results concerning the use of RSP as an organic feed ingredient. Increases in live weight of animals, improved growth rates, increased feed intakes and improved feed conversions ratios and a stronger resistance against diseases are the common results of these trials. By improving immune function of animals, especially of young animals, RSP also reduce the incidence of enteric disease and diarrhoea.

Mass livestock production and confined animal husbandry throughout the globe has had undesirable impacts on the nature of animals, i.e. the natural development of animals and their immune systems, and to treat diseases sub-therapeutic and

therapeutic antibiotics have been used extensively as growth promoters in livestock production. Recently, however, the negative effects of such growth promoters and therapeutic antibiotics on animal and human health has been questioned.

As a result of increasing consumer pressure and in particular concerns about increased microbial resistance to antibiotics, a ban on the use of antibiotic growth promoters in animal feed has been already introduced in Germany recently. Already back in 1998, the European Union had banned antibiotics important in human medicine from use as growth promoters in livestock production. Other countries, including USA, have and are making sincere efforts to accomplish same.

There is considerable evidence that antibiotic arsenals are being depleted due to the development of resistant organisms. The more microorganisms that become resistant to antibiotics, the greater the risk of a resurgence of untreatable infectious diseases. The overuse of antibiotics not only in human medicine but also in livestock feeding is the major cause of antibiotic resistance in food borne illness.

Almost 80% of antibiotics used in animal husbandry today are not used to treat sick animals, but merely to promote efficient growth of chickens, cows, pigs and aquaculture.

There is a number of animal feed additives in the market currently that do not contain any antibiotic antimicrobial substances. These are mainly probiotics, prebiotics, postbiotics enzyme, plant essential oils, extracts and organic acids All are presently enjoying a resurgence of interest following the EU-wide ban on antibiotics and US and worldwide consumer demands.

Probiotics providing beneficial microorganisms to the natural microflora of the digestive system. Probiotics, prebiotics and postbiotics have beneficial effects on the immune system of animals. But limited astringent effects on the mucous membrane of the gastero-intestinal tract.

Plant extracts are believed to be beneficial for the digestive system, Organic acids also have shown positive results.

RSP improves diet digestibility as a result of maintaining optimum pH within the gut, resulting in lower levels of nitrogen excretion and less odour. By improving digestibility and food utilization, RSP improve gastric and intestinal conditions of animals, as well as improving physical and financial performance, RSP also has a positive impact on the environment by improving digestibility of feed nitrogen utilization and manure management.

Replacing antibiotics with RSP as animal feed supplement leads to increased milk production and increased butterfat percentage in dairy cows. Using RSP is also resulted in improved feed efficiency, decreased feed costs, reduced fly population and

reduced cost for insect control. Furthermore, the weaning weights increased and faster weight gains are observed in dairy cows, while problems with scours greatly decreased. Also, RSP improved the animal's resistance against stress factors such as heat.

One of the most beneficial effects of RSP on animals is the overall immune response increase in animals. By improving immune functions in the animal, RSP is able to reduce the incidence of diarrhea and other digestive upsets to a considerable extent as well as to improve the animal's defenses against pathogens such as E.coli, Salmonella and other opportunists gut pathogens.

RSP is able to form a protective film on the mucous epithelium of the gastrointestinal tract against infections and toxins. The macro colloidal structure of RSP ensures a good shielding on the mucous membrane of the stomach and gut, the peripheral capillaries and damaged mucous cells. As a result of this process, 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 feed switches are made. RSP also helps to prevent excessive loss of water via the intestine.

RSP has the ability to influence in particular the metabolism of proteins and carbohydrates of microbes by catalytic means. This leads to a direct devastating effect against bacteria cells or virus particles. A second mechanism is related to the inter ionic bonds of high-molecular protein fractions (toxins) of infectious microbes. Their toxic impact on physiological processes of mucous membrane cells can be weakened considerably or even blocked completely.

Dermal, oral or subcutaneous application of RSP leads to inhibitory effects on inflammation. The ability to inhibit inflammation is believed to be related with the flavonoid groups contained in RSP.

As high-molecular RSP remain in the gastro-intestinal tract almost entirely following the enteral application (there is no self-resorption), antiresorptive and adsorptive effects take place where they are needed in the digestive tract. Primarily cationoid noxes (protein toxins, toxic substances) are fixed, their resorption is reduced considerably or even prevented completely and their elimination through faces is promoted. As adsorption by RSP includes not only physical and chemical reactions, but also complex formation and ion-exchange, it is more intensive and dynamic compared to pure physical adsorbents.

RSP stimulates the resistance forces of the body and leads to an increase in phagocytosis activity. This inducer effect is believed to be due to the phenolic components in RSP and is the basis for the success of the treatment of the so-called factor diseases in young animals.

RSP stabilize the intestinal flora and thus ensures an improved utilization of nutrients in animal feed (improved feed efficiency). This leads to an increased in live weight of the animal without increasing the amount of feed given to the animal.

RSP is purely natural. Its use in animal feed excludes any possibility of antibiotic residue or microbial resistance. Simultaneously, as a result of a improved food conversion rate and enhanced absorption of nitrogen by the animal, nitrogenous wastes and odour are reduced. Humic substances in Reed-Sedge Peat, such as humic, fulvic, ulmic acids and humins are major naturally occurring biological components. RSP also contains stable humified substances, such as hemicellulose, cellulose, lignin, pectins, bitumens, waxes, resins, nitrogenous materials, lipids, amino acids, organic sulfur, non-saturated and saturated fatty acids, various types of carbohydrates, ethereal oils, balsam, bioterin and tannic acid (Andriessc, 1985; Hruska, 1988; Rieda, 1992; Banaszkievies and Drobnik, 1994)

RSP is AAFCO (Association of American Feed Control Officials) and OMRI (Organic Material Review Institute) approved product.

(Listed references available upon request)

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