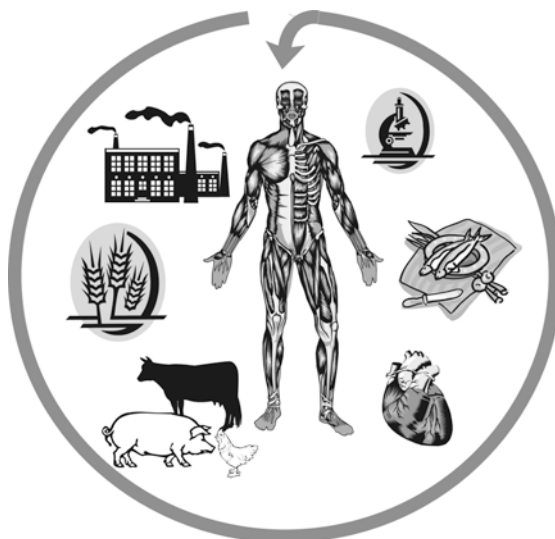


**Slovak Agricultural University in Nitra**  
Faculty of Biotechnology and Food Sciences

**Krakov Pedagogical University**  
Institute of Biology

## **RISK FACTORS OF FOOD CHAIN**



**OCTOBER 6-TH, 2005**

**NITRA**

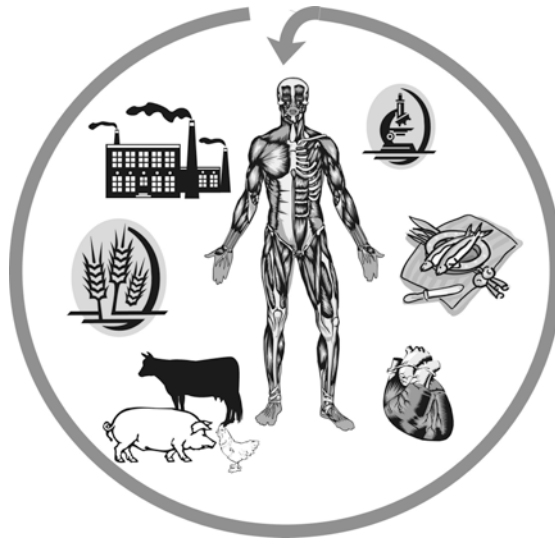
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Department of Animal Physiology  
Department of Hygiene and Food Safety  
Slovak Society for Agricultural, Forestry, Food and Veterinary Sciences at the Slovak  
Academy of Sciences

Proceeding Book (Abstracts) of 5-th International Scientific Conference

## **RISK FACTORS OF FOOD CHAIN**



**OCTOBER 6-TH, 2005**

**NITRA**

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Authorized by the Rector of SAU in Nitra on 26.9.2005 as a Proceedings  
Book of Abstracts  
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ISBN 80-8069-593-8

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## **The content of some heavy metals in the fish muscle from the water reservoir Branovo (district Nové Zámky)**

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This study presents a rate of heavy metals accumulation in the muscle of three analyzed fish species – common carp (*Cyprinus carpio*), Prussian carp (*Carassius gibelio*) and northern pike (*Esox lucius*) from the water reservoir Branovo. The samples were collected from Branovo water reservoir in September 2004, analyzed by AAS and evaluated in  $\text{mg.kg}^{-1}$  of fresh matter. Concentrations of heavy metals in the muscle were as follows: Fe 7.81–52.65, Mn 0.32–0.70, Zn 3.87–19.86, Cu 0.42–0.97, Ni 0.04–0.26, Co 0.02–0.16, Cr 0.07–0.23, Pb 0.08–0.48, Cd 0.09–1.15 and Hg 0.01–0.22. Statistically significant differences ( $P < 0.05$ ) in the metal accumulation between fish species for Mn, Ni, Co, Pb, Cd, and Hg were recorded. On average, the order of metal concentrations in the fish muscle was: Fe > Zn > Cu > Mn > Pb > Cd > Ni > Cr > Hg > Co.

## **Consideration of feed antibiotic by *Cinnamomi aetheroleum* in feeding mixtures of broilers**

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Broilers fed the feeding mixtures with *Cinnamomi aetheroleum*. This feed supplementation is source of effective substance eugenol and acceptable partial support feed additive for substitution feed antibiotic avilamycin. The results of trial indicate a tendency of positive influence to metabolic responses at organism of broilers. Feeding mixtures with *Cinnamomi aetheroleum* demonstrate comparable productive efficacy and feed conversation though its intake of feeding mixtures was lower but value of European index of fattening chickens where tendentionously higher. Results referred to in article are partial. Research this problem continues with diversify to following of alternations for inside organs of broilers, colonizing of the digestive tract by microorganisms, quality of muscular and liver tissues.

## Quality of pork after application of vitamin E and C to food and injection

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In experiment thirty pigs (White Meaty) defined with DNA test as not susceptible to malignant hyperthermia (non mutant on RYR1) were used. Experimental groups were fed with supplementation of vitamin E (500 mg  $\alpha$ -tocopherol acetate/kg diet) and/or both vitamin E and C (200 mg L-ascorbic acid/kg diet) for the last 30 days before slaughter. Furthermore, part of meat samples of control group and group with vitamin E was injected with 10 % by weight of 1.5 % calcium ascorbate solution. Higher dietary vitamin E resulted in higher levels of  $\alpha$ -tocopherol in fresh (24 h) and chill-stored (5 days) meat ( $P < 0,05$ ). Similar results were received at supplementation of vitamin C. Positive effect of vitamin E and C (group E + C) was found on pH 45 min post mortem ( $P = 0,06$ ) and on drip loss ( $P < 0,05$ ) compared to control group. Positive effect of vitamin E supplementation on oxidative stability measured as thiobarbituric acid reactive substances (TBARS, MDA) was received mainly in chill-stored meat ( $P < 0,05$ ). Additional effect of vitamin C on oxidative stability of fresh and chill-stored meat using TBARS method was not found. Water soluble antioxidant Ca-ascorbate, injected in meat, increased the concentration of calcium ( $P < 0,05$ ) and ascorbic acid ( $P < 0,05$ ), and stabilized the colour („a“ value,  $P < 0,05$ ) of chill-stored meat.

Results of the present study conclude that supplementation vitamin E (500 mg/kg diet) and C (200 mg/ kg diet) for 30 days before slaughter improve meat quality values, but seems it depends on the genetic background of animals (occurrence of mutation on RYR1). Vitamin E improved the oxidative stability of meat (TBARS). Injection of Ca-ascorbate stabilizes the colour of chill-stored meat and increases the content of calcium in muscles. It could provide new opportunity for calcium supplementation in nutrition of people and improved meat processing technologies.

## Risky factors of agricultural production in Hontiansky region

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Contamination of agricultural soils with heavy metals is potential source of contamination of the whole food chain. For that reason the best solution is to prevent food chain from contamination in the beginning. If the soil

contamination had originated, it is possible to monitor it or to try to eliminate its consequences. In our work we have focused to the contamination of agricultural soils in alluvium of the river Štiavnica in Hontiansky region, which have been influenced during centuries by intensive mining activities. Weathering of old mine heaps and redeposit rock fragments, which are often rich in heavy metals sulphides, led to remobilisation of these metals to water and consequently to deposition in alluvial soils and accumulation in agricultural plants.

The obtained results show that agricultural soils are strongly polluted by Pb, Cu, Cd, Zn and Mn. On the other hand, agricultural plant production is strongly contaminated only by Pb and Cd.

### **Effect of antibiotics compensation by biostrong on sensorial quality of the chicken meat**

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Katedra hodnotenia a spracovania živočíšnych produktov, FBP SPU Nitra

The aim of this report was to evaluate impact and substitution of feeding antibiotics for fed the feeding mixture with Biostrong (which use is due to finish by the end of 2005) as possible feeding supplements in nourishment of poultry and it's influence on sensorial quality for this meat. It's particularly about Biostrong. We have been observing different indicators this sensorial quality of poultry such as: smell, flavour, mellowness, tenderness. Our outcomes for the poultry quality indicate potential substitute plant Biostrong for feeding antibiotics. We have recorded statistic conclusive differences in the sensorial quality legs and we have not recorded statistic conclusive differences in the sensorial quality breast of poultry between our observing groups

### **Morphological changes in mucous of Japanese quail (*Coturnix coturnix japonica*) intestine after peroral administration of cadmium**

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The study investigated morphological changes in enterocytes and goblet cells of adult Japanese quail that were given cadmium (  $\text{CdCl}_2$  ) perorally, dissolved in water at a dose of 0,24 mg Cd per head and day for 57 and 118 days. The aim of our study was to observe chronic effects of cadmium on the structure enterocytes and goblet cells by means of light and transmission electron microscopy. Blood resorption of cadmium after peroral administration occurs particularly in the duodenum. Examination of duodenal mucosa by light microscopy showed no marked morphological changes. Necrotic changes in

enterocytes were observed in the apical part of intestinal villi indicating physiological replacement of these structures with relatively short lifespan. The mucin-producing goblet cells had normal structure. More pronounced morphological changes were observed in all enterocytes using transmission electron microscopy. Their mitochondria were damaged and the cytoplasm contained flocculent material. However, no morphological damage to microvilli and tight intercellular connections between enterocytes was observed.

### **Possibilities of elimination of mycotoxins in veterinary medicine**

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This work deals with possibilities of mycotoxins elimination. The decontamination effect of some adsorbent (activated charcoal, white clay, zeolit), yeast and commercial preparation Detoxa 2000 plv. a.u.v. on zearalenon (ZEA) was experimentally tested. The high adsorbent ability by zeolit (99-100%) was detected. White clay reduced extremely both of ZEA concentrations (10 and 50 ng/ml). Zea reduction by activated charcoal ranged from 72,9 to 96,2%. Also *Saccharomyces cerevisiae* and Detoxa 2000 plv. a.u.v. appeared very good inactivation ability (97,8-99,8%).

### **Risk factors of food chain and clinical risk- blood cholesterol and body mass index in university students**

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Katedra výživy ľudí, Fakulta agrobiológie a potravinových zdrojov SPU Nitra

The aim of the study was to monitor some risk factors of atherosclerosis in 203 university students in Nitra – 93,6 % females and 6,4 % men (average age 21,6 ± 1,1 years). Overweight (according to body mass index) was present in 9,47 % of women and in 15,38 % of men. Obesity was detected in 0,53 % of women and in 7,69 % of men. Normal blood cholesterol (5,0 mmol/l and less) was assed in 96,06 % of students (in 90,15 % of women and 5,91 % of men). In the students with lower blood total cholesterol was detected lower body weight (58,7 kg versus 63,9 kg), also BMI (20,5 versus 22,1) and lower difference between real and ideal body weight (-1,1 kg versus 3,7 kg).

