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ORAL PRESENTATIONS

Grape seed by-product counteracts the oxidative stress and inflammatory response produced by Aflatoxin B1 at intestinal local level in pig

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The aim of the present study was to investigate the capacity of a grape seed by-product (GS) to counteract the toxic effect produced by aflatoxin B1 (AFB1) on several inflammatory and oxidative indices in gut associated lymphoid tissue (mesenteric lymph nodes) of weaned pigs after 4 weeks of mycotoxin exposure. Twenty-four cross-bred weaning piglets (TOPIGS-40) were divided in four experimental groups (control, AFB1, GS and GS+AFB1) with 6 pigs/group and received for 30 days the following diets: 1) control diet consisting in a normal diet for pig after weaning; 2) AFB1 diet: control diet contaminated with 320 ppb AFB1; 3) GS diet: control diet including 8% grape seed waste and 4) GS+AFB1 diet: AFB1 contaminated diet plus 8% GS. Results showed that AFB1 reduced the antioxidant responsiveness in lymph nodes by increasing the level of thiobarbituric substances and decreasing antioxidant enzymes (CAT, SOD and GPx) activity as well as the total antioxidant capacity. AFB1 disturbed also the inflammatory cytokines production by increasing the concentration of IL-6, TNF- α , IL-1 β , IL-8. Inclusion of 8% of grape seed waste in the diet of pigs intoxicated with AFB1 counteracted the negative effect of AFB1 by restoring the inflammatory and oxidative status toward that of the control suggesting that this waste is a promising alternative solution for mycotoxin counteracting damage.

Keywords: grape seed, aflatoxin B1, inflammatory response, oxidative stress, mycotoxin

The nutritional value of legumes as crop in sustainable agriculture

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Economically, legumes represent the second most important family of crop plants after *Poaceae* (grass family), accounting for approximately 27% of the world's crop production. The importance of grain legumes in the world is high due to their significance in human and animal nutrition.

A wide variety of pulses can be grown globally, making them important both economically as well as nutritionally. Legumes provide protein (20-40%) and fibre, low content of fat as well as a significant source of vitamins and minerals, such as iron, zinc, folate, and magnesium and bioactive substances (phenolic compounds, lectins, enzyme inhibitors, phytates, oligosaccharides).

Although legumes have higher content of fiber, like cereals, this does not diminish their digestibility and nutritional value, because hulls of legumes have high digestibility (low share of lignin and high share of hemicellulose and cellulose). In nutrition, pulses provide not only quality protein, but energy as well due to the content of starch. The nutritive value of legumes is limited particularly by digestibility of protein, amino acid composition, amino acid utility, as well as the presence of anti-nutritional factors, such as trypsin and chymotrypsin inhibitors, condensed tannins, lectins, etc. Some industrial processes using heat treatment can improve the nutritional properties of legumes. At the same time, this treatment is: modified starch, which increases the digestibility of carbohydrates, protein denaturation and reduction of their solubility, disruption of cell walls to improve the accessibility of nutrients to digestive enzymes and to improve digestibility of crude protein.

Peas are an important domestic source of proteins. Their production is 4-5 mil. tons, import 1 mil. tons (despite that only approximately 60 % requirements are covered). Utilization of pea in animal nutrition is as a forage (whole plant, including straw) and seeds (in Europe 85-90 % for livestock feeding). It would be suitable to increase pea yields and change the balance of utilization (most economical is to replace soybean meal with a domestic product).

Peas, like other legume seeds, are characterized also by their highly degradable protein and slowly degradable starch.

The objective of this study was to determine the effect of extrusion, flaking and roasting on nutritional characteristics, effective degradability (*in sacco* method) and digestibility (*mobile bag* method) of crude protein (CP) of peas of Slovak provenance.

We found positive effect of heat treatment on crude protein solubility and ruminal crude protein degradability of pea. Slovak varieties of peas belong to varieties with low content of antinutritive substances. The effective degradability of crude protein was 88% in untreated peas, while in extruded peas it was lower by 20%. The degradability of starch in extruded peas was 51-65%, in untreated 76%. After extruding, 35-50% crude protein passes from the rumen to the small intestine and the digestibility is high (91-98%).

Key words: Nutritional value, legumes, peas

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Technological and technical measures for mycotoxin control

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Mycotoxins as secondary metabolites of the molds are toxic to humans and animals, forcing manufacturers to continuously monitor these substances and prevent from entering the production, processing and distribution system. Prevention is the most essential, once mycotoxins enter the food chain, there is a limited number of measures to eliminate them. The occurrence of mycotoxins on the crops is influenced by many factors. Some of them could be changed by appropriate measures, but some factors cannot be influenced. These factors can roughly be divided into the following: biological - including hybrid sensitivity and susceptibility to mold, factors affecting crop conditions in the field (temperature, humidity, mechanical injury, insect damage, birds, weeds), harvest time as well as harvesting method, the way of transport and storage conditions (temperature, humidity, hygiene). If mycotoxins enter the food chain, some technological or technical measure could be applied. Physical remove by cleaning, washing, brushing or dehulling is the first step to minimize the level of mycotoxins. It could be very efficient but there are limitations of the application of this method. Thermal treatment is less efficient for mycotoxins taking in account that most of them are resistant to the high temperature. In the last 15 years, more attention has been paid to use mycotoxin's binders and adsorbents. Adsorbents are recommended to the end, neither one of preventive measures doesn't give results. The important fact is that there are only a few registered products on the market in which efficacy is tested and proved. Those products usually are a combination of inorganic and organic components and their actions are efficient only in the animal body.

Keywords: mycotoxins, food, feed, technological measures, adsorbents

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Manipulation of ruminant's diet in order to improve fatty acid profile of milk

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Dairy products milk, yoghurt and cheese are important foods of the human diet worldwide, with a steadily rising production and consumption, especially for Asian and African countries. Along with the increase in demands, there is a change in the preferences of health conscious consumers who demand more health-friendly foods. A new strategy in the creation of novel dairy products is the enrichment of the milk nutritional profile through the dietary manipulation of the ruminant's diet. Some examples of enrichment include the modification of the fatty acid profile (ratio of unsaturated to saturated fatty acids). Although milk and yoghurt are considered as low fat products it is possible that enriched with omega -3 fatty acids can become more desirable, especially dairy products such as cheese that contains high fat content can help in the prevention of chronic diseases such as cardiovascular disease and cancer. Today, many plants and their extract and by-products are examined in ruminant nutrition, such as flaxseed (*Linum usitatissimum*), cannabis (*Cannabis sativa*) and lupines (*Lupinus albus*). Flaxseed can be fed to cows, sheep or goats despite its content of anti-nutritional factors, such as cyanogenic glycosides that are toxic for the animals. Fatty acids account for 55% of the total fat content of the seed and are mainly represented by α -linolenic which corresponds to 18% of the total seed weight. Available data concerning dairy cows indicate that the addition of 0.9-1 kg of flaxseed per cow per day resulted in an increase in α -linolenic from 0.44 to 0.78 % whereas an 8% content per kilo of dry food substance increased the content of polyunsaturated fatty acids from 33.5 to 36.5 g/kg. Another new feed ingredient is the by-product of industrial cannabis (*Cannabis sativa*) that is rich in polyunsaturated fatty acids. Cannabis oil is mostly (84%) comprised of polyunsaturated omega-3 and omega-6 fatty acids (56% linolenic, 22% α -linolenic, 4% γ -linolenic and 2% stearidonate). There are yet limited reports on the change in the fatty acid profile of milk in animals fed with 5-10% of cannabis in the mix of concentrated feed. Moreover, a significant source of polyunsaturated fatty acids is the white lupine (*Lupinus albus*) that contains on average 8.5% oil mainly with C18-1n9 (4.36%) and C18-2n6 (1.45%) fatty acids. An important consideration in the use of sources of unsaturated fatty acid in cow diets is that large amounts of the dietary unsaturated fatty acids are hydrogenized by the rumen bacteria to saturated fatty acids which limits the effects of the dietary modifications. For this reason, feed processing methods have been proposed to protect against the oxidative action of rumen microorganisms.

