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Agriculture and animal genetic resources have considerable economic importance for future. The great importance of the diversity of animal genetic resources is made up of their real contribution to the value chain in agriculture and their potential value as a combined genetic basis for future requirements for human nutrition.
In order to preserve and properly manage the genetic resources it is necessary political, legal and financial framework, as in most parts of the world and regulated. It is certainly important variability within a breed, that should be retained as a basis for selection. All of the above mentioned is stil not implemented in B&H. The State of B&H has the basics and the possibility to recognize their animal genetic resources, but only with the established political, legal and financial framework.
The conservation of animal genetic resources is necessary to ensure the genetic basis for future selection, adaptation to changing production and breeding conditions, and to preserve local breeds as a cultural heritage.

Key words: *animal breeding, genetic resources, conservation of animal genetic resources*

TEMPERATE FRUIT BREEDING: METHODS AND ACHIEVEMENTS

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Summary

Temperate fruit breeding has undergone significant changes in recent years. New selection methods have been developed and applied. Apple, pear and apricot breeding at Agrocope Changins-Wädenswil (ACW, Switzerland) aims to respond to the most important needs of growers, marketers and consumers. It consist of identifying as quick and as precise as possible the most promising progeny plants. The challenge is to efficiently spot the outstanding genotypes prone to become a successful commercial variety out of a large quantity of progeny plants. The appropriate choice of parents is crucial. While breeding for disease resistance, some early phenotypic screening tests of progenies e.g. for scab resistance in apple can be performed. However, for other diseases such as powdery mildew and fire blight, selection can be reasonably made only at a later stage. New methods to make selection for tree and fruit characters more precise were developed in recent years and lead to the concept of Marker-assisted breeding (MAB). Genetic markers can reduce the number of plants, and the time required for evaluation, thus new varieties become commercially available sooner. How can molecular selection methods reasonably be applied in an apple breeding programme? Application of phenotypic and molecular early selection techniques in the apple breeding programme at Agroscope Changins-Wädenswil will be demonstrated and economic constraints discussed. Moreover, missing information about phenotypic traits to be used for efficient early selection will be outlined.

Key words: Fruit breeding, disease resistance, fruit quality,

PLANT BREEDING CENTRES IN BOSNIA AND HERZEGOVINA

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Summary

Due to lack of funds, proper legislation and plant breeding centres, there are currently no major plant breeding programs being carried out in Bosnia and Herzegovina. Initial steps, which might help create breeding programs, have been made in the last decade through establishment of a gene bank and several introduction centres. The aforementioned capacities provide the start material for future breeding efforts. However, in order to activate plant breeding activities in this country, a system which will effectively regulate the entire process, from the use of germplasm and introduction of new cultivars to registration and legal protection of cultivars, must be established. Without the systems which will enable the plant breeders to benefit financially from their new cultivars, breeding in B&H cannot become sustainable. Aside from the legislative regulation, the government and the legislative bodies must support the formation of plant breeding centres through capital investments and subsidizes. The outcomes of well-developed plant breeding programs will not just include new commercial cultivars but also cultivars for specialized productions linked to rural tourism.

Key words: introduction, germplasm, legal protection, rural tourism.

PLANT BREEDING – INTEGRATING AGRICULTURAL PRODUCTION AND FOOD QUALITY

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Summary

Plant breeding is the process of converting genetic resources into improved cultivars. In historical classifications, plant breeding has been categorized either on a technical level (selection, cross breeding, hybrid breeding, mutation breeding, backcross breeding) or on a biological level of propagating planting material (clone breeding, pure-line breeding, population breeding, hybrid breeding). Here, a new view of plant breeding is presented – plant breeding as an applied research discipline for integrating sciences/technologies with crop traits and market needs. Sciences and technologies are representing the toolbox of plant breeding comprising fields such as crop evolution research for securing genetic resources, breeding methods, selection techniques, handling of genetic variation or induction of mutations, physiology, genetics, genomics and proteomics of individual traits, genetic engineering, cellular techniques and related sciences. Crop traits and market needs are representing the breeding goals comprising various needs of farmers and agronomy (crop yield, resistances and other agronomic traits), harvest quality requirements of consumers and the food industry (nutritional quality, health characters, taste, food safety, processing quality, non-food traits) or the growing need for adaptation to global changes both with respect to environment and economy. Examples from soybean, wheat and other crops can illustrate how unique genetic resources are successfully converted into new cultivars with increased agronomic performance, enhanced nutritional, processing or health quality (seed protein content, isoflavones, carotenoids, beta-glucane) or improved food safety (lower cadmium, reduced allergenic potential, fusarium head blight resistance). Thus, plant breeding is constantly contributing to new opportunities for innovative product development by the food industry.

