BOOK OF ABSTRACTS

17TH INTERNATIONAL SYMPOSIUM OF BIOLOGY AND ANIMAL NUTRITION

September 29th 2023, INCDBNA Balotesti, Romania

17th International Symposium of Biology and Animal Nutrition

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INCDBNA IBNA Balotesti, Romania

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NATIONAL RESEARCH-DEVELOPMENT INSTITUTE FOR BIOLOGY AND ANIMAL NUTRITION

29th September 2023

IBNA Headquarters, Balotesti

17th International Symposium of Biology and Animal Nutrition

Symposium Program

08.00 - 8.30 REGISTRATION

08.30 - 9.00 WELCOME (Prof Dr. Horia Grosu, Dr. Catalin Dragomir)

09.00 - 10.15 FIRST SESSION OF SCIENTIFIC COMMUNICATIONS
(Moderators: Yusuf Konka, Catalin Dragomir)

09.00 - 09.15
Evaluation of hemp cake (Cannabis sativa) and other hemp by-products of Greek origin and efficacy in dairy cow nutrition
Konstantinos Kalaitsidis, Zoi Parissi, Alexandros Theodoridis, Eleni Tsaliki, Konstantina Vasilopoulou, Stella Dokou, Diamanto Lazari, Georgios Valergakis , Maniati Marina, Giannenas Ilias

09.15 - 09.30
Effects of butyrate supplementation to laying hen diets on performance and immunity
Ali Tosun, Gökhan Filik, Ayşegül Filik, Yusuf Konca

09.30 - 09.45
Bioaccessibility of phytochemicals from blackcurrant (Ribes nigrum L.) by-products during in vitro digestion and the antioxidant potential evaluation on counteracting the in vitro induced lipid peroxidation
Arabela Untea, Alexandra Oancea, Vlaicu Alexandru, Varzaru Iulia, Saracila Mihaela

09.45 - 10.00
Association of oregano, garlic, rock sapphire and Camelina sativa essential oils, used as feed additives in pigs' diet, with the fecal microbiota
Konstantina Nikolaou, Ioannis Skoufos, Chrysoula Voidarou, Aikaterini Nelli, Konstantina Fotou, Eleftherios Bonos, Ilias Giannenas, Katerina Gregoriadou, Evangelia Gouva, Georgios Magklaras, Christos Zacharis, Achilleas Karamoutsios, Tariq Aziz, Caglar Ersanli and Athina Tzora

10.00 - 10.15
First assessments of the carbon footprint of sheep farms in Romania -preliminary results
Throude Sindy, Catalin Dragomir, Mihail Alexandru Gras

10.15 - 10.45 COFEE BREAK

10.45 - 12.00 SECOND SESSION OF SCIENTIFIC COMMUNICATIONS
(Moderators: Radovan Kasarda, Horia Grosu)

10.45 - 11.00
Genetic makeup and diversity of Slovak Warmblood horse
Radovan Kasarda, Nina Moravčíková, Juraj Candrák, Marko Halo

11.00 - 11.15
Simulated effect of a composite reproductive technology (MOET) on genetic progress of the cattle population
Mihail Alexandru Gras, Cătălin Mircea Rotar, Horia Grosu, Rodica Stefania Pelmus, Cristina Lazar

11.15 - 11.30
Interest molecular markers for meat and reproduction in Teleorman Black Head ewes
Cristina Lazăr (Van), Mihail Alexandru Gras, Cătălin Mircea Rotar, Rodica Stefania Pelmuş

11.30 - 11.45
Estimation the genetic parameters for age at first calving in Charolais and Limousine breeds
Rodica Pelmus, Horia Grosu, Cătălin Mircea Rotar, Cristina Lazăr (Van), Mihail Alexandru Gras

11.45 - 12.00
Digitization of agriculture – a tool for increasing the efficiency
Camelia Ionescu

12.00 - 13.15 LUNCH BREAK

13.15 - 15.15 THIRD SESSION OF SCIENTIFIC COMMUNICATIONS
(Moderators: Ilias Giannenas, Ionelia Taranu)

13.15 – 13.30
Effect of two different Tenebrio molitor insect meals on performance of finishing pigs
Christos Zacharis, Eleftherios Bonos, Georgios Magklaras, Aikaterini Nelli, Konstantina Fotou, Konstantina Nikolaou, Chrysoula (Chrysa) Voidarou, Anastasios Tsinas, Ilias Giannenas, Efthimia Antonopoulou, Stefanos Andreadis, Christos Athanasiou, Athina Tzora, Ioannis Skoufos.

13.30 - 13.45
Effects of a low zearalenone concentration exposure on piglet microbiota
Iulian Alexandru Grosu, Cristina Valeria Bulgaru, Gina Cecilia Pistol, Daniela Eliza Marin and Ionelia Taranu

13.45 - 14.00
The antioxidant effects of grape seed meal by-product in LPS-treated IPEC-1 cells and DSS- challenged post-weaning piglets
Gina Cecilia Pistol, Daniela Eliza Marin, Cristina Valeria Bulgaru, Andrei Cristian Anghel, Mihaela Sărăcilă, Mihaela Vlassa, Miuta Filip, Ionelia Taranu

14.00 - 14.15
Comparative study on phytochemical profiles and antioxidant capacity of black elder (Sambucus nigra L.), produced in different geographic area in Romania
Vlaicu Alexandru, Untea Arabela, Saracila Mihaela, Varzaru Iulia, Oancea Alexandra

14.15 - 14.30
Physico-chemical, thermal and spectroscopic complex characterization of some vegetable waste, potentially used as animal feed
Mihaela Vlassa, Filip Miuta

14.30 - 14.45
Alternative protein sources to soybean meal in swine diets
Gabriela Maria Cornescu, Tatiana Dumitra Panaite, Mara-Ioana Munțiu-Rusu, Cristina Camelia Matache, Ana Cișmileanu

14.45 - 15.00
Screening of selected berries leaves for bioactive components and their related antioxidant activities
Varzaru Iulia, Untea Arabela, Saracila Mihaela, Oancea Alexandra, Vlaicu Alexandru

15.00 - 15.15
Influence of feeding dietary hempseed and linseed on milk characteristics of goats Murciano-Granadina
Ana Cișmileanu, Alexandra Oprea Oancea, Catalin Dragomir, Smaranda Toma

15.15 - 15.30 BREAK

15.30 - 17.15 FOURTH SESSION OF SCIENTIFIC COMMUNICATIONS (Young Researchers Session) (Moderators: Daniela Marin, Arabela Untea)

15.30 - 15.45
Potential use of co and by products of black chokeberry (Aronia Melancarpa) as source of antioxidant in animal nutrition
Saracila Mihaela, Varzaru Iulia, Oancea Alexandra, Vlaicu Alexandru, Untea Arabela

15.45 – 16.00

Effects of roughage level and source on performance parameters and meat characteristics of limousine feedlot cattle

St. Dokou, I. Giannenas, E. Bonos, G. Arsenos

16.00 - 16.15

Optimizing microwave-assisted extraction of polyphenols from mustard seed meal

Anghel Andrei Cristian, Tăranu Ionelia, Alina Orțan

16.15 - 16.30

Diet replacement with whole insect larvae affects ileal morphology and microflora of broiler chickens

Stylianos Vasilopoulos, Ilias Giannenas, Ifigeneia Mellidou, Ioanna Stylianaki; Efthimia Antonopoulou; Athina Tzora; Ioannis Skoufos; Christos G. Athanassiou; Elias Papadopoulos; Paschalis Fortomaris

16.30 - 16.45

Dietary effect of microencapsulated probiotics on growth performances, health status,intestinal morphology and microflora in weaning piglets

Nicoleta Aurelia Lefter, Georgeta Ciurescu, Mihaela Dumitru, Petru Alexandru Vlaicu, Anca Gheorghe, Claudiu Gal

16.45 – 17.00

Exploitation of local agricultural byproducts and formulation of isoproteinic diets for Tenebrio molitor (Coleoptera: Tenebrionidae) rearing

M. Vrontaki, C. Adamaki-Sotiraki, C.I. Rumbos, A. Anastasiadis, C.G. Athanassiou

17.00 - 17.15

The effects of including linseeds and mustard seeds in goats' diets on various milk quality parameters

Oancea Alexandra, Vlaicu Alexandru, Vărzaru Iulia, Sărăcila Mihaela, Untea Arabela, Dragomir Catalin

17.15- 17.30

Some Carcass Quality Characteristics of Anatolian Buffaloes

Aisha Ali Ahmed, Yusuf Konca

17.30 - 17.45

FINAL DISCUSSION AND PERSPECTIVES

17.45

FAREWELL COCKTAIL

POSTER PRESENTATIONS

Study of some bioactive compounds in fodder for animal feed
Miuta Filip, Mihaela Vlassa, Ionelia Tăranu, Daniela Marin, Catalin Dragomir

Ex-vivo studies on the effects of Alternaria toxins on the inflammatory response at theporcine intestinal level
Valeria Cristina Bulgaru, Ana Maria Perțea, Ionelia Tăranu, Daniela Eliza Marin

The role of alternariol in the apoptotic process at the gut level in pigs
Ana-Maria Pertea, Cristina Valeria Bulgaru, Gina Cecilia Pistol, Ionelia Taranu and Daniela Eliza Marin

Sorghum grain in broiler's diet: Effects on growth performance, blood biochemistry, and meat quality
Georgeta Ciurescu, Andreea Vasilachi, Lavinia Idriceanu, Dumitru Mihaela

Exploring the probiotic potential of lactic acid bacteria and microencapsulation of selectedstrains by spray drying process
Mihaela Dumitru, Nicoleta Aurelia Lefter, Georgeta Ciurescu

Lentil seeds as protein alternative on poultry nutrition
Tatiana Dumitra Panaite, Ana Cişmileanu, Gabriela Maria Cornescu, Mara-Ioana Munțiu-Rusu, Andreea Vasilache, Cristina Camelia Matache

Metabolomic and toxicity prediction of alternariol using in silico approaches
Daniela Eliza Marin and Ionelia Taranu

Using intestinal explant culture to evaluate the effect of apple pomace on inflammation and oxidative stress in piglets after weaning
Ionelia Taranu, Gina Pistol, Cristina Bulgaru, Iulian Grosu, Daniela Marin

Screening of the chemical composition of sea buckthorn pomace as a by-product intended for animal nutrition
Mihaela Saracila, Arabela Untea, Iulia Varzaru, Petru Alexandru Vlaicu, Alexandra Oprea-Oancea

The effects of mulberry leaves on the nutritional quality profile of laying hens's egg
Mara-Ioana Munțiu-Rusu, Tatiana Dumitra Panaite, Cornescu Gabriela Maria, Camelia Cristina Matache, Mariana Ropotă, Arabela Elena Untea