Keywords: dairy animal nutrition, milk, fatty acid profile, flaxseed, cannabis, lupine

Aromatic plants, extracts and essential oils as feed additives to control coccidiosis in chicken: lessons from nature

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Over the last two decades there have been increasing concerns over the use of antibiotic growth promoters to support growth performance, as well as antimicrobials and antiparasitic pharmaceuticals used routinely in farm animals to treat diseases. Antimicrobial resistance has been detected in all parts of the world; it is one of the greatest challenges to global public health today, and the problem is increasing. Although antimicrobial resistance is a natural phenomenon, it is being propagated by misuse of antimicrobial drugs, inadequate or inexistent programmes for infection prevention and control. Due to excessive resistance development to antibiotics, the EU has banned the use of antibiotics as growth promoters for farm animals since 2006. Presently, in Europe, the use of ionophore antibiotic feed additives in coccidiosis control is allowed but certain objections are raised against coccidiostats. Although a complete ban on the use of coccidiostats in animal feeds has not yet been enforced, this may possibly happen in the short term in many countries. Certain coccidiostats have been already prohibited, such as nicarbazin. Also, for example, in Canada, poultry producers who want to produce drug-free broiler chickens, and as opposed to the European countries where anticoccidial ionophore inclusion in broiler feed is still permitted, both antimicrobials and anticoccidial drugs are forbidden according to the current legislative framework. Total drug ban in poultry production represents a greater challenge to the poultry industry as coccidiosis represents a major predisposing factor for the occurrence of necrotic enteritis, clinical infections caused by *Salmonella* and *Escherichia coli* infections, as well as, colonization by zoonotic pathogens of human health importance, such as *Campylobacter jejuni*. In the post-antibiotic era, novel feed additives in poultry diets will be sought in order to provide effective alternatives to cope with coccidiosis and infectious diseases. There are plant secondary metabolites that have negative consequences on pathogens and such plants or their extracts can be included in chicken diets. These secondary metabolites may also have an antioxidant and/or antiinflammatory positive effect on chicken organism. Manipulation of the gastrointestinal microflora by dietary aromatic plants, extracts, essential oils and synbiotics as feed additives may also have a competitive exclusion effect on pathogens, and can offer further means to support health and improve productivity and sustainability in broiler industry.

Keywords: chickens, oregano, thyme, plant extracts, anticoccidials

Preliminary study on SNP polymorphism in Romanian cattle population

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Molecular markers with influence on cattle traits and possible use of them as genomic information sources in breeding value estimation is the main pursuit of cattle breeding associations. Use of genomic information in breeding value estimation process drive to a gain in accuracy of estimation and reduced genetic improvement costs. In Romania genomic breeding value estimation in cattle represent a technical paradigm shift from classical method. Regarding those changes SNP polymorphism characterization and association studies are demanded in Romanian cattle population. In this study were genotyped 100 dairy cows (Romanian Black Spotted and Montbeliarde breeds) with 56k SNP panel, using Affymetrix technology. After missing SNP's imputation with BEAGLE software, quality control analysis was performed using GenABEL package from R. Analysis exhibit a surprisingly large number of SNP's in Hardy-Weinberg equilibrium with increased potential of improvement. Also, homozygosity is increased but populations are well clustered from the genomic kinship point of view. In conclusion, using of SNP dense high panels have a good potential and will be very useful in genomic selection in Romanian cattle breeds.

The impact of dietary grape seed meal on weaning piglets microbiota

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Grape seed meal is a waste product of the winery and grape juice industry and a rich source of bioactive compounds with anti-inflammatory properties (polyphenols, ω -6 fatty acids, and fibers). As a practical application, this dry form of grapes seed (meal) can be quickly processed by encapsulation and might serve as food supplements. The effect of grape seed meal was quantified in two experiments. In the first experiment the impact of grape seed meal was observed in the microbiota in DSS (dextran sodium sulphate)- treated piglets while in the second experiment grape seed meal was investigated in its role of modulating Aflatoxin B1 - contaminated piglets microbiota. Both experiments used the 16s rRNA amplicon sequencing of the V3 and V4 regions using Illumina MiSeq platform with the 300PE method in obtaining the raw data. The sequences obtained and alpha and beta diversity were determined in both cases with help of the v.1.9.1 QIIME pipeline software. Marked shifts in the microbiota of healthy and afflicted piglets were observed on the phylum taxonomic rank and at a genus level, with grape seed meal modulating some of the bacterial genera.

Keywords: microbiota, grape seed, aflatoxin B1, inflammatory bowel disease, dextran sulfate

Effect of the alfalfa hay flour on nitrogen balance in growing pigs

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Alfalfa (*Medicago sativa*) also known as Lucerne is the most popular perennial legume cultivated throughout the world due to the valuable nutritional composition. The objective of this study was highlighting the effects of 5% alfalfa hay flour on nitrogen balance and plasma urea nitrogen in growing pigs. Ten castrated male TOPIGS pigs (30.29 ± 1.27 kg, initial body weight) used in the trial for 25 days were assigned into two dietary treatments: control diet (M, basal diet) and experimental diet (E, with 5% alfalfa hay flour, partially replace sunflower meal). The pigs were individually allotted in metabolism cages throughout the entire experimental period. Samples of the feces and urine were collected 4 days/week, for 3 weeks. Urine was analyzed for nitrogen whereas feces were analyzed for dry matter and nitrogen. The E diet decreased the urinary nitrogen output (-49%, $P < 0.001$) meanwhile the fecal nitrogen output was not affected. The total amount of nitrogen output (nitrogen from feces and urine) was lower (-21.09%, $P < 0.001$) in group E vs. the group M. As an effect the nitrogen retention was 37.24%, higher for E diet compared to the M diet ($P < 0.001$). Pigs fed with E diet had slightly decreased values of plasma urea nitrogen (-17%, $P > 0.05$). Our results indicate that the addition of 5% alfalfa hay flour in growing pig's diet improved body nitrogen retention, and have a positive effect on plasma urea nitrogen.

