

HUMAC® Natur AFM with a high content of **natural humic acids (65%)** is a natural feed material intended for all types of animals. The product is mixed into the feed as a preventive measure, which supports the reproductive indicators of animals, improves their production health and ensures the production of animal products without residues of foreign substances. It is also used to prevent and support the treatment of diarrheal diseases, dyspepsia and various intoxications. The natural humic acids in the product have the ability to bind various types of toxins, while simultaneously supplying minerals and trace elements in a chelated form that is easily usable in the animal's body. **The high efficiency of the product is ensured by the activation of the raw material** - humic substances by our own technological procedure. The product prepared in this way shows better biological effectiveness in the animal organism.



Activated natural humic acids play a key role in the detoxification of the feed and the body of broilers thanks to their high adsorption capacity. They can bind toxic substances in the animal's digestive system (toxins, heavy metals, PCB substances, etc.) to their structure, which are then excreted in the feces. They support the immune system, activate metabolism and have an antiseptic effect. Furthermore, they reduce barnyard and ammonia odors in the farm by min. 40%. They stabilize the pH in the entire digestive system of animals, optimize digestive processes and support the reproduction and activity of symbiotic microflora. They have a significant impact on increasing meat production as well as improving its quality.

In 2015, the effect of supplementing the diet of broilers with humic acids on their growth performance and carcass yield was tested (Marcinčáková et al., 2015). In the experiment, day-old COBB 500 chickens were divided into two groups of 40 each. The first group was fed standard feed, the experimental group was mixed with 0.6% HUMAC® Natur AFM. Once a week, all chickens were weighed and after 39 days of fattening they were slaughtered and analyzed for carcass yield, breast and thigh weight. In the experiment, the body weight of chickens fed a diet supplemented with humic acids was comparable to a control group without humic acids in the diet, which was due to **lower feed consumption** when supplemented with HUMAC® Natur AFM. **Carcass weight and carcass yield were significantly higher in the experimental group fed HUMAC® Natur AFM** (see table 1).

Table 1. Changes in slaughter parameters without application and after application HUMAC® Natur AFM

Parameter	Control	HUMAC® Natur AFM 0,6 %	Unit	Change
Total weight	2535,0	2498,0	g	- 1,46 %
Carcass weight	1812,0	1922,0	g	+ 6,07 %

Product application in broiler breeding

Breast weight	486,9	516,7	g	+ 6,12 %
Thigh weight	506,3	535,3	g	+ 5,73 %

In 2018, an experiment investigating the effects of humic acids on poultry in stressful conditions was conducted (Vašková et al., 2018). On the farm in Velký Krtíš, chickens were divided into two groups, in the control group fed with standard feed there were 15,700 chickens, in the experimental group where HUMAC® Natur AFM was added to the feed in the amount of 6 g per 1 kg of feed there were 20,000 chickens. 10 animals from each group were sampled before and after transport to the slaughterhouse. It was found that under normal conditions for 42 days, the administration of humic acid has a **significant effect on the excretion of Se**, according to the significant deposition of Se in the kidney tissue, without significantly increased activity of the corresponding enzyme. Overall, the administration of humic acids at a concentration of 0.6% in feed mixtures for 42 days has **the effect of reducing transport stress**.

In 2019, 150 one-day-old (male) COBB 500 broiler chickens were tested for the effect of humic substances in food on fattening, carcass yield, blood biochemical parameters and the mineral profile of broiler chicken bones (Jačuttová et al., 2019). The chickens were divided into three equal groups: 1) the control group, 2) the first experimental group, to which 0.8% HUMAC® Natur AFM was added to the feed and 3) the second experimental group, with the addition of 1.0% HUMAC® Natur AFM preparation. Once a week, all chickens were weighed and feed consumption was recorded daily. The results show that **feeding humic acids** at concentrations of 0.8% and 1.0% tended to cause **an increase in body weight and weight gain**. A higher addition of the preparation (1%) showed a slightly stronger effect on growth parameters. Improved feed conversion ratio was observed at the end of fattening in both experimental groups (see Table 2). Both tested concentrations of humic acids **confirmed a positive effect on the reduction of AST and ALP in the blood** of broilers (Blood enzymes AST and ALP serve as indicators of liver damage) from the experimental groups. They also worked to reduce the concentration of cholesterol in the blood. The addition of 0.8% HUMAC® Natur AFM had **a positive effect on the amount of calcium and phosphorus** (important for bone building) in the blood.

