

**Institute of Biology and Animal Nutrition**

**Book of abstracts of the 4<sup>th</sup> international symposium  
” BIOLOGY AND NUTRITION OF  
FARM ANIMALS – TOWARDS  
INTEGRATION IN THE EUROPEAN  
RESEARCH AREA”**

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# **Institute of Biology and Animal Nutrition**

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## **Introduction**

The Organizing Committee of the 4th international symposium "Biology and Nutrition of Farm Animals – Towards Integration in the European Research Area" hosted by the Institute of Biology and Animal Nutrition thanks all of you who have responded to our invitation to attend this scientific event. The Book of Abstracts contains your contribution to the success of this meeting and it will be presented too all the participants. The full scientific papers will also be available on CD Rom. The Organizing Committee will also try to publish the Proceedings of the symposium in vol. 8 of *Archiva Zootechnica*, before the time of the event. However, the Proceedings will only include the papers that have been received before the printing deadline. The papers accepted for presentation in the symposium but received after the printing deadline will be published in vol. 9 of *Archiva Zootechnica*.

## **Welcome**

It is a great pleasure to meet again at the 4th international symposium "Biology and Nutrition of Farm Animals – Towards Integration in the European Research Area", more so as we celebrate this year 35 years from the establishment of our institute.

The Organising Committee has worked hard to make a rich, diverse program, which to respond the desiderate of integration within the European Research Area.

The oral presentations, the posters and the discussions on the presented papers will form the forum for updated information which to assist each of us for a better, diversified and in-depth knowledge of the approached topics. They will also allow the establishment new contacts between researchers, professional associations, university professors, decision-making factors from the Ministry of Agriculture, from the Academy of Agricultural and Forestry Sciences, from the Agency of Agricultural Counselling, with private farmers and with trading companies. This will create the prospects for the development of new consortia.

The event hosted by us is in line with the targets of the newly established "Association of Animal Husbandry Nutritionists" – "to promote the scientific information and research by hosting symposia".

The topics of the symposium target the integration in the European research Area by FP6 projects, the safety and quality of animal feeds and products and solutions to boost animal farms competitiveness.

Nowadays, symposium like ours, cannot be organised without the financial help of the Ministry of Education and Research and of sponsors. We are very grateful to the sponsors and to the development department of our institute for their financial and other contributions and for their continuous efforts for support.

I look forward to a successful symposium and wish you an enjoyable, fruitful and pleasant experience.

Doina Valentina Grossu

Chairwoman, Organizing Committee Symposium 2005

# **Influence of the unsaturated fatty acids from different sources on pig meat quality**

Veronica Hebean, Mihaela Hăbeanu, M. Neagu

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## **Abstract**

*A total of 44 Large White pigs assigned to two groups (C and E) were used to assess the handling the lipid structure by an efficient conversion of the fats from different sources (soybean meal + full fat soy beans, rapeseed meal + rapeseeds) included in the compound feed (CF) formulations. No significant difference was observed in the performance of the pigs from either group ( $P>0.05$ ). Feed conversion ratio (4 kg CF/kg gain for group C and 3.91 kg CF/kg gain for group E) was not significant different between the treatments ( $P>0.05$ ). The proportion of intramuscular monounsaturated fatty acids was 7.65% higher and the proportion of intramuscular polyunsaturated fatty acids was 25.37% lower in group E compared to group C. The proportion of monounsaturated fatty acids from the subcutaneous and peri-renal regions was higher in group E than in group C: 51.37 g/100 g fat in group E, as compared to 44.12 g/100 g fat in group C for the subcutaneous fat and 50.69 g/100 g fat in group E compared to 44.00 g/100 g fat in group C for the peri-renal fat. The use of soybean meal in the dietary compound feeds produced a higher content of polyunsaturated fatty acids. The saturated to unsaturated fatty acids ratio was favourable to the unsaturated fatty acids in both groups.*