## **The effect of pollutants on nitrogenous metabolism in *in vivo* and *in vitro* conditions**

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The aim of the study was to evaluate the effects of some pollutants on ALT, AST, GGT and GDH enzyme activities of ruminal fluid *in vivo* and *in vitro* conditions. *In vivo* experiment was carried out on ewes from an industrially exposed and control areas. The concentrations of Cu and Zn were significantly higher in the rumen fluid of sheep from the industrially exposed area. The activities of individual enzymes from industrially exposed area were significantly higher. *In vitro* experiment, Cu<sup>2+</sup>, Cd<sup>2+</sup> and Zn<sup>2+</sup> were examined to assess how individual enzyme activity of ruminal fluid might be affected. Cd was found to inhibit both GDH and GGT activity but on the other hand, it stimulated both ALT and AST activities. Cu inhibited GDH activity. Zn produced an activation of ALT, AST and GDH. Results of the study indicate that pollutants can affect ruminal enzyme activities of sheep and there are differences between the effect of pollutants added individually to ruminal fluid and effect of pollutants which are animals exposed to chronically in industrially exposed area. *In vivo*, resulting enzyme activity reflects mutual action of individual pollutants on enzyme system in the rumen environment.

## **Combined effect of ultraviolet radiation and cadmium on general metabolism, mortality and developmental abnormalities in common frog embryos**

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We measured general metabolism, mortality and incidence of developmental abnormalities in common frog embryos exposed to ecologically relevant doses of ultraviolet radiation and increasing concentrations of cadmium i.e.: 0.2, 0.5, 1, and 2 mg/L. Biologically effective doses provided during experiment were 0.24 kJ×m<sup>-2</sup> for UV-A and 2.71 kJ×m<sup>-2</sup> for UV-B. The highest level of metabolic activity showed embryos from control group (3.27±1.15×10<sup>-3</sup> mgO<sub>2</sub>/h ±SD). Exposure to cadmium and ultraviolet radiation reduced metabolic activity of embryos to 2.33±0.39×10<sup>-3</sup> mgO<sub>2</sub>/h (UV+Cd - 1mg/L) and 2.02±0.64×10<sup>-3</sup> mgO<sub>2</sub>/h (UV+Cd - 2 mg/L). The lowest level of metabolic

activity represented embryos exposed to UV radiation ( $0.95 \pm 0.59 \times 10^{-3}$  mgO<sub>2</sub>/h).

Lethal concentration of cadmium LC<sub>50</sub> calculated after 72, 96 and 168 hour were 53 ppm, 4.5 ppm and 0.29 ppm respectively in embryos exclusively treated with cadmium. Whereas lower values of LC<sub>50</sub> were calculated for embryos exposed both to cadmium and ultraviolet radiation i.e.: 72h-LC<sub>50</sub>=2 ppm, 96h-LC<sub>50</sub>=0.59 ppm and 168h-LC<sub>50</sub>=0.18 ppm.

Deformities of hatched larvae included axial distortions, abdominal oedema and craniofacial abnormalities. All the tadpoles hatched from embryos treated with UV+1mg/L Cd, 2 mg/L Cd and UV+2mg/L Cd showed morphological abnormalities. Although significant differences between larvae hatched from control embryos ( $44 \pm 18.31\%$ ) and animals derived from embryos exposed exclusively to UV radiation ( $73.81 \pm 8.58\%$ ) were observed. We conclude that ultraviolet radiation may enhance harmful effects of cadmium and probably other heavy metals on amphibian embryos developing in natural environments.

### **Gluten proteins as risk factor for coeliac disease**

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Coeliac disease is a disorder of the small intestine, characterized by villous atrophy, due to intolerance to dietary gluten in genetically susceptible individuals, which responds to gluten withdrawal.

The aim of the study was to analyse of 25 different species and varieties of cereals and pseudocereals in view of the composition of the protein complex, SDS-PAGE profile and immunological testing. The study deals with selection of suitable varieties of genotypes from the point of baking and for the coeliac diet.

HMW glutenin subunits analysis was realised by standard alkaline vertical discontinual electrophoresis in the polyacrylamide gel, ISTA SDS-PAGE, with the follow quantitative and graphic software evaluation. For immunological testing Elisa kit Ingezim gluten (Ingenasa, Madrid, Spain) was used.

Results of protein complex fractional composition in wild selection of cereal and alternative cereals confirmed large variability as well as in Osborne fractions presentation so storage protein electrophoretic composition. Elisa analyses acknowledge inappropriateness of wheat, barley and rye for patients with coeliac disease. Analysed pseudocereals collection is characterised by absence of allergic protein, so they are suitable for non-gluten diet.

## Actual situation with adulteration of butter at Slovak market

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Adulteration of milk butter and cheese with addition of foreign fats is actual problem in the Slovak market with milk and dairy products. Reference method for detection of foreign fats in milk fat by gas chromatography analysis of triglycerides profile is able to detect wide scale of vegetable and animal foreign fats in milk butter and cheese as theirs sum of foreign fat. Samples are compared with standardised milk fat (CRM BCR 519). A „finger print“ chromatogram of triglycerides profile in unknown sample must be identical to a „finger print“ chromatogram of triglycerides profile in CRM BCR 519. Therefore a positive sample for sum of foreign can be analysed to fytosterols by gas chromatography. This test can detect whether milk fat was denaturated with foreign vegetable fat too. This article describes the actual situation in adulteration of milk butter and cheese after „target monitoring“ during summer 2005 on Slovak market too. This monitoring was organised as an official control by State Food Safety Authority after too many complaints of consumers.

## Floristic research of industrial waste heap from ferroalloy production

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Industrial heaps as anthropogenic biotopes are negative effect in the country. Low biodiversity is caused by special relief, soil and microclimatic conditions. Plants, which are occurred there, must have adaptation for extreme conditions. They are tolerant to high concentration of some potential toxic compounds (toxic metals). We determined together 107 plant species on industrial heap and on adjacent biotopes. We recorded 23 species of vascular plants on scab (on the substrate without soil). Dominant plants were: *Erysimum cherianthoides*, *Microrrhinum minus*, *Salix caprea*, *Tussilago farfara* a *Verbascum thapsus*. Another typical plant species of heap were: *Acetosa pratensis*, *Achillea millefolium*, *Agrostis stolonifera*, *Artemisia vulgaris*, *Daucus carota*, *Calamagrostis epigejos*, *Hypericum perforatum*, *Lactuca serriola*, *Larix decidua*, *Pinus sylvestris*, *Populus tremula*, *Salix purpurea*, *Tanacetum vulgare*, *Taraxacum officinale*, *Tripleurospermum inodorum*. Only 11 species of higher plants occur on the youngest part of scab (where inert waste still grows). Exigent species on soil conditions are frequent mostly on the edge of heap, where is evident increased percentage of invasive and expansive plants. Natural



sub-xerotherm vegetation of pastures and thicket are sustained on surrounding biotopes with noticeable immigration of some invasion species.

### **Microbial control of selected surfaces in the operation to processing of meat**

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Microbial contamination at selected surfaces in the meat-packing was monitored. Total count of bacteria from 4 localities, for the duration of 5 months by M Petrifilm plates was observed. At the desktop, there were from 0,778 log KTJ/20 cm<sup>2</sup> to 1,732 log KTJ/20 cm<sup>2</sup> total count of bacteria. The maximal legal limit is 2,301 log KTJ/cm<sup>2</sup>. At the sticks, there were values of total count of bacteria from 1,959 log KTJ/20 cm<sup>2</sup> to 2,593 log KTJ/20 cm<sup>2</sup>. These values are nearly the maximal legal limit and in the third taking, the values were high than is the maximal legal limit. At the surface of knife of mince, there were total count of bacteria 0 – 2,505 log KTJ/20 cm<sup>2</sup>, the values in the third taking were over the maximal legal limit. At the surface of stoker, there were the values of total count of bacteria from 0,301 – 0,778 log KTJ/20 cm<sup>2</sup>.

The microbial contamination of selected surfaces was suitable, expecting the third taking. We can value the efficiency of disinfecting preparations than suitable. It is very important to do the cleaning after the completion of work.

### **Analyse of appearance of drug dependence in population of some high schools students**

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The aim of our research work was to analyse the spreading of drugs between pupils studying at secondary educations. Our objectives were to find out where the youngsters spending their times, their personal experiences with alcohol, smoking drugs and their reasons for choosing it; and how good information are available to them related to the use of drugs. The outcomes: we have found that youngsters irrationally use up their free time i.e. most often they spend their free times with their friends in an area where they can smoke, drink alcohols, and deal with drugs. In most cases these students at Secondary educations, had some experiences with smoking and drinking of alcohols.

Regarding light drugs, some respondents have tried marihuana, ecstasy and LSD. There however, was no indication of them using hard drugs. Main reasons for them to try out drugs for the first time, was due to curiosity and having fun

with their friends. With regards to the daily usage of drugs, the respondents gave reasons to the fashion and idleness. There is however, good information available to students about drugs. Respondents have received this information from the media. Our research shows, that drug addictions between students in Secondary educations, have not yet expanded. However, in the future it is suggested that getting into a contacts with drugs among these students would be more likely to happen.

### **Drinking regime in nourishment of university students**

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In the work drinking regime of students of Slovak Agricultural University in Nitra was observed. Total intake of liquids, intake of liquids during the examinations and the choice of single liquids were analyzed. Most of the students received insufficiency amount of liquids and their drinking regime was not regular. The increase of drinking was recorded during the examinations. Our students preferred natural drinks and coke type than others drinks.

### **Influence of different structure complete diets for chickens on tenderness meat of chickens**

*Haščík, P., Kulíšek, V.*

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The effect of complete diets for chickens ISA 30 composed only of plant had positive influence on the tenderness of chicken meat. This result may affect consumer in choosing the meat. Our result demonstrated the subjective evaluation of tenderness of meat, what is different than physical or chemical methods.

## **Effect of gamma radiation upon the reproductive organ of Japanese quail**

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The aim of this work was to obtain effect of gamma radiation on histological structure of testes of Japanese quail and following regeneration alteration. Results indicated the maximum intensity of regress change in testes. Changes were obtained between 14 and 21 days after radiation. Start of regeneration changes begin between 28 and 35 days after radiation. In this time began partial pathological mitosis of spermatogonia. Regeneration of spermatogenic epithelium ended and restored between 49 and 56 days after radiation.

## **Vitamin C and Cadmium**

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Ascorbic acid is one of important antioxidant in blood plasma and tissues with a very wide spectrum of biological effects. Cadmium is a very toxic heavy metal and an important environmental pollutant which is present in the soil, water, air, food and in cigarette smoke. Cadmium causes poisoning in various tissues of humans and animals. The result of experimentally realized acute and chronic intoxication with medial lethal doses of cadmium on laboratory rats of Wistar strain showed that cadmium is one of the inducers of oxidative stress, which is compensated by ascorbic acid overproduction in the liver of rats.

Our experimental data consequently evoked the question: What would have been a sufficient saturation with vitamin C of human organism unable to produce it, what are exposures to cadmium from different sources required to elimination of cadmium negative impacts on human health?