Table 2. Changes in slaughter parameters without application and after application of HUMAC® Natur AFM

Parameter	Control	HUMAC® Natur AFM 0,8%	HUMAC® Natur AFM 1,0%	Unit	Change 0,8%	Change 1,0%
Total weight	2101,8	2113,5	2133,8	g	+ 0,56 %	+ 1,52 %
Feed conversion	1,61	1,60	1,58		- 0,62 %	- 1,86 %

Product application in broiler breeding

Carcass yield	75,78	75,94	76,08	%	+ 0,21 %	+ 0,40 %
Breast yield	26,20	26,38	27,68	%	+ 0,69 %	+ 5,65 %
Thigh yield	26,97	27,35	28,59	%	+ 1,41 %	+ 6,01 %

In the internal research from 2005 in the company Drůbežárna Obytce, an operational trial was carried out on more than 26,000 chickens of the ROSS 308 type. HUMAC® Natur AFM was added to the feed in the amount of 0.7% during the entire fattening period of the experimental group. HUMAC® Natur AFM had an effect on the average weight of chickens and **significantly reduced their mortality**.

Table 3. Changes in slaughter parameters without application and after application of HUMAC® Natur AFM

Parameter	Control	HUMAC® Natur AFM 0,7 %	Unit	Change
Average weight	1,86	1,91	kg	+ 2,69 %
Feed conversion	1,71	1,57		- 8,19 %
Mortality	2,92	0,95	%	- 67,47 %

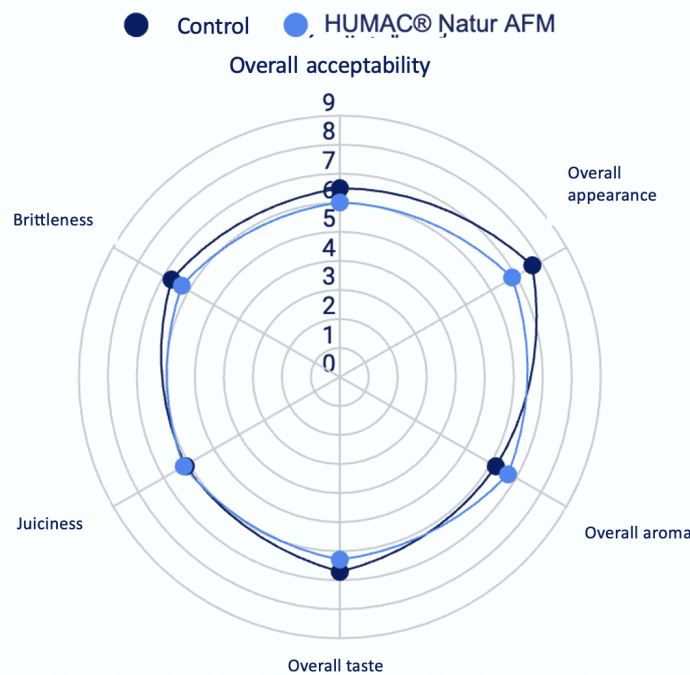
In 2020, a similar experiment was conducted in which the influence of humic substances on the intestinal microflora and the immune response of broilers was investigated (Mudroňová et al., 2020). 100 day-old COBB 500 broiler chickens (males) were divided into two equal groups – experimental and control. The chickens were fed a standard feed mixture, in the experimental group 0.8% HUMAC® Natur AFM was mixed into BR-2 and BR-3. In the experimental group, a **stimulating effect** of 0.8% HUMAC® Natur AFM on **the activity of the immune system and the gastrointestinal tract was observed**. In the experimental group, there was a **decrease in the ratio of enterobacteria** (reduction in quantity) and lactic acid bacteria (increase in quantity) in the intestines of experimental animals with a positive effect on the intestinal microbiota. **These findings indicate that administration of 0.8% HUMAC® Natur AFM has a protective and immunostimulatory effect on broiler chickens.**

Also in 2020, a multiple factor analysis of the physico-chemical and organoleptic properties of breast and thigh meat of broilers fed a diet supplemented with HUMAC® Natur AFM was performed (Semjon et al., 2020). 150 pieces of day-old chickens (male) COBB 500 broilers were divided into three equal groups - one control and two experimental. The chickens were fed with a standard feed mixture, one experimental group was mixed with 0.8% HUMAC® Natur AFM and the other with 1.0% HUMAC® Natur AFM, throughout the fattening period. Both experimental groups showed an insignificant increase in body weight and weight gain compared to the control group of broilers. **The highest average body weight was recorded in the experimental group**