**Keywords:** *fatty acids, finishing pigs, oil sources, carne, fat around kidneys, subcutaneous fat.*

# The chemical bonds between mycotoxins and cell wall components of *Saccharomyces cerevisiae* have been identified

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## Abstract

*Several studies carried out in vivo during the last decade on animals indicate that addition of yeast cell walls to contaminated feeds alleviate the harmful effects of mycotoxins. The term of mycotoxin binder has been used to characterize the effect of yeast cell wall, but nothing was known on the chemical interactions between the binder and mycotoxins.*

*We showed that  $\beta$ -D-glucans are the yeast component responsible for the complexation of ZEN, and that the reticular organization of  $\beta$ -D-glucans and the distribution between  $\beta$ -(1,3)-D-glucans and  $\beta$ -(1,6)-D-glucans play a major role in the efficacy. Using <sup>1</sup>H-NMR, X-ray diffraction and UV spectral techniques, in association with equilibrium studies with bound and free toxins separated by a dialysis membrane and balanced according to various environmental conditions, we showed that weak hydrogen and van der Waals bonds are involved in the chemical complex formation between ZEN and  $\beta$ -D-glucans. Thus, the chemical interaction is more of "adsorption type" than "binding type". Molecular modelling was performed to validate the concept on other mycotoxins such as aflatoxin B1, deoxynivalenol and patulin. The potential energy of the formed complexes was calculated and used to estimate their stability.*

**Keywords:** *Mycotoxins; binders, yeast cell wall;  $\beta$ -D-glucans; animal production.*



# Evaluation of nutritional value and safety of the green micro-algae *Chlorella vulgaris* treated with novel processing methods.

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## **Abstract**

Three green micro-algae *C. vulgaris* (C1) preparations were investigated – singly spray dried; electroporated and spray dried, and ultrasonized and spray dried. Nitrogen-balance study was accomplished. Ultrasonized *C. vulgaris* was investigated for its safety in prolonged (33 days) feeding study. Apparent crude protein digestibility for spray dried *C. vulgaris* was  $46.9 \pm 12.7\%$  (mean  $\pm$  SD), for electroporated *C. vulgaris*  $44.3 \pm 7.5\%$ , for ultrasonic treated algae  $56.7 \pm 13.7\%$ . PER was  $1.4 \pm 0.3$ ;  $1.0 \pm 0.5$ ;  $2.1 \pm 0.3$ , respectively. N-balance was  $41.86 \pm 32.8$  mg;  $31.3 \pm 17.3$  mg; and  $66.7 \pm 30.1$  mg, respectively. The differences between nutritional parameters for ultrasonized and electroporated *C. vulgaris* were statistically significant ( $p < 0.05$  in HSD-Tukey test). There were no negative effects of algal feeding on blood biochemistry and hematology. Histology of gut, livers and kidneys revealed no changes in organ structure. The digestibility of *C. vulgaris* was enhanced by ultrasonic treatment and reduced by electroporating, thus the ultrasonication may be a helpful technological process in practical processing of the green micro-algae in food industry. Furthermore, feeding green micro-algae has shown no adverse effects and so there is no hazard combined with feeding the animals with the micro-algae.

**Keywords** *Chlorella vulgaris*, nutritional value, digestibility, uric acid, allantoin, rats, safety

# Effects of organic selenium (Sel – plex) administered in reproduction sows on production indices in piglets

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## **Abstract**

*Research was performed on Pig Complex Iernut, county of Mureș on ten F1 hybrid (Large White x Landrace) sows divided in 2 groups during 60 days. The sows from experimental group, 2 received organic Selenium (Sel-plex) supplements in total mixed ratio for 60 days (last 30 days of gestation and first 30 lactation days) in proportion of 0.03%. During experimental period, piglets from both groups were weighted at 3 days of age, 21 days of age, and at weaning (30 days of age). The following parameters were recorded: evolution of body weight, average daily gain, and feed consumption. The use of organic selenium (Sel-plex) in sows both in pregnancy and lactation in proportion of 0.03% led to increase of piglets' body weight at weaning by 8.25% and average daily gain by 8.20% and a better feed rend valuable.*