Keywords: alfalfa hay flour, nitrogen balance, pigs, plasma urea nitrogen

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Use of natural mineral sources in dairy cows feeding with favourable impact on the Environment and production efficiency

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The feeding of dairy cows has to be mineral balanced due to the fact that milk eliminates important amounts of mineral salts, especially calcium and phosphorus, but also potassium, sodium, chlorine etc.

The purpose of the presentation is to highlight the sources of macro and microelements of minerals that can be used in the feeding of dairy cows, in their choice being useful to take into account the level until when the mineral elements are not toxic to the organism, the requirements of this category of bulls, as well as the mineral content of the feeds in the ratio structure.

During the presentation will be presented the nutritional requirements for dairy cows depending on their body weight, level of milk production and physiological status, as well as the disorders that may occur in the body in case of mineral deficiency or excess. Also, reference will be made to the use of organic minerals that have a much higher bioavailability and biological activity compared to inorganic salts and they can be used in lower doses.

Next, it will be highlighted the way of managing the natural zeolites represented by the volcanic tuff that represents an eco-alternative mineral resource of the future, which is why it is important to know and disseminate information regarding the efficiency of their use in the field of animal breeding.

The use of zeolites in calf feeds assures a number of positive aspects, respectively it is a source of minerals for animals that are used differentially depending on the species, the structure of the ratio and the gastrointestinal pH, it ensures the improvement of the animal production and its quality, it stimulates the immune system and, by default, it substantially reduces the rate of morbidity and mortality, especially for young animals.

To highlight these aspects, a case study was also be analyzed, which revealed that the inclusion in the rations of 150 and 300 g tuff/head/day resulted in a qualitative improvement of the milk production marked by the increase of the protein content and a decrease of the total number of germs.

It can be stated that an optimum mineral level of the ratio has the capacity to improve the quality of milk production, animal health and welfare, ensuring optimal technological conditions that do not affect the environment.

Integrated -omics approaches for meat quality improvement

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Transcription has a substantial genetic control and genetic dissection of gene expression could help us understand the genetic architecture of complex phenotypes such as meat quality in cattle. A total of 80 steers were selected for phenotyping, genotyping and RNA-seq evaluation. A panel of traits related to meat quality along with information on 112,042 SNPs and expression data on 8,588 autosomal genes and 87,770 exons from 8,467 genes were included in an expression and splicing quantitative trait loci (QTL) mapping (eQTL and sQTL, respectively). Expression of 1,352 genes was previously identified as associated with meat quality traits using a gene, exon and isoform differential expression analysis. The identified QTLs were classified as cis or trans using 1 Mb as maximum distance between the associated SNP and the gene. Polymorphisms associated with expression of at least 20 genes, and splicing of at least 20 exons were considered QTL hot spots. A total of 8,377 eQTLs were identified, including 75.6% trans, 10.4% cis, 12.5% DE trans and 1.5% DE cis; 11,929 sQTLs were uncovered: 66.1% trans, 16.9% DE trans, 14% cis and 3% DE cis. Twenty seven expression master regulators and 13 splicing master regulators were identified and were classified as membrane associated or cytoskeletal proteins, transcription factors or DNA methylases. These genes could control expression of other genes through cell signaling or by a direct transcriptional activation/repression mechanism. The *ZNF804A*, *ALAD*, *OR13F1* and *ENSBTAG00000000336* genes were identified as both expression and splicing master regulators. In the present analysis, we show that eQTL and sQTL mapping makes possible positional identification of gene and isoform expression regulators. Additionally, this mapping provides new insight into the regulatory network architecture in *longissimus dorsi* muscle in beef cattle.

Genotype by Environment interaction for tolerance to heat stress in crossbred beef cattle

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Based on recent predictions (IPPC, 2013), global temperatures are expected to rise by 1.4–3.0°C by the end of this century, and by 5.0°C in certain temperate areas of the planet. The climate change is expected to impact tropical and subtropical regions sooner and with greater intensity. The objective of this study was to estimate the effect of various proportion of Brahman genes in Angus-Brahman crosses on phenotypic plasticity of core body temperature in response to environmental heat stress. This knowledge is useful in identifying the thresholds for heat stress appropriate for various breed compositions and evaluating the effectiveness of various Angus-Brahman crosses to mitigate the negative effect of environmental stress in hot and humid climate. A total of 299 two-year old heifers born in 2015 and 2016 ranging from 0% (100% Angus) to 100% Brahman were evaluated under hot and humid conditions during 2017 and 2018 at the University of Florida Beef Research Unit. Vaginal temperature, a direct measurement of an animal's ability to prevent hyperthermia during heat stress, was recorded for five or six consecutive days using iButton data loggers. The temperature-humidity index over 24 hours was used to calculate the heat load for each day. Two strategies were used to evaluate the change in core body temperature of breed groups in response to environmental challenge, a random regression mixed model to estimate reaction norm parameters for each breed group in response to a specified environmental heat stress, and a repeated measures mixed model to evaluate the response to different environmental heat load. Cattle with 100% and 75% Brahman genetics were the most resilient to heat stress and very similar, cattle with 0% Brahman genes (Angus) were the least resilient to heat stress, and the cattle with 50%, 33.5% and 25% Brahman genes were in the middle with an average resistance to heat stress. The result from the reaction norm analysis showed a significant genotype by environment interaction of core body temperature in response to heat stress as measured by the slope of reaction norm for breed groups with increased proportion of Brahman genes.

Evaluation of the anti-inflammatory and anti-microbial potential of grape waste - an *in vitro* study

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After the ban of the in-feed antibiotics in the European Union (2006), the current challenge in animal nutrition is to find a low-cost alternative to cover the spectra of the antibiotics used in farm animals. The by-products resulted from the processing of plants for food and non-food purposes have a broader range of feeding values and nutritional properties. Due to their higher value option, the recovered bioactive constituents from these by-products could be used in animal nutrition as antibiotic replacers. Winery wastes (grape pomace, GP) are rich in bioactive compounds (polyphenols, PUFAs, fibers). The aim of this study was (i) to evaluate the chemical composition of grape pomace (GP) and (ii) to investigate the effect of GP in restoring the mediators associated with intestinal inflammation in LPS-treated cells as *in vitro* model. The bioactive compounds from GP were characterised by HPLC-MS-DAD (polyphenols) and gas chromatography (fatty acids). To induce intestinal inflammation in a cellular model, intestinal cells were treated with 5µM LPS for 4 hours. After LPS incubation, cells were cultured in presence of a GP extract (5µg/ml) for 24 hours. The gene expression of inflammatory mediators and related signalling molecules was evaluated by real-time qPCR. Our results showed that GP extract is rich in total polyphenols, of which the highest concentration being observed for flavonoids such as epicatechin and procyanidin dimer. Also, GP had a high content of unsaturated fatty acids, especially the ω-6 linoleic acid, ω-9 oleic acid and ω-3 α- linolenic acid. In cell culture model, the addition of GP extract to LPS-treated cells reduced the levels of all analysed pro-inflammatory cytokines and increase the level of IL-4 and IL-10 anti-inflammatory cytokines induced by LPS. GP extract rich in polyphenols reduced the levels of nuclear receptors NF-kB1 and Nrf2 mRNAs below the LPS levels. In conclusion, grape pomace rich in bioactive compounds (polyphenols, PUFA, fibers) had anti-inflammatory properties, anti-microbial role and antioxidant features. Due to these beneficial characteristics, grape pomace could be an valuable alternative to the in-feed antibiotics in animal nutrition.

