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Fourth International Conference on

Agriculture Digitalization and Organic Production

ADOP 2024

Conference Programme and Abstracts

June 5–8, 2024

Minsk, Republic of Belarus

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- Republican Unitary Enterprise "Scientific and Practical Center of the National Academy of Sciences of Belarus on Agricultural Mechanization" (RUE SPC of the NAS of Belarus for Agricultural Mechanization, Minsk, Republic of Belarus)
- St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS, St. Petersburg, Russia)

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Thursday, June 6, 2024	
09:00-13:00	**Oral Session 3: Digitalization and Organic Animal Husbandry: Poultry Farming, Dairy Production and Aquaculture** **https://us06web.zoom.us/j/88319865873?pwd=sVQzdjNgs397bfd8KBrWAPVL7DbnIn.1** **Cochairs: Vladimir Surovtsev, Evgeniy Zhilich**
	Roman Nekrasov, Evgenia Tuaeva, Magomed Chabaev, and Nadezhda Bogoluybova. Use of Hermetia Illucens Larvae Fat in Feeding of Calves
	Vladimir Surovtsev, Yulia Nikulina, Alexandra Zaytseva, and Sergey Kuleshov. Evaluation Model for Digital Technology Efficiency: the Example of Intelligent Digital Video Monitoring of Early Disease Diagnosis and Physiological Cows Condition
	Konstantin Ostrenko, Anastasia Ovcharova, Nadezhda Belova, Ivan Kutyin, Kirill Koltsov, Vyacheslav Rastashansky, and Natalia Nevkrytaya. The Effect of an Emulsion Based on Coriander (Coriándrum Sátivum) and Fennel (Foenículum Vulgáre) on the Expression of Genes Forming the Immune Status of Dairy Calves
	Elena Yildirim, Larisa Ilina, Georgi Laptev, Daria Tyurina, Valentina Filippova, Andrei Dubrovin, Natalia Novikova, Kseniya Kalitkina, Ogulgerek Djepbarova, Ekaterina Ponomareva, Alisa Dubrovina, Irina Klyuchnikova, Natalya Patyukova, Darren Griffin, and Michael Romanov. The Search for Sources of Enterobacteria and Clostridia Endotoxins in Russian Dairy Farms: Possible Transfer of Endotoxins through the Feed-Cow-Milk Chain
	Anastasia Ovcharova, Konstantin Ostrenko, and Andrey Gavrikov. The Effect of Lactobacillus Reuteri Probiotic Strains on Productivity and Basic Physiological Parameters of Laying Hens
	Victar Lemeshevsky. Provision of Substrates for Energy Processes in Bulls at Different Levels of Metabolizable Protein
	Vitaly Javakhia. Antiviral and Antifungal Protective Activity of a Cold-Shock Protein fFrom Bacillus Thuringiensis
	Nadezhda Bogolyubova. The use of Melanin in the Nutrition of Broilers to Preserve the Health of Birds and Obtain High-Quality Poultry Products
	Georgi Laptev, Daria Tyurina, Elena Yildirim, Elena Gorfunkel, Larisa Ilina, Valentina Filippova, Andrei Dubrovin, Alisa Dubrovina, Natalia Novikova, Veronika Melikidi, Kseniya Kalitkina, Ekaterina Ponomareva, Vasiliy Zaikin, Irina Klyuchnikova, Darren Griffin, and Michael Romanov. Effects of Glyphosate and Antibiotics on the Expression of Genes Related to Performance, Antioxidant Protection and Histological Barrier in the Cecum of Broilers
	Georgi Laptev, Daria Tyurina, Valentina Filippova, Elena Yildirim, Larisa Ilina, Elena Gorfunkel, Veronika Melikidi, Andrei Dubrovin, Kseniya Kalitkina, Ekaterina Ponomareva, Vasiliy Zaikin, Irina Klyuchnikova, Alisa Dubrovina, Ogulgerek Jepbarova, and Jie Zhu. The Influence of Glyphosate in Combination with Antibiotics on the Microbial Community of Broiler's Cecum According to Whole Genome Sequencing
	Roman Meshcheryakov, Gleb Tevyashov, and Konstantin Rusakov. Automatic Determination of Sturgeon Size Using Deep Learning Technologies
	Evgeniy Ivashko. Mathematical Model of a Cage Fish Farm
	Marina Solovey, Alexey Snytnikov, Aleksandr Tristanov, and Pavel Chernyshkov. Forecasting the SAM Index Value Using Fourier Series and Neural Networks
09:00-13:00	**Online Oral Session 4: Digital Technologies and Robotics in Crop and Livestock Production** **https://us06web.zoom.us/j/88319865873?pwd=sVQzdjNgs397bfd8KBrWAPVL7DbnIn.1** **Cochairs: Anton Saveliev, Igor Pylilo**
	Artem Popov, Ivan Blekanov, Mikhail Arkhipov, and Olga Mitrofanova. Improving the Quality of X-Ray Images of Seeds in Smart Farming Using Deep Learning