## **Risk factors of cardiovascular diseases**

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In this study we have analysed some factors of basic biomedical value for improvement the life quality. This publication aims are to know risk factors of cardiovascular disease, which were examined in 49 Romanian children (25 boys and 24 girls) aged 4 to 18 years from Žilina district and 47 Romanian children (23 boys and 24 girls) aged 8 to 18 years from Banská Bystrica. The content of nutrition was evaluated in food composition of the Romanian children families by questionnaire method. The food composition may have adverse consequence for pathological blood serum concentrations, and development of overweight, cholesterolaemia and the other complications. The results can be important argument for intensification of health treatment intervention.

## **The use of *Lactobacillus reuteri* in prevention and therapy of diarrhoeic syndrome in pigs**

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The aim of our study was to obtain more information about the influence of *Lactobacillus Reuteri* on the systemic immunity response in relationship to bacterial pathogen *E. coli* in the digestive tract of piglets. In two model experiments, 18 pigs in each group - experimental (E) and control (C) - were used. For 49 days, 10 animals in group E were given 3 ml of *Lact. Reuteri* oral for 5 days. Each animal was applied with 3 ml *E. coli*. Blood collection was from eyes, through the venous circulation on the 49, 54 and 59 days of age. To realize the aim, we determined phagocytic activity of neutrophils (FA Ne) and leukocytes (FA Lc), the phagocytic activity index of neutrophils (IFA Ne) and leukocytes (IFA Lc), reduction of tetrazolium salt (INT Test) and concentration of total immunoglobulin- (Tlg). 24 hours after application of *E. coli* in group C, first clinical changes, such as increased temperature and, in one case, death, appeared. In group E no death was recorded. Obtained values were highest in group E on 59 day of age.

## **The control of food chain in ensuring animal health and food safety in conditions of the State Veterinary and Food Administration of the Slovak Republic**

***Ihnátová, M., Bíreš, J.***

State Veterinary and Food Administration of the Slovak Republic, Bratislava  
This paper deals with the results of residue control in food chain. The results from the residue control, presented in this paper, are indicated for the year 2004 and include the results from the control of soil, water, feeding stuffs, plant raw materials and foodstuffs as well as raw materials and foodstuffs of animal origin. Depending on both the level of food chain and competencies, several organizations under the Ministry of Agriculture take a share in the residue control. The paper is mainly aimed at control of those levels of food chain which are controlled and guaranteed by the State Veterinary and Food Administration of the Slovak Republic.

### **Application of DNA test for sex identification of the emu (*Dromaius novaehollandiae*) in Slovakia**

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Every procedure for sex determination of the birds employed should be safe, accurate, fast and inexpensive. Conventional techniques to identify the sex of emu present significant problems: the animals may suffer stress; since they are subjected to; invasive procedures such as endoscopy and cloaca touch (Malagó et al., 2002).

Most birds have heteromorphic sex chromosomes, which allow the identification of their sex by cytological methods or by procedures based on the difference in sequence between W and Z forms. A group of primitive birds, which includes emu, the Z –W chromosome pair only with great difficulty be identified microscopically (Ansari et al., 1988). This paper describes the detection of a female by CAPS (cleaved amplified polymorphic sequence) assay (Kloet et al., 2001) reliable sex identification of the emu in Slovakia.

## **Concentration of heavy metals in the organs of *Clethrionomys glareolus* (Schreber, 1780) from area of nuclear power station**

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<sup>4</sup>Katedra ekológie a environmentalistiky, FPV UKF Nitra.

Contamination of selected parenchyma organs (liver, kidney) of *Clethrionomys glareolus* (Rodentia) chemical elements (Cu, Fe, Mn, Zn, Cd) from area of nuclear power station were studied. For analysis of the content of these trace elements an AAS method was used.

The concentration of copper in kidneys (10,697 mg.kg<sup>-1</sup>) of *Clethrionomys glareolus* was higher in comparison with liver (4,037 mg.kg<sup>-1</sup>). The ratio between concentrations in kidneys and liver in the case of copper was 2.65 : 1. A higher level of iron was recorded in kidneys (563.85 mg.kg<sup>-1</sup>). The mean levels of manganese in liver (0.0015 mg.kg<sup>-1</sup>) and kidney (0.001 mg.kg<sup>-1</sup>) were relatively equal. Concentration of zinc in kidneys (40.875 mg.kg<sup>-1</sup>) was higher than concentration in liver (33.64 mg.kg<sup>-1</sup>). Cadmium content in parenchymatosis organs showed low values (liver: 0.012 mg.kg<sup>-1</sup>; kidney: 0,025 mg.kg<sup>-1</sup>).

## **Confirmation of sulfidimicin residues in animal products of poultry by para-aminobenzoacid**

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The four-plate test (FPT) (Bogaerts and Wolf, 1980) with the test organism *Bacillus subtilis* BGA (Test agar pH 7.2; trimethoprim at a concentration of 0.05 µg.ml<sup>-1</sup>) is a microbial inhibition test widely used for the detection of the presence of sulphonamide residues in the first stage of the residue screening. Its postscreening verification in potentially positive samples must be further confirmed by more specific method. Para-aminobenzoic acid (PABA) specifically inhibits the bacteriostatic activity of sulphonamides, and in the presence of PABA sulphonamides become weak and lose their antibacterial activity. Because, the aim of our previous study was to utilise the inhibitory effect of PABA for the presumptive identification of sulphadimidine at its residue screening and to determine the PABA confirmatory concentration under

*in vitro* condition, the aim of our current study was to verify the obtained results under *in vivo* condition. For the confirmation of the presence of sulphadimidine residues in animal products derived from layers after its oral administration at a dose of 2 g.l<sup>-1</sup> via drinking water, 3 µg.ml<sup>-1</sup> of PABA was used. Our observations confirmed the data presented in our previous study. PABA, at the concentration of 3 µg.ml<sup>-1</sup>, antagonised the inhibitory effect of sulphadimidine on the test organism *Bacillus subtilis* BGA manifested by the production of the inhibition zones. As a result, no inhibition zones were observed. In our judgement, the presented PABA concentration we recommended for the reliable identification of sulfadimidine at its residue screening by using the FPT.

### **Effect of electromagnetic field on the setting eggs of Shaver Starcross 288 during storage and incubation**

**Jedlička, J.**

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The main goal of our work was comparison of influence of electromagnetic radiation in time of storage hatched eggs in laboratory conditions for hatching out of chickens. We also bend our mind to influence of electromagnetic radiation for hatching of hatched eggs in time of incubation.

We realized our experiments in hatchery the type BIOS MONO 06, which was adapted to work more correctly. We replaced thermostat with mechanical (bimetal) thermo – sensor by electronic (bead type) thermo – sensor, so we reached higher sensibility on set temperature. We also used digital thermometer STD 9, which is able to get results from hatchery with precision on 0,1C. The relative humidity of the air was kept and measured by digital hydrostat PHI. Biological control of hatching was taken by candling of eggs on 7th and 18th day. We should also remove futile eggs and also with dead embryo:

We observed the influence of variable magnetic field on embryonic development of chickens in our experiments and followed all these factors:

- Beginning of hatchability of chicken from hatched eggs – it is the time when chicken broke the eggshell by beak for the first time.
- Time needed for hatchability of chicken – it is the time from the moment when the chicken broke the eggshell till it left the eggshell.
- Time of hatching all group of chickens - was taken as a period of time when we put the hatched eggs into the hatchery with temperature of 37,5 – 38,2C till they hatched out from hatched eggs.
- Hatchability – we got it as a percentage from hatching of chickens from hatched eggs, which were put into the hatchery.

- Weight of hatched chickens - was taken on laboratory scales with correctness on 0,01 grams.

We reached very positive influence of EMP on illuminated hatched eggs during their storage. On the other hand the influence of magnetic field caused lower hatchability and chickens lost their weight. The magnetic field had not any negative influence at the beginning of hatching, the period of time of hatching all group and also the time of hatching of chickens.

- Time needed for hatchability of chicken – it is the time from the moment when the chicken broke the eggshell till it left the eggshell.
- Time of hatching all group of chickens - was taken as a period of time when we put the hatched eggs into the hatchery with temperature of 37,5 – 38,2C till they hatched out from hatched eggs.
- Hatchability – we got it as a percentage from hatching of chickens from hatched eggs, which were put into the hatchery.
- Weight of hatched chickens - was taken on laboratory scales with correctness on 0,01 grams.

### **Appearance of resistant coagulase -negative staphylococci in wild hare meat**

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In this study, the strains of typical and untypical coagulase-negative staphylococci isolated from muscle tissues *Lepus europaeus* have been tested for their sensitivity to some antibiotics using disc-diffusion assay. Among 72 staphylococci isolates the sensitivity of was observed to the vancomycin (30 µg, 5 µg), gentamicin (30µg, 10µg,) streptomycin (10 µg) and oxacillin (5 µg). These isolates showed the highest sensitivity to gentamicin 30 µg, oxacillin 5µg and the lowest sensitivity to the vancomycin 5 µg. To the ampicillin 10 µg, 2 µg, oxacillin 1µg, tetracycline 30 µg, 10 µg, methicillin 5 µg, penicillin 10 IU. and erythromycin 15 µg no inhibition was observed in 23 staphylococci strains. The highest resistance to erythromycin 15 µg was ascertaining in 11 isolates (31 %) of 23 staphylococci isolates. At the same time were nine isolates resistant to above one antibiotic of them, and the highest multiresistance was detected to penicillin-ampicillin (6 isolates, 67 %). As seen from the results, resistant coagulase-negative staphylococci can be isolated from the game. Due to its significant increasing of the microbial resistance to antimicrobial substances has become an alarming factor. An important means to solve this world-wide problem of development and spread of the microbial resistance to antibiotics is



its monitoring combined with other measures (e. g. rationalisation of antibiotic prescription and other measures).

### **Honey: advisable environment of microorganisms or not?**

***Kačaniová, M.***

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Experiments were focused on following microorganisms in bee gastrointestinal tract, pollen and honey in various locations of Slovakia. In digestive tract of bees we detected increased number of anaerobic microorganisms than aerobic. Major differences in count of microorganisms were present in summer and winter bees. Anaerobic and aerobic microorganisms, coliforms, enterococci, *Bacillus* sp, *Pseudomonas* sp. and yeast. In connection with summer bees we found even staphylococci. In pollen of bees we detected mesophil anaerobical, mesophil aerobic microorganisms and microscopic fungi. Most frequent species of microscopical fungi were *Alternaria* and *Cladosporium*. In honey we only detected microscopical fungi with the most frequent species, which were *Rhizopus* and *Penicillium*.

### **Risk of animal transport**

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During the transport of live animals is necessary to respect the rules about animal protection. Transport of animal and manipulation with them done unsuitably is the reason of the stress. In accordance with stress some meat qualitative defect can rise (PSE and DFD meat). Thereat transport can be one of the risk factors of food chain.

Public started to call for improvement of standards considering environment and welfare of animals.