**Keywords:** *sows, piglets organic selenium, Sel-plex*

# The effect of including pea in diets for growing-finishing pigs on performance and meat quality

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## Abstract

*The objective of the current experiment was to evaluate the effects of including peas in rations for growing - finishing pigs. Quality of grower diets for fattening hybrid pigs in weight categories 35-65 kg were tested in a feeding trial. The main source of proteins in control group K was the soybean meal (15.4%) and in experimental group P1 was the soybean meal partly replaced by 15% native pea eventually 15% extruded pea. During the finishing phase pigs (weight categories 65-105 kg) receiving finishing diets with total substitute soybean meal partly replaced by 30% native pea eventually 30% extruded pea. Feed was provided on an ad libitum basis and free access to water. The utilization of nutrients in the tested diets was assessed in balance experiments. Individual pig weights were recorded at the beginning of the experiment and every two weeks thereafter and consumption of feed mixtures. The animals were slaughtered in 150-165 days of age when they achieved the live weight 103 kg. We determined the parameters of fattening capacity, carcass value and meat quality after the slaughter. Physical characteristics and chemical composition were determined in musculus longissimus dorsi by standard method according to the norm STN 57 0185. The musculus longissimus dorsi were homogenized and analyzed for individual nutrients. The data were evaluated with common statistic methods. The differences between groups were evaluated by the variance analyses (ANOVA) and F-test. Utilization of home sources of proteins could be interesting also for the pork producers from the economical point of view. Our results demonstrate that pea can be included in the feed mixture instead of soybean meal without decreasing of the fattening capacity, carcass value and meat quality. Meat quality expressed in pH value, colour and electric conductivity did not show statistically significant differences in the studied groups. Qualitative parameters and chemical composition of longissimus dorsi muscle did not differ significantly. Present results show the suitability of 30% peas in feed mixtures fit for production of pigs meat of good quality. Producers should not hesitate including pea in their diet formulation.*

**Key words:** *Pea; nutrients; digestibility; pigs fattening; meat and carcass quality*

# Nutritional assessment and fate of DNA of roundup ready maize using rats

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## Abstract

*This study was conducted to compare chemical composition and nutritive value of conventional and transgenic (Roundup Ready) maize. Chemical methods were used for nutrient content determinations. Effective degradability and its characteristics were determined by in sacco method, and intestinal digestibility by mobile bag method. Crude protein content in conventional maize was 97.3 g.kg<sup>-1</sup> DM, and 96.6 g.kg<sup>-1</sup> DM in transgenic maize. Effective degradability of organic matter reached up to 59.9 and 62.3 %, and ileal digestibility of crude protein non-degradable in rumen was 92.9 for modified and 96.1 % for conventional form of maize. Our results suggest that chemical composition and nutritive value of RR maize is equivalent to its isogenic form.*

*Second object was to analyse foreign DNA present in experimental feed mixture that contained genetically modified Roundup Ready maize. The presence of cp4 epsps fragment from transgenic maize and zein gene fragment by PCR method. We used the amplified fragment of glyceraldehyde 3-phosphate dehydrogenase from rat's genome as control. Samples analysis showed individual variability of studied fragments presence of transgenic maize and  $\alpha$ -zein gene fragments in individual animal organs and among animals. It was demonstrated that presence or absence of studied DNA fragments (cp4 epsps and zein gene fragments) in organs of animal fed RR maize does not depend on content of genetically modified maize in feed mixture for experimental animals.*

**Keywords:** *Roundup Ready maize, rats, DNA, fragments, PCR, nutritive value, degradability*

# **Effect of using rapeseeds or rapeseed meal as only protein sources on the feed intake, weight gain and feeding efficiency of fattening steers**

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*Institute of Biology and Animal Nutrition, Balotești*