Konstantin Ostrenko, Anastasia Ovcharova, Nadezhda Belova, Ivan Kutyin, Kirill Koltsov, All-Russian Research Institute of Physiology, Biochemistry and Nutrition of Animals – Branch of the L.K. Ernst Federal Research Center for Animal Husbandry, VNIIFBiP, Borovsk, Russia.
Vyacheslav Rastashansky, Normopharm – Skolkovo, Skolkovo Innovation Center, Moscow, Russia.
Natalia Nevkrytaya, FSBSI "Research Institute of Agriculture of Crimea", Simferopol, Republic of Crimea, Russia.
Lecture Title: The Effect of an Emulsion Based on Coriander (Coriándrum Sátivum) and Fennel (Foenículum Vulgáre) on the Expression of Genes Forming the Immune Status of Dairy Calves.
Abstract: In the early period of ontogenesis, the entire digestive system is formed, especially the mucous membrane lining the entire surface of the hollow organs of the digestive system and representing a large contact surface for food and various antigens. The purpose of this research was to study the effect of a feed additive based on a mixture of essential oils of coriander and fennel on the immune status of calves during the milk-feeding period. The results of the study showed that the expression level of the proinflammatory cytokines IL6 and IL8, used to destroy antigens, was higher in the experimental group. Decreased expression of SIRT3 in the control group is reduced, which is the main factor associated with low metabolic activity, including the accumulation of lipid droplets inside the cell, which contributes to a decrease in energy supply and survival of the body. In the experimental groups, an increase in the expression of the SIRT3 gene reflects factors of increased productivity and nonspecific resistance of dairy calves. The data obtained may indicate that when using a feed additive based on essential oils, it has a pronounced immunostimulating effect, contributes to an increase in the nonspecific resistance of calves.



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Darren Griffin, School of Biosciences, University of Kent, Canterbury, Kent, UK.
Michael Romanov, School of Biosciences, University of Kent, Canterbury, Kent, UK; L.K. Ernst Federal Research Center for Animal Husbandry, Podolsk, Russia.
Lecture Title: The Search for Sources of Enterobacteria and Clostridia Endotoxins in Russian Dairy Farms: Possible Transfer of Endotoxins through the Feed-Cow-Milk Chain.
Abstract: Here, samples to identify bacterial endotoxins were collected from two commercial dairy farms in Leningrad Oblast: farm A (samples of feces and milk were taken) and farm (where samples were taken from the feeding table, milk and rumen chyme). The study comprised four groups (A1, A2, B1, B2) where 1 was the control and 2 the test group. A1 were healthy, A2 showed signs of pathologies of the limb joints, B1 received the basic diet (BD) and B2 were fed this, plus the feed additive AntiKlos. Using PCR, samples were examined for the presence of genes for Shiga toxins (stx1A, stx2B), intimin (eae) and enterohemolysin (ehxA) produced by enterobacteria; for alpha (cpa1), beta (cpb) and epsilon toxin (etx) produced by Clostridium perfringens, plus binary toxin (cdtB), toxin A (tcdA) and