Yolk color intensification using marigold and paprika extract
Camelia-Cristina Matache, Tatiana Dumitra Panaite, Gabriela-Maria Cornescu, Mara-Ioana Muntiu-Rusu, Arabela Elena Untea

Nutritional potential of cowpea seeds as future protein supply to partially replace soybeanmeal in the poultry diet
Mădălin Manole, Georgeta Ciurescu

Optimization of Probiotic Viability via Freeze-Dried Encapsulation with differentcryoprotectants
Dan Rambu, Mihaela Dumitru

ORAL PRESENTATIONS

Evaluation of hemp cake (Cannabis sativa) and other hemp byproducts of Greek origin and efficacy in dairy cow nutrition

Kalaitsidis Konstantinos[1] , Parissi Zoi[2] , Theodoridis Alexandros [3], Tsaliki Eleni [4], Vasilopoulou Konstantina[1] , Dokou Stella[1] , Lazari Diamanto[5] , Valergakis Georgios E.[6] , Marina Maniati[1] , Giannenas Ilias[1]

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[5] Laboratory of Pharmacognosy, Department of Pharmacy, School of Health Science, Aristotle University of Thessaloniki, GR-54124, Thessaloniki,Greece
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Initially, the nutritional value of the three main by-products of Cannabis Sativa (hempseed cake, second-rate quality hemp seed and hemp hay), cultivated under Greek conditions and collected from four plantations in the Macedonian region was estimated. A second part of the study was the investigation of the effects of diet supplementation with hempseed cake (HSC) on the performance of Holstein dairy cows. The HSC used for this experiment was the one analyzed in the first part of the study. A total number of 20 lactating cows were allocated into two equal groups in a randomized block design. Cows of both groups were offered a TMR on the same feed allowance. The diet of the experimental group was supplemented with 3.5 % hemp cake, at a quantity of 1kg of hemp cake per cow per day. Milk yield was recorded individually, and feed refusals were recorded on a pen basis daily, during the first 40 days of lactation. Individual milk samples were analyzed for their chemical composition, lipid oxidative stability and fatty acid composition and THC and CBD content, as well as feed samples of each group. Individual blood samples were received for biochemical indices assessment. All data were subjected ANOVA statistical analysis. The results of hemp by-products evaluation had an interesting chemical profile of all hemp by-products and a HSC which is high in total fat, fiber and protein content. The experimental results indicated that the addition of HSC did not affect milk production and composition ($P > 0.05$). However, diet supplementation with HSC favourably affected milk fatty acid profile. Finally, serum NEFA concentration was lower for the HSC supplemented group while serum urea levels were higher ($P < 0.05$).

Keywords: Cannabis Sativa; Hempseed cake; Hemp by-products; dairy milk yield; fatty acid profile

Effects of butyrate supplementation to laying hen diets on performance and immunity

Ali Tosun[1], Gökhan Filik[2], Ayşegül Filik[2], Yusuf Konca[1]*

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Butyric acid is a natural compound and have no adverse health effects when consumed by animals. It is known to have antibacterial action and may regulate beneficial intestinal flora and have positive effect on the morphology and functions of the intestine and immune response of the animal. The aim of this study was to determine the effects of encapsulated sodium butyrate (ESB, purity 30% sodium butyrate) on the performance and immunity in laying hens. A total of 120 Lohman white laying hens with 82 weeks of age were used. The hens were divided to 4 treatment groups with 10 replicates, each containing 3 hens and fed through 12-week. Treatment groups as follows: 1: Control (C, no additive group), 2: Addition of 0.5 g/kg ESB to basal diet (ESB05), 3: Addition of 1.0 g/kg ESB to basal diet (ESB1) and 4: Addition of 2.0 g/kg ESB to basal diet (ESB2). The body weights of hens were determined at the first and last day of experiment and body weight changes were calculated. After 2 weeks adaptation, egg productions and feed intake were determined on week 2, 4, 6, 8, 10 and 12. Egg mass was calculated as egg yield (%) × egg weight (g). The hens were vaccinated 4th week of experiment with new castle disease (ND) and infectious bronchitis (IBR) vaccine by drinking water. A laying hen was randomly selected from each cage (10 from each group) and taken blood samples from wing vein at 0, 3, 7 and 21 d after vaccination. The serums were stored a freezer at -80 °C until analysis. In the serum, (ND and IBR antigen titres were determined with commercial Elisa kits. Addition to SB to laying hen diets did not have effects on body weight (BW), feed conversion ratio (FCR), egg production and egg mass of laying hens. Feed consumption was significantly increased with addition ESB2 at 4th period, however did not have effects in overall period. The titres of ND and IBR values in blood were not significant among the treatments. As a result, it has been determined that addition of ESB to diet did not have significant effects on performance, and immunity titers of ND and IBR in laying hens.

Key words: Sodium butyrate, body weight, feed egg quality, immunity

Bioaccessibility of phytochemicals from blackcurrant (Ribes nigrum L.) by-products during in vitro digestion and the antioxidant potential evaluation on counteracting the in vitro induced lipid peroxidation

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Blackcurrant (*Ribes nigrum L.*) is a berry bush widely cultivated in Europe and North America for producing juices, jams, jellies and syrups. In additional to berries, blackcurrant leaves and pomace, as by products, have also been shown to have health-promoting effects being demonstrated to have significant anti-inflammatory and antioxidant properties. In order to establish the nutritional value of potential feed additives (blackcurrant by products), a static model was used to evaluate the influence of digestion conditions and the chemical structure and composition on bioaccesibility of bioactive compounds. The antioxidant potential of blackcurrant by products was evaluated in terms of DPPH, ABTS and iron chelation capacity, the leaves proving to be a significant powerful antioxidant ($p < 0.001$) compared to pomace. The bioactive compounds with remarkable antioxidant activity were considered and blackcurrant leaves can be considered a valuable natural source of vitamin E, carotenoids and polyphenols. The counteracting potential of inhibiting the oxidation process was evaluated using an in vitro induced lipid peroxidation system assessing the thiobarbituric reactive substances (TBARS) as biomarkers for quantifying lipid oxidation in meat. Blackcurrant leaves extract shows the strongest effect ($p < 0.0001$) in inhibiting meat lipid peroxidation (33.82 % compared with 10.18 % inhibition in pomace). The bioaccessibility of polyphenols was assessed to establish the fraction which is released from the vegetal matrix in the gastro intestinal tract and becomes available for absorption. Bioaccessibility of blackcurrant leaves and pomace was evaluated by a static in vitro digestion procedures, simulating oral, gastric and small intestinal digestion. After digestion steps, the samples were analytically prepared to determine the content of recovered phenolics. Each stage, especially intestinal digestion, was found to increase the phenolic content in the digestion fluid. From the subclasses of polyphenols considered, in the case of blackcurrant leaves, it was noticed higher bioaccesibility of hydroxybenzoic acids (especially ellagic acid) and hydroxycinnamic acids (especially cinnamic acid) after the small intestine phase. In the case of blackcurrant pomace, flavonoids presented highest bioaccessibility, for catechin and rutin being recorded important rates. The concentrations of flavonoids compounds were higher in leaves compared to pomace (13.08 vs 1.18 mg/g Quercetin Equiv), but according to bioaccesibility results, flavonoids from pomace are released upon intestinal digestion better than leaves.

Keywords: blackcurrant, by-products, antioxidants, in vitro digestibility, lipid oxidative stability

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Association of oregano, garlic, rock samphire and Camelina sativa essential oils, used as feed additives in pigs' diet, with the fecal microbiota

Konstantina Nikolaou[1], Ioannis Skoufos[1], Aikaterini Nelli[1], Anastasios Tsinas[1], Eleftherios Bonos[1], Ilias Giannenas[2], Katerina Gregoriadou[3], Georgios Magklaras[1], Christos Zacharis[1], Achilleas Karamoutsios[1], Caglar Ersanli[1] and Athina Tzora[1]

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Herbal extracts have been related to antioxidant and antimicrobial activities, associated with their biologically active molecules and have been proposed as suitable alternatives for antibiotics in livestock. This trial was conducted to examine the effects of dietary supplementation with an extract including Greek oregano, garlic, rock samphire and camelina either in dry form or encapsulated in cyclodextrin, on weaned pigs' fecal microbiota, at the point of the end of the trial and two times after the experimental period, assessing the duration of the impact of the experimental diet on fecal microbial communities. Mixed crossbred weaned pigs (¼ Large White × ¼ Landrace × ½ Duroc) 35 days old were selected from a commercial pig farm and subsequently randomly allocated to three experimental groups. Control group A (CTL) was fed a basal diet based on maize and soybean meal without any additive. Group B (NPRO) was under a dietary supplementation with an extract including Greek oregano, garlic, rock samphire and camelina in dry form and Group C (PRO) encapsulated in cyclodextrin. Pigs of groups B and C were fed with supplemented diet from 35 until 75 days of life. The microbiota was examined in fresh fecal samples at the end of the experimental diet (t1), one week later (t2) and 2 months after (t3). High-throughput sequencing of the 16S rRNA gene (V4 hypervariable region) was performed, to analyze the fecal microbiota. The bioinformatic analysis was carried out using IMNGS pipeline and Rhea platform. At the end of the experimental period (t1) Shannon Effective (on the OTU level), an alpha diversity metric, was decreased for both types of the experimental diet ($p<0.05$) compared to control, indicating a more diverse microbial community associated with the control diet.Compositional differences were observed between fecal microbiota of weaned pigs under basal control diet and those fed with experimental diets at the end of the experimental diet and seven days later (PERMANOVA $p<0.05$) (figure 1A). Pigs having had a dietary supplementation with the extract encapsulated (t2) tend to present in their fecal bacterial communities decreased Shannon Effective compared to pigs with control diet ($p = 0.0571$). Supplementation of weaned pigs with the extract in dry form or encapsulated, compared to the control diet (t2), led to statistically significant compositionally different microbial communities (PERMANOVA $p<0.05$) (Figure 1B). Dietary supplementation in dry form did not influence the alpha and beta diversity in fecal pigs' microbiota, (t3). Statistically significant differences concerning the relative abundances of various taxa and OTUs were noticed between pigs fed with control and supplemented diets at the end and 7 days later towards an eubiotic state.