Dietary phytoadditives as natural solution to alleviate the negative effects of the high heat stress on broilers

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High ambient temperatures (above 30°C) compromise growth performance and productivity primarily by reducing feed consumption and reducing nutrient use. Also, exposure of broilers to high heat stress increases the susceptibility to colonization with pathogenic bacteria (e.g. *E. coli*, *Salmonella spp*, Staphylococci) in the gut microbiota and the decrease of beneficial bacterial populations (e.g. Lactobacilli). Given these negative consequences of high heat stress, it is necessary to apply solutions in order to alleviate its negative effects. Among them, nutritional strategies are scientifically supported, economically viable and of consumer acceptability. The use of phytoadditives are among the natural nutritional solutions to diminish the negative effects induced by the high heat stress in poultry production. A research team from IBNA Balotesti conducted some experiments on broiler reared under heat stress conditions (32 ° C) using in their diet phytoadditives of local origin such as: oregano, artemisia, rosehip, grape seed oil, willow bark, bilberry leaves, sea buckthorn meal. These phytoadditives have been used at different levels of diet inclusion and in different forms: plant powders as such, meal, oily extracts or in other solvents. The choice of phytoadditives was made based on the antioxidant properties that were determined in them. Following the studies, the results showed that the bioactive compounds contained in some of the phytoadditives studied can alleviate the negative effects of the heat stress on broiler performance and balance of the intestinal microflora. The proposed paper presents the benefits and limitations of the use of these phytoadditives in the feeding of broiler reared under high heat stress (32 ° C) in order to maintain the performance and the balance of the intestinal microflora.

Keywords: broiler, heat stress, intestinal balance microflora, performance, phytoadditives

Effects of using white and red grape pomace in broilers diet on meat color

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The 4-weeks feeding trial (14-42 days) was conducted on 200, Cobb 500 broilers, assigned to 5 groups (C, E1, E2, E3, E4) and reared in floor pens in a semi-intensive system. The structure of the diet for all 5 groups was enriched in polyunsaturated fatty acids (59.65 g/100 g total FAME) by including 4% flax meal. Compared to the control formulation, the experimental formulation included 2 varieties of grape pomace: 3% (E1) and 6% (E2) white grape pomace; 3% (E1) and 6% (E2) red grape pomace. The color determination was performed using the Konica Minolta CR-400 colorimeter. The diet supplementation with grape pomace led to the chicken meat color variation, represented by: brightness (L^*), redness-greenness (a^*), yellowness-blueness (b^*) values and the total color difference (ΔE^*), depending on the level of inclusion in the diet and the variety used. The recorded results for the thigh meat indicated: a significant decrease ($P < 0.05$) in the brightness of E3 meat; the increase ($P < 0.05$) of a^* values for E1 and E4 groups; the increase of b^* values in all experimental groups (E1-E4), compared to C group. The L^* and a^* color values measured in the breast meat showed insignificant color variations ($P > 0.05$) in all experimental groups (E1-E4), compared to C group. A significant increase ($P < 0.05$) for yellowness (b^*) showed the breast meat from E2, E3 and E4 groups. The total color difference (ΔE) for the thigh meat and that of the breast meat, was higher in E3 group, which had a 3% red grape pomace level of inclusion in broilers diet, compared to the one in C group. The results showed that the red grape pomace had a significant effect on the a^* values, compared with the white grape pomace, increasing the level of inclusion in the diet leading to the intensification of the red color of the chicken meat.

Keywords: broiler, color parameters, grape pomace, meat

POSTER PRESENTATIONS

Milk fatty acid profile altered by including whole rapeseeds and pumpkin seeds cake in Murciano Granadina goats` diet

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The effect of including high levels of dietary lipids in order to improve the milk fatty acids profile was studied on thirty-six Murciano Granadina goats, randomly assigned in three groups, fed a control diet (CTL), an experimental diet based on rapeseeds (ERS) and another experimental diet based on pumpkin seeds cake (EPC). The experimental ingredients were obtained from the local feed market, cultivated on farm or obtained from the oil producers.

The trial took place in August-September, in a commercial goat farm and lasted 28 days. The three diets consisted of 1 kg of hay (70% Italian Ryegrass & 30% alfalfa) and 1.24 kg of compound feeds (fixed amounts), in order to meet the nutritional requirement for 1.26 kg/d milk yield. While being isoenergetic and isonitrogenous, the three diets ensured increasing levels of dietary fats: from 1.88 % (CTL) to 4.82 % (ERS) and 3.20 % (EPC). Although the two ingredients were not protected against ruminal biohydrogenation of unsaturated lipids, they led to an increase of PUFA proportion in total FAME for both ERS and EPC groups (+8 % and +25% respectively, comparing to CTL), while the effects on CLA and the effects on $\Omega 6:\Omega 3$ ratio were dependent on the source of dietary lipids. Thus, inclusion of pumpkin seeds cake led to an increase of CLA (+9%), while inclusion of rapeseeds led to a decrease of $\Omega 6:\Omega 3$ ratio (-13%). These preliminary results offer a base for developing local milk premium products, enriched in fats that are more favorable for consumers' health.

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Effect of graded replacement of soybean meal by cowpea (*Vigna unguiculata* [L] Walp) supplemented with probiotics on broiler chicks' performance, and gut microflora populations

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Price and availability of soybean meal on global markets may change rapidly, thereby stimulating interest in maximizing the use of locally produced protein sources, like legumes. This study aimed to investigate the effect of inclusion levels (0, 10 and 20%) of raw cowpea seeds (RCWP; *Vigna unguiculata* [L] Walp, cv. *Ofelia*) with and without probiotic addition on growth performance, digestive organ sizes and cecal pH. A total of 720, mixed sex one-d-old broiler chickens (Cobb 500) were allotted to 6 dietary treatments with 4 replicate pens (30 birds/replicate pen). Data were analyzed as a 3 x 2 factorial arrangement with 3 levels of RCWP with and without probiotic (3×10^8 cfu probiotic/kg of diet). The probiotic strain used was the *Lactobacillus plantarum* (ATCC 8014) from the IBNA Balotesti, Romania bacteria collection. The impact of the treatments on the microflora population in the gastro-intestinal (GI) tract at 26 and 42-d-old was also evaluated. The results showed that the broilers fed RCWP in an optimized diets on digestible amino acid contents had comparable BW, ADG, ADFI and FCR to the control group ($P > 0.05$). The digestive organ sizes (*i.e.* gizzard, heart, liver, pancreas, spleen, small intestine, cecum and the small intestine length) and pH of the cecal digesta were not affected ($P > 0.05$) by treatments. Probiotic supplementation was effective at beneficially modulating GI microflora composition. In particular, at 42-d, the lower caecal coliform concentration (\log_{10} cfu/g of wet digesta) was seen ($P > 0.05$), whereas had the highest ($P < 0.01$) *Lactobacillus* concentration. It is concluded that probiotic addition had a significant effect on cecal microflora composition.