## **The role of apoptotic (Bax) and antiapoptotic (Bcl-2) peptid in the regulation of porcine sexual maturation**

***Kolesárová, A.<sup>1</sup>, Sirotkin, A.<sup>2</sup>, Kramárová, M.<sup>1</sup>, Massányi, P.<sup>1</sup>, Kováčik, J.<sup>1</sup>, Lukáč, N.<sup>1</sup>***

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The aim of our experiments was to study differences in the expression of apoptotic (Bax) and antiapoptotic (Bcl-2) peptide released by porcine granulosa cells. Animals were divided in two groups according to the sexual maturation (sexually immature gilts and sexually mature gilts). Granulosa cells were isolated from immature and preovulatory ovaries of gilts. The substances were assayed in cells using immunocytochemistry. We determined differences in the expression of Bax and Bcl-2 between groups of animals. It was observed, that sexual maturation of gilts is associated with a change in the expression of Bax and Bcl-2. There were also increases in the expression of Bcl-2 and Bax in cultured granulosa cells of sexually mature animals (sexually immature gilts: Bcl-2 28,70%±1,03 and Bax 31,90%±2,32, sexually mature gilts: Bcl-2 37,73%±1,83 and Bax 48,70%±2,55). These data demonstrate the ability of apoptotic (Bax) and antiapoptotic (Bcl-2) peptide to regulation of porcine sexual maturation.

## **Increasing of infertility in Slovakian man Population**

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At the moment the male factor of infertility is the mean indication for IVF, and we suppose that 40% of each couple have to undertake IVF procedure. This problem is easy to check doing a routine analysis of ejaculate - spermogram, which is focused on quantitative and qualitative parameters. The reference value of Normozoospermia according to the WHO criteria is 20 mil. of spermatozoa/ml or more, with 50% or more with a good motility or 25% or more with progressive motility, and more then 30% of spermatozoa with normal morphology (WHO, 1999). Deviation from Normozoospermia is for example Oligozoospermia in a case when a sperm concentration is less then the reference value, Asthenozoospermia, when motility of sperm is less then 20% and Teratozoospermia when morphology is less then reference value, and the combination of this deviations, the couple must undertake ICSI method (intracytoplasmatic sperm injection).

Our study included 998 of couple which underwent treatment of assisted reproduction in our IVF Center.

In 28% of cases we diagnosed Normozoospermia, 12% of Asthenozoospermia, Teratozoospermia in 8%,

Asthenoteratozoospermia in 15%, Oligoasthenoteratozoospermia 31% from all patient.

551 of couple (55%) we have had indicated ICSI method. The fertilization rate after ICSI was 78% in case of Asthenozoospermia, 60% in case of Teratozoospermia, 75% in case of Asthenoteratozoospermia, in case of Oligoasthenoteratozoospermia was 80%, with the pregnancy rate 25%, 37%, 22% and 45% respectively.

From our study we can deduce that ICSI method have a high effectiveness in a treatment of male factor of infertility and had been used successfully to obtain live offspring.

### **Survey of some risk factors of boarding and lifestyle in selected Slovak population**

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The objective of this study was to monitor some risk factors of boarding and lifestyle, particularly alcohol, coffee, salt, sugar, drinking and smoking. The method for information obtaining was questionnaire. The survey study included 500 inhabitants of Slovak republic from 5 different regions (251 women and 249 men) in the age 25-79 years (average age  $49,2 \pm 15,2$  years). The results pointed to the considerable differences in frequency between women and men. The most of respondents drink alcohol occasionally, every day only 6,8 % of men. More than 50 % women and men drink 1-2 coffees daily (61,8 % women and 51,4 % men). Negative is that people use excessively sugar and salt, what is unhealthy. Very bad is drinking regime, because the most of respondents has daily intake of beverages only 1-2 litre. Positive is smoking, 70,9 % of women and 57,8 % of men never smoked.

## **The influence of chrome on the glucose and cholesterol changes in Japanese quails**

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In this study effect of Cr on levels of glucose and cholesterol in Japanese quail was observed. Chromium was daily applied in dose 0.12 mg for quail. Glucose and cholesterol were analysed with Lachema Tests and photometric determined on 1, 35 and 50 day of experiment. In group with Cr addition an decreased levels of glucose (15.55; 13.15 mmo/l) and cholesterol (4.80; 4.53 mmol/l) were found in the middle of the study as well as in the end of experiment. Positive effect of chromium was observed after 50 day of application chromium to Japanese quails.

## **Concentrations of cadmium, arsenic, and lead in selected tissues of red deer and wild boars**

***Kováč, G., Jesnská, M., Seidel, H., Nagy, O., Húska, M., Link, R.***

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Cumulating of heavy metals in the environment represents an important aspect of environmental quality and, particularly, of safe, full-value edible vegetable and animal products. This is caused mostly by secondary effects, which contaminate, soil, atmosphere, agricultural crops, livestock, and farm animals. The aim of this work was to determine concentrations of cadmium, arsenic, and lead in parenchymatous organs and muscles collected from red deer and wild boars killed in selected areas of East Slovakia. The results indicate that the concentrations of cadmium, arsenic, and lead in the aforementioned tissues range within the norm given by food codex. Despite these findings, there are some differences between the species, which result from different way of feeding and different dietary components.

## **Comparison study of estimation of detection sensitiveness of microbial inhibitory tests used for screening of sulfonamid in practise**

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Microbial inhibition tests (MIT) form the basis of screening in detection of presence of antibiotic and sulphonamide residues in food producing animals and their products. MIT must fulfil the basic legislative requirement and indicate reliably the presence of the investigated substance in examined matrices in concentrations equal to maximum residue limit (MRL) set. With respect to different detection sensitivity of MIT specified by the producers or screening method, and the MRL of  $0.1 \text{ mg.kg}^{-1}$  established for sulphonamides, the objective of the present work was to evaluate the detection sensitivity of four official MIT Delvotest<sup>®</sup>SP, Premi<sup>®</sup>Test, the Four-plate test (FPT) and the screening test for determination of antibiotic residues (STAR method) to sulphonamides under in vitro conditions. According to the results obtained in our study we detected that Delvo<sup>®</sup>SP and the FPT do not indicate the presence of all sulphonamides tested at the levels of MRL set, and therefore, for the primary screening of sulphonamide residues at the levels of the concern, only Premi<sup>®</sup>Test and STAR method can be recommended.

## **Concentration of cadmium in liver and kidney of some wild animals**

*Kramárová, M.<sup>1</sup>, Massányi, P.<sup>1</sup>, Jančová, A.<sup>2</sup>, Toman, R.<sup>1</sup>, Slamečka, J.<sup>3</sup>, Kolesárová, A.<sup>1</sup>, Lukáč, N.<sup>1</sup>, Kováčik, J.<sup>1</sup>*

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<sup>3</sup>Research Institute of Animal Production, Nitra

Cadmium is an environmental pollutant that has serious toxic effect in animals and also humans. In this study we analyzed the accumulation of this metal in liver and kidneys of wild animals (wood mouse, yellow-necked mouse, red deer, brown hare). Samples were analyzed by the atomic absorption spectrophotometry (AAS). The highest levels of cadmium were found in the kidneys ( $0.213 - 2.387 \text{ mg. kg}^{-1}$ ) of all animal species. The concentration of cadmium in liver was in range of  $0.06 - 0.48 \text{ mg.kg}^{-1}$ .

## **Enterococcus – is their occurrence in food-stuffs danger?**

**Kročko, M., Čanigová, M.**

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This study is monitoring genus *Enterococcus* from the viewpoint of its occurrence in food, production of biogenic amines, its resistance to antibiotics and its probiotic character. Dynamics of the *Enterococcus* occurrence in samples of pork meat was evaluated in the process of its ageing. Average numbers of *Enterococcus* in meat 24 h post mortem fluctuated in the interval of  $10^1 - 10^3$  cfu.  $\text{cm}^{-2}$ . After 7 days of ageing the numbers of *Enterococcus* remained in this interval.

## **Incidence of *Fusarium* mycotoxins in chicken feed mixtures from Slovakia**

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A total of 50 samples of chicken feed mixtures of Slovakian origin were analysed for eleven toxicologically significant *Fusarium* mycotoxins, namely fumonisin B<sub>1</sub> and B<sub>2</sub> (FB<sub>1</sub>, FB<sub>2</sub>), moniliformin (MON), zearalenone (ZON), A-trichothecenes: diacetoxyscirpenol (DAS), T-2 toxin (T-2) and HT-2 toxin (HT-2) and B-trichothecenes: deoxynivalenol (DON), 3-acetyl-deoxynivalenol (3-ADON), 15-acetyl-deoxynivalenol (15-ADON) and nivalenol (NIV). All of the samples proved to be contaminated with at least two of the mycotoxins screened. FB<sub>1</sub> was detected in 49 samples (98 %) in concentrations ranging from 43 to 798  $\mu\text{g.kg}^{-1}$  of sample and FB<sub>2</sub> in 42 samples (84 %) in concentrations ranging from 26 to 362  $\mu\text{g.kg}^{-1}$  of sample. MON was detected in 26 samples (52 %) in concentrations that ranged from 42 to 1214  $\mu\text{g.kg}^{-1}$  of sample. T-2 was found in 45 samples (90 %) in relatively low concentrations ranging from 1 to 130  $\mu\text{g.kg}^{-1}$  (average 13  $\mu\text{g.kg}^{-1}$ ), followed by ZON that was found in 44 samples (88 %) in concentrations ranging from 3 to 86  $\mu\text{g.kg}^{-1}$  (average 21  $\mu\text{g.kg}^{-1}$ ). HT-2 and DON were detected in 38 (76 %) and 28 (56 %) samples, respectively, in concentrations of 2 to 173 (average 18  $\mu\text{g.kg}^{-1}$ ) for HT-2 and 64 to 1230  $\mu\text{g.kg}^{-1}$  sample (average 303  $\mu\text{g.kg}^{-1}$ ) for DON. The acetyl-derivatives of DON were in just four samples, while NIV was not detected in any of the samples investigated. In a relatively large proportion of the feeds tested, a combination of six or even eight simultaneously co-occurring mycotoxins was revealed. Despite the limited number of samples investigated during this study, it might be concluded that chicken feed mixtures may represent a risk from a

toxicological point of view and should be regarded as a potential source of the *Fusarium* mycotoxins in Central Europe. This is the first reported study dealing with a *Fusarium* mycotoxin contamination of poultry mixed feeds from Slovakia.

### **Effect of disinfecting preparations on eggs of pig parasites**

**Laciak, V., Laciaková, A.**

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The aim of our experiment was estimation of devitalisation (ovicidic) effect of selected disinfection preparations against germinated forms of pig parasites, non embryonic eggs of *A. suum*, *T. suis*, *Oesophagostomum dentatum* in laboratory conditions.

The highest effectiveness from tested disinfectants (Pedox, Dezikon, Saniten, ammonium hydroxide) was recorded at 180 minutes exposure with 10 % concentration of ammonium hydroxide (92.08 ± 7.54 % devitalized eggs of *A. suum*). However, ammonium hydroxide was not effective against eggs of *T. suis*. Lower effectiveness, but with potential practical application was found in Saniten with 10 % concentration at 180 minutes exposure (devitalization of 39.05 ± 3.63 eggs of *A. suum*, and 30.25 ± 2.57% eggs of *T. suis*, 35,26% ± 4,67%). The other tested disinfection preparations, from devitalisation effect against eggs of parasites point of view, are not recommended for application

### **Contamination of food-stuffs with microscopic filamentous fungi**

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The aim of our experiment was to examine various commodities on the presence of molds and evaluation of microbiological findings in accordance with valid food legislation (Regulation MP SR and MZ SR No 557/1999-100).