First assessments of the carbon footprint of sheep farms in Romania - preliminary results

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Romania is signatory of international agreements aiming to reduce the greenhouse gases emissions / carbon footprint of various activities, among which the agriculture. An important source of the emission from agriculture is the animal husbandry sector, especially the ruminants. In the last 30 years, the number of farms animals in Romania has generally decreased, thus leading to a dramatic decrease of the carbon footprint of animal husbandry. However, in this moment the official prognoses assume yearly increases of the number of farm animals. This imply that the decrease of the carbon footprint no longer relies on the reduction of the number of animal and measures have to be implemented to ensure reduction of carbon footprint through increased efficiency and specific investments. However, in order to initiate public policies, e.g. rewarding mechanisms that stimulate the farmers to reduce the carbon footprint of various productions (milk, meat), an approach allowing the estimation of greenhouse gases emissions / carbon footprint at the farm level / enterprise level is needed. At our knowledge, this is the first report on the carbon footprint at the livestock farm level in Romania. The presentation delivers the preliminary results from an analysis comprising a first set of 30 Romanian milk sheep farms. The estimations were done using CAP'2ER tool, developed by IDELE, France, previously adapted for the specifics of the Romanian sheep production systems. The use of the tool allowed the estimation of the gross and net emissions, carbon storage, etc. per production unit (litre of milk, corrected for fat & protein content). Also, it allowed the distribution of the greenhouse gases emissions per sources, thus opening the possibility to identify the most relevant directions of actions toward carbon footprint reduction at the whole farm level. Last, but not least, the specifics of the Romanian production systems having relevance on the adaptation of CAP'2ER tool are depicted.

Keywords: sheep farms, carbon footprint, CAP'2ER

Acknowledgement: The work was supported by European Community in the LIFE PROGRAM for Climate Change mitigation, within the project: Green Sheep Life "Demonstration and dissemination actions to reduce the carbon footprint in sheep farming", contract LIFE19 CCM/FR/001245

Genetic makeup and diversity of Slovak Warmblood horse

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The Slovak Warmblood horse is a versatile sport horse breed originating from Slovakia. It is the scion of Austro-Hungarian warmblood breeds and horses ennobled from Arabians, English purebreds and half-bloods. During the systematic breeding program, which began in the 20th century, several breeds were used to introduce new bloodlines and improve the breed, including Furioso, Nonius, Trakehner, Hanoverian, Holstein, Oldenburg, and Westphalian horses. The aim of this study was to assess the genetic diversity and makeup of the Slovak warmblood horse population represented by 77 horses through testing the intensity of gene flow and admixture with six warmblood breeds: Arabian (26) and English (36) Thoroughbred, Hanoverian (16), Holstein (4), Oldenburg (6), Westphalian horse; and Norik of Muran (25) as control outgroup. Genomic data for animals were obtained by Illumina 50K and GGP Equine 70k arrays. After quality control, the database included 190 animals and 36490 autosomal informative SNPs. Average values of heterozygosity (H_o=0.333±0.151, H_e=0.333±0.145) and genomic inbreeding (F_{HOM}=0.002±0.027) pointed to the higher proportion of homozygous genotypes in the gene pool of Slovak Warmblood breed. Discriminant analysis of principal components supported by Nei's genetic distances and Wright's fixation index revealed that tested breeds formed three genetic groups. Arabian Thoroughbred and Norik of Muran were clearly separated, while the other breeds in the analysis were grouped into a common cluster. This confirmed subsequent unsupervised Bayesian-based analysis of admixture among breeds, where the optimal number of genetic clusters in the database was three. The highest genetic similarity to Slovak Warmblood horse revealed Hanoverian, Oldenburg and English Thoroughbred. The highest intensity of gene flow was found between Slovak Warmblood and Oldenburg. Obtained results reflected mainly the fact that the breeding program of Slovak Warmblood horse is open, which means that there is a strong effect of other breeds (in accordance with the breeding standard) on their gene pool.

Keywords: animal genetic resources, genetic admixture, SNP genotyping, warmblood horses

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Physico-chemical, thermal and spectroscopic complex characterization of some vegetable waste, potentially used as animal feed

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The aim of the paper is a complex characterization of some freeze-dried fruits and vegetables waste (Golden apple, Delicious red apple, carrot, celery, beetroot, red potato skin), that can be used as alternative feed sources used in animal nutrition. The samples waste was analyzed by classical elemental analysis, the bioactive compounds as carbohydrate, organic acids and polyphenols content by chromatographic methods and antioxidant activity by spectroscopic methods. Thermal degradation of vegetable residues was studied by Thermogravimetric Analysis and Differential thermal analysis. Also, the samples were characterized by spectroscopic techniques as Fourier Transform Infrared spectroscopy and microscopic techniques as Scanning Electronic Microscopy, X Ray Diffraction and Atomic Force Microscopy. The structural components in plant cells (lignin, hemicellulose and cellulose) that has a highest content fiber is potato skin NDF (46.29%), while celery has the highest content of ADF (14.96%) and golden apples the highest content cellulose (14.49%). Golden apple presents also higher carbohydrates content (50.382 g/100g). Celery shows large (59.382 mg/100g) of total organic acids. Total polyphenols larger quantity was found in beetroot (129.882 µg/100g). By thermal degradation were evaluated the thermal stability and weight loss which show the composition of the solid mass. The residue remains at 1100 °C varying from (3.865 %) golden apple to (10.721 %) red potato skin. Microstructure of the studied powders by microscopic techniques reveals the particle size, the semicrystalline profile and surface topography of the dried powders. In this respect red apple, carrot, beetroot, celery appear lamellar structure of fiber, while potato skin presents a granular structure. These vegetable wastes are recommended for use in animal feed due to their valuable chemical composition and bioactive compounds.

Keywords: atomic force microscopy, Fourier transform infrared spectroscopy, physico -chemical methods, thermogravimetric analysis, scanning electronic microscopy, vegetable wastes, X ray diffraction

Simulated effect of a composite reproductive technology (MOET) on genetic progress of the cattle population

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Genetic progress in a progeny testing scheme applied to the Romanian Spotted (RS) cow population increases with an annual rate of about 0.212 genotypic standard deviations. This genetic progress was compared to that produced by a testing scheme from a nucleus of animals in which multiple ovulation and embryo transfer (MOET) are induced, starting with a zero year, in which are used only mothers and fathers of bulls obtained under this scheme. In the MOET methodology, two application schemes are distinguished: one based on the use of adult animals, with the selection of donors after the completion of the first lactation, and a juvenile scheme, in which the donors are selected based on the information from the pedigree and at the current time, based on the genomic estimated breeding value. In this paper, the comparison was made with juvenile nucleus herd. The annual selection gain rates were predicted for progeny testing scheme, for selection on collaterals (half-sisters), selection on collaterals (mothers, good sisters and half-sisters), and for the case of using genomic selection. Thus, in terms of progeny testing, the MOET nucleus brought an increase of 9.6% in annual genetic gain, collateral testing decreased the estimated genetic gain by 10.9% when only half-sisters were used, and decreased only by 1.3% when all the information from the collaterals was used. Genomic selection brought a 19.5% increase in genetic progress compared to progeny testing and 8.9% compared to progeny testing within the MOET nucleus. Regarding the estimated genetic progress gain and the accuracy of estimation gained, when collateral testing is used, the optimal gain in accuracy and genetic progress was obtained when evaluating 6 good sisters and 60 half-sisters, above these values, the gains being decreasing. Considering the results obtained in this simulation, and considering also that genomic testing is also used within the association, the use of closed MOET juvenile nucleus type test farms will bring the greatest increase in genetic progress.

Keywords: MOET, genetic gain, progeny testing, selection on collaterals, genomic selection

Acknowledgement: The research was supported by Romanian Spotted Type Simmental Cattle Breeding Association

The antioxidant effects of grape seed meal by-product in LPS-treated IPEC-1 cells and DSS- challenged post-weaning piglets

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Weaning transition in piglets is a very stressful, associated with important gastrointestinal disturbances, immune dysregulations, intestinal inflammation, alteration of the intestinal integrity and functionality and microbiota dysbiosis. As a pivotal factor in the pathogenesis of intestinal inflammation, oxidative stress leads to cellular damage and tissue injury. The nutrition of piglets after weaning aims to ameliorate these perturbations, new strategies based on the bioactive compounds with anti-inflammatory, antioxidant and anti-microbian effects being intensively studied in past decades. The agro-industrial by-products are rich in natural antioxidants (polyphenols, polyunsaturated fatty acids etc), which are effective in the treatment of intestinal inflammation and oxidative stress, exhibiting many favourable effects. The aim of our study was to evaluate the capacity of a grape seed meal by-product (GSM) to counteract the effects induced by baterial lipopolysaccharide (LPS) in vitro on IPEC-1 intestinal cells and by dextran sulphate sodium (DSS) in vivo on piglets after weaning. At the end of the cell culture experiments and of the feeding trial, the cellular supernatants, the IPEC-1 cells (from the in vitro expertiments) and the colon and mesenteric lymoph nodes (from the in vivo experiment) were collected, and the reactive oxygen species (ROS), pro-oxidant markers (malodialdehyde, TBARS, protein carbonyl, DNA damage) antioxidant enzymes (catalase - CAT, superoxide dismutase -SOD, glutathione peroxidase –GPx, endothelial and inducible nitric oxide synthases –eNOS and iNOS) and several important components of Keap1/Nrf2 signalling pathway were analysed. Our results demonstrated that GSM extract or 8% dietary GSM showed anti-oxidant properties reducing ROS production after LPS or DSS treatment and restored the gene expression and activity of antioxidant enzymes, CAT, SOD, GPx, eNOS and iNOS as key components of the defence system at intestinal level. These beneficial effects were modulated via Nrf2 signalling pathway in both in vitro and in vivo studies. In conclusion, these results suggested that grape seed meal could be used to improve the antioxidant responses in pigs after weaning, and might be a promising feed alternative in nutritional strategy for piglets.

Keywords: grape by-product; IPEC-1 cells; pig; oxidant/antioxidant response; signalling pathway.

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Digitization of agriculture - a tool for increasing the efficiency

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The ubiquity of digital technologies is transforming agriculture and food production. Specifically, in the agricultural sector, the diffusion of mobile technologies, remote sensing services and distributed computing are already improving producers' access to information, inputs and markets, increasing production and productivity, streamlining supply chains and reducing operating costs and environmental impact. But it's not just about farmers. The farmer loses, on average, three times during the production cycle: The first time when planning production, because without accurate data on the quality of the soil and the real needs of the crops, it cannot optimally calculate the necessary investments. The second loss is in the production phase, mainly due to the wrong assessment of the timing of the application of specific agro technical measures. (20% - 40% per year) And the third loss of the farmer is at the price of the product. Only a product that meets the quality criteria, either in terms of visual characteristics or nutritional composition - and can prove it - manages to command a premium price. According to statistical data provided by Inaco, the main instrument for keeping records of land and agricultural works: 49,5% an agenda, 20% Excel-type programs, 13,5% say they don't think they need such tools, 17% use a computer program or a dedicated application for farm management. Business Innovation Council, as a partner of a consortium made up of 7 states (Italy - coordinator, Spain, Greece, Turkey, Slovenia, Estonia) has been implementing the Digital Farmer project, financed by the Erasmus+ Program. The project will support farmers in developing a new set of skills in different fields of application which have been identified as future trends in the agricultural sector: Decision Support Systems (DSS); Block Chain Technologies; Information and communication technologies (ICT); Nirs and Drones; Farmbot and E-Commerce software, marketing and advertising platforms. All the project results will be available in all project partners' languages: English, Italian, Romanian, Estonian, Greek, Turkish, Slovenian, Spanish, also on the project website: www. digital-farmer.net. The course will start this year, end of September, it's free and can be accessed by anyone interested.