Keywords: cowpea, broiler, microflora, performance, probiotic

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***Bacillus licheniformis* as feed additive: *in vitro* evaluation of potential probiotic in animal nutrition**

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Bacillus licheniformis ATCC 21424 strain was evaluated *in vitro* as source of probiotics in monogastric nutrition. The strain was subjected to probiotic characterization. The strain presents a high acid tolerance showing survival of 70.93% at pH 2, 84.91% at pH 3 when was conserved at 4°C, respectively 73.50% at pH 2, 72.41% at pH 3 at room temperature, for 3 h of incubation. The bile salt tolerance of strain registered a survival of 71.33% at 4°C vs. 69.98% at room temperature. The strain was found to be sensitive (6-15 mm) to 9 antibiotics testes, while at clindamycin (2 µg) a high resistance was established. *B. licheniformis* ATCC 21424 is responsible for high-level heat resistance of spores, 7.39 CFU/ml was found during 120 min. of incubation at 80°C. These results indicated that the *Bacillus licheniformis* ATCC 21424 had a *promising potential as good probiotic and could further be exploited for its use in animal nutrition.*

Keywords: *Bacillus licheniformis*, spore, probiotics, fermentation

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Influence of dietary bilberry leaf powder on intestinal microflora of broiler chickens

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The objective of this study was to evaluate the influence of bilberry leaf powder on the productive performances and intestinal microflora of chicken broiler reared under in thermoneutral conditions (N) vs heat stress (S). Two experiments were conducted on 112 Cobb 500 broiler chicks assigned in four experimental groups (28 chickens/group) and housed in an environmental controlled hall. Two groups (CN and EN) were reared in thermoneutral conditions. In the second experiment other two groups were reared (CS and ES) in heat stress (32^o C). The light regimen was 23 hours light / 1 hour of darkness. The structure of control groups diets (CN and CS) was same, the ratio for the experimental groups differing from control diets by the addition of 1% of bilberry leaf. Growth performances were monitored through the entire experimental period (0-42 days). Bilberry leaf did not affect the daily feed intake, feed conversion rate under same environmental conditions. Compared to CN group, CS group had a lower body weight by 26.53% and a feed conversion rate decrease by 4.42%. For groups fed with addition of bilberry leaf, in heat stress condition, compared with thermoneutral condition for body weight the decrease was by 34.41% and for feed conversion rate was 4.22%. In thermoneutral condition colonies forming units (CFU) of Lactobacilli were higher ($p < 0.05$) for experimental group. The other bacterial colonies (E.coli, Staphylococci spp, Enterobacteriaceae spp) were not different. In the case of heat stress conditions CFU of Ecoli and Staphylococci spp were smaller for experimental group, in the case of Staphylococci spp. the difference was statistically significant ($p = 0.001$). Diet supplementation with bilberry leaf influenced the balance of the intestinal microflora by reducing the CFU of E.Coli and Staphylococci spp. in heat stress conditions and thermoneutral conditions.

Keywords: broiler chickens, intestinal content microflora, bilberry leaf

Effect of dietary triticale on amino acids profile of muscle tissue in broiler chicks

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The effect of dietary triticale in broilers on chemical composition and amino acids profile of muscle tissue was evaluated. The broilers (n=400; Cobb 500) were randomly allotted to 2 dietary groups (4 replicate/group) and fed with corn-soybean meal control diet (C) or corn-triticale-soybean meal diet (T) for 35 days. The three-phase T diet had triticale in the amount of 284.0 g/kg (starter), 308.2 g/kg (grower) and 335.0 g/kg (finisher) that partially (50%) replaced corn. The diets were isocaloric, isonitrogenous and with similar content of digestible sulphur amino acids, lysine, calcium, and available phosphorus. At slaughter, muscle samples (breast and thigh) were collected for further analysis. The amino acids profile of the meat samples was determined by HPLC method. Results showed that chemical composition (dry matter, crude protein, crude fat, and ash) of breast and thigh muscle were not affected by the dietary treatments ($P > 0.05$). At levels of individual amino acids there were an increase of valine (+5.69%; $P < 0.001$), phenylalanine (+3.90%; $P = 0.012$), lysine (+3.93%; $P = 0.036$) and arginine (+4.76%; $P = 0.019$) in breast muscle as effect of triticale diet and a tendency to increase the total essential amino acids content (+2.23%; $P = 0.062$). No differences ($P > 0.05$) were found in the content of essential amino acids or flavour-related amino acids of the thigh muscle. Our results indicate that triticale can partially replace corn in broiler chicks diets, with no effect of muscle tissue chemical composition and beneficially affect the amino acids profile of breast muscle.

Keywords: amino acids, breast muscle, broilers, thigh muscle, triticale

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Effect of dietary raw cowpea (*Vigna unguiculata*) seeds on broiler chick's meat quality

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Four hundred and fifty broiler chicks (Cobb 500) were used to evaluate the effect of dietary replacement of soybean meal (SBM) with raw cowpea seeds (RCWP), on broiler meat quality. Chicks were randomly divided in three experimental groups: control group fed with basal diet corn-soybean meal and two groups fed with RCWP at levels of 10 and 20% per kg diet. All diets were formulated as iso nitrogenous and iso caloric. Each experimental group was subdivided in six replicates of twenty-five chicks. The trial was carried out during forty-two days. Twelve chicks per treatment (two per replicate) were slaughtered at the end of the experiment and meat samples (breast and superior thigh) were analysed for fatty acids profile and cholesterol content. The results showed that inclusion of 20% RCWP increased ($P<0.05$) n-3 fatty acids, including linolenic acid (LA), alfa-linolenic (ALA), docosapentaenoic acid (DPA) and docosahexaenoic acid (DHA), in breast and thigh meat. In addition, n-6/n-3 ratio decreased significantly ($P<0.05$) by dietary replacement of 20% in both breast and thigh muscle, indicating a higher meat product quality. However, RCWP had no significant influence in broiler meat cholesterol content and chemical composition, obtaining similarity between experimental and control groups. It can be concluded that RCWP replacement of SBM might improve broiler meat quality by using locally obtained raw material with potential benefices for human health.

