



NATURAL BEDDING FOR ALL ANIMAL SPECIES WITH A DISINFECTANT AND ABSORPTIVE EFFECT ON THE STALL ENVIRONMENT

Supports the productivity and well-being of animals | Reduces the occurrence of respiratory and physical diseases | Withholds and absorbs emission gases | Significantly increases the use of bound ammoniacal nitrogen for soil fertilization and thus improves plant nutrient intake | Improves the economy and effectivity of plant and livestock

HUMAC® Welfare is a black-brownish powdery or granuled (8 mm) product with a high content of humic acids. The basic material is Leonardite - a 100% natural substance with a high biological effectivity. This preparation has no added substances.

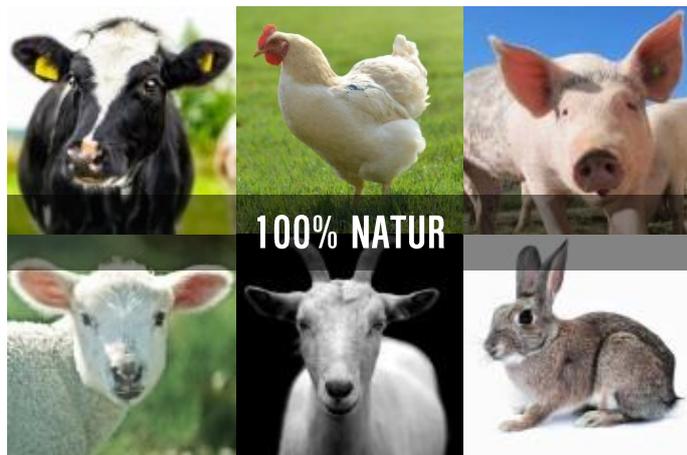
The application of **HUMAC® Welfare** on bedding **significantly supports the stabilisation of zoohygenic conditions and the productivity health and wellbeing of bred animals**. In their natural form, humic acids belong among natural antibiotics, which are sought by animals themselves if ill or injured.

Humic and fulvic acids are the effective substances of the product. Aromatic polymer compounds with a complex structure, significant physicochemical properties and a large specific surface, have a significant ability to **withhold and bond harmful substances into their structure, such as: emission gases (ammonia, methane, hydrogen sulphide, CO₂, CO, N₂O, NO,...), toxic substance leftovers, microbial poisons, fungal toxins and poisonous compounds (PCB, dioxins, heavy metals, pesticide remains, herbicides)**, which got into the stored manure either via faeces, digestive system or are contained in contaminated bedding.

Adjusts the pH of liquid manure to acidic resp. neutrally (pH up to 7) when the ammonia in liquid manure occurs mainly as a stable ammonia ion (NH₄⁺), while an alkaline environment (pH above 7) forms humifulvia, which absorbs volatile ammonia well.

The content of minerals and trace elements in the product is also substantial, as they significantly enrich the manure with nutrients via nitrogen bond to humic acid molecules. Thus a **highly effective and quality fertiliser with a natural soil fertility stimulator** (humic acids) **originates**. The application of the product thereby brings economic benefits regarding both plant and livestock production.

Storing liquid manure with the addition of HUMAC® Welfare significantly reduces the loss of ammoniacal nitrogen in a form of emissions. As an inhibitor prevents nitrification of ammonia to nitrates followed by denitrification to gaseous nitrogen. **The liquid manure thus becomes a great resource of easily accessible nitrogen for plant nutrition, even after being stored for a couple of months.**



Via **withholding harmful emission gases** (NH₃, H₂S, CO₂) it effectively protects animals from diseases, mainly respiratory airways and conjunctiva mucosal damage and suffocation.