## **Abstract**

*The effect of including two levels (30% and 50%) of two sources of plant protein (rapeseeds or rapeseed meal) in compound feed formulations on the feed intake, weight gain and feeding efficiency of Maramures Brown fattening steers (237 to 267 kg initial body weight), was investigated. The steers were assigned to four groups differing as protein source and dietary level. Barley silage was the only bulk forage; the animals had free access to both the compound feed and to the bulk forage. The use of both ground rapeseeds and of rapeseed meal in the compound feeds for fattening steers was more efficient when their proportion was about 30%: higher weight gains (1352 and 1336 g/steer/day) and lower energy and protein consumption (5.10 and 5.29 C<sub>FU</sub>/kg gain; 441 and 518 g IDP/kg gain).*

**Keywords:** *rapeseeds, rapeseed meal, intake, weigh gain, feeding efficiency, steers.*

# Arabian horses genotyping using seventeen microsatellites

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## Abstract

*The use of DNA technology for analysing microsatellites is increasing every day. Microsatellite markers are evenly distributed across genome and can be identified within DNA samples using PCR. Genetic diversity of horse populations were analysed using 17 microsatellite markers. The DNA loci analysed – AHT4, AHT5, ASB2, HMS2, HMS3, HMS6, HMS7, HTG4, HTG6, HTG7, HTG10, VHL20, ASB23, ASB17, LEX3, HMS1 and CA425 – were chosen based upon the polymorphism detected in other breeds. This technology has great potential for use in horse breeding situation where levels of genetic variation could be monitored and inbreeding controlled in a commercial breeding program and provides a more efficiently and sensitive method for parentage and individual identification.*

**Keywords:** *microsatellites, polymorphism, genotyping, Arabian horse.*

# **Productive effect of replacing the dietary soybean meal by various levels of rapeseed meal in broiler diets supplemented with enzyme preparations**

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## **ABSTRACT**

*The biologic test involving the use of rapeseed meal as replacer of the soybean meal, with or without supplemental enzyme preparations, used 1680 Ross 308 broilers throughout the age period 0-42 days. The broilers were assigned to 6 groups: two control groups (M, MK) and 4 experimental groups (E1, E2, E1K, E2K), with 280 broilers per group (6 groups × 2 replicates × 140 broilers). The trial a control formulation (based on corn, wheat, full fat soy, soybean meal, oil and fish meal) and two experimental formulations in which the soybean meal was replaced by rapeseed meal as follows: 25%, 34.50% and 38% in E1; 50%, 66.15% and 74.14% in E2, according to the developmental stage. The three formulations have also been supplemented with 0.5g enzyme complex (beta-glucanase, endo-beta-glucanase, alpha-amylase, bacilolysine and endo-beta-xylanase) per kg feed (groups MK, E1K and E2K). The experimental results show that the rapeseed meal can be used in the compound feeds formulations for broilers replacing 25% of the soybean meal without affecting broiler performance. Diet treatment with „Kemzyme VP Dry” did not influence significantly broiler performance. Soybean meal replacement by rapeseed meal in excess of 25% was not justified even with enzyme treatment, even though the economic efficiency was improved due to the lower cost of the rapeseed meal..*

**Keywords:** *soybean meal, rapeseed meal, enzymes, broilers, gain, feed conversion ratio, cost*

# Growth performance of “underprivileged” piglets fed using an electronic milk dispenser

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## Abstract

*The experiment was performed on “underprivileged” piglets (underweight at birth), artificially fed ad libitum using an automatic milk dispenser, until weaning (at 28 days of age). The following parameters were determined: milk and prestarter feed intake, body weight and average daily gain (weekly, up to 70 days of age) in comparison to their brothers from the litters they were extracted from. Until weaning, the “underprivileged” piglets achieved an average daily gain (ADG) 11.22% lower and a milk intake (sow milk equivalent) 40.5% higher. After weaning, at 70 days of age, the “underprivileged” piglets achieved an ADG 32.41% higher and a prestarter feed intake 48.42% higher compared to their brothers weaned by the sow.*