Keywords: raw cowpea seeds, chemical composition, fatty acids profile, cholesterol, meat quality, broiler

Effects of dietary hemp seed and dynamic changes on plasma IgG, IgA, and IgM in lactating sow and their litter

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Immunoglobulins are proteins produced by the immune system to fight against antigens. Hemp is one of the oldest technical plants characterized by a valuable nutritional composition especially in terms of amino acids and fatty acids. A trial was conducted on multiparous lactating sows TOPIGS (N=10) and their litter (N=100) divided into two groups: C (control diet) and Hemp seed (HS diet). Sows were fed 5% hemp seed while piglets were fed 1.5% hemp seed starting 10 days after farrowing. The plasma concentration of immunoglobulins (IgA, IgM, IgG) was measured by ELISA after plasma dilution [1:10,000 for (IgA), 1:120,000 (IgG) and 1:10,000 (IgM)]. Absorbance was read at 450 nm using a microplate reader (Tecan Infinite M200 PRO, Austria). Blood samples (10 ml/sows and 4 ml/piglets) were taken the first day after farrowing, at 7 and 21 days. The humoral immune response was different by hemp seed addition in sows and their litter diet. The IgA, IgM, and IgG concentrations in sows plasma were insignificantly different as the effect of HS diet as follows: IgA and IgG concentrations were lower (9.9% and 14.33%) and IgM was higher (4.32%) vs. C diet. Contrary, we noticed that the plasma concentration of IgA, IgG, and IgM decreased by dietary addition of hemp seed on piglet (IgA with 3.82%, $P<0.02$; IgM with 37.8%, $P=0.008$, and IgG with 17.33%, $P>0.05$) vs. C diet. As expected, the predominant level was noticed for IgG that decreased by hemp seed addition both sows and litters plasma. The IgG value ranged between normal limits (16-25 mg/mL). There was an increase in sow plasma IgA concentration at 7 and 21 days after farrowing compared to the first day after farrowing, while IgG and IgM insignificantly decreased. The day of sampling had also a significant effect on piglet for all type of immunoglobulin assessed, with a pronounced decrease at 7 and 21 days after farrowing. In conclusion, although hemp seed was incorporated in the diet in a low quantity, we noticed a significant influence on IgA in piglets. A significant decrease of IgA, IgG and IgM concentrations was noticed up to 21 days in piglets, while on sows we noticed a pronounced effect of IgA level and a tendency on IgM.

Keywords: hemp seed, piglets, plasma immunoglobulin, sows

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Carcass evaluation by non-linear multiple regression equations using ultrasound measurement in goats

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Meat quality is quite important for the consumers, and is accomplished by improving carcass quality in animals designated for meat production. The purpose of this study was to estimate carcass meat quantity by ultrasound and non-linear multiple regression equations. The measurements were conducted on 22 Carpatina kids aged 5.5 months, in two points (P₁ – 5 cm from the spine, in line with the 12th rib; P₂ – between 3rd and 4th lumbar vertebra) of *Longissimus dorsi* muscle to obtain: subcutaneous fat layer thickness (2.02; 1.93 mm), muscle depth (21.05; 20.19 mm), muscle eye area (9.99; 9.71 cm²) and muscle perimeter (130.45; 130.02 mm). Meat quantity was estimated with coefficients of determination by non-linear multiple regression equations, using four ultrasound parameters, measured in P₂ for live weight, semi carcass and carcass weight (0.93), and also in commercial cuts, leg and rack (0.91; 0.90), followed by loin and shoulder (0.86; 0.85). The meat amounts obtained by ultrasound measurements was done in P₂ with the best estimation for commercial cuts, loin and shoulder (0.94; 0.94), followed by leg and rack (0.92; 0.90). Very good meat estimation was obtained using four ultrasound parameters in P₁ for live weight (0.93), semi carcass (0.92) and carcass weight (0.91) and in commercial cuts, leg and rack (0.91; 0.90), followed by loin and shoulder (0.86; 0.85). The non-linear multiple regression equations developed in this study by ultrasounds showed very high precision coefficients, by estimating meat production and by improving the evaluation of Carpatina goat selected for meat quality.

Keywords: *Longissimus Dorsi*, Carpatina goat, carcass quality, non-linear multiple regression equations, ultrasound

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Dietary effects of *Medicago sativa* hay and *Pisum sativum* seeds on plasma protein and enzymes profile of growing-fattening pigs

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Interest to maximize the use of alternative protein sources including legumes has increased due to the considerable progress in plant breeding (higher protein content, better amino acid composition and digestibility), local disponibility and sustainability (nitrogen-fixation crop). The purpose of the experiment was to evaluate the effects of dietary mixture alfalfa hay:peas powder as partial replacement of sunflower meal on plasma protein and enzymes profile of growing-fattening pigs. The experiment was carried for 25 days on 10 male TOPIGS pigs with 30.28 ± 0.53 body weight kg and 81 ± 3 days of age. The pigs were randomly assigned into 2 groups: control [C, based on corn-sunflower meal and soybean meal] and experimental (E, where the mixture of alfalfa hay:peas powder (1:1) partially replace the sunflower meal). At the end of the feeding trial from all pigs, blood samples were collected by jugular venipuncture in order to determine the plasma protein (total protein, total bilirubin, albumin, creatinine, uric acid, urea nitrogen) and enzymatic (aspartate aminotransferase; alanine aminotransferase; gamma-glutamyl transferase; lactate dehydrogenase; creatine kinase) profiles using a chemistry analyser Spotchem EZ SP-4430, Arkray, Japan. Our results showed that the trial had no significant effect on blood constants; however there was a tendency to decrease the plasma protein fraction urea nitrogen (-27%; $P = 0.095$) in E group as compared to the C group. Moreover, the enzyme activity of gamma-glutamyl transferase tended to increase (+34%; $P = 0.093$) in the E diet comparing to the C diet. The obtained values for all blood parameters were within the normal range for this category of pigs. The results of the present study suggest that dietary mixture alfalfa hay:peas powder used in modern-day domestic pig diets as local sources of nutrients maintains the important marker of health in the normal reference ranges for growing-fattening pigs category.

Keywords: *Medicago sativa*, pigs, *Pisum sativum*, plasma parameters

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Dietary effects of some perineal legumes on performances and plasma energetic profile of growing-fattening pigs

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A trial was conducted to evaluate the effects of dietary mixture lucerne hay: peas powder as partial replacement of sunflower meal on performances and energetic profile of growing-fattening pigs. Ten male TOPIGS pigs (30.28 ± 0.53 kg, body weight; 81 ± 3 days of age) housed in metabolic cages, divided to 2 groups: control [C, based on corn-sunflower meal and soybean meal] and experimental (E, where the mixture of lucerne hay:peas powder (1:1) partially replace the sunflower meal) were used in a 25 day trial. Both diets were in pelleted form. Blood samples (N=10) were collected at the end of the trial from the external jugular vein of pigs. The plasma concentration of glucose, triglyceride, total cholesterol, high-density lipoprotein cholesterol, and low-density-lipoprotein cholesterol was determined by a chemistry analyzer (Spotchem EZ SP-4430, Arkray, Japan). The results showed that the pigs fed the E diet had a lower final average body weight (11%, $P > 0.05$) and average daily gain (19%, $P > 0.05$) then pigs fed C diet. Consequently, the feed conversion of pigs fed E diet slightly increased (19%, $P > 0.05$) compared to the C diet. The E diet decreased the plasma concentrations of glucose (1%, $P > 0.05$), triglyceride (43%, $P > 0.05$), total cholesterol (30%, $P > 0.05$), high-density lipoprotein cholesterol (12%, $P > 0.05$) and low-density-lipoprotein cholesterol (49%, $P > 0.05$) compared to C diet; however, the values range in normal limits. We can conclude that the dietary mixture of lucerne hay: peas powder (1:1) maintained the normal physiological state of the animals reflected in performances and plasma constants comparable to control.