In period from October 2004 up to February 2005 120 samples of food commodities (cheeses, spices, cereals and nuts) from the market in Slovak republic were examined. In individual samples of food commodities, macromorphological and micromorphological identification of microscopic molds was performed. Taking of samples was carried out in accordance with requirement of STN ISO 8261. Count of molds was analysed according to STN ISO 7954. Results obtained by qualitative analysis of individual samples were statistically examined by Anova and Tukey test.

Permitted limits of mold count were exceeded in samples of cheeses, spices (caraway), and nuts. Microbiological counts in cereals were below permitted limits established by Regulation MP SR an MZ SR No 557/1999-100. Micromorphological identification was performed for the presence of *Penicillium*, *Aspergillus*, *Fusarium* and *Cladosporium* in all examined samples.

### **The influence of probiotic preparation with *Bacillus* on selected haematological and protein parameters in suckling piglets**

**Link, R., Kováč, G., Novotný, J., Húska, M.**

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In this study we evaluated the influence of probiotic preparation BioPlus 2B administration on haematological and protein metabolism. The experiment lasted from the birth of piglets until the age of 35 days. There were 18 piglets, crossbred landrace x Slovak white, included into the trial. Piglets were divided into the experimental group (n=9) and the control group (n=9). Each piglet from the experimental group was given 0.01 g of BioPlus 2B a day during the whole period of the trial strictly individually, e.i.  $3.2 \times 10^7$  of *Bacillus licheniformis* and *Bacillus subtilis*. The blood sampling was on day 0, 7, 14, 21, 28, 35.

We observed significant increase in packed cell volume in the experimental group compared with the control group on day 28 and 35. Total serum protein concentrations and serum albumin level had increasing tendency in the experimental group, which performed significant differences between groups on day 14, 28 in serum protein level, on day 35 in serum albumin level.

### **Effect of caffeine on selected metabolic parameters and health of cattle**

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The aim of the trial was to determine haematological parameters, some enzymes and health state after intravenous application of caffeine to six cows. Caffeine, in dose 4.2 g, was administered to cows in *vena jugularis*. Health state was checked by clinical examination and blood was sampled before application and 1, 3, 6 and 24 hours after application.

Temperature of animals was within physiological range during the whole period of the experiment. We observed slight increase in temperature within the 1st



hour. Heart rate decreased mildly within 6 hours, but 24 hours after administration it was same as at the beginning of the experiment.

The intravenous application significantly influenced haematological parameters within the 1st hour. Number of erythrocytes decreased from  $6.5 \text{ T.l}^{-1}$  to  $5.8 \text{ T.l}^{-1}$ , which was statistically significant ( $p < 0.05$ ), packed cell volume also decreased from  $0.28 \text{ l.l}^{-1}$  to  $0.23 \text{ l.l}^{-1}$  ( $p < 0.01$ ). Three hours after application number of erythrocytes increased to  $6.11 \text{ T.l}^{-1}$  and significant difference disappeared. Number of leukocytes and haemoglobin concentration was constant during the experiment. Activity of AST was not influenced by preparation. Activity of CPK was also in physiological range, but within the 24th hour we found its significant decrease.

### **The influence of prolonged dietary restriction on antioxidant status of organism in chickens**

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The present study examined the effect of prolonged dietary restriction on serum total antioxidant status (TAS) and serum thiobarbituric acid reactive substances (TBARS, marker of lipid peroxidation) in chickens. 30 broiler chickens (age 21 days) were divided into 3 groups: group I - food ad libitum, group II - deprived of food (daily dose 32 g/chicken) and group III - deprived of food (daily dose 16 g/chicken). After 9 days of starvation the serum TAS and TBARS were investigated. TAS was measured by spectrophotometric method (RANDOX, UK) according to Miller et al. (1993) using our modification (Lovásová and Rácz, 1998). TBARS concentration was measured by spectrophluorometric method (Yagi, 1982). We found out no significant changes in serum TAS (gr. I:  $\text{TAS} = 0,97 \pm 0,07 \text{ mmol/l}$ , gr. II:  $\text{TAS} = 1,01 \pm 0,15 \text{ mmol/l}$ , gr. III:  $\text{TAS} = 1,10 \pm 0,25 \text{ mmol/l}$ ), but lipid peroxidation was significantly elevated in both starved groups of chickens (gr. I:  $\text{TBARS} = 1,27 \pm 0,32 \mu\text{mol/l}$ , gr. II:  $\text{TBARS} = 1,82 \pm 0,42 \mu\text{mol/l}$ ,  $p < 0,05$ , gr. III:  $\text{TBARS} = 1,84 \pm 0,49 \mu\text{mol/l}$ ,  $p < 0,05$ ). The results show, that prolonged dietary restriction reduces tolerance to oxidative injury and leads to increase of lipid peroxidation.

## **Influence of bendiocarbamat to the histological structure of thymus.**

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Bendiocarbamat (BDC) is used as an effective insecticide in household, food stores and agriculture. Mechanisms of its effect is based on inhibition of acetylcholinesteras (AChE) joined to the carbonyl group initiation enzymes. The result of action is the accumulation of acetylcholine and subsequent expensive stimulation of the nervous systems which evokes the death of insects. Thymus is a central lymphoid organ in the mediastine. Influence of AChE or butyrylcholinesteras (BuChE) on thymus was described. In this study we analyzed histological changes of the rabbit thymus after BDC application in various time periods (3, 10, 20, 30, 60, 90 days).

Quantitative evaluation demonstrated in control group (without BDC) that thymus cortex form  $57.94 \pm 7.10\%$ . In all groups after BDC administration we found higher relative volume of cortex (61.4 – 78.2 %). This parameter was significant in all periods ( $p < .05$ ) except after 30 days of BDC application. Medulla represents  $35.94 \pm 7.38\%$  of relative volume of thymus tissues in the control group. The dynamics of relative volume alterations of the experiment group has been similar as in cortex. Detailed morphometric assay demonstrate decrease of the thymocyte number on the constant area after BDC application (29.53-38.50) but this difference was not significant in comparison with control group ( $40,3 \pm 25,0$ ). In general we can state that BDC affects the formation of basic thymus structure.

## **Effect of rosemary and temperature of storage on oxidative changes in non thermal treated meat products**

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In our experiment, effect of rosemary powder, alone and in combination with ascorbic acid, on oxidative changes of fat content and biogenic amines production in fermented not thermal treated product “salami Hornad”, was evaluated. Each group of samples was divided proportionally and samples were stored at 15 a 20°C. Addition of rosemary and combination of rosemary with ascorbic acid on the first day of storage significantly decreased level of histamine and tyramine in samples. Temperature of storage did not influence on

content of biogenic amines in samples. Results showed that rosemary powder had a significant antioxidative effect. Ascorbic acid addition increased antioxidative effect of rosemary. Addition of antioxidants and lower temperature of storage significantly increases fat stability in food.

### **Utilization of non-conventional plant species for production of functional foods under the metal burden conditions of the soil**

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This work includes the soil and crop plants samples results from region in Slovak republic - Bojničky which is contaminated by acid pollutants and heavy metals. First chemical analysis on risk elements (RE) contents in these samples was realized. Tested plants were buckwheat, amaranth and millet. These non-conventional plant species samples were taken from agricultural enterprise, from producers. Buckwheat and amaranth can be used for a variety of baked products including pancakes, breads, muffins, crackers, bagels, cookies, and tortillas among others. It is thought of as a cereal, but is actually an herb of the buckwheat family, Polygonaceae. Millet is one of the smallest grains with higher protein content than corn, barley or sorghum. In 2 pot experiments millet and buckwheat were cultivated in soil from key region. Then the substances were added into the soil of 6 variants to arrange pH reaction and to lower toxic elements input into the both crop plants. Then the results from this survey and from the above mentioned one were evaluated and compared. The purpose of this study is to demonstrate the changes of heavy metals mobility in crop plants and to clarify the importance of heavy metals monitoring in Slovak types of soil. The results from our experiment show that relatively low RE soil content could not mean that the plants like amaranth, millet and buckwheat will not absorb significant concentrations of risk elements (RE) and these can cause harmful affecting on plants in final point. Our next study will concern phenol compounds content changes within the influence of RE (metallic burden from soil vs. rutin content changes, etc.).

### **Quality of long-time stored food wheat from the point of view of the contamination by heavy metals**

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In this contribution, some findings on the accumulation of certain elements (Fe, Mn, Zn, Cu, Co, Ni, Cr, Pb, Cd), with possible negative effects on human

health, in long-term (13 months) stored food wheat, *Triticum aestivum*, L., are presented. The samples were taken from the storage depots in the Hontianske Nemce and Rybany regions, which are classified as uncontaminated with respect to the elements of interest. All samples contained variety Vlada from the 2004 harvest. The samples were milled by a laboratory mill (Brabender Quadrumat Senior) gaining four milling products: 2 low grinded flours (denoted MF I. and II.), milling bran (MF III.), and grinding bran (MF IV.). Further source of samples, for comparison of contamination levels, was the highly contaminated region of Spiš; cereal samples from selected localities of Kľuknava agricultural company, harvest 2003. The analysis of presence of these trace elements was performed by the flame atomic absorption spectrophotometry (AAS). The reference values for the maximal acceptable levels of the concentration of the elements of interest were taken from the Food Codex of the Slovak Republic. The results indicate significant differences in the content of the risky elements in the four milling fractions. Particularly high concentrations (above limits) of Pb and Cd in the wheat were observed in the samples from the “uncontaminated” Rybany and Hontianske Nemce regions (Tab. 1) which were even higher than those observed for “contaminated” Spiš region (Tab. 2). The limits for Ni and Cr have not been exceeded. Higher above-limits concentrations of Fe, Mn, Zn, Cu, and Co have been found in all bran parts (fractions III. and IV.) from all regions. The results have implications for choices regarding an appropriate milling technique and the subsequent processing of the particular milling fractions. It has been found/confirmed that the raw material (grain) from the long-term storage is unsuitable for whole-grain products. The results also underline the necessity of a more strict control of the deposits for the presence of certain elements in the food wheat including the so called non-risky localities in Slovakia. The research on the causes of the distribution of the elements of interest (heavy metals) into grain in the selected storage depots continues.