Key words: *genetic resources, plant breeding, soybean, wheat, food quality*

ANIMAL PRODUCTION

PRODUCTIVE PERFORMANCES AND EXTERIOR CHARACTERISTICS OF LAMBS IN ORGANIC PRODUCTION FEEDING DIFFERENT CEREALS

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Summary

Application of cereals in feeding sheep in organic farming is fairly represented. Given the significant variations in market supply and price of corn increasingly is being used in feeding animals barley and oats. The aim of this manuscript was to determine how oats and barley affects on the production properties and exterior characteristic of lambs in organic farming in the fattening stage. In the investigation was included 20 lambs Merinolandschaf breed. The lambs were aged 60 days, evenly divided by sex, healthy and in good condition. Feeding lambs was conducted with a mixture of grains (300g/day/animal) containing 50% corn in both groups and 50% oats or barley depending on the group. Lambs had alfalfa hay *ad libitum* and mineral supplement. The experiment lasted 40 days. Significantly ($P < 0.05$) higher average daily gain and body condition scores were determined in lambs that were fed a mixture 50% of barley compared to those fed with 50% of oats (162.07: 107.28, or 2.90 and 2.44), while the exterior characteristic and physical development indices showed no significant deviations. This gives a certain advantage barley in lambs feeding compared to oats in combination with corn, which would be confirmed in future studies using several types of cereals in the diet and a larger number of animals.

Key words: *lambs, performance, exterior, organic production, oats, barley*

DIFFERENT NUTRITIONAL STRATEGIES FOR REDUCING METHANE EMISSIONS FROM RUMINANTS: NATURAL FEED ADDITIVES AS ALTERNATIVE TO CHEMICALS

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Summary

According to the report Livestock's Long Shadow (FAO, 2006), globally, livestock production is responsible for 18% of greenhouse gas emissions. From those, 13% are from extensive livestock production systems (grazing cattle, sheep and goats) and 5% from intensive livestock production systems (pork, poultry and dairy). Livestock production generates a number of emissions to the air (methane, ammonia and nitrous oxide). Methane is a greenhouse gas with a global warming potential more than 23 times higher than carbon dioxide. Methane emissions from enteric fermentation depend on the feed quality and amount of feed ingested by the animal. Options to reduce methane emissions from enteric fermentation include improved animal productivity and feed management. In this review, current approaches towards mitigation of methane in ruminants farming are summarized. Different strategies based on the introduction of methane inhibitors, both biological and chemical, with the animal feed, to reduce the activity of the methanogenic microorganisms in the gut, are reviewed.

Key words: *methane emission, ruminant nutrition, additives*

BREEDING OF CARP FINGERLINGS IN RECIRCULATING SYSTEMS

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Summary

Taking into consideration high losses and long period required for carp breeding up to market size and weight, the research focused on assessment of possibilities of breeding carp larvae and fingerlings in recirculating system. Three-day larvae of the average individual weight of 1.3 mg·ind^{-1} were settled in three 150-liter tanks. Each thank contained 30 000 larvae. Water temperature, as an important factor for growing larvae and fingerlings, varied between 23-24°C throughout the breeding period, and concentration of dissolved oxygen varied from 4.7 to 8 mg·L^{-1}. Feeding of larvae started immediately after settling in with the nauplius larvae *Artemia salina*, which were decapsulated and prepared for feeding 1 day earlier. Afterwards, live feed was replaced with forage mixture. The daily amount of extra feed was given at 2-hour intervals. After the 31st farming day, mass of fingerlings bred in the recirculating system depended on feed type and varied from 855.3 to 1123 mg·ind^{-1}.