HUMAC 1.0%. Feed consumption was similar in all groups during the fattening period, but there was an **improvement in the feed conversion ratio, especially in the group fed with 1.0% HUMAC® Natur AFM.** No significant differences were noted in carcass yield, but there was a significant increase in breast and thigh meat yield in broilers from the HUMAC experimental group by 1.0% compared to the control group. Thigh meat obtained from broilers belonging to the experimental groups showed increased phosphate content and decreased pH. **The ability of HS to lower the pH in produced breast and thigh meat provides an advantage during storage.**

In 2021, the effect of supplementing the diet of broilers with natural and acidified humic substances on the quality of the breast meat produced was tested (Hudák et al., 2021). In the experiment, COBB 500 HUMAC® Natur AFM was added to standard feed BR1 - BR3 in the amount of 0.7% when breeding broilers.

Graph 1. Assessment of sensory properties of breast meat*



*Overall acceptability, appearance, smell, and taste were rated using a 9-point hedonic scale ranging from 1 (extremely dislike) to 9 (extremely like). Juiciness and tenderness were rated on a scale from "imperceptible" = 0 and "intense" = 9

From the results that were obtained, it can be said that **HUMAC® Natur AFM supplementation significantly affected the composition and quality of breast meat. Meat fat content and pH decreased** and the meat was lighter in color. They also noted a significant effect of **the addition of HUMAC® Natur AFM on meat quality during storage.** The oxidative stability and sensory variables of the meat were better compared to the control (see graph 1). The addition of 0.7% natural HUMAC® Natur AFM represents a good potential for a **significant increase in the quality of the meat produced**, as well as for a **potential improvement in the growth parameters of poultry.**

Product application in broiler breeding

In 2021, the influence of humic substances on selected minerals in the muscles of broilers was tested (Skalická et al., 2021). One-day broilers ROSS 308 were divided into three groups of 30 pieces. HUMAC® Natur AFM was administered to the experimental groups only in the last stage of BR3 feeding (from 30 to 42 days), one in the amount of 0.3% and the other 0.7%. According to the results of this experiment, the use of HUMAC® Natur AFM as a feed supplement contributed to an **increase in the content of Ca and Mg in the breast and thigh muscles of broilers**. Changes in element concentrations observed in chicken muscle after the addition of humates included in this study were due to mutual interactions. The mechanism involves the formation of chelate bonds with elements. **HUMAC® Natur AFM can therefore be considered a feed supplement that positively affects the nutritional value of chicken meat.**

Table 4. Content of some elements in meat without application and after application of HUMAC® Natur AFM

Parameter	Control	HUMAC® Natur AFM 0,3 %	HUMAC® Natur AFM 0,7 %	Unit	Change 0,3 %	Change 0,7%
Ca in breasts	0,43	0,47	0,51	g/kg	+ 9,30 %	+ 18,60 %
Ca in thighs	0,48	0,32	0,51	g/kg	- 33,33 %	+ 6,25 %
Mg in breasts	0,69	0,73	0,80	g/kg	+ 5,80 %	+ 15,94 %
Mg in thighs	0,67	0,67	0,59	g/kg	+ 0,00 %	- 11,94 %
Cu in breasts	11,72	9,35	8,83	mg/kg	- 20,22 %	- 24,66 %
Cu in thighs	11,62	10,07	8,50	mg/kg	- 13,34 %	- 26,85 %
Zn in breasts	26,62	22,45	25,18	mg/kg	- 15,66 %	- 5,41 %
Zn in thighs	28,35	24,38	25,75	mg/kg	- 14,00 %	- 9,17 %

Recommended dosage of HUMAC® Natur AFM for poultry	0,4 - 0,7 % into feed
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Natural feed material with activated humic acids

Product application in broiler breeding



The activated natural humic acids in the product are mixed into any feed that can be fed immediately. They are indigestible and after ingestion pass through the digestive tract, where they have a positive effect on many processes in the body. We recommend applying the product year-round, as it has a preventive effect, especially on diarrheal diseases, and improves the animals' immunity and welfare in the long term. For health problems (diarrhea, etc.), increase the daily recommended amount by 2-3 times for at least 5 days. The preparation has no known side effects or contraindications, however we recommend keeping a two-hour interval between administration of the veterinary medicine. The product has no shelf life.

Economics of HUMAC® Natur AFM product in poultry breeding

An increase in daily gains (by 8%), better feed conversion (by 7%) and a reduction in deaths (by 50%) will ensure a return on the cost of purchasing the product. The overall improvement in health will reduce the need for veterinary drugs.

HUMAC® Natur AFM is suitable for use in organic agriculture for the production of organic food



HUMAC® - Natural humic acids activated for a healthy life

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