ANIMAL PRODUCTIVITY LABORATORY

Laboratory of Poultry Nutrition and Product Quality was established on 7 Dec., 1993. The laboratory has been continuously carried out intensive research activities, analyzing the quality of different feed raw materials and feed additives and their influence on animals productivity, digestive physiological processes and product quality; so on 20 June, 2014 under the Lithuanian University of Health Sciences Senate Resolution of (Protocol No. 47-9) and the LUHS Council decision of Lithuanian University of Health Sciences (Protocol No. 5-2) the decision was taken to change the name of Poultry Nutrition and Product Quality Laboratory to the Animal Productivity Laboratory.

Research interests – the analysis of feed raw materials quality, feed additives, optimization of feeds formulation, the impact of feed raw materials and feed additives on digestive physiology of poultry, pigs, rabbits, and fish, and the evaluation of animal origin products (poultry, eggs, pork, rabbit meat, fish meat) quality.

Performing research, collaboration with foreign and Lithuanian research and study institutions and business companies has been held: Institute for Reproduction and Food Research of Polish Academy of Science, Institute of Animal Nutrition of Hohenheim University and Department of Livestock Population Genomics of Institute of Animal Science of Hohenheim University, Institute of Animal Nutrition and Functional Plant Compounds, University of Veterinary Medicine, Vienna, (Austria), Department of Biology of VMU, KTU Food institute, Poultry farms, enterprises for compound feeds in Baltic countries, and others. International conferences concerning feed materials and feed additives, animal nutrition and product quality issues are organized at the laboratory every two years, scientific seminars and international BOVA courses teaching students for master‘s degree are held. The courses are held in cooperation with the universitie of Hohenheim. International scientific conferences are organized in cooperation with strategic partners - the University of Hohenheim (Germany) and the University of Veterinary Medicine, Vienna, (Austria).

Laboratory researchers are active in research, making scientific reports in Lithuania and in other countries of the world, such as Brazil, Austria, Germany, Scotland, Lebanon, United Arab Emirates and others.

On the basis of the developing projects consulting is provided to intensify egg and meat production and to improve quality of animal origin products.

The laboratory is also engaged in the performance of research orders presented by Lithuanian Ministry of Agriculture and business companies.

Owing to international collaboration, for the first time in Lithuania detailed analysis of nutritive substances in grain crops was performed. The analysis permitted to examine concentrations of antinutritive substances such as oligosaccharides, non starch polisacharides, glucans and others. The research of the study of complex composition consisting of butter, propionic, sorbic and lauric acids, essential oils and plant extracts, investigating its influence on the digestive processes and meat quality of broiler chickens, rabbits, fattening pigs, fish and eggs quality was also conducted. The effect of medium chain fatty acids, emulsifiers and their combinations with phytobiotic preparations for broiler chickens and laying hens productivity, digestive processes and poultry meat and egg quality were investigated. Recently conducted studies in which the extruded full-fat rape seeds, peas and soybeans utilization possibilities in the diets of laying hens, broiler chickens, pigs and cows are analyzed.

The laboratory in collaboration with foreign partners (German company Phytobiotics Futterzusatzstoffe GmbH and Biochem Zusatzstoffe Handels- und Produktionsgesellschaft mbH and the Belgian company Innov AD NV/SA and others) performs research projects.

Researchers of high competence work in the laboratory and a modern research base is created. The laboratory facilities are used for organizing the study process to implement practical work of bachelor’s, master’s degree programs of Animal Husbandry Technologies faculty, and for Veterinary Medicine, and Veterinary Food Safety programs of Veterinary Medicine faculty of VA, LUHS. In the laboratory, approximately 15 bachelor’s and master’s degrees graduates get trained according to all the above mentioned programs every year. In the laboratory Zootechnics 03A doctoral study process is also carried out.