The unused nitrogen from the feed ratio after excreted from the organism is stabilised to use as a high quality nitrogen source for plant fertilization. Manure in addition with **HUMAC® Welfare** has a significantly **higher C:N ratio, which largely affects the increased soil fertility and improvement of the humification process.**

HUMAC® Welfare improves farming conditions such as:

- Increased livestock production
- Reduced mortality
- Increased share of positive culling
- Reduced share of enforced culling
- Higher number of born animals
- Reduced occurrence of gastro-enteritis
- Reduced occurrence of bronchopneumonia
- Improved physical condition
- Reduced occurrence of musculoskeletal disorders
- Substantial reduction of hoof diseases
- Improved economy and effectivity of breeding

Method of feeding

HUMAC® Welfare is applied by strewing on the bedding in recommended doses and intervals for each animal species.

The product is not toxic, has no withdrawal period or side effects in case of a strew overdose.

Dosage	
On bedding	regular dose 10 - 25 kg / 100m² of the bedding dosed as needed based on the bedding condition on several layers for each animal species within this range
On liquid manure	regular dose 2 - 4 kg / 100 litres of manure

Suitable for large-scale breeding: bovine cattle, pigs, poultry, sheep, goats, rabbits

Packaging: **25 kg, 1000 kg**

Warranty: **24 months** from the date of manufacture, at observing storage conditions.

Suitable for use in organic farming (dependent on local registrations)

Technical parameters	
Humic acids in dry matter	min. 45 %
Other substances in dry matter	
Fulvic acids	min. 5 %
Calcium (Ca)	40 000 mg/kg
Magnesium (Mg)	4 800 mg/kg
Iron (Fe)	18 000 mg/kg
Copper (Cu)	10 mg/kg
Zinc (Zn)	30 mg/kg
Mangan (Mn)	120 mg/kg
Cobalt (Co)	1.00 mg/kg
Selenium (Se)	1.50 mg/kg
Vanadium (V)	40 mg/kg
Molybdenum (Mo)	2.50 mg/kg
all naturally occurring trace elements in a carboxymethylcellulose complex of organic matter	v µg/kg
Properties	
pH	5,6
Humidity	max. 15%





EFFECTS AND PURPOSES OF APPLYING HUMAC® WELFARE

Effects and purposes of applying HUMAC® Welfare

- Significantly withholds and bonds emission gases (ammonia, methane, hydrogen sulphide, CO₂, CO, N₂O, NO...) into its structure, and thus significantly contributes to improved stall air quality and reduced loss of emission gases into the atmosphere.
- Helps to ensure quality air without other inadequately high demands for increased air ventilation also at lower ventilation level.
- Lowers inadequate humidity in the stall with its absorptive abilities.
- By binding ammonia into its structure prevents it from being released into the air after the microbial decomposition of urine (in mammals) and of uric acid (at birds) - release of ammonia occurs within 1 - 2 hours after elimination of excrements.
- Adjusts liquid manure pH to acidic resp. neutral (pH up to 7) when the ammonia in liquid manure occurs mainly as a stable ammonia ion (NH₄⁺), while in an alkaline environment (pH above 7) rapidly changes to volatile ammonia.
- Withholding and binding ammonia is very important for its further effective usage for fertilisation at all poultry - poultry manure in fact contains 2x more ammonia nitrogen per ton in comparison with liquid pig manure and 3x more than liquid bovine manure. Escape of NH₃ is directly proportional to that.
- Unused nitrogen from the feed dose after excreted from the organism is stabilised for its further usage as a high quality and easily accessible source of nitrogen for plant fertilization.
- Application is crucial during summer-time, when ammonia emissions are higher than in winter. Outdoor temperature increased by 1°C subsequently increases the emissions resulting from stabled cattle by 2.6%. Bedding treated with **HUMAC® Welfare** binds ammonia significantly better and reduces its emissions.
- A kilogram of straw can absorb 2 - 5 g of ammonia, after the application of **HUMAC® Welfare**, the absorptive abilities of the bedding increases by 50%.
- The ongoing effect in storage tanks and mainly in unclosed tanks and during warmer periods is crucial. Storing liquid manure with **HUMAC® Welfare** significantly reduces the loss of ammoniacal nitrogen in a form of emissions and prevents ammonia nitrification to nitrates followed by denitrification to gaseous nitrogen, thus the liquid manure becomes a great source of easily accessible nitrogen for plant nutrition, even after being stored for a couple of months.
- The presence of humic acids in **HUMAC® Welfare** significantly affects emissions of other greenhouse gases created by microbiological and biochemical decomposition of liquid and solid excrements.
- When **HUMAC® Welfare** is used in under-grate areas where fattening pigs are stabled on grates, the production of ammonia is reduced by 49% based on the amount of product used. By the application of **HUMAC® Welfare** in pig breeding on floor, the ammonia production reduces by over 40%.
- The occurrence of humic acids in bedding during the period of storing excrements binds toxic leftovers, microbial poisons, fungal toxins and poisonous compounds (PCB, dioxins, heavy metals, pesticide remains, herbicides, etc.), that got in the stored manure via faeces, digestive system or are contained in contaminated bedding.
- Lowers the content of CO₂, that is created by decomposition of unconsumed feed leftovers, but mainly from animal excrements,