*“Underprivileged” piglets can be recuperated by milk feeding using an “artificial sow” if taken from their mothers in a timely manner.*

**Key words:** *“underprivileged” piglets, artificial feeding, automatic milk dispenser*



# Rheological study on the ruminal fluid in small ruminants

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## Abstract

*Cereals are the main energy source of the animals diets subjected to fattening, however a small part of these diets starch is actually digested by the enzymes produced by the ruminants. From the literature data we found that the high level of the cereal share in the feeding diets in ruminants leads to the marked increase of the ruminal fluid viscosity, thus depreciating the ruminal digestion process. (2,4,7) The ruminal fluid characterized by the flowing behavior index  $n$  and the consistency coefficient  $K$ , when using feeding diets with different barley proportions, is a pseudoplast fluid,  $0 < n < 1$ , thinning at shearing. The apparent viscosity of the ruminal fluid when using feeding diets containing increased proportions of barley, increases with the increase of barley proportion, as follows: for a barley proportion of participation of 60%, the apparent viscosity of the ruminal fluid increases 2.5 times compared to control (diet based on alfalfa hay 100 %); from 0.92 mPa s (M) to 2.32 mPa s (R3) before feeding and from 0.88 mPa s in control to 2.21 mPa s (R3) at three hours from feeding.*

**Keywords:** *sheep, rumen, viscosity, cereals*

# **Performance of dairy cows fed with high moisture whole plant maize silage inoculated with *Pediococcus acidilactici* and *Lactobacillus plantarum***

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## **Abstract**

*Whole plant maize (DM 241 g kg<sup>-1</sup>) was ensiled into two ferroconcrete trenches of 100 t each. Two treatments were applicable 1) untreated (UT), 2) treated with the lactic acid producing bacteria 2 *Lactobacillus plantarum* and 2 *Pediococcus acidilactici* and Enzyme – Cellulase (I). In the research fermentation quality of the silages was analyzed, aerobic stability measured, forage intake and milk yield of dairy cows studied. Compared with the control less ( $P<0.01$ ) WSC were fermented in to organic acids. Inoculation resulted in a significant increase ( $P<0.01$ ) of the lactic acid concentration and numerically decrease of the acetic acid concentration and prevented the butyric acid fermentation. Ammonia-N concentration was significantly lower ( $P<0.01$ ) in inoculated silage compared with untreated. Inoculation lowered dry matter losses and improved digestible value of the silage. Treatment with inoculant had now effect on aerobic stability of the silage. The results also showed that when silage was inoculated, silage intake of dairy cows increased by 1.44 kg DM and energy-corrected milk yield improved by 2.5 kg per cow per day compared with ordinary made silage.*

**Keywords:** *silage, inoculant, fermentation, aerobic stability, dairy cows, milk production.*

# **Phytase as a factor of improving broilers growth performances and environmental protection**

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## **ABSTRACT**

*The aim of this work was to find out the possibility how to increase the availability of phytic phosphorous and, at the same time, decrease phosphorous excretion through faeces into the environment when using phytase in broilers fed diets based on corn, soybean and sunflower meal with reduced level of phosphorous added. In all feeding periods of broilers, the group fed trial mash II with reduced phosphorous level and phytase had higher body weight by 2.0-18.7% during the trial, better feed conversion by 7.0% at the end of the trial and by 17.7% at the end of the second week, mortality lower by 16.7% and decrease of phosphorous level in faeces by 5.4 to 22.4 during the trial. The positive production results obtained in broiler feeding have shown that phytase added affected the increase of availability of trial mashes based on corn, soybean and sunflower meal with reduced level of phosphorous added.*