Services that are offered in the laboratory

1. Endo-1,4-β-xylanase, buffer capacity, crude fiber are determined in raw feed materials and compound feeds, and in cereals - total and soluble pentosans and β–glucans.
2. Chimus pH, transit time, lactates, dry matters and short chain fatty acids (acetic, propionic and butyric) are determined in the separate parts of animals'digestive tract.
3. Morphological structure of broiler chickens carcasses is determined following "Dissection of Poultry Carcasses" INRA (2000).
4. Meat and eggs pH, dry matter, fat and ash contents are determined.
5. The strength of poultry *femur* and *tibia* bones is measured with texture analyzer TAplius and the mineralization degree is determined according to Huyghebaert method (1996).
6. The investigation of eggs qualitative indices (weight, albumen height, haugh unit, yolk color intensity) are determined using multifunctional egg tester "EMT-5200", strength of shell – by "Egg Shell Force Gauge Modell-II" and thickness of eggshell by 0-25mm (0-1") Mitutoyo Digital Micrometer (sharp and, blunt end, and equator).
7. Macro- and trace elements Ca, Se, Zn, Mn, Cr, Fe are determined using of atomic absorption spectrometric system (AAS).
8. Activity of bacterial enzymes α-galactosidase, β-galactosidase, α-glucosidase, β-glucosidase and β-glucuronidase is determined according to release amount of *p*- or *o*-nitrophenol from nitrophenilglucosides;
9. High performance liquid chromatography (HPLC) Varian ProStar (Varian Corp., USA) System is used to determine phenolic acids and flavonoids in cereals, pigments (lutein and zeaxanthin) in egg yolk, vitamin E and its homologues in egg yolk and meat (poultry, pork, rabbit meat, fish meat), biogenic amines, cholesterol concentration in egg yolk and meat. Also, the oxidation degree of lipids (TBARS) is determined in eggs, liver and meat of poultry, pigs, rabbits and fish according to Draper and Hadley (1990) method.
10. The colour measurements in egg yolk and meat are conducted instrumentally by Minolta Chroma-meter CR-410 (Konica Minolta, Osaka, Japan) in the CIE L* a* b* space.

Expanding the spectrum of performed services, in pursuance of basic research, outsourced work of economic subjects, for preparing doctoral, master's theses and research, having modern PAD detector under the HPLC, creates possibility to determine oligosaccharides of different polymerization level, such as D-xylose, D-xylobiose, D-xylotriose, D-xylotetrose, D-xylopentose, D-xylo-hexose.

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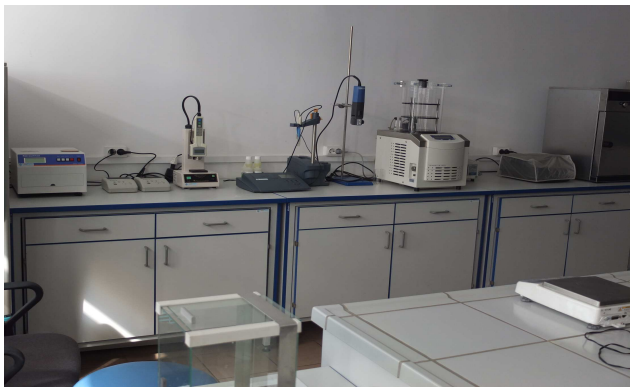
The main laboratory equipment

*High pressure liquid chromatography (HPLC) system **Varian ProStar** (Varian Corp., USA) with **UV/VIS Detector Varian ProStar 325**, **Varian ProStar fluorescence detector 363** and mass spectrometer **Thermo Scientific, LCQ Fleet**.*

*Microwave sample digestion system **MARSXpress***

Atomic absorption spectrometry system (AAS)



*Multifunctional egg tester **EMT-5200**, egg shell strength analyzer **Egg Shell Force Gauge Modell-II** and samples lyophilisator **ALPHA 1-2 LD plius***

*Texture analyzer **TAplius***

Minolta Chroma-meter CR-410 *(Konica Minolta, Osaka, Japan)*