Key words: *carp, recirculating systems, larvae, fingerling*

APPEARANCE PARASITES TICKS AND THEIR SIGNIFICANCE AS VECTORS CAUSES DISEASES PEOPLE AND ANIMALS IN THE UNA - SANA CANTON

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Summary

Ticks are arthropods the order mites (*Acarina*). They parasitize during feeding on mammals, birds and reptiles. They are vectors and reservoirs of pathogenic viruses, bacteria and the other causes of epidemic the disease, and are important in veterinary and human medicine. Usually transmitted on the man *Lyme borreliosis* and on the dogs babesiosis. In 2010. monitored the occurrence of ticks in Una-Sana canton. There was intensive occurrence of hard of ticks-scrub ticks-*(Ixodidae)*. Forty-two people are registered with the bite of *Ixodes ricinus*, aged 2-74 years. They also registered 52 dogs illness from piroplazmoze. Climate change, temperature increase, changes in quantity of precipitation caused changes in the behavior of microorganisms with the appearance of of new mutations, changes in their the reservoir, as well as vectors which transmit illness, most commonly of ticks. In the past some decades we are faced with a progressive global warming caused by an excessive concentration of greenhouse gases in the atmosphere due to of the human activities. Global warming causes a wide the range consequences on human the health including the changes in the spread of tick-borne pathogens. Temporal and the spatial changes in temperature rainfall and humidity have a high probability of significant effect on the biology and ecology of tick-vectors, hosts on which ticks feed and the possibility of transmission disease pathogens. Ticks species appear to be in areas that are not their natural habitats, and bring with them disease and atypical for new areas.

Key words: *Ixodes ricinus, Vectors of pathogens, Unsko – sana canton, Climate change*

THE EFFECT OF LGB GENES ON QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF MILK CROATIAN POPULATION OF HOLSTEIN BREED

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Summary

Among whey proteins β-lactoglobulin is of particular importance. The gene (LGB) responsible for synthesis of β-lactoglobulin in *Bos taurus* is located on the eleventh chromosome genome. LGB is in two common variants, A and B polymorphic allelic variants, and several rare variants. The aim of this study was to determine the impact of LGB genotypes on milk production characteristics of the Croatian population Holstein breed. For the 112 cow in third lactation underwent genotyping for the LGB using RFLP-PCR method. Data on the qualitative and quantitative characteristics of milk are obtained from the HPA. There was a positive effect of AA genotype on milk yield and BB genotypes on fat content, while effect of genotype was not a significant on protein content. The results presented in this paper can be used in programs of selection and crossing of cattle in order to achieve efficient production of milk in terms of quantity and the useful substances in milk.

Key words: *cows, beta-lactoglobulin, milk production, milk characteristics*

COMPARISON OF NONLINEAR MODELS TO DESCRIBE GROWTH OF BROILER CHICKEN RAISED IN CONFINED OR SEMI CONFINED SYSTEMS

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Summary

Many nonlinear models have been used to describe growth of broilers based on data obtained in controlled housing and *ad libitum* feeding. Considerably less information is available on fitting the growth functions to data obtained from restricted growth studies. Therefore in a present study, two set of data were used to compare Gompertz, Von Bertalanffy and Logistic model in attempt to describe broiler growth raised in confined or semi confined systems. The models parameters (A, B and k) and different criteria of fitting goodness (coefficient of determination-R^2, absolute sum of squares-SS and standard deviation of residuals-Sy.x) were calculated using technical computing package GraphPad Prism, 1999. The Von Bertalanffy model showed the lowest SS and Sy.x and the highest R^2, and seems to be the best fit in both raising systems. Generally, according to goodness of fit criteria all models are more suitable in semi confined than in confined raising system. The parameter A was maximum in the Von Bertalanffy model and considerably less in Gompertz and Logistic model. The estimate of B was the smallest in the Von Bertalanffy while Logistic showed greater values. The growth rate (k) was ranged from 0.01451 to 0.0776 and showed the earlier maturity rate in Logistic model than other. Age and weight of broilers at inflection point were the highest in Von Bertalanffy model. As expected, maximal increnment at inflection point in all models was bigger in the confined system.

Key words: *Broiler growth, nonlinear models, confined vs.semiconfined*

QUALITY OF CORN SILAGE ON FARMS IN BOSNIA AND HERZEGOVINA

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Summary

The aim of this research paper was to determine the quality of corn silage on farms for milk production in Bosnia and Herzegovina. We analyzed samples of corn silage with 72 farms, which on average have more than 10 dairy cows in the herd.
Based on the results of analysis by experts from the Agricultural Institute from Federation of Bosnia and Herzegovina and the Agricultural Extension Service Agency Republic of Srpska to give recommendations for the feeding of dairy cows as well as recommendations on the preparation of corn silage and agro technical practice of corn silage.
The following quality parameters of corn silage were determined: pH value, dry matter, protein, fiber, mineral matter.
The results of the analyzed samples of corn silage showed a desirable pH value (3.99), low average protein content 6.08%, a high fiber content 31.38% and low content of mineral matter 2.36%.
Statistically, there are significant differences in the quality of silage in all of quality parameters.