Keywords: energetic profile, lucerne hay, performances, pigs, peas

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Physicochemical and microbiological characteristics of goat milk from animals grown in a mountainous area in Bulgaria

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The study was carried out under production conditions in a farm that breeds local goats and goats of the Bulgarian White Dairy Goat. The capacity of the farm is 150 animals. The study was conducted between May and September 2018. Individual milk samples were taken on a monthly basis from morning milking. A total of 100 individual and 10 bulk milk samples were examined. The following parameters were determined on the individual samples - fat, solids non fat, protein and density. The bulk milk samples were tested for fat, solids non fat, protein, density and titratable acidity. One time, a total of 62 samples was taken to determine the microbiological parameters of milk from the left and right halves of the udder of 31 goats. For the period May-September, the percentage of fat in the milk of local goats averaged 3.61% and of goats from Bulgarian White Dairy Goat- 3.54%. The solids non fat were 8.27% and 8.19%, total protein - 3.13% and 3.10%, and the dry matter - 11.89% and 11.74%, respectively. In the milk of local goats and from the Bulgarian White Dairy Goat, the percentage of fat, solids non fat, protein and dry matter decreased significantly from May to August, and in September their values increased significantly compared to the previous control. For the period May-August (1st to 4th controls) the individual constituents of milk changed to varying degrees with the most variable being milk fat (decrease of 0.97% in local goats milk and 1.09% in milk from Bulgarian White Dairy Goat) followed by solids non fat (0.56% and 0.7% respectively). The slightest change was in protein - 0.21% and 0.26% respectively.

Keywords: goat, physicochemical and microbiological characteristics of milk

Estimation of the genetic parameters for reproduction traits using a threshold model in Teleorman Black Head sheep breed

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The objective of this study was to estimate the breeding value and heritability for the reproduction trait, number of born lambs, in Teleorman Black head sheep breed using a threshold model. The pedigree consisted of 491 animals: 144 ewes, 17 rams and 330 lambs from the experimental farm of the National Research - Development Institute for Animal Biology and Nutrition Balotesti. The breeding value of the best Teleorman Black sheep for the number of born lambs ranged from 0.013 to 0.022. The heritability for the number of born lambs was low (0.01). The threshold model was adequate due to better accounting for total variability.

Keywords: threshold model, sheep, breeding value, heritability

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Genetic diversity of Slovak autochthonous cattle

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The aim of this study was to evaluate genetic diversity of Slovak Spotted and Slovak Pinzgau cattle. Overall 151 animals genotyped by high-density SNP array were used for this study. After quality control 38,769 autosomal loci for Slovak Spotted and 35,933 autosomal loci for Slovak Pinzgau cattle were included in the analyses. Coefficient of inbreeding was estimated by segments of runs of homozygosity for analysed breeds. As expected, the highest level of inbreeding for each breed was identified for ROH length category 1-2 Mb that date back 50 ancestors generations, while the ROH > 16 Mb pointed to the level of recent inbreeding (0.87 % Slovak Pinzgau, 0.44 % Slovak Spotted). Historical effective population size was estimated based on linear regression. For Slovak Spotted was obtained value of 38.25 and for Slovak Pinzgau 29.58. The linear regression showed a decrease of 7.44 individuals per generation for Slovak Spotted and 7.93 individuals per generation for Slovak Pinzgau cattle in effective population size. The results of this study may indicate to the breeders to make critical decisions for improvement of genetic resources status to ensure the preservation and conservation of both local breeds in Slovakia.

Keywords: genetic resources, homozygosity, inbreeding, population, Slovak Spotted, Slovak Pinzgau

The effect of using an oil mix in laying hens' diets on egg yolk cholesterol concentration

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A 4-week feeding trial was conducted on 48 Lohmann Brown layers (55 weeks) in order to evaluate the effect of an oil mixt on egg yolk cholesterol. The trial was conducted in an experimental hall with controlled environmental conditions (average temperature/total growth period $22.41 \pm 0.98^{\circ}\text{C}$; humidity $66.35 \pm 5.68\%$; ventilation/chick $0.50 \pm 0.24\%$; CO_2 level 686.39 ± 104.38 ppm). The light regimen was adequate to layers age (16h light/day). The layers assigned to 2 groups (24 hens/group, 4 hens/cage) received a conventional diet with the same basal formulation (16.80% crude protein; 2760 kcal metabolizable energy). The new formulations diet for the experimental (E) group differed from the conventional diet C, by replacing the sun flower oil with an oil mix (0.50%). The compose of the oil mix is 20% buckthorn oil, 20% sesame oil, 20% rosehip oil, 20% grape oil and 20% walnut oil. Samples of 18 eggs/group were collected at the end of the trial and assayed for the cholesterol concentration. Significant differences ($P \leq 0.05$) were recorded between the group C compared with E. Thus, the cholesterol concentration in experimental group (1,52g cholesterol/100g yolk) was significantly ($P=0.0131$) lower compared to C (1.69g cholesterol/100g yolk). The use of an oil mix could significantly influence egg yolk cholesterol.

Keywords: oil mix, laying hens, egg yolk cholesterol

Influence of beer pulp, lucerne dehydrate and sunflower meal, as protein sources on the consumption and weight development of breeding female lambs of Pleven Blackface sheep breed.

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The purpose of the study is to test the influence of beer pulp, lucerne dehydrate and sunflower meal as protein sources on the consumption and weight development of breeding female lambs of the Pleven Blackface sheep breed with start live weight of 35.8 kg. Before entering in an experiment lambs are weighed individually on two consecutive days, the average body weight of measurements has been accepted for initial live weight of incoming animals. The animals are divided into three experimental groups and fed on the basis of the three different protein sources. The rations are balanced by energy, protein and mineral substances, according to the standards for feeding lambs (Todorov *et al.*, 2010). For better consideration of the effect of the protein source, mean hay quality (15% residues) was used in the three test groups. From the forages used, samples are taken weekly for determination of dry matter and for chemical analysis. It was found that for a period of 42 days, a total growth is up to 8.70 kg of lambs with a start live weight of 35.8 kg by nutrition of alfalfa pelleted dehydrate included in the ration of female lambs for breeding as a protein source. Nutrition by beer pulp and lucerne dehydrate as a protein sources results in an average daily growth of 0.200 and 0.207g. The average dry matter intake of the total ration of one animal is from 1.68 (in the lucerne dehydrate group) to 1.77 kg / day (for the beer pulp group).