Keywords: digital, agriculture, innovation, drones, blockchain, farmers

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Effect of two different Tenebrio molitor insect meals on performance of finishing pigs

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Fish meals and soybean meals are the most widely used protein sources in pig diets due to their high-quality amino acid profile. However, the increase of the cost of these meals and their limited availability have necessitated the development of alternative feed ingredients such as insect meals. In the present work, two insect meals from Tenebrio molitor were examined in diets of finishing pigs. The larvae used for the first meal were reared using a conventional substrate, while the larvae used for the second meal were reared in a substrate enriched with functional ingredients of aromatic and medicinal plants. In total, 18 finishing pigs (135-days-old; average weight 89.67 kg) were allocated to 3 groups: A) Control; B) 50% replacement of soybean meal by the conventional insect meal; C) 50% replacement of soybean meal by the enriched insect meal. The whole experiment lasted 28 days and the pigs were weighed individually on the 1st, 14th, and 28th days. Daily records were maintained for feed intake and any cases of mortality. The results of the statistical analysis (one-way ANOVA & Kruskal-Wallis, using SPSS software) showed that the bodyweight and the weight gain of the pigs did not differ ($P>0.10$) between the three groups for any measurement. Feed intake and feed conversion ratio were within the expected ranges for the commercial pig farm that housed the experimental trial. Hematological and biochemical parameters did not differ between the three groups, except for blood albumin which tended to be higher in Group C ($0.05<P\leq0.10$) compared to the other two groups. Meat chemical analysis did not identify any differences ($P>0.10$) in moisture, protein and fat content. Based on these results both Tenebrio molitor meals can be included in diets of finishing pig without negative effects on their growth performance, health and meat quality. Acknowledgements: The research has been funded by National Greek Funds. Project code: T2EΔK-02356. Acronym “InsectFeedAroma”.

Key Words: finishing pigs, insect meal, Tenebrio molitor, soybean alternative, aromatic plants, growth performance

Effects of a low zearalenone concentration exposure on piglet microbiota

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Pigs exhibit a high sensitivity to zearalenone (ZEN) contamination, particularly after weaning, which can lead to harmful effects on various health indicators. Although according to the recommendations 2006/576/EC the maximum admitted concentration in feed for piglet is 100 µg ZEN/kg feed, there are no specific regulations defining the maximum limit for ZEN in piglet feed. Two concentrations of zearalenone were tested, one below the EC recommended limit (75 µg ZEN /kg feed) and one above the EC recommendation (290 µg ZEN /kg feed) were investigated in order to assess their influence on the gut microbiota and SCFA synthesis. The performed investigation also included the analyze of the junction protein as an indicator of intestinal integrity and evaluation of the local immunity through secretory IgA production. While exposure to feed contaminated with 75 µg ZEN /kg feed did not show significant effects on the analyzed parameters, the feed containing 290 µg ZEN/kg feed altered several microbiota populations (decrease the Lactobacillus and Bifidobacterium populations and increase the relative abundance of Clostridium, Enterobacter and Prevotella) and increased the secretory IgA levels. These findings contribute to a better understanding of the dose-dependent adverse effects that ZEN can have on the colon of young pigs.

Keywords: piglets; zearalenone; microbiota; short chain fatty acids

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Interest molecular markers for meat and reproduction in Teleorman Black Head ewes

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The production and quality of sheep meat is an important demand of the consumers from many countries. To answer this question sheep farmers, have to improve constantly the sheep breeds and that is why the purpose of this research was to analyze several important genes associated with sheep meat production and reproduction in a local sheep breed Teleorman Black Head (TBH). A selection of some representative genes linked to the sheep meat production was studied in this study: CAST gene which encodes the protein calpastatin corelated with muscle production and activity and Boorola gene, involved in the hyperprolific phenotype of Booroola ewes. Reproduction contribution in any sheep breeds was also part of this research and the presence of several genes like MANTR_1A, AA_NAT, FecX I and FecX G in TBH ewes was studied. The biologic material was genomic DNA extracted from blood samples from 50 TBH ewes. The gene polymorphism and the genotypes frequencies were determined by PCR-RFLP procedure and the results were analyzed to establish the Hardy-Weinberg equilibrium by R software. For MANTR_1A gene three genotypes (CC, CT, TT) were identified, in the first place being situated CT (0.60) followed by TT (0.30) and then CC (0.10). AA_NAT gene polymorphism also manifested three genotypes (AA, AG, GG) displayed in 0.38, 0.20 and 0.42 respectively. For CAST gene the polymorphisms detected were displayed in three genotypes (0.44 for MM, MN with 0.30, NN for 0.20). Boorola, FecX I and FecX G genes did not manifested polymorphism in all 50 TBH ewes investigated in the present study. Further studies regarding other gene mutations must be investigated with impact on ovulation rate, to determine the inheritance in TBH ewes. These preliminary results will be associated with sheep performance in order to discover a better link between meat and reproduction markers used for genetic selection for the Teleorman Black Head sheep population.

Keywords: molecular markers, meat evaluation, gene characterisation, local sheep TBH

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Comparative study on phytochemical profiles and antioxidant capacity of black elder (Sambucus nigra L.), produced in different geographic area in Romania

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Black elder (Sambucus nigra L.) is a wild shrub commonly found in Romanian spontaneous flora, known for its medicinal and culinary uses. This study aims to compare the phytochemical profiles and antioxidant capacity of black elder (Sambucus nigra L.) fruits and leaves cultivated in Northern and Southern geographic areas in Romania. The primary composition revealed that Southern black elder fruits and leaves have higher crude protein content (16.11% and 31.79%) compared with the Northern samples (12.32% and 19.62%). Opposite, the crude fat content in the Northern samples was higher in fruits (7.83%) and leaves (5.72%) versus Southern samples (5.49% and 5.16%). The fat content of black elder fruits and leaves contains significant amounts of fatty acids, in samples analyzed from both geographic areas. Although the fruits had higher content of total polyunsaturated fatty acids (74.09 g/100g Southern variety respectively 72.38 g/100g Northern variety) the leaves had higher content of omega-3 (47.20 g/100g Southern variety respectively 45.86 g/100g Northern variety), representing 85.58% respectively 78.77% of the total polyunsaturated fatty acids. From the mineral profile, iron was with 13.72% higher in Northern variety fruits and with 46% higher in leaves. The antioxidant capacity of the fruits and leaves varieties determined by three different methods (ABTS, DPPH and phosphomolybdenum assay) showed that the fruits presented higher values compared to the leaves. From the DPPH assay, the samples (fruits and leaves) collected from the Northern part presented significantly higher values compared to the Southern samples, the difference being 3-fold to 9-fold times higher (139.70 versus 374.19 mM equiv. Trolox in fruits; 46.41 versus 382.58 mM equiv. Trolox in leaves). These observations are sustained by the polyphenols profile where the samples from the Northern geographical region presented significantly higher values compared to the Southern variety, especially for the values of coumaric acid (6.356 mg/g), methoxycinnamic acid (1.489 mg/g) and ellagic acid (0.198 mg/g) in the leaves. From the lipophilic antioxidants, the Northern leaves of black elder presented significant concentrations of carotenoids (lutein, zeaxanthin, astaxanthin, and canthaxanthin) compared to the other samples, having lutein as main carotenoid. Same trend was noted in the case of vitamin E isomers, the principal source being alpha-tocopherol (1486.58 ppm). These results, indicate that the leaves of black elder can be used as a feed additive in animals nutrition because of its important content of essential nutrients and bioactive substances with antioxidant potential, especially in the leaves collected from the Northern Romanian geographic part.

Keywords: black elder, antioxidants, polyphenols, feed additive, essential nutrients.

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Alternative protein sources to soybean meal in swine diets

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Swine diets often rely on a combination of corn and soybean meal due to their advantageous mix of corn energy and soybean meal's ideal amino acids profile. Nevertheless, the expenses associated with these diets structure have become a concern for farmers, with ingredients accounting for over 70% of the total cost. Consequently, the current approach involves exploring feasible alternatives to partially replace soybean meal, with the goal of reducing feeding costs while maintaining feed quality, animal productive performances, and the quality of animal products. There are some local available protein sources that deserve special attention and can be experimented in swine feeding at different inclusion levels and for different production cycles, as: peas meal a well-known rich source of proteins (20–25%), with a high content of essential amino acids such as lysine and threonine especially for growing and finishing swine category. Dehulling sunflower meal, a product derived from sunflower seeds after oil extraction, provides a protein level exceeding 30% and a low fiber content. It contains high methionine levels and can be incorporated into swine diets, although lysine supplementation is necessary. Another viable protein option is rapeseed meal, a byproduct of rapeseed oil production that assures a protein content ranging from 35% to 40%. This meal contains a high concentration of sulfur amino acids, with positive effects on production performance and meat quality. Lupin contains between 31% and 37% protein and can be utilized as an additional protein source in swine feed, being characterized by a high amino acid digestibility exceeding 85%.
These protein sources present practical alternatives for partially substituting soybeans in swine diets. To effectively utilize these ingredients, conducting a comprehensive nutritional analysis is imperative. This analysis will facilitate the adjustment and formulation of well-balanced feeds tailored to fulfill the distinct needs of various swine categories.

Keywords: alterantives protein, lupin, peas, sunflower, soybean meal, swine

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Screening of selected berry leaves for bioactive components and their related antioxidant activities

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Berries are the main commercial product of the blackberry and raspberry, while leaves are considered agri-food waste products and a possible alternative for obtaining raw materials with significant economic potential. The aim of this study was the nutritional evaluation through phytochemical analysis of blackberry and raspberry leaves and screening of their biological activity (antioxidant capacity and inhibition of lipid peroxidation). The leaves of this plants contain relatively large amounts of minerals, especially Fe, and important levels of PUFA, along with a favorable ratio of ω-6/ω-3 fatty acids (0.26 for raspberry leaves and 0.35 for blackberry leaves). The content of MUFA in raspberry leaves was almost double that in the blackberry leaves. In order to assess the nutritional value of fat, the ratios of PUFA to SFA were used, and a ratio close to 2.6 was registered in blackberry leaves and 1.4 in raspberry leaves. The concentrations of the analyzed liposoluble antioxidants (lutein, zeaxanthin, astaxanthin, canthaxanthin and total vitamin E) were higher ($p < 0.05$) in blackberry leaves compared with raspberry leaves, while significant ($p < 0.05$) higher content of water-soluble antioxidants was registered in raspberry leaves (total polyphenols content 26.2 mg GAE/g DW of which flavonoids accounted for 10.6 mg/g DW). Ferulic acid was the most abundant phenolic acid in both types of leaves, while among flavonoids epicatechin was the predominant one. Blackberry and raspberry leaves were also used to investigate their potential activity against free radicals with possible implication in alleviating oxidative stress. Blackberries leaves had the highest antioxidant capacity inhibition of superoxide radicals ($O_2^{\bullet -}$), while raspberry registered the highest inhibition of hydroxyl radicals ($OH^{\bullet}$). The maximum inhibition percentage of lipid peroxidation was obtained for blackberry leaves (24.86 % compared to 4.37 % in raspberry leaves), suggesting its potential in limiting oxidative reactions. The free radical scavenging and the inhibition of lipid peroxidation of these berry extracts warrant further in vivo studies to evaluate their protective antioxidant effects in animal nutrition.