**Keywords:** *broilers, feed utilisation, phytase, phosphorous excretion, weight gain*

# Investigations on the influence of several enzymatic activators and inhibitors on layer eggshell quality

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## **Abstract**

*This experiment was ported to establish the influence of different Mn and Zn sources, known as enzymatic activators, on egg production and eggshell quality, in a critical period of laying curb, when economical loses are due to poor eggshell quality. To prove the implication and importance of Zn and of the carbonic anhydrase in uterus activity and eggshell formation, one of the experimental groups was treated with an inhibitor substance, acetazolamide. The results of the experiment indicate that the supplementation of laying hen's diet with Mn and Zn has improved eggshell parameters. The most performing values were obtained when diets were supplemented with organic sources of Mn and Zn: compared to control group, at this experimental group the eggshell weight was superior with 0.189g, shell thickness with 0.200 mm, shell deformation with 0.079mm and eggshell strength with 64.45g.*

**Keywords:** *eggshell, zinc, manganese, carbonic anhydrase, shell weight, shell thickness, shell deformation, eggshell strength*

# Effects of feeding mycotoxin binder (HSCAS) at later ages on gastrointestinal environment and metabolism in broilers

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## Abstract

To determine the effects of Hydrated Sodium Calcium Aluminosilicate (HSCAS), a toxin binder, on performance, internal organ weights, pHs of gastrointestinal tract, and some blood parameters two-weeks of feeding trial was conducted on broilers before slaughter. A total of 108, 28 days old Ross 308® broilers were allocated to three groups with four replicates. Diets were mixed to supply; a) no HSCAS; b) 1 g/kg HSCAS; and c) 2.5 g/kg HSCAS. Performance parameters including live weight gain (LWG), feed intake (FI) and feed conversion rate (FCR) were determined weekly and all animals were killed at the end of experiment. Blood samples were taken during slaughtering and in harvested sera of those bloods biochemical parameters were determined. Internal organs were weighed and pH in the crop and duodenum were recorded from the mucosal surface of those organs. The data were analyzed by using General Linear Model and the means were separated by Least Significant Differences at 0.05 level. Orthogonal contrasts were utilized to demonstrate the effect of the addition of HSCAS on the parameters. 100 % pure HSCAS addition to the broiler diets did not have any effect on LWG and FCR. Broilers in 2.5 g/kg supplemented group consumed significantly higher feed than those in other two groups ( $P < 0.05$ ). Carcass weights were not influenced by HSCAS addition. Gizzard weight in broilers in 2.5 g/kg HSCAS supplemented group were significantly lower ( $P < 0.05$ ) than those in no-HSCAS group. In addition, the pancreas weight in 2.5 g/kg supplemented group tended to be lower than those in other two groups ( $P < 0.10$ ). However pHs in the duodenum were not affected by dietary treatment, HSCAS addition significantly increased pH in crop ( $P < 0.05$ ). Serum creatinine, protein kinase and aspartate amino transferase enzyme levels were significantly different among the groups ( $P < 0.05$ ). The results of present study suggest that addition of pure HSCAS to diet may modify performance, internal organ weights, gastrointestinal and biochemical parameters to some degree. Further studies are needed to reveal its ultimate effects and mechanism of actions.

**Keywords;** Broiler, HSCAS, pH, Biochemistry

# From safety feed to safety food: the application of HACCP in mycotoxin control

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## Abstract

*Mycotoxins are secondary metabolites which are synthesized by moulds colonizing plants in fields and during storage. They cause pathological and undesired physiological hazards on human and animal health. The most important contamination source of mycotoxins to animal are preserved forages and cereals, and contamination varies in level depending on the processed stages before and after harvest of raw materials.*

*Animals which consume contaminated feed with mycotoxins suffer from lesions in the mouth, excessive growth of liver and pale aspect of liver, growth of kidneys, immunosuppression, dysfunction of nervous system, fragility of bones, decrease in pigmentation, decrease of egg production and egg weight, lower growth rate. These symptoms vary depending on the animal species and mycotoxins kinds. Domestic animals which consume feeds contaminated with mycotoxins not only get mycotoxins but also carry over these kinds of toxins to meat, milk and eggs altering human health in an indirect way. So, people are faced with the danger of mycotoxins by consuming not only plant products but also animal products.*