especially those that persevere in a deep bedding or in under-grate channels.

Effects on animal health

- Emission gases affect the metabolism mainly of intensively growing animals during fattening at insufficient ventilation. Suffocation may occur under extreme circumstances caused by high concentration of CO₂.
- Ammonia dissolves on upper respiratory tract mucosa and conjunctiva. Ammonium hydroxide forms, that is irritant. If animals stay long in an environment with high concentration of airborne ammonia over 0.05% of the capacity, mass keratoconjunctivitis (inflammation of eye cornea and conjunctivitis), and laryngotracheitis (inflammation of larynx and trachea), spasm of the vocal cords especially at poultry and pigs may occur. Furthermore causes the drop of erythrocytes and haemoglobin, and decreased resistance against respiratory diseases. As soon as a bigger amount of ammonia enters the blood stream, an intense irritation of CNS and medulla oblongata occurs, blood pressure increases followed by spasms, respiratory system paralysis and death.
- Hydrogene sulfide acts toxically primarily on the respiratory system (RS). At higher concentration RS paralysis occurs.

Effects on fertilising quality in plant production

- Significantly increases the use of ammoniacal nitrogen at fertilising - prevents loss of NH₃ in the air and as an inhibitor of nitrification prevents its fast nitrification and losses from soil to ground waters, and thus available for plant nutrition.
- By reducing the leaching of nitrates significantly lowers the accumulation of nitrates in plants and other crops - prevents from contamination of groundwaters.
- The economy of plant cultivation and fertilization improves thanks to nitrification inhibition and to keeping the nitrogen in an ammoniacal (easy to use) form by lowering future nitrogen addition via mineral fertilizers.
- The binding of nutritional components present in animal faeces increases their effectivity and usage by up to 50%.
- Prevents loss of important manure components even if admixed into the soil later on.
- Stall manure with the addition of **HUMAC® Welfare** has a significantly higher C:N ratio, which may greatly impact the increased fertility of manured soils and the quality of the humification process. This results in increased amount of soil hummus, better profit margins, lower costs on mineral fertilizers, protective chemicals and an overall improvement of arable lands.
- Prevents balance disruption of the nitrogen cycle in nature, e.g. by over-application of fertilizers, which results with an excessive amount of nutrients that can cause water pollution and eutrophication on one side, and increased emissions gases that can cause acidification of soils and a greenhouse effect on the other.
- Applying **HUMAC® Welfare** together with stall manure into the soil, supports the reduction of soil acidification, eutrophication of waters and air pollution with ground-level ozone, and reduces ammonia and other substance emissions (hydrogen sulphide, sulphur dioxide, nitrogen oxides, and volatile organic compounds). This is a crucial phase in fulfilling the EU directive on nitrates, that expects a decrease of ammonia emissions by 14% until 2020. The expected arrangements to limit the application of fertilizers would eliminate the penetration of nitrates into water such as ammonia emissions into the air.