Keywords: blackberry leaves, raspberry leaves, antioxidants, free radical scavenging

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Estimation the genetic parameters for age at first calving in Charolais and Limousine breeds

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The objective of this study was to estimate the genetic parameters for age at first calving in Charolais and Limousine cattle breeds using animal model. Charolais and Limousine are meat breeds with a high-quality meat. Charolais breed has the following advantages: high growth rate, very heavy carcasses, low fat percentage, high utilization of fibers, high intake, docile breed, maternal instinct and longevity. Limousine breed presented the qualities: high feed conversion rate, high yield at slaughter, ease of calving, fertility and productive longevity.
In the breeding program of Charolais and Limousine cattle breeds the main objective is the increase of meat production. The reproduction trait as calving ease is included in the objectives of the breeding program. The age of the first calving of dam influenced the calving ease.
The data consist on 239 records for Charolais breed and 309 records for age at the first calving in Limousine breed. The data were from Romanian Breeding Association for Beef cattle. The age at the first calving was 792.92±6.77 days for Charolais breed and 813.83±6.09 days for Limousine breed. The heritability value for age at the first calving was 0.273 for Charolais and for Limousine breed was 0.275. The breeding values of cows with records for age at first calving were between -30.697 and 40.929 for Limousine breed were between -46.64 and 42.65. Improvement the reproduction traits increase the profitability of farms.

Key words: age at the first calving, cows, animal model, genetic parameters

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Influence of feeding dietary hempseed and linseed on milk characteristics of goats Murciano-Granadina

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An experiment was carried out on Murciano-Granadina lactating goats in order to improve milk quality following the dietary inclusion of linseed or hemp seeds. The goats were divided in 3 groups of 88 animals each and were given rations calculated to have the same protein and energy level for each group; the rations consisted of 1.5 kg of hay (mixture of 87% cereals and 13% alfalfa) and 1.2 kg of concentrated feed (CF). The goats feeding was carried out as follows: group C (control, CF with sunflower seed), group E1 (CF with 25% linseeds) and group E2 (CF with 25% hemp seeds). After 6 weeks we observed that the milk production was not different between the groups (1.21 liters for C, 1.05 liters for E1 and 1.14 liters for E2), as well as the level of milk protein (on average, 4%). On the other hand, the fat level was significantly higher ($p < 0.05$) in group E1 (6.085%) and in group E2 (6.052%) compared to group C (5.704%); same situation was registered for lactose level ($p < 0.001$) which had values of 4.86% in the E1 group, 4.85% in the E2 group compared to 4.76% in the C group. Regarding the milk's fatty acids composition, a significant decrease ($p < 0.0001$) of saturated acids (SFA) was found in the E1 groups (62.08%) and E2 (62.56%) compared to C group (70.04%) and a significant increase ($p < 0.0001$) of polyunsaturated acids (especially, cis-oleic, cis-linoleic and conjugated linoleic CLA) in both E1 and E2 groups. Our findings indicate that incorporating linseed or hempseed into diets has a positive impact on milk fat production in dairy goats, while maintaining consistent levels of milk protein and raw milk output. Additionally, these dietary modifications led to alterations in the fatty acid composition, potentially enhancing the nutritional quality of goat milk for human well-being.

Keywords: goat, hempseed, linseed, milk, fatty acids

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Potential use of co and by products of black chokeberry (Aronia melancarpa) as source of antioxidants in animal nutrition

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Since the ban of antibiotics as growth promoters in the EU (2006), several nutritional strategies in the poultry industry were proposed to maintain high standards of productivity, healthiness, and welfare. In poultry, natural sources of antioxidants act as potent free radical scavengers for the improvement of an organism's oxidative balance. Chokeberries (Aronia melanocarpa) have recently become one of the most popular and widely used berry fruits containing high content of bioactive constituents with a strong antioxidant capacity. Unlike berries, chokeberry leaves (CL) and pomace (CP) as useless parts were far less investigated, although they are a promising alternative of antioxidants. This study aimed to evaluate the potential of leaves (co-product) and pomace (by-product) of black chockeberry as a source of valuable bioactive constituents for animal nutrition by identifying and quantifying the phytochemical compounds and investigating the antioxidant potential. The total polyphenols, flavonoids, carotenoids and tocopherols were evaluated. The screening and quantification of polyphenols were performed using RP-HPLC. Antioxidant activity of samples was determined using four different methods (ABTS·+, DPPH, Fe^{2+}-chelating power and the phosphomolybdenum method). In vitro antioxidant potential of the CL and CP ethanolic extracts was evaluated by induced lipid peroxidation on organic tissue. Compared to CP, CL contained significantly higher levels of hydrophilic antioxidants (61.06±0.15 mg/g GAE vs. 22.94±1.52 mg/g GAE total polyphenols; 8.47±0.53 vs. 1.89±0.08 mg/g QE flavonoids), but lower levels of ß-carotene (4516.76±45.35 vs. 8511.41± 0.25 mg/kg), lutein (52.35±3.21 vs.346.60±1.18 mg/kg) and canthaxanthin (6.96±0.1 vs11.99±1.48 mg/kg). CL had higher levels of α-tocopherol than CP (1154.10±10.43 vs. 114.37±0.57 mg/kg α-tocopherol), but lower levels of γ-tocopherol (18.10±0.36 vs. 21.19±0.31 mg/kg γ-tocopherol). Twelve polyphenols constituents were identified by RP-HPLC, with flavan-3-ol, epicatechin, rutin and catechin being dominant phenolic compounds in CP and cumaric, rutin and catechin in CL. Results from the ABTS, Fe^{2+}-chelating power, phosphomolybdenum methods and DPPH assay showed that CL has higher antioxidant activity than CP. The application of a CL ethanolic extract on peroxidised tissue sample inhibited peroxidation with an efficiency of 32.06%, higher than CP (27.45%). Even though is a waste, CL is a valuable source of health-promoting phytochemicals with a higher antioxidant activity than CP and that might be used for various applications as a promising supplement in animal feed.

Keywords: black chokeberry, leaves, pomace, by and co product, phytochemicals, antioxidant potential.

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Effects of roughage level and source on performance parameters and meat characteristics of limousine feedlot cattle

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Roughage type and level in the diet of feedlot cattle can significantly affect their performance and hence farm profitability. In Greece, wheat straw is usually the dominate roughage in the diets of fattening cattle. However, alfalfa silage is also often included in feedlot rations. In the present trial 60 Limousine cattle, 12-months-old, were allocated into 4 groups, with 3 replicates each, using a randomized block design. The study was performed on a commercial farm and lasted 90 days, following an adjustment period of 14 days. Animals were fed the same concentrates based on grains and soybean meal. The daily allowance of roughage was set as following: Group LF received 0.5 kg of wheat straw, Group MF received 1 kg of wheat straw, Group HF received 1.5 kg of wheat straw and Group AS received 3 kg of alfalfa silage. Feed was offered twice daily in the form of total mixed ration, whereas water was available ad libitum. Individual body weights were recorded at the 1st, 45th and 90th day and feed residuals were monitored on a weekly basis. Manure samples were evaluated using the fecal sieving technique. At the end of the trial all cattle were slaughtered. Individual rumen tissue samples were collected for histomorphological evaluation. Longissimus dorsi muscle samples were collected for chemical composition and fatty acids analysis. No significant differences ($P > 0.05$) were observed in performance among groups. However, LF group had significantly ($P < 0.05$) higher number of undigested grains and feed particles in fecal samples. Significantly ($P < 0.05$) lower papillae length and width were detected in the rumen of the cattle offered the lowest quantity of straw (LF). The different diets influenced ($P < 0.05$) the fatty acid profile in examined meat sample, but the chemical composition of those samples did not differ ($P > 0.05$) among groups. The minimum wheat straw supplementation in LF group resulted in higher undigested feed particles and lower rumen papillae length. In conclusion, roughage level and type in the diet of feedlot cattle can significantly affect their meat fatty acid profile.

Keywords: feedlot cattle, roughage, meat fatty acids, rumen morphometrics

Optimizing microwave-assisted extraction of polyphenols from mustard seed meal

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The management of agroindustrial by-products has become a pressing concern at present times. The global production of 1.3 billion tons of agricultural residues presents a significant challenge, as a considerable portion of these byproducts is wasted, leading to substantial economic losses estimated at around 990 billion dollars. The issue of agroindustrial by-products also has important implications for greenhouse gas emissions, as they are responsible for approximately 26% of global emissions annually. Despite these challenges, agricultural residues hold promise as a valuable resource due to their abundance in compounds with therapeutic properties. These by-products can serve as valuable raw materials in various industries, including food, pharmaceuticals, and textiles. Among these compounds, polyphenols stand out as prominent bioactive constituents found within agroindustrial residues, with numerous beneficial applications. However, the industrial utilization of polyphenols derived from agroindustrial byproducts faces significant obstacles, particularly in terms of reducing extraction and purification costs and minimizing the use of hazardous solvents and reagents. In this context, this study proposes to investigate the optimization of microwave-assisted extraction for polyphenols from mustard seed meal as an eco-friendly method to obtain valuable products from agroindustrial by-products. Various parameters, such as solvent type, concentration, meal:solvent ratio, irradiation time, and extraction temperature, are analyzed to determine the optimal conditions for polyphenol extraction from mustard seed meal. The most efficient polyphenol extraction was achieved from Ukrainian mustard seed meal using 50% and 80% methanol as the solvent, with irradiation times of 20 and 30 minutes, temperatures of 100 and 125°C, and meal-to-solvent ratios of 1:30, 1:35, and 1:40. Moreover, under eco-friendly conditions, optimal polyphenol extraction was observed from Ukrainian mustard seed meal using ethanol as the solvent. The most efficient extraction conditions were achieved with ethanol concentrations of 50% and 80%, irradiation times of 20 and 30 minutes, temperatures of 100°C and 125°C, and meal-to-solvent ratios of 1:20, 1:30, 1:35, and 1:40. Furthermore, the findings of this research have the potential to contribute to the development of solutions that promote a circular economy and minimize losses associated with agro-food industry activities, while also reducing the environmental impact and generating substantial revenue benefits.