### **Regulation of fermentation process in silage from hybrid sorghum (*Sorghum bicolor* x *Sorghum sudanense*) in areas with moisture deficit.**

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We examined the regulation of fermentation process in silage from hybrid sorghum and sudan grass (*Sorghum bicolor* x *Sorghum sudanense*). The control was additive free. Were three attempted groups: P1 with biological-enzymatic silage additives (*Lactobacillus plantarum*, *Pediococcus acidilactici* and cellulase), P2 biological-enzymatic silage additives (*Lactobacillus plantarum*, *Enterococcus faecium*, *Pediococcus acidilactici* and amylase, cellulase, hemicellulase, pentosan) In this study was preserved the with dry matter content

410.12 g.kg<sup>-1</sup> FM, crude protein content 130.61 g, WSC 156.99 g and crude fibre content 259.65 g.kg<sup>-1</sup> DM. We found out that the additives itself positively in improvement of fermentation process and pH decrease compared with the non-treated silage (pH control variant – 3.92, variant P1 – 3.83, variant P2 – 3.83). Content of lactic acid increased from 46.90 g. kg<sup>-1</sup> DM in control silage to 48.09 and 51.33 in silages P1 and P2 variants. The level of acetic acid was in all silages high, 6.22 – 8.71 g per kg DM. Exception from this situation was butyric acid, that was in untreated silage highly significant (0.40 to 0.21 – 0.17 g per kg DM in silage treated biological-enzymatic additive). NH<sub>3</sub>-N of total N – from 3.73 % in control silage to 3.50 and 3.69 % in silages P1 and P2 variants. From content of nutritive found out, that crude protein content was highly in control silage (129.17 g per kg DM). From our results follow that the application of silage additives may cause the improvement of fermentation process. We found not positively inoculation effect on the nutrition composition of silages.

### **The effect of cadmium in combination with zinc and selenium on ovarian structure in Japanese quails**

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In this study the effect of single cadmium, cadmium + selenium and cadmium + zinc administration on the ovarian structure of Japanese quails was studied. The morphometric analysis of the relative volume of primary follicles detected the highest value in control group with a similar value in the group with administration of cadmium with selenium. Lower relative volume is reported in group with cadmium and zinc administration and the group with simple cadmium administration ( $P < 0.05$ ). The relative volume of growing follicles was very similar in all studied groups (11.33 – 15.35%), and the relative volume of stroma was very stable (82.59 – 86.45%).

In the evaluation of the number of follicles undergoing atresia significantly higher number of atretic primary follicles as well as growing follicles in the group with cadmium administration and cadmium with selenium administration in comparison with control group was found. In comparison of normal and atretic follicles we report the most negative effect on ovarian structure in group with cadmium administration. Selenium co-administration show protective effects but only the co-administration with zinc prevent significant cadmium ovarian alterations.

## **Effect of higher doses of cadmium with interaction with zinc on health of turkey and health safety of products**

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In the experiment was following the effect of Cd and with Zn interaction on production, health, immunity and content of Cd in tissues and organs of turkeys. Turkeys of the breed BIG 6 were divided into 4 groups. Control group, group with addition of Cd (1mg/piece/day), group with addition of Zn (72 mg/piece/day) and group with addition of Cd and Zn. There were any statistical significant differences recorded among the groups in the following parameters of cell immunity. The content of Cd in the leg muscle was statistical significant higher ( $P > 0,001$ ) in the group with addition of Cd and Cd+Zn in comparison control group and group with Zn addition. Similar dependence was found in the kidney and liver. The significant difference in the content of Cd ( $P > 0,001$ ) was found among the group with addition of Cd (kidney 1.09 mg, liver 0.78 mg) and group with addition of Cd+Zn (kidney 0.62, liver 0.41 mg). This fact confirmed protected effect of zinc against cadmium.

## **Biological availability of oxytetracycline in sheep after Tetraxyl L.A. and Alamycin L.A. application**

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Blood serum concentrations and biological half-life of oxytetracycline (OTC) after long action preparations were investigated in adult sheep of the Slovak merino breed. Contemporarily their local tolerance has also been observed.

In the first group (N= 6) oxytetracycline was administered in the form of preparation Tetraxyl L. A. inj. a.u.v. (Biotika, Slovenská Ľupča, Slovak Republic) and in the second group (N = 5) in form of preparations Alamycin L.A. inj. a.u.v. (Norbook Laboratories Limited, North Ireland). Oxytetracycline was administered intramuscularly at a single dose of 20 mg per kg of live weight. The blood serum concentrations of OTC were studied in the intervals of 1, 3, 6, 24 hours and 2, 3, 4 and 5 days after single administration of preparations. OTC has been determined by high HPLC chromatography.

Therapeutically concentrations of OTC (above  $0.5 \mu\text{g}\cdot\text{ml}^{-1}$ ) produced by Tetraxyl were detected in 74 hours in and after Alamycin administration in 67 – 68 hours. Detectable concentrations of OTC (under MIC) of Tetraxyl ( $0.28 \mu\text{g}\cdot\text{ml}^{-1}$ ) and Alamycin ( $0.14 \mu\text{g}\cdot\text{ml}^{-1}$ ) were recorded in 96 hours. On the 5 day all samples, in both groups, were negative. On the basis of our results was

concluded that in selected pharmaceutically parameters and also in local tolerance Tetraxyl L.A. is more favourable in comparison with Alamycin L.A.

### **Biological availability of chlortetracyclinium in Sheep after Vubivet C prm.ad us.vet. application in milk and water**

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The standard chlortetracyclinium chloride biological availability and other pharmacokinetic parameters were observed in adult sheep of the Slovak merino breed after administration of Vubivet C prm. in milk and in water. Both groups were given chlortetracyclinium chloride in Vubivet C prm. a.u.v. preparation (Biotika Slovenská Ľupča) in a single dose of 20 mg/kg live weight. The preparation was administered per os in 2% suspension by probe. Chlortetracyclinium chloride concentrations in blood serum were determined chromatographically after 1, 3, 6, 12 and 24 hour. After Vubivet C prm. administration in milk and water indicated that biological availability of Vubivet C prm. administered in milk is 33.79 % lower than in water. When the preparation was applied in water the biological half-time of chlortetracyclinium chloride was 8.64 hr and 8.82 hr when applied in milk.

### **Comparison of the acute toxicity of salinomycin in Synvertas plv. and Sacox 120 gran. preparations in chickens**

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The work presents median lethal dose ( $LD_{50}$ ) of sodium salinomycin in the Slovak anticoccidial preparation Synvertas *plv. ad us. vet.* (Biotika, Slovenská Ľupča, Slovak Republik) and in the Germany anticoccidial preparation Sacox 120 gran. ad us.vet.(Hoechst Roussel Vet, Germany), in 4-week-old chickens.  $LD_{50}$  value of sodium salinomycin in Synvertas preparation was determined at 107.5 mg.kg<sup>-1</sup> of b. w. and in Sacox preparation was determined at 100.0 mg mg.kg<sup>-1</sup> of b.w. From the clinical signs of intoxication after lethal doses of 100 and 120 mg of sodium salinomycin per kg<sup>-1</sup> (1000 and 1200 mg of Synvertas preparation and 833.3 mg and 1000 mg of Sacox preparation) of b.w., the following signs were prominent: ataxia to movement, lying on the side or in sternal position with neck stretched forward and legs stretched backwards, dyspnoea, cyanosis, sharp CNS inhibition, loss of acoustic and touch responses. Hyperaemia of liver, pancreas, spleen and kidneys, anaemia of GIT mucosa, diffuse acute bronchopneumonia (in one chicken lung oedema), slight

anaemia of thoracic musculature, slight banding of thigh and thoracic musculature were recorded in most dead chickens.

### **Appearance of bacteria *Escherichia coli* in meat of wild pheasants**

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In this study quantitative microbiological examination of the breast and thigh muscles of 99 farm pheasants was performed. The total bacterial count, the count of *Enterobacteriaceae* and *Escherichia coli* and the presence of enterohaemorrhagic serotype O157 of *E. coli* were determined. A continual increase in bacterial counts during a cold storage of pheasants for fifteen days has been observed. The most significant increase in the total plate count was noticed in the third group (birds shot to the abdomen) being stored at a temperature of +4 °C, where the total bacterial count in the end of experiment exceeded a value of  $10^6$  CFU.g<sup>-1</sup> and the count of *Enterobacteriaceae* reached a value of  $6 \cdot 10^6$  CFU.g<sup>-1</sup>. As follows from the results, the quality of pheasant meat depends upon both the place of shooting and the storage temperature. If the shot hits the body cavity, storage for 15 days at +4 °C can lead to a significant multiplication of micro-organisms penetrating to the meat from the digestive tract. Therefore, the meat can become less valuable even when kept under regular conditions.

### **Using of Premi®Test in detection of antibiotic in food-stuffs of animal origin**

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In this study, microbiological tests for the detection of beta-lactam antibiotics in meat and meat products are evaluated. The traditional FPT (four plate test, containing *Bacillus subtilis* and *Kocuria rhizophila*), BsDA (*Bacillus stearothermophilus* disc assay) and a newly developed microbiological test, Premi®Test (containing *Bacillus stearothermophilus*) were included in this study. The limit of detection (LOD) of the Premi®Test is compared with the LOD of the traditional methods.

The detection limits of the tests are determined by using beta-lactam antibiotic standards dissolved in meat juice, as well meat tissue obtained from laying hens after experimental administration of amoxicillin. Positive samples, based on inhibition of growth of the organism in the test, are confirmed with high performance liquid chromatography (HPLC). Growth inhibition in the



traditional tests is visible as a clear zone on the plate, for Premi®Test, this is based on the absence of a colour change of the test.

### **The problems with hygienic quality of silage from high moisture crimped maize corn**

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In this study was preserved the with 648 g of dry matter. The control was additive free. Were three attempted groups: P1 with a biological additive (*Lactobacillus* DSM 13573), P2 with a chemical additive (22.9 % natrium benzoate and 8.3 % natrium propionate) and P3 with a chemical additive (42.5 % formic acid, 30.3 % ammonium formate, 10.0% propionic acid).

From fermentation process resulted that control silage, silage P1 and silage P2 had same fermentation (pH 3.88, 3.78 and 3.81). Silage P3 had pH 4.08, and high significant lowest content of all acids. Exception from this situation was butter acid, that was in P3 silage highly (0.69 to 0.10 – 0.32 g per kg DM). At silage P3 were the fermentation process and all processes reducible and the maize corn was conserved. In other silages was pass of good fermentation, the content of milk acid was 24 g.kg<sup>-1</sup> DM (in silage P3 only 1.5 g per kg DM). The level of acetic acid was in all silages low, 2.83 – 4.33 g per kg DM. Content of alcohol was higher in control silage (1.44 g per kg DM) and lowest in P3 silage (0.04 g per kg DM).

The losses of dry matter were influenced by good fermentation process. Their level in all silages was low, only 0.40 – 0.75 %. Highest loss of dry matter was in control and lowest in silage P1, which was preserved with the biological additive. From content of nutritive found out, that crude protein content was highly in silage P3 (99.8 g per kg DM). In attempted silages was decreased content of crude fibre from 30.7 in control silage to 18.3 – 21.9 g per kg DM. The levels of NEL and PDI were not affected by application silage additives.

The crimped maize corn before conservation contained 14 000 spores per g corn (*Mucor*, *Rhizopus*, *Alternaria* and *Aspergillus*). After fermentation all silages contained not filamentous fungi. Past three days from opening of silo was a few fungi of genus *Penicillium* in silages attempted with chemical additives detected.