*This study aimed to enable the continuity of improving food safety from farm to fork by application of a HACCP system in order to control mycotoxin contamination of raw material starting from the fields until it reaches the farm animals .*

**Keywords:** Food safety, Feed safety, Mycotoxin, HACCP

# Enhancing nutritional quality of sunflower meal in broiler feeding

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## **ABSTRACT**

*The objective of our investigation was to establish the nutritive value of upgraded sunflower meal in broiler feeding, in comparison to decellulosed sunflower meal and soybean meal. Sunflower meal tested contained 44 % crude protein. Upgraded decellulosed sunflower meal significantly improved the nutritive value of basal diet which contained decelulosed sunflower meal (negative control group I). Upgraded decellulosed sunflower meal in broiler diet showed better nutritive value than soybean meal. This was reflected by higher weight gain (6.30%), more efficient feed conversion (6.52 %), higher edible part yield (8.00%), higher share of meat from breast and thighs in live body mass (10.90%), lower share of abdominal fat in live body mass (14.07%) and lower percentage of fat in meat (34.18%)*

**Keywords:** *broiler chicken, feeding, sunflower meal, meat quality, performances*

# **Assessment of mycologic and mycotoxicologic contamination of soybean, sunflower and rape seeds and meals during 2002 – 2004**

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## **Abstract**

*Raw feed ingredients contamination with micromycetes species (fungi or moulds) is a current issue. The presence of fungi contributes to raw feeds degradation affecting thus their nutritive quality, while the toxic secondary metabolites they release accumulate and are endanger animal health. The toxic matter (mycotoxins) released by species of Aspergillus, Penicillium and Fusarium genera forms the major risk of intoxication for farm animals. Furthermore, some mycotoxins may pass unchanged chemically from the forages to animal food (meat, milk, eggs) being thus a risk to human health. The use of antifungal or fungistatic substances destroys the micromycetes but they have no effect on the mycotoxins released before the treatment. 73.68% of the analysed product samples were positive for Aspergillus species, of which A. flavus accounted for 63.15%. Penicillium species have been identified in 52.63% of the analysed samples, while Fusarium species in 32.15%. Species of Rhizopus, Mucor, Alternaria and Mirothecium have been identified in proportions ranging from 2 to 11%. In the absence of adequate treatments which to control the adverse effect of mycotoxins on the animal, the mycological examination, the identification and quantification of the active mycotoxins are the main methods of assessing the quality of raw and finished feeds.*

**Keywords:** *soybeans sunflower, rapeseed, toxicogenic micromycetes, mycotoxins*



# Impact of Fumonisin B<sub>1</sub>, a mycotoxin present in maize, on pig immune response

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## Abstract

*We demonstrated that FB1 alter the IPEC-1 cell morphology and inhibit in a dose dependent manner their proliferation by blocking the cells in G0/G1 phase of the cell cycle. FB1 also decreases the TEER of intestinal cell monolayer and decrease in a dose dependent manner in vitro and in vivo the production of IL-8, a cytokine involved in the recruitment of neutrophils.*

*A prolonged in vivo exposure (28 days) to feed contaminated with 8 µg/g of FB1 significantly decreased the expression of IL-4 mRNA by porcine whole blood cells and diminished the specific anti-Mycoplasma antibody titer after vaccination in weanling piglets. By contrast, ingestion of the toxin had no effect on the total serum concentration of the immunoglobulin subset (IgG, IgA and IgM). Taken together our data indicate that the mycotoxin, FB1 alters both the innate and the specific immune response. This alteration has consequences on pig health it increase pig susceptibility to enteric infection and it decreases immune response mounted during a vaccination protocol..*

**Keywords:** . Fumonisin B<sub>1</sub>, maize, pig, immune response