Keywords: microwave-assisted extraction, agro-industrial by-products, polyphenols, eco-fiendly

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Effect of partial replacement of the diet of broilers with whole *T. molitor* larvae on the morphology and microbiota of the intestine

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Limited availability and increasing costs of conventional feeds cast major problems in future poultry farming. However, a promising dietary source of protein and fat comes from Tenebrio molitor (TM) larvae. In a 35-day trial, 120 broiler chicks were divided into 3 groups: "Control", "TM5" and "TM10", the former feeding on conventional feed while treated groups received partially replaced feed with whole dried TM larvae at 5 and 10%, respectively. Partial replacement with whole TM larvae affected intestinal microbiota and morphology of the broilers, showing an increased a-diversity index, which is a possible indicator of improved intestinal health and a higher Chao-1 index, especially in the TM10 group. Broilers maintained the physiological intestinal development, with a higher Vh:Cd ratio in the duodenum where primary physical, chemical and hormonal activities take place, without any adverse effects on the jejunum. Part replacement led to a decrease in the *Firmicutes/Bacteroidota* ratio, mainly in the TM5 group, while a significant increase in *Bacteroidota* and *Campilobacterota* was observed in the ileum ($P<0.05$). At the genus level, a higher relative abundance of *Lactobacilli* was evident in the caecum, together with an increase in Staphylococci ($P<0.05$), the latter, however, owed to species limiting fatty acid oxidation. The increase in populations of the genera *Clostridium*, *Lactobacillus*, *Oscillospira*, *Faecalibacterium* especially in the caecum of the TM10 group, could be associated with improved formation of the intestinal epithelium. Regarding the latter, the 10% replacement had a lesser effect on gut morphology compared to the 5%, mainly in the duodenum and ileum, suggesting that the lower replacement rate may be preferable for broilers as a more influential feed additive.

Keywords: Tenebrio molitor, intestine, morphology, microbiota, diversity

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Dietary effect of microencapsulated probiotics on growth performances, health status, intestinal morphology and microflora in weaning piglets

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The aim of the study was to test the effects of microencapsulated probiotics on growth performances, health status, intestinal morphology and microflora of weaning piglets. A total of 160 weaners, 8.52±0.15 kg body weight, aged 28 ± 3 days were divided into four groups of 40 animals each (4 replicates with 10 individuals each) for 21 days. The control group (CON) received a basal diet without probiotics, while the experimental groups were supplemented with 1×10^8 CFU/g of L. acidophilus (LA), 3×10^8 CFU/g of L. plantarum (LP) and a diet containing 1.1% mix of L. acidophilus and L. plantarum (LA+LP). At the end of the trial the production performances, such as body weight (BW), average daily feed intake (ADFI), average daily gain (ADG), feed conversion ratio (FCR) were evaluated. Blood biochemical parameters from the plasma metabolic profile (lipid, protein, enzyme, and mineral) were determined. To evaluate the effect of dietary probiotics on intestinal morphology and microbiota, at the end of the trial, 8 animals per group were slaughtered and samples of duodenum, jejunum and ileum segments and intestinal content were collected. The results showed that the experimental groups performed better in terms of ADFI (P=0.014), ADG (P=0.091) and FCR (P=0.018) than the CON group. No effects ($p>0.05$) on biochemical parameters among treatments were noticed, which revealed that the tested supplements did not alter the health status. The tested probiotics, particularly the LA+LP diet increased ($p<0.05$) the jejunum and ileum villus length and width, crypt length, total villi and crypt length as well as their ratio compared with the control. In conclusion, microencapsulated probiotics, particularly the combination of L. plantarum and L. acidophilus strains, had no significant influence on growth performances and biochemical plasma parameters. However, they were able to maintain a favourable equilibrium of the gut microbiota diversity with beneficial effects on piglets' health.

Keywords: L. acidophilus; L. plantarum; microencapsulated probiotics; performance; piglets' health, weaning piglets'

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Exploitation of local agricultural byproducts and formulation of isoproteinic diets for Tenebrio molitor (Coleoptera: Tenebrionidae) rearing.

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While insect larvae are a natural component of diets of carnivorous fish and several monogastric animals (e.g. poultry animals), EU has recently given insects the ‘’green light’’ for their incorporation as feeding substrate in aquaculture and livestock farms. Insects represent a promising feeding as their production is environmental friendly. Indicatively, insects are able to feed on agricultural byproducts converting them into high-value nutrients, such as proteins and lipids. As a huge amount of wastes and byproducts are produced from most agricultural farming systems, insect farming has attracted recently a lot of scientific and commercial interest. Thus, the aim of this study was to evaluate a series of locally produced agricultural byproducts (i.e., by-products of the production of maize, sunflower, lucerne, oat, rice, brewery, and mushroom) as feeding substrates for larvae of the insect species Tenebrio molitor. Initially, larvae were fed on the different by-products and larval performance was recorded. Based on the results of the first trial, the best performing by-products were further incorporated in isoproteinic diets creating three different protein levels (i.e., 17,4, 20,3, and 22,6%). Larval performance was also recorded in the isoproteinic diets. In both trials wheat bran with yeast served as control. The results of the first trial showed that larvae grew well on oat and maize by-product, as well as on brewer's spent-grains, although in most cases a lower growth rate was recorded compared to control. The results of the second trial revealed that T. molitor larvae perform good on diets consisting of different byproducts. However, higher composition of protein in diets does not always led to better performance of larvae, indicating that other factors should be taken into consideration during the design of insect diets. These results aim to contribute the sustainable production of insects utilizing local byproducts, and to boost insect farming.
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Keywords: insects, larval growth, T. molitor, agricultural by-products, isoproteinic diets

The effects of including linseeds and mustard seeds in goats' diets on various milk quality parameters

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The effects of local varieties of linseed (as source of PUFA) and mustard seed (as source of antioxidants) on milk quality were studied within a feeding trial on 18 lactating goats, divided in three groups: Control (with sunflower meal and sunflower oil), E1 (where sunflower meal and oil were replaced by linseeds, 12% inclusion level, DM basis), and E2 (where one quarter of the linseeds was replaced by mustard seeds, DM basis). Chemical analyses performed before the trial revealed that linseed presented high levels of linoleic acid (16.08 g FAME/100g) and linolenic acid (56.66 g FAME/100g), whereas the mustard seeds had high antioxidant capacity, due to the elevated levels of tocopherols (244,49 mg/kg), particularly γ-tocopherol (175.84 mg/kg), and carotenoids, especially β-carotene (52.56 mg/kg). The inclusion of linseed has increased the content of milk polyunsaturated fatty acids (p=0.001), including the Ω3 fatty acids (p=0.001), thus leading to a reduction of the Ω6/Ω3 ratio (p=0.001), comparing to the control group. However, in the experimental group, where the inclusion level of the linseed was lower (9% only, being partly replaced by mustard seeds) the Ω6/Ω3 ratio was also lower (p=0.001) comparing to the control group, but a higher saturated fatty acid content (p=0.004) was noticed. As one of the effects was the increase of milk PUFA content, more susceptible to oxidation, the milk content in vitamin E was also assessed. The E2 group showed highest vitamin E content in milk (32.92 mg/L), with α-tocopherol being the most abundant isomer (19.37 mg/L). However, none of the experimental diets (either linseeds or linseed & mustard seeds) have influenced the oxidation parameters that are characteristic to the first step of fatty acid oxidation (concentration of conjugated dienes and peroxide value); quite the opposite, the content of conjugated dienes increased in both experimental groups (p=0.001). On the other hand, our study suggested the ability of the linseed and mustard seed to influence the parameters that are characteristic to the second of fatty acid oxidation, by drastically reducing the p-anisidine value (p=0.001). Furthermore, after 24 hours of storage of the milk samples at room temperature, p-anisidine was significantly higher in case of linseed group, compared to the control group (69.09 vs 53.43). However, the value corresponding to the linseeds & mustard seeds group was unaffected by the storage, indicating that dietary inclusion of mustard seeds may positively influence the milk shelf life. In conclusion, our study suggested that the dietary inclusion of linseeds had a positive impact on goat milk fat quality by increasing the content of polyunsaturated fatty acids. When linseed was included in combination with mustard seeds, it enhanced some parameters that express the antioxidant potential of milk, thus potentially extending its shelf life.

Keywords: linseed, mustard seed, milk quality, milk fatty acids, milk antioxidants.

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Some Carcass Quality Characteristics of Anatolian Buffaloes

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Buffaloes contribute significantly to meat and milk production where they live. However, buffaloes feeding and their products have been studied insufficiently compared to cattles. This study was carried out to determine physico-chemical properties of muscle samples taken from Longissimus dorsi trochis of Anatolian water buffalos slaughtered in the Kayseri region. In the study, 34 buffaloes that were sampled in slaughterhouse in March and April 2023. In the study, it was determined that 28 of the buffaloes sent for slaughter and female (82.4%) and 6 male (17.6%). The average condition score in females was 4.02 and the body condition scores ranged between 3.0 and 5.0 and for males body condition score was 3.25 and the range between 3.0 and 3.75. The average hot carcass weight in females was 245.68 kg and in males 220.31 kg. The slaughter age in female buffaloes (between 2 and 5 years old) is higher than that of males (2 years old) and they are sent to slaughter after an intensive feeding. The thickness of the carcass fat was 9.35 mm in females and 7.39 mm in males, and the meat pH24 value was similar 5.49 in females and males. The L* (lightness) 40.62 and 42.06, a* (redness) value 20.63 and 17.44, and b* (yellowness) value varied between 12.31 and 11.19 in females and males respectively. As a result, it was determined that slaughter age, condition score and carcass fat thickness and a* and b* values in meat were higher in females, meat pH values were similar and L* values in meat were lower than males.

Keywords: buffalo, carcass, meat quality, sustainability

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POSTER PRESENTATIONS

Study of some bioactive compounds in fodder for animal feed

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The aim of this paper was to evaluated of some bioactive compounds in fodder used in animal feed. The studied fodder were grape seeds and sea buckthorn (individual and mixed), rapeseed, mustard and flax seeds. The bioactive and nutritional compounds: carbohydrates, organic acids and some flavonoids and phenolic acids were analyzed by high performance liquid chromatography (HPLC). Also, the total phenolic content (TPC) and antioxidant activities by DPPH (2,2′-diphenyl-1-picrylhydrazyl radical) and ABTS [2,2'-azinobis-(3-ethylbenzothiazoline-6-sulfonate) assays were determined. Thus, the quantities of carbohydrates (glucose, fructose, sucrose, maltose) were varied between 1796 and 7606 mg/100g and the organic acids (oxalic, citric, tartaric, malic) amounts were varied between 813 and 8078 mg/100g. Regarding of the quantities of flavonoids and phenolic acids, they were found in the range of 16 and 307 mg/100 g in studied samples. The results show that these fodders have important nutritional and antioxidant properties and can be used in animal feed.