	toxin B (tcdB) produced by Cl. difficile. In the test Group A2, one animal out of six studied (16.7%) had the intimin (eae) and enterohemolysin (ehxA) genes pro-duced by enterobacteria that were not found in the control A1. The epsilon toxin gene (etx) was the most common and present in 100% of the examined fecal samples from both farms and 100% of milk samples from farm A.
	**Anastasia Ovcharova, Konstantin Ostrenko, Andrey Gavrikov**, All-Russian Research Institute of Physiology, Biochemistry and Nutrition of Animals – Branch of the L.K. Ernst Federal Research Center for Animal Husbandry, VNIIFBiP, Borovsk, Russia. **Lecture Title:** The Effect of Lactobacillus Reuteri Probiotic Strains on Productivity and Basic Physiological Parameters of Laying Hens. **Abstract:** Probiotics have a positive effect on a digestive tract, immune system, and metabolic processes in poultry organisms. Probiotics have a pronounced antagonistic effect against the opportunistic pathogenic flora of the gastrointestinal tract. The purpose of this work was to study the effect of probiotic lactobacilli on egg producing ability of laying hens, on indicators of nonspecific resistance and the composition of the microflora of the gastrointestinal tract. Two strains of L. reuteri were used in the diet of laying hens of the Hysex-Brown cross. As a result, an increase in poultry egg production by 6.6% relative to the control group was found, and the yield of egg mass in the experimental group was 21.2 kg higher than in the control. There was a significant increase in phagocytic and bactericidal activity of blood serum by 7.2% and 10.4%, respectively, The content of lysozyme in the serum of poultry in the experimental group was 1.2% higher than the control. The use of probiotic lactobacilli in the diet of laying hens led to an increase in the number of bifidobacteria by an order of magnitude and a decrease in the number of escherichia, salmonella and clostridium in the intestinal contents birds.
	**Victar Lemeshevsky**, International Sakharov Environmental Institute of Belarusian State University, Minsk, Belarus; All-Russian Research Institute of Physiology, Biochemistry and Nutrition of Animals – Branch of the Federal Research Center for Animal Husbandry named after Academy Member L.K. Ernst, Borovsk, Russia. **Lecture Title:** Provision of substrates for energy processes in bulls at different levels of metabolizable protein **Abstract:** Animal productivity and product quality depend on the composition of the final products of feed digestion in the gastrointestinal tract, which, when entering the body tissues, are used as substrates for tissue enzymes that form a certain direction of metabolic processes. Purpose of the study: to study the features of the use of substrates in energy metabolism at different levels and ratios of nitrogen-containing substances in the diet of Kholmogory bulls. Materials and methods. The research was carried out on 4 bulls of the Kholmogory breed using the latin square method at the age of 7-8 months and the initial live weight of the bulls was 147.3 kg. The animals received 4 different levels of metabolizable protein in their diet: 7.80; 8.06; 8.40 and 8.60 g/MJ of metabolizable energy. At the end of each monthly period of the experiment, before feeding and 3 hours after it, the indicators of gas-energy exchange were studied using the mask method and the quantitative contribution of the main groups of substrates to energy metabolism (to the amount of heat production). Results. The effectiveness of using substrates in energy metabolism was assessed based on the results of studying the influence of different levels of metabolizable protein in the diet of Kholmogory bulls during the growing period. The effective use of metabolizable energy and amino acids for live weight gain has been established at a level of metabolizable protein in the diet of 8.2 g/MJ of metabolizable energy. A decrease in the contribution of metabolizable energy and amino acids to the increase in production was shown at a metabolizable protein value of 8.5 g/MJ of metabolizable energy.