From ours results follow that the application of silage additives may cause the improvement of fermentation process and the fermentation process affects of hygienic quality the crimped maize corn.

## **Metabolic profile test as important factor in detecting of subclinical diseases**

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Health status and maintenance of utility on asked level are influenced by many factors. It is important to prevent them by providing good conditions. The possibility how to prevent some diseases is early diagnostic of potential metabolic disorders. Dairy cows are component of food chain, for all that is necessary to produce milk of high quality. Metabolic profile test can uncover disorders of health status before clinical symptoms of disease.

## **Following of zinc effect on cadmium distribution in organism of Japanese quails**

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The effect of zinc on cadmium distribution in tissues of Japanese quail was investigated. Japanese quails (n=60) were divided into 3 groups. Each group consisted of 20 birds. Group 1 was the control group. In the experimental group G2 Zn was administered daily in form of water solution in dose 12 mg of Zn for one quail. In group G3, combination of Cd and Zn, in dose 0.12mg of Cd and 12 mg of Zn. The levels of Zn and Cd in tissues were evaluate with method AAS. It was observed protective effect of Zn against of Cd long-term application in Japanese quail.

## **The nutritional parameters of pork meat of altered quality**

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The changes in the levels of amino-acids of pork meat (*m. longissimus dorsi*) of normal quality, and that of altered quality PSE (pale, soft, exudative) were observed in dependence on the length of freezing storage. The aim was to deepen and to make objective the knowledge on the effect of freezing process on the parameters of quality of pork meat.

According to our finding, pork meat with PSE, regarding total proteins and aminoacids, is not nutritionally less valuable than that qualitatively unchanged.

The results showed generally higher values of essential isoleucine, treonine, valine, leucine and phenylalanine, non essential tyrosine, glutamic acid, cystine, aspartic acid and alanine in the fresh musculature of pigs with PSE meat. The finding was emphasised by the sum of essential aminoacids in the PSE meat and correlated with statistically significantly higher values of total proteins in the PSE meat.

### **Content of heavy metals in fish muscle from Kurzweil lake (district. Nové Zámky)**

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This study presents a rate of heavy metals accumulation in the muscle of three analyzed fish species – common carp (*Cyprinus carpio*), Prussian carp (*Carassius gibelio*) and northern pike (*Esox lucius*) from the Kurzweill Lake. The samples were collected from Kurzweill Lake in September 2004, analyzed by AAS and evaluated in  $\text{mg.kg}^{-1}$  of fresh matter. Concentrations of heavy metals in the muscle were as follows: Fe 4.49–19.31, Mn 0.18–0.62, Zn 4.66–23.67, Cu 0.31–1.31, Ni 0.05–0.23, Co 0.04–0.22, Cr 0.06–0.18, Pb 0.06–0.44, Cd 0.07–0.72 and Hg 0.01–0.31. Statistically significant differences ( $P < 0.05$ ) in the metal accumulation between fish species for Fe, Mn, Zn, Cd, and Hg were recorded. On average, the order of metal concentrations in the fish muscle was: Fe > Zn > Cu > Mn > Pb > Cd > Co > Ni > Cr > Hg.

### **The influence of chlorination of drinking water on the quality of eggshell**

**Šály, J., Neuschl, J., Mateová, S., Baranová, D.**

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The influence of chlorination of drinking water on some parameters of egg production and activity of selected enzymes was investigated in laying hens of hybrid Shaver in the fifth month of laying. Chlorine was added to drinking water in the form of Chloramin at doses 0.3 mg/l and 0.9 mg/l. Control layers were supplied non-chlorinated water. All layers were fed mixed feed Hyd 10 containing 2.97 % calcium and 0.56 % phosphoms. The content of chlorine in drinking water had no significant effect on the weight of eggs. However, chlorination of water caused that layers produced eggs with significantly decreased strength and thickness of eggshell and the number of broken eggs was increased too. This decreased quality of eggshell was not related to the changes in serum levels of calcium and phosphorus. The activity of alkaline phosphatase

and lactate dehydrogenase was significantly higher in experimental hens. No significant changes in the activity of gamma glutamyl transferase and cathepsin were detected in experimental hens compared to the control.

### **Influence of some diseases on the quality of eggshell**

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We bring to a notice the unfavourable influence of diarrhoea on the quality of eggshell. Diarrhoea with regard to the possibility of frequent and mass occurrence can give rise to considerable economical losses in stocks resulting from deterioration of the quality of shell. Decreased quality of shell necessitates the investigation of feed mixture not only for the content of the mineral components but also for the possible contamination by molds. Although application of Fungicidin in dose 55 mg per 1 kg of feed decreases the adverse influence of molds on the quality of shell, this cannot be considered the most suitable veterinary measure; far more important is the prevention.

### **Risk factors of civilization diseases pertinent to boarding and smoking habits in university students**

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The aim of the study was to evaluate some risk factors of civilization diseases pertinent to boarding and smoking habits in 144 university students in Nitra aged 20-25 years (average age  $21,5 \pm 0,9$  years). The method for information obtaining was questionnaire. In the group of students, who never consume alcohol (11,1 %) versus the group of students, who consume alcohol (88,9 %), was more students, who also never smoked in the past (100,0 % vs. 57,0 %), smoke in present (100,0 % vs. 65,6 %), never drink coffee (37,5 % vs. 27,3 %), never drink Coke (43,7 % vs. 33,6 %), never use sugar (31,3 % vs. 16,4 %) and salt (6,3 % vs. 5,5 %). Less women, who never consume alcohol, also consume salt products (0,0 % vs. 2,3 %). In this group was less women, who have deficient drinking regime – who consume 0,5 litre beverages a day (12,5 % vs. 7,0 %).

## Nutrition risks from boarding in university students

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Sugar, salt, coffee, Coke and alcohol consumption were assessed in 274 secondary school students (62,4 % females and 37,6 % men) aged 20-25 years (mean age  $17,0 \pm 1,0$  years). The method for information obtaining was questionnaire. Height and weight were measured and body mass index was calculated (mean weight was  $62,8 \pm 10,8$  kg, height  $171,4 \pm 9,4$  cm, and body mass index  $21,2 \pm 3,1$  kg.m<sup>-2</sup>). In the group of students was: more women (61,5 % women and 75,0 % men) with frequent salt products consumption (namely from 1 to 7 times a week); more women (29,8 % women and 14,4 % men) with frequent coffee drinking (namely from 3 to 4 coffee a day); more men (15,0 % women and 25,3 % men) with frequent Coke drinking (namely daily or nearly daily); more men (13,4 % women and 29,8 % men) with frequent alcohol consumption (namely 1 and more times a week).

## Nutritional and lifestyle factors and bone mass density in females aged 31-50 years

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The aim of this study was to evaluate the influence of the nutrition and lifestyle factors on bone density in 151 females aged from 31 to 50 years (average age 43,0 years). The bone mass of probands was measured using the ultrasound method of osteodensitometry. Consequently using the form of questionnaire were evaluated the nutritional habits and lifestyle of testing females (milk and milk products consumption, and diets). In the tested group of females, 42,4 % women had T-score values less than  $-0,99$  (these values indicate osteopenia or osteoporosis – group a), 57,6 % had T-score values more than  $-1$  (normal bone density – group b). It was confirmed the influence of the lower body weight as the risk factor of the osteoporosis' formation and development, when the highest body weight had the women in the group b. Other risk factor is low BMI-index. The highest values of BMI-index were found in the group b. Significant differences in milk, milk products consumption, and diets were not observed in the several groups of women.

## **The occurrence of white mistletoe in Košice and its interaction in laboratory mice**

**Šutiak, V., Droppová, L., Puchá, Z., Šutiaková, I., Čonková, E., Čellárová, E., Korének, M., Neuschl, J., Skalka, J., Velesová, M., Vaczi, P.**

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In this report we have studied the occurrence of white mistletoe in five localities of Košice and its effect in mice tissues. Our studies demonstrated that the infestation of deciduous trees with white mistletoe differed in all localities but in certain cases were significantly higher ( $P < 0.05$ ). Furthermore we have registered that the loaf and fruit extracts of white mistletoe suppressed the body metabolism in low concentration (0,05 (w/v) %) with the significant decrease the body temperature in mice (on the level of significance  $P < 0.05$  or even with higher statistical significance). Higher concentrations of extracts ( $> 1$  %) kill the mice after i. p. administration.

## **Knowledge from the analgesic studies in animals and their use for man and his interests**

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In this study we are dealing with morphine, especially about its effect in animals in the relation to controls. Our results of study demonstrated that morphine induced in rabbits various clinical and laboratory changes. From the first group of parameters we can refer about the evident induction of somnolence, analgesic-sedative effect, miosis, kyphosis and very significant ( $P < 0.0005$ ) depression of respiration. Our experiments demonstrated however that the distinct depressive effect of morphine is also on the body temperature and on the heart rate ( $P < 0.01$ ). Morphine induced furthermore the important changes also in laboratory parameters (significant hypercapnia with the increase of bicarbonates in peripheral blood, but it did not influence  $pO_2$  in peripheral blood significantly). Furthermore morphine induced also the transient decrease and later on the significant increase of base excess and also slight decrease of pH of blood of rabbits. Our results of experiments are inspirative for the further studies with morphine and so we would like to continue in our experiments. Literature data demonstrated namely, that in contrast to such analgesics as are some artificial steroids, antipyretics, spasmolytics, antiflogistics, neuroleptics,

antidepressives, antiepileptics and synthetic opioids, morphine may have also endogenous origine, which property favours its studies, especially with animals.

### **Electrophoretic picture of alpha -1- plasmatic proteinase inhibitors after different nutrition in pigs**

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Alpha proteinase inhibitors are members of the serpin superfamily of proteinase inhibitors that participate in a variety of physiological functions. Our plasma protein inhibitors were in the range of the isoelectric points of pH 3.75-7.35 in sows on 7th and 28th day post partum. The dominant fraction of the inhibitors ranged within pH 3.75 and 4.5, whereas minor fractions occurred also in the area up to pH 2.8 specific staining was used to detected proteinase inhibitors in piglets in positions that were identical with the mother animals after 48 hours, however, with decreased activities. The dominant 4-6 fractions (after Sanolac-Ferkel) of alpha-1-proteinase inhibitors of trypsin were registered in the blood-plasma of pigs in scale of isoelectric points pH 3.75-5.0 after 3 hours to 7 days.

### **Microbiological contamination and somatic cell count of bovine milk samples stripped before and after udder preparation for milking**

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The aim of the trial was to determine the level of contamination of fore stripped milk by microorganisms (total bacteria counts, Coliforms, Psychrotrophs). We have tested two different manners of forestripping – first: before udder preparation to milking and second: after the finish of udder preparation to milking. Somatic cell counts were also evaluated. During each proceeding of forestripping two samples of milk were collected. In first group first sample was collected before preparation of udder and second after preparation. In second group the first and second samples were collected after preparation of udder. In first group we have calculated significant decrease of measured parameters from first to second sample. However we could not find any differences between samples in second group of half udders. In conclusion, we could demonstrate that application of the manner forestripping in first group contribute to improve the quality of milk by reducing microbiological contamination of milk.