Keywords: antioxidant activity, bioactive compounds, carbohydrates, fodder, HPLC, organic acids, TPC.

Ex-vivo studies on the effects of Alternaria toxins on the inflammatory response at the porcine intestinal level

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Alternariol (AOH) and Alternariol Monomethyl Ether (AME) are toxins produced by Alternaria fungi, which can contaminate corn, fruits, and oil seeds. Currently, there are not many in vivo studies concerning the effects of Alternaria toxins on human and animal health, but in vitro studies have shown that AOH and AME exposure is associated with oxidative stress and inflammation. Considering that the pig is a great consumer of cereals or fruits that can be contaminated with these toxins, an ex-vivo study on intestinal explants from the jejunum of weaned piglets was performed. The aim of this study was to evaluate the effects of AOH and AME on the inflammatory response at the porcine intestinal level. The effects at the level of some pro-inflammatory markers such as the inflammatory cytokines IL-1β, IL-6, IL-8, and TNF-α were evaluated both individually by treating the explants with individual toxin: AOH 10 mg/ml or AME 10 mg/ml, as well as with a toxin combination: AOH 5 mg/ml + AME 5 mg/ml. Explants were cultivated in complete Williams medium for 4 hours in an atmosphere of 5% CO2 and 37°C. After 4h, supernatants were collected for cytokine analyses by ELISA and the explants were used for the analyse of pro-inflammatory markers expression by qPCR. The results have shown that while AOH 10 mg/ml didn`t induce significant changes in the protein concentration of IL-1β, IL-6, IL-8, and TNF-α, AME 10 mg/ml led to a significant increase of both IL-1β ($P = 0.0103$) and IL-8 ($P=0.0472$) as reported to the control. Moreover, the simultaneous exposure to AOH mg/ml and AME mg/ml induced a significant increase in IL-1β protein concentration ($P=0.0267$). The results concerning expression of genes involved in inflammation by qPCR are under analysis. In conclusion, the results obtained so far from this ex-vivo experiment suggest that, at the porcine intestinal level, exposure to Alternaria fungi can produce a pro-inflammatory effect, AME having a more pronounced pro-inflammatory effect than AOH and the combination of the toxins.

Keywords: Alternariol, Alternariol Monomethyl Ether, inflammation, intestine, pig

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The role of alternariol in the apoptotic process at the gut level in pigs

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Alternariol (AOH) is a toxic secondary metabolite produced by Alternaria fungi. It is an important contaminant of grains and fruits, which have been frequently detected in apples, apple products, tangerines, olives, peppers, red peppers, tomatoes, tomato products, rapeseed meal, sunflower seeds, sorghum, wheat and edible oils, citrus fruits, carrots, barley, oats, etc. From the studies carried out so far, it is known that Alternaria toxins induces cell death, being able to have genotoxic, mutagenic and carcinogenic properties. AOH induces DNA strand breaks and gene mutations in cultured animal and human cells. As information concerning the AOH toxicity were issued mainly from in vitro studies, our study aimed to provide new data about the AOH toxicity at the intestinal level in pigs using an ex-vivo approach (intestinal explants). Through their diets rich in cereals, pigs are particularly exposed to the contamination with mycotoxins, including alternariol. Three fattening pigs with mean body weight of 87kg were slaughtered and the intestinal explants were obtained from the jejunum using an 8mm biopsy punch. Explants samples were cultivated in 6 well plates containing complete Williams medium, treated or not with AOH (5 and 10 mg/mL) and incubated for 4 hours at 37°C and a CO2 concentration of 5%, under agitation. The effects of AOH on the expression of some genes involved in the regulation of apoptosis (BAX, BCL2) and on MAPKs cell proliferation signalling pathways (ERK-1, ERK-2, JNK-1, JNK-2) was analysed by real time PCR technique in the intestinal explant samples. Our results have showed that both AOH concentrations led to a decrease in BAX gene expression, a pro-apoptotic marker, while tended to decrease the anti-apoptotic marker BCL2 gene expression. Also, both AOH concentrations induced an increase in ERK-1 and ERK-2 MAPKs gene expression, while the expression of JNK-1 and JNK-2 genes remain unaffected by the exposure to AOH. In conclusion, our preliminary data have shown that alternariol has a pro-apoptotic effect in pig intestinal explants realized through the ERK1/2 signalling pathway.

Keywords: alternariol, swine, intestine, apoptosis

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Sorghum grain in broiler's diet: Effects on growth performance, blood biochemistry, and meat quality

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Abstract: Climate changes become a threat to the livestock sector, and finding novel nutritional solutions for feeding farm animals became a priority. Sorghum (Sorghum bicolor (L.) Moench) are valuable in terms of drought-resistant plants. The influence of feeding a new hybrid of sorghum (ES Shamal, orange variety) in broiler chickens on growth, health, meat, and litter quality was evaluated from 1–42 d. A total of 360-day-old male Ross 308 broiler chicks (40.1±2.3 g) were randomly assigned to 3 experimental diets: 100% corn-based diet (CON), partial replacement of corn with 50% sorghum (S50), total replacement of corn with sorghum (S100). All diets were calculated to be isonitrogenous and isocaloric with similar content of total lysine, total sulphur amino acids, calcium, and available phosphorous. The results indicated that partial or total replacement of corn by sorghum is suitable for broiler chicken diets with no adverse effects on growth, and slaughter performance, as well as litter quality over the whole trial period. Moreover, the substitution of corn with sorghum, reduced ($p = 0.007$) abdominal fat associated with an increase in breast and thigh meat color (L* values; $p < 0.001$). Also, a significant ($p = 0.002$) decrease in plasma triglyceride was found in broilers fed sorghum-based diets. Except for collagen and hardness in the breast and thigh, and gumminess only in the thigh muscle, there were no differences in fundamental physicochemical (pH, protein, fat, moisture) or textural attributes of meat due to dietary treatment. However, sorghum alters the intestinal microflora, resulting in a lower count of E. coli in the caeca. It can thus, be concluded that sorghum (ES Shamal, orange variety) can be included in broiler feeds from hatching to day 42, without any adverse effects on the broiler's performance.

Keywords: broiler; sorghum; performance; plasma metabolites; meat traits

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Exploring the probiotic potential of lactic acid bacteria and microencapsulation of selected strains by spray drying process

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A number of fourteen lactic acid bacteria (LAB) strains were isolated from the intestinal tract and feces of piglets. From total isolates, only twelve were biochemically and genetically (16S rRNA sequencing) confirmed as Limosilactobacillus fermentum, Lactobacillus acidophilus and Lactiplantibacillus plantarum. The probiotic potential included pH tolerance (pH 2.0 and 3.0), bile salts (0.3% ox gall) resistance, hemolysis activity, antibiotic susceptibility and high-temperature resistance were evaluated. When exposed to low pH and bile salts, only two isolates from identified strains exhibited high survival rates, these two were L. acidophilus IBNA 76 and L. plantarum IBNA 84. The antibiotic test presented 100% resistance of both strains to gentamicin, kanamycin, lincomycin, colistin sulfate, erythromycin, amikacin, oxytetracycline, enrofloxacin, streptomycin and tilmicosin lower than the 0.6 mm inhibition zone diameter. Promising isolates (L. acidophilus IBNA 76 and L. plantarum IBNA 84) were exposed to the spray-drying technique based on observable probiotic potential and survival rates. A maltodextrin-glucose solution was used as carrier matrix material. The encapsulation probiotic isolated survived both over 67% and 77%, corresponding to a reduction in strain viability from 109 to 107 CFU/g. After further in vitro evaluations, the findings of this study showed that, from all LAB strains, L. acidophilus IBNA 76 and L. plantarum IBNA 84 may be considered probiotics candidates for animal nutrition and may have promising performance in piglet feed due to their origin of isolation.

Keywords: probiotics; lactic acid bacteria; viability; spray-drying; piglets

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Lentils as protein alternative on poultry nutrition

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The research aimed to test the potential and challenges of incorporating lentils into broiler diets. The experiment involved incorporating different types of lentils: yellow (E1), red (E2), green (E3), black (E4), and a mix of all types (E5) at a 20% inclusion rate. With protein content ranging from 23.94% to 26.19%, the lentils were utilized as a substitute for up to 50% of soybean meal protein. The study evaluated how this substitution affected broilers' growth performance, production efficiency (Protein Efficiency Ratio, PER; European Production Efficiency Factor, EPEF; Efficiency of Energy Utilization, EEU; Performance Index, PI), meat quality (proximal composition, quantifiable properties parameters, fatty acids content and colour) and overall health of broiler. A 42-day feeding trial was conducted on 300, day-old ROSS 308 chicks assigned to 6 (C; E1; E2; E3; E4; E5) groups and kept in an experimental hall on permanent wood shaves litter. During the starter stage (1-10 days) all chicks received a conventional compound feed (C). All experimental groups, exception E5 group, registered significant ($p \leq 0.05$) higher values for finally body weight (2545.2 g E1, 2541.9 g E2, 2600.3 g E3 and 2509.9 g E4 vs.2407.1 g C and 2408.1 g E5) and daily weight gain. The same statistically different ($p \leq 0.0001$) results were observed for PI (180.12 % E1; 179.85 % E2; 180.01 % E3) and EPEF value (514.62 E1; 513.87 E2; 514.30 E3) compared to C (161.93 % PI; 462.67 EPEF) and E5 (180.12 % PI; 465.95 EPEF). PER and EEU were not statistically different among dietary groups. The quantifiable properties of meat registered no differences between groups, although the pH value increased ($p \leq 0.0001$) significantly between groups, and also over different time (hours) intervals (5.76 for T_{0h}; 5.82 for T_{24h}; 5.84 for T_{48h} and 5.86 for T_{72h}, respectively). Significantly higher content of omega-3 polyunsaturated fatty acids (PUFA) was detected in chicken breast on E1 group, resulting in a lower omega-6/omega-3 ratio (13.86). In conclusion, lentils can be considered an effective alternative protein source in broilers' diet, with significant impact on production performances, energy and protein efficiency, as well as meat quality.

Keywords: lentil, broiler, protein efficiency ratio, performances, fatty acids

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Metabolomic and toxicity prediction of alternariol using in silico approaches

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Alternariol is a metabolite produced by Alternaria fungus that can contaminate a variety of food and feed materials. The objective of the present study was to provide a prediction of Phase I and II metabolites of alternariol and a detailed ADME/Tox profile for alternariol and its metabolites using an in silico working model based on the MetaTox, SwissADME, pKCMS and PASS online computational programs. A number of 12 metabolites were identified as corresponding to the metabolomic profile of alternariol. ADME profile for AOH and predicted metabolites indicated a moderate or high intestinal absorption probability but a low probability to penetrate the blood brain barrier. Beside cytotoxic, mutagenic, carcinogenic, endocrine disruptor effects, the computational model has predicted for analyzed compounds other toxicological endpoints as vascular toxicity, hemato-toxicity, diarrhea, nephrotoxicity. AOH and its metabolites have been predicted to act as substrate for different isoforms of phase I and II drug-metabolizing enzymes and to interact with the response to oxidative stress. In conclusion, in silico methods can represent a viable alternative to the in vitro and in vivo tests for the prediction of mycotoxins metabolism and toxicity.