The effects of some wine industry by-products, added in the diets of broilers, on the energy profile of the blood plasma

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A 4 weeks study, that included 2 experiments on 2 groups of 120 Cobb500 chickens, (14 - 42 days), was carried out. The broilers were divided into 3 groups: C, E1, E2 (first experiment) and C, E3, E4 (second experiment). In both experiments the broilers were housed on the ground, in an experimental hall with controlled microclimate conditions: average temperature 25.87°C and humidity of 41.97% in the first experiment and an average temperature 27.73 °C and humidity of 52.71% in the second experiment. The light regime used was 23h /day. The diet for group C, from both experiments, had the same structure, included 4% flaxseed and were characterized by 3126.76 kcal / kg ME and 21.50% CP. The diets for E1 and E2 groups included, in addition to the diet for group C: 3% (E1) and 6% (E2) red grapes marc. The diets of experiment 2 included compared to diet C: 1.5% (E3), respectively 3% (E4) grape seed oil. At the end of the trial (42 days), blood samples were collected from 6 chickens/group from which were determined: glucose, cholesterol and triglycerides levels. The results recorded in the first experiment showed a significant decrease ($P < 0.05$) of the glucose and cholesterol concentrations in the experimental groups (E1 and E2 respectively), compared with the C group, whereas the triglycerides differed significantly, compared to C, only in the case of group E2 (6% red grape marc). Regarding the second experiment, significantly lower concentrations ($P < 0.05$) compared to group C, were obtained for all parameters determined at the 2nd experimental groups (E3 and E4 respectively). The results recorded in this study highlighted the beneficial effect of using the wine by-products (red grapes marc and grape seeds oil), for feeding broilers by improving the health status, reflected by the energy profile of the blood plasma.

Keywords: broilers, cholesterol, glucose, red grapes marc, triglycerides, grape oil

Dietary effects of some not conventional feed ingredients on plasma lipo-protein profile in growing-fattening pigs

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It is known that there are an interdependence between formulating the diet and concentration of certain plasma biochemical parameters as important marker of health status. The present study aimed to investigate the metabolic response (lipo-protein profile) of growing-fattening pigs to the addition of not conventional feed ingredients (triticale, millet, millet and a mix (1:1) between extruded linseed and walnut). The experiment was carried out for 3 weeks on 15 TOPIGS hybrids pigs, 81 ± 3 days old, with an initial body weight of 30 ± 0.5 kg, distributed into 3 groups (5 replicates/group): control diet (corn-triticale-soybean meal); experimental 1 (corn-millet-soybean meal); experimental 2 (corn-millet mixed with 1:1 extruded linseed:walnut meal). At day 21 the Spotchem EZ SP-4430 analyzer (Arkray, Japan) was used to determine the lipidic (total cholesterol, high-density-lipoprotein cholesterol, triglyceride) and the proteic (total protein, total bilirubin, albumin, creatinine, blood urea nitrogen, uric acid) profiles from the blood samples collected from the jugular vein of all experimental pigs. For the lipidic profile no significant changes were found between the groups as response to the types of diet. However, there was noticed, a tendency to decrease the triglyceride mean values (-42%, $P = 0.08$) in the experimental 1 diet compared to control diet. Regarding the protein profile statistically significant differences between experimental groups were found for two plasma parameters, total protein (<1.14 times in E2 group compared to E1 group) and uric acid (<1.11 times in E2 group compared to E1 group). However the results of our analysis for both parameters ranged in normal values for this category. The present study revealed that the addition of millet with or without a mixed with 1:1 extruded linseed:walnut meal to the diet of growing pigs maintains the blood plasma parameters within the normal reference ranges beneficial to the health status.

Keywords: not conventional ingredients, pigs, plasma parameters

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The effect of a diet with flax meal and citrus peel on the production performances and on the plasma energy profile of broiler chickens

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A trial was carried out on 120 broiler chickens (40 chickens/group) from the Cobb500 hybrid, raised in an experimental floor hall, with controlled microclimate. In the starter phase (1-14 days), the chicks were fed with a conventional diet based on corn, soy, gluten, sunflower and 4% flax meal. At the beginning of the grower phase (14-28 days), the chicks were weighed individually and divided into three homogeneous groups (C, E1, E2) with an average weight of 440.77 ± 0.11 g. The basic diet of the experimental groups was similar to the group C, both in the growth and finishing phase, the difference being made by addition of 4% flax meal and 2% orange peel (E1) respectively 4% flax meal and 2% red grapefruit peel (E2). The citrus peels were characterized by a content of 1.26% CP and 0.24% EE (orange peel) respectively 1.43% CP and 0.20% EE (red grapefruit peel). Cu, Mn and Zn had close values for the two by-products (2.02; 6.20; 7.06 ppm orange and 1.08; 5.01; 9.41 ppm grapefruit, respectively) while Fe was found in a very varied concentration 8.47ppm (orange) vs. 54.59ppm (grapefruit). During the experimental period (14-42 days), the production performances were recorded daily. The final weight of the chickens was significantly higher ($P=0.0006$) in group E1 (2956.03g) and group C (2946.39g) compared to group E2 (2764.31g). The highest daily feed intake was recorded in group C (146.25 g feed/chick/day) compared to group E2 (140.56 g feed/chick/day). Also, in group E2 the highest feed conversion ratio was registered (1.73 kg feed/kg gain). At the end of the trial, blood samples from 6 chickens/group was collected to analyze the energy profile from plasma. Glucose, cholesterol and triglycerides (mg /dL) had significantly lower values ($P \leq 0.0001$) in groups E2 and E1, compared to group C. The results obtained in this experiment have significantly highlighted the beneficial effect of citrus peel in chickens' diets on the plasma energy profile, but also on the production performances (E1-orange peels).

Keywords: broiler performances, citrus peel, flax meal, energy profile, blood cholesterol, triglycerides

Some freeze dried fibre from agro-food residues characterization by physico-chemical, thermal and spectroscopic methods

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The aim of this paper is the characterization of dried freeze waste fibre samples of Red apple and carrot used as feed supplement for the reduction of the toxic effect of aflatoxin B1 in swine.

Synthesized from the *Aspergillum flavus* fungus, the toxigenic strains of aflatoxins are among the most harmful mycotoxins that are found in foods, humans, animals and soils.

The valuable sources of dietary fibre, fruits and vegetables and theirs by-products from the industry are of interest, because they are inexpensive and available in large quantities.

The selected agro-food residues samples were analysed by physico-chemical methods, thermogravimetric analysis (TGA-DTG), Fourier Transform infrared spectroscopy (FTIR-ATR), scanning electronic microscopy (SEM) and X ray diffraction (XRD). The structural components in plant cells (lignin, hemicellulose and cellulose) has a highest content fibres in Red apple: 19,85% NDF, 14,90% ADF and 13,09% cellulose. The carrot samples content 14,19% NDF, 10,74% ADF and 8,83% cellulose. By TGA were evaluated the thermal stability and weight loss which show the composition of the solid mass (fibres). The presence of AB1 in the contaminated samples, could be attributed to thermal decomposition at an endothermic peak around 400 °C, for all samples. The moieties assessed by FTIR showed the presence of C-H, N-H, O-H, C=O as main functional groups, attributed mainly to the complex carbohydrate structures and proteins. Microstructure of the studied powders by scanning electronic microscopy and X ray diffraction reveals the particle size and the semicrystalline profile of the dried powders.

The results obtained confirm the capacity of the fibres from analysed samples to adsorb on their surface mycotoxin AB1 type.

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