## **Comparison of effects of cadmium and nickel on mouse testis after peroral administration in food**

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The aim of this study was to observe the changes in testis of mice after a long-term administration of nickel and cadmium in food in separate experiments and to compare these changes using the light microscopy methods. ICR mice aged 4 weeks were used in the experiment. Twenty males were treated with CdCl<sub>2</sub> at a daily dose 1 mgCd<sup>2+</sup>.kg<sup>-1</sup> b.w. in a standard pellet diet. The same number of males was given nickel (NiCl<sub>2</sub>) in a daily dose of 10 mg.kg<sup>-1</sup> body weight. Cadmium and nickel were applied directly onto the pellets as an aqueous solution. Males were sacrificed after 3, 6, 9 and 12 weeks of Cd and Ni intake. Twenty males served as an untreated control and were killed in the number of five males at the same periods like the cadmium and nickel-treated animals. Histological observations of the changes in the testes were realized.

Histopathological examination of the testis structures revealed degeneration of the seminiferous epithelium after 9 and 12 weeks of Cd administration. The vacuolization of the epithelium and degeneration of the spermatogonia after 9 weeks of Cd daily intake were apparent. Pyknosis and necrosis of the evacuated germinative cells takes place in the testes. These changes were more evident after 12 weeks of Cd administration. Similar changes were observed in nickel-treated mice. However, on the contrary of the cadmium-treated males, the seminiferous epithelium was damaged on the periphery of the testes already after 3 weeks of nickel intake in food. Germ cells were evacuated from the epithelium. The increase in the number of interstitial cells at the periphery of testis was observed. The more visible changes were observed after 6 weeks of Ni exposure. The epithelium was very low. Some tubules were filled with the mass of cells. Normal tubules with spermatogenesis in the centre of the testis were observed. After 9 weeks of the experiment, the germinal epithelium with disintegrated cells was completely detached from the basal membrane. Mass of dead cells in the lumen of some tubules was also observed. After 12 weeks of nickel administration, the changes in testes were similar to those in the previous periods. However, we observed the higher amount of blood capillaries in the interstitium subjectively.

The results of this study indicate that low doses of cadmium and nickel cause similar changes in the testes after peroral intake with some differences in the range of the changes and time of appearing of the first signs of spermatogenesis damage.



## **An occurrence of men's ejaculate quality changes in Slovakia and eventual effect of environmental chemical factors**

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In this study the men's ejaculate quality with fertility disorders were investigated. The aim of this work was to find the most frequent sperm change and relationship between the fertility disorders and eventual environmental sources of chemical contamination. Ejaculates of 2193 men suffering with fertility disorder were analysed and the sperm concentration, motility, morphology and presence of leukocytes was evaluated. The relative occurrence of individual changes of sperm quality in relation to the districts where men are living was stated. Asthenospermia was recorded almost in all districts as the most frequent change of sperm quality with average occurrence of 63.75%. Important sources of environmental contamination which can be considered as one of the reasons of these disorders origin are located in the vicinity of the districts which men coming from. The highest percentage of disorder occurrence was recorded in Dolný Kubín, Ružomberok and Prievidza, which are located in the important contaminated areas of Slovakia.

## **Actual content of iodine in food-stuffs of animal origin from the view of their safety and biological value**

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Iodine concentration was assessed by the Sandell-Kolthoff method in 226 bulk samples of fresh cow milk from 226 farms covering 66 districts, in 84 samples of breast and leg muscles of broilers from 7 farms in 4 districts, in 108 samples of muscles (*m. gracilis*) pigs from 18 farms in 10 districts and in 513 eggs from layers in large scale breeds and in a small farm in the Czech Republic. The samples were collected during the period from August 2003 to September 2004. Average iodine concentration in milk of the Czech Republic was  $310.4 \pm 347.0 \mu\text{g I}\cdot\text{l}^{-1}$  and significant variations of iodine content in milk from different farms expressed by variation range  $<10$  to  $>1000 \mu\text{g I}\cdot\text{l}^{-1}$  were detected. The variations reflected marked differences in iodine saturation of dairy cows. Average milk iodine concentration is twice and a half the findings detected before supplementation initiated between the years 1997-1999.

Average iodine concentration in breast and leg muscles was  $18.9 \pm 6.71 \mu\text{g I kg}^{-1}$  and  $37.2 \pm 19.73 \mu\text{g I} \cdot \text{kg}^{-1}$  fresh matter, respectively, and coefficient of variation was 35.6 % and 53.1 %, respectively. Iodine concentration in leg muscles was statistically significantly higher ( $P < 0.001$ ) relative to breast muscles. Average iodine concentration in muscles was  $25.6 \pm 15.6 \mu\text{g I} \cdot \text{kg}^{-1}$  fresh matter and coefficient of variation was 60.6 %. Iodine level variations in samples from respective farms was expressed by the variation ranges of 8.48 to  $66.2 \mu\text{g I} \cdot \text{kg}^{-1}$ . The concentration of iodine in egg yolk from layers in large scale breeds ( $n = 264$ ) was  $1089 \pm 279 \mu\text{g I} \cdot \text{kg}^{-1}$  fresh matter and was significantly higher compared with the value in the small farm ( $n = 249$ ), i. e.  $287 \pm 166 \mu\text{g I} \cdot \text{kg}^{-1}$  fresh matter.

The detected variations might have been caused by different iodine saturation of dairy cows, broilers, pigs and layers, manifestation of physiological ability of respective animals to utilize the iodine source, potential effect of goitrogens and environmental conditions.

It is necessary to accept the iodine content in milk, broiler and pig meat and eggs in the balance of iodine supply in the shopping basket of consumers.

### **The concentration of cadmium in organs of cows after experimental Load by cadmium sulphate**

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The concentration of cadmium in various organs of cows after long-term consumption of cadmium sulphate was investigated. Experimental animals (6 pregnant cows, from 4 to 8 years) were in course pregnancy and after parturition fed separately with concentrates supplemented by cadmium sulphate in daily dosage 250 mg Cd pro toto (2 animals) and 500 mg Cd pro toto (4 animals). Cadmium was administered from 203 to 328 days in three cows (one cow 250 mg Cd + two cows 500 mg Cd) and these cows were slaughtered at the end of Cd administration (group I - E1). In three cows (one cow 250 mg Cd + two cows 500 mg Cd) cadmium was administered for 68 to 138 days and administration of cadmium was stopped from 24 to 135 days before slaughter (group I - E2). Control animals (4 cows) were fed with analogous diets which were not supplemented by cadmium (group II - C). All the animals were slaughtered and samples from liver, kidney, muscle, ovary and uterus were collected for the determination of cadmium using the atom absorption spectrophotometry. The following mean concentrations of cadmium ( $\pm$  SD), expressed in  $\text{mg} \cdot \text{kg}^{-1}$  of fresh tissue, were found (group I - E1; group I - E2; group II - C): kidney ( $17.80 \pm 1.21$ ;  $6.87 \pm 1.46$ ;  $0.45 \pm 0.16$ ) the differences in concentrations between E1 : E2 are  $p < 0.01$ ; E1 : C  $p < 0.01$ ; E2 : C  $p < 0.01$ ),

liver ( $6.74 \pm 2.01$ ;  $2.67 \pm 0.80$ ;  $0.27 \pm 0.11$ ) (E1 : E2  $p < 0.05$ ; E1 : C  $p < 0.01$ ; E2 : C  $p < 0.05$ ), uterus ( $0.450 \pm 0.134$ ;  $0.291 \pm 0.217$ ;  $0.028 \pm 0.019$ ) (E1 : E2  $p > 0.1$ ; E1 : C  $p < 0.05$ ; E2 : C  $p > 0.1$ ), ovary ( $0.119 \pm 0.045$ ;  $0.086 \pm 0.087$ ;  $0.028 \pm 0.017$ ) (E1 : E2  $p > 0.1$ ; E1 : C  $p < 0.05$ ; E2 : C  $p > 0.1$ ), muscle ( $0.059 \pm 0.014$ ;  $0.022 \pm 0.004$ ;  $0.028 \pm 0.024$ ) (E1 : E2  $p > 0.1$ ; E1 : C  $p > 0.1$ ; E2 : C  $p > 0.1$ ).

## Seminal concentrations of nickel in various animals and correlation to spermatozoa quality

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In this study the analysis of nickel in animal semen (stallion, bull, ram, boar, fox) and its relation to spermatozoa quality was analyzed. The analysis of nickel showed that the concentration of this element in stallion semen  $0.20 \text{ mg.kg}^{-1}$ , in bull  $0.12 \text{ mg.kg}^{-1}$ , in ram  $0.31 \text{ mg.kg}^{-1}$ , in boar  $0.06 \text{ mg.kg}^{-1}$  and in fox  $0.36 \text{ mg.kg}^{-1}$ . Seminal nickel concentration was significantly higher ( $P < 0.05$ ) in foxes than that in bulls and significantly higher ( $P < 0.01$ ) in rams and foxes in comparison with in boars.

In stallion semen we determined  $17.09 \pm 3.66\%$  of total pathological spermatozoa, with the dominancy of knob twisted flagellum, separated flagellum and flagellum torso. In bulls we found  $11.80 \pm 4.88\%$  of total pathological spermatozoa, with the dominancy of separated flagellum, flagellum torso and knob twisted flagellum. In ram semen was occurrence of pathological spermatozoa  $17.17 \pm 3.76\%$ , and separated flagellum, flagellum torso, knob twisted flagellum were the most frequent forms of pathological spermatozoa. The total percentage of pathological spermatozoa was  $9.82 \pm 1.47\%$  in boar. From all observed pathological spermatozoa evaluated in boars the highest numbers were with separated flagellum, flagellum torso and other pathological spermatozoa. The total percentage of pathological spermatozoa was  $7.75 \pm 1.33\%$  in fox. From this total number the most frequent changes were knob twisted flagellum, separated flagellum and broken flagellum.

Correlation analysis in bulls indicated a high positive correlation between seminal nickel and separated flagellum ( $r=0.76$ ) and medium positive correlation between nickel and flagellum torso ( $r=0.62$ ), in rams high positive correlation between nickel and separated flagellum ( $r=0.77$ ). In relation to studied nickel medium positive correlation was found between nickel and separated flagellum ( $r=0.43$ ), nickel and other pathological spermatozoa ( $r=0.45$ ) in boars.

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| Title of publication:     | Risk Factors of Food Chain V                     |
| Type of publication:      | Proceedings Book of Abstracts                    |
| Authors of publication:   | Group of Authors                                 |
| Editors:                  | P. Massányi, R. Toman, N. Lukáč,<br>M. Kramárová |
| Publisher:                | Slovak Agricultural University in Nitra          |
| Number of printed copies: | 100  |
| Year of publication:      | 2005   |
| Press:                    | Slovak Agricultural University in Nitra          |

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Texty neprešli jazykovou úpravou.

Publikácia vydaná pre potreby účastníkov konferencie a praxe.

ISBN 80-8069-593-8