Keywords: alternariol, metabolism, toxicity

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Using intestinal explant culture to evaluate the effect of apple pomace on inflammation and oxidative stress in piglets after weaning

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The present study evaluated the effect of an apple pomace extract on intestine of piglets after weaning a critical period for this farm animal species. Apple and apple pomace are very rich in active biomolecules such as polyphenols, fiber, vitamins, minerals etc, which could attenuate the transitory inflammation occurred after weaning due to their anti-inflammatory, antioxidant properties. An in vitro study was carried out on intestinal jejunal explants to assess the effect of apple pomace on several markers of inflammation and oxidative stress. Pigs of 4 weeks of age were used to obtained explants which were incubated for 2 hours with 1/25 and 1/50 apple pomace extract and then either with E. coli-LPS or hydrogen peroxide for another 2 hours at 37^0C and 5% CO_2. The results show an increase in the concentration of pro-inflammatory markers interleukin-8 and -6 as well as in nitric oxide production. A decrease in catalase activity after H2O2 challenge was registered. Both concentrations of apple pomace extract were able to attenuate negative effect induced by E. coli-LPS or H2O2.

Keywords: explant, apple pomace, pig, inflammation, oxidative stress

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Screening of the chemical composition of sea buckthorn pomace as a by-product intended for animal nutrition

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Sea buckthorn (Hippophaë rhamnoides L.) is a shrub cultivated for numerous dietary and pharmaceutical purposes. Pressing of juice produces high amounts of pomace, which currently are discarded as a waste or utilized rather inefficiently; therefore considerable amounts of nutrients might be lost annually. This pomace might finds usage as animal feed or simply discarded, owed to the lack of appropriate handling or processing facilities. The present study aimed to evaluate the chemical composition of sea buchthon pomace as by-product for inclusion in animal feed. The proximate composition (crude protein, crude fat, crude fiber), fatty acids (gas chromatografy), total polyphenols (spectrophotometry), minerals (flame atomic absorption spectroscopy) were evaluated. Antioxidant activity of samples was determined using 2 2-diphenyl-1-picrylhydrazyl (DPPH) and the phosphomolybdenum methods. Analitycal results showed that sea buckthorn pomace contains 12.85% crude protein, 10.12% crude fat and 12.24% crude fiber. The results of the determination of fatty acids showed that sea buckthorn is rich in palmitoleic (22.04±0.028 g/100g fatty acid methyl ester), palmitic acid (27.5± 0.071 g/100 g fatty acid methyl ester) and is a valuable source of α-linolenic acid (11.08±0.092 g/100 g fatty acid methyl ester). Regarding mineral content, sea buckthorn pomace is rich in Fe (246.72±0.262 mg/kg) and Mn (154.7±0.283mg/kg). Sea buckthorn pomace had an important content of total polyphenols (9.96±0.15 mg/g gallic acid equivalent) and expressed high antioxidant activity as shown by DPPH method (28.39 ±0.05 mM Trolox equivalent) and phosphomolibdenum method (112.31±12.2 mM ascorbic acid equivalent). In conclusion, sea buckthorn pomace represents a valuable source of nutrients and bioactive compounds with important antioxidant activity making it suitable for inclusion as supplement in animal nutrition.

Key words: sea buckthorn, pomace, by product, screening, chemical composition, animal feed.

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The effect of mulberry leaves on the nutritional quality profile of laying hens' eggs

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The experiment studied the effects of different levels of mulberry leaf powder (ML) inclusion in laying hens' diets on their nutritional quality and the fatty acids profile. The study was conducted on 120 HyLine laying hens (age 27 weeks), divided in 3 groups: control (C; 0%), and experimentals E1(1.5%) and E2 (3%). Feed and water access were provided ad-libitum. At the start of the experiment and during the 2nd-week and 4th-week periods, egg samples (18 eggs per group) were collected to evaluate the nutritional quality profile of the eggs. In the experimental group E1, the dietary fatty acids profile from the diets, particularly linolenic acid and the total Ω3 content, showed a significant increase ($p \leq 0.05$) of 1.09 for linolenic acid and 1.49 for Ω3, respectively, compared to both C and E2 groups. The antioxidant profile exhibited significant differences ($p \leq 0.05$) on E2 group (0.93) which demonstrated significantly higher antioxidant levels compared to both E1 and C (0.88) groups. However, the total content of Ω6 did not show significant changes ($p > 0.05$) between the experimental groups. The content of polyphenols recorded a significant increase ($p \leq 0.05$) on E2 group (2.75), compared to C (2.60) and E1 (2.67) groups. Concerning the fatty acids profile of eggs, α-linolenic acid recorded the highest value (0.27) on E2 group, compared to C (0.17) and E1 (0.21) groups. Similarly, for total content of Ω3, E2 group recorded the highest value (1.20), compared to C (0.52) and E1 (1.08) groups. The results of the experiment demonstrated that 1.5% and 3% dietary inclusion levels of mulberry leaves powder significantly enhance the intensity of the fatty acids profile without adversely affecting production performances.

Keywords: antioxidant profile, fatty acids, laying hens, mulberry leaves, nutritional quality

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Yolk color intensification using marigold and paprika extract

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Egg yolk colour is an important parameter for consumers, it can be obtained by dietary manipulation using carotenoids from natural sources. The present study aimed to evaluate the effect of supplementing the diet of laying hens with different sources of natural colourants, like marigold (*Tagetes erecta L.*) and paprika (*Capsicum annuum*) extracts on their egg yolks' colour intensity and lutein content. A 6-week trial was conducted on 168 Lohmann Brown layers (45 weeks), assigned to four dietary treatments (42 hens/group; 21 replicate/groups with 2 birds/cage), housed in Big Dutchmann digestibility cages with similarly environmental conditions (temperature: 22.44±1.85 °C; humidity: 63.88±6.02 % and ventilation: 27.4 ± 10.86 m/s). The hens were fed with a standard diet (C) characterized by 17% PB, 2750 Kcal EM/kg and three experimental diets supplemented with 0.07% marigold extract (E1), 0.07% paprika extract (E2) and 0.02% marigold + 0.05% paprika extract (E3). Marigold and paprika powder presented high content of the lutein (3786.66 mg and 956.26 mg) which has increased the lutein concentrations in compound feed (22.19 mg/kg diet, E1; 9.06 mg/kg diet, E2 and 14.77 mg/kg diet, E3) and egg yolk. The experimental results demonstrated that inclusion of marigold and paprika powder improved the yolk color intensity without negative effects on production performances and internal and external egg parameters. Yolk colour intensity registered a significant higher value ($p \leq 0.001$) for all experimental groups (6.04, E1 respectively 7.22 for E2 and E3) compared to C group (4.41) during the entire period. The same observation was noticed for lutein content in yolk, which significantly ($p \leq 0.001$) increased for E1 (28.67 ppm) compared to C (7.77 ppm) and experimental groups E3 (12.35 ppm) and (E2 8.03 ppm). This increase is positively correlated with the concentration of lutein in the marigold powder.
In conclusion, the use of these sources of carotenoids in laying hens' diet could be an effective way to improve the nutritional properties and yolk color of the eggs without affecting their quality and consumer's safety.

Keywords: egg, laying hens, lutein, marigold, paprika, yolk colors

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Nutritional potential of cowpea seeds as future protein supply to partially replace soybean meal in the poultry diet

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Abstract: Legumes have the potential to support global protein production by partially replacing soybean meal (SBM) in the poultry diet. This will not only help meeting the increasing worldwide demand for proteins but could contribute towards mitigating the threat imposed on the environment by current agricultural practices in higher-economy countries (dependence on fossil fuel energy and harmful emissions). Among the legumes, cowpea (*Vigna unguiculata* [L] Walp) is a valuable crop. It is a rich source of proteins, fiber, and other non-nutrient compounds considered beneficial for health. Although a popular source of proteins in many parts of the world, especially in the Mediterranean area, Middle East, and South America, it has yet to be fully exploited in the poultry industry where SBM is the predominant source of proteins in the diet. In addition, fava bean enables symbiotic fixation of atmospheric nitrogen and can provide a more environmentally friendly substitution for industrial N-fertilizers with associated improvements in resource efficiency and production costs. From both a food security and environmental sustainability perspective, encouraging both the production and utilization of cowpea is a timely and important target. Thus, this review focuses on the potential of cowpea as a functional feed ingredient to partially replace SBM in the poultry diet.

Keywords: cowpea, nutrients, anti-nutritional factors, poultry nutrition.

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Optimization of Probiotic Viability via Freeze-Dried Encapsulation with different cryoprotectants

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In order to exert their beneficial physiological effect and to ensure a site-specific release, probiotics must withstand a wide spectrum of extrinsic factors that include manufacturing, processing and host organism specific conditions. The aim of this study was to investigate capacity of four distinct encapsulation materials: skim-milk (SM), maltodextrin (MD), trehalose (THR) and glucose (GLC) combined with probiotics in a 1:2 ratio (w/w) to serve a dual function by acting as a cryoprotectant and as a delivery form in order to confer protection against host-related factors such as low pH and bile salts concentrations (0.3 and 0.5%). After freeze-drying process, the viability of the isolated strains (*Lactobacillus paracasei ssp. paracasei* IBNA 01 and *Lactobacillus acidophilus* IBNA 05) were higher vs. control for SM, MD, and THR, SM ensuring almost 100% viability for IBNA 01 and 88% for IBNA 05, highlighting the importance of bacterial different phenotypes that impacts survivability to different conditions. GLC shows no relevant effect on viability for first stain, in case of second being detrimental. In both strains, the utilization of MD material resulted in exclusive survivability during 2h-exposure to simulated gastric acid (pH 3). Initial strain exhibited a reduction in viability at a rate of approx. 5% per hour, second one demonstrating to be resistant in acidic condition maintaining its viability almost unchanged from the starting point. Tolerance to bile salts concentrations of 0.3% and 0.5% were high for both strains encapsulated in MD, the viability of the first strain remained unchanged, while the second strain exhibited proliferation initially and then both experienced a 5% decline in viability during the second hour. It can be concluded that SM confer cryoprotection for bacteria subjected to freeze-drying and MD demonstrate efficacy across all investigated conditions.

Keywords: probiotics; lactic acid bacteria; viability; freeze-drying;

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