Key words: *corn silage, protein, cellulose, dry matter, mineral matter*

INFLUENCE OF WELL-TIMED REVELATION AND TREATING DERMATITIS INTERDIGITALIS ON REDUCING THE NUMBER OF TREATED ANIMALS

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Summary

Dermatitis interdigitalis is extremely contagious disease of hoof multicausal etiology which very fast increase in a problem of whole herd. This disease meaningful affect on reducing milking and increasing producing costs due to therapy treatment.
During 2010 we have followed the research of incidence dermatitis interdigitalis at 7 PKB Corporation farms, as well as influence of well-timed revelation and treatment on reducing the number of treated animals. Reducing of frequency dermatitis interdigitalis has been achieved at 5 farms, by the well-timed health measures and regular hoof treatment have been conducted twice a year. The results at farms: at the farm 06 for 24.8%, at the farm 02 for 23%, at the farm 05 for 19.3%, at the farm 07 for 13.1% and at the farm 01 for 8.99%. Insufficient dedication to hygienic conditions and post therapeutic measures resulted on increasing the number of diseased animals at two farms. At the farm 03 for 36.6% and at the farm 04 for 3.98%.Measures to reduce the incidence of dermatitis interdigitalis are: better zoo hygiene conditions, well-timed revelation and adequate disease therapy by direct perpetrators, controlled livestock sale and better observation of each cattle.

Key words: *Dermatitis interdigitalis, hoof treatment*

CURRENT SITUATION AND PROSPECTS OF DAIRY SHEEP PRODUCTION IN ALBANIA

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Summary

There is a tradition over centuries for rising of small ruminants (sheep and goats) in Albania. It has been favored due to: i) geo climatic conditions; ii) large natural meadow areas (400 000 ha) and 1.2 million ha forestry ranges, which have been grazed from animals; iii) autochthonous genetic resources, which are very good adapted to environmental conditions. Although number of small ruminants has not recently increased, it is remarked a specialization of dairy purposed flocks in order to increase milk yield.

Today, milk production is based on the genetic potential of local breeds and the use of exotic breeds like Kios, Assaf, etc. and their crossbreeding. In addition to that, the improvement of management and feeding have influenced in the increase of productive and reproductive performance of flocks. South and South East Regions of Albania like Vlora, Korça, and Gjirokastra are most distinguished to small ruminant rearing.

Economic results show that milk production is prevalent if compared to meat production. In addition, there is no accurate evidence in relating to the profit difference between intensive and extensive production systems of small ruminants.

Key words: dairy flocks, local breeds

PRELIMINARY RESULTS ACHIVED FROM ALPINE GOAT BREED IN SMALL RUMINANT STATION –ALBANIA

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Summary

Small Ruminant Station (SBI) has played a key role for conservation, development and sustainable use of exotic breed nucleuses, in function of applying breeding policies for small ruminants in Albania. One of the breeding nucleuses of small ruminants is Alpine goat one. Alpine goat breed was imported, for first time, in 1989 from France. Number of heads imported was 18 (yearling kids). In addition, 66 kids (62 F and 4 M) were again imported from France in 1990s.
The Performance showed by Alpine goat breed in SBI during the years 2005-08 (n=50 heads) were shown. Lactation I : milk yield (kg) 241 ± 21.4, butterfat (%) 3.654 ± 0.018, CV(%) 3.34; protein(%) 3,217 ± 0.008, CV% 1.68; live weight at birth of kids 3.15±0,02 kg, CV(%) 3.9; live weight at weaning 14.12±0.13 kg, CV(%) 16.8; live weight at the age of 6 months 24.2±0.09 kg, CV(%) 18.2. Lactation II: milk yield (kg) 366 ± 25.7, live weight at birth of kids 3.16±0,02kg, CV(%) 4.1; live weight at weaning 15.02±0.12kg, CV(%) 15.4; live weight at the age of 6 months 24.3±0.11kg, CV(%) 12.2. Lactation III: milk yield (kg) 492 ± 35,3; live weight at birth of kids., 3.21±0.01 kg CV(%) 4.1; live weight at weaning 14.82±0.11kg, CV(%) 8.1; live weight at the age of 6 months 25.13±0.17kg, CV(%) 12.8. Reproductive performance: fertility (%) 95.8; prolificacy (%) 133.5; abortions (%) 3;

Key words: *alpine goat, milk, live weight*

GENETIC CHARACTERIZATION OF ISTRIAN CATTLE USING MICROSATELLITE MARKERS

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Summary

Istrian cattle are one of the three Croatian autochthonous cattle breeds, which was at the end of the twentieth century brought on the edge of survival. Genetic structure of 159 animals of Istrian cattle was estimated using nine microsatellites. The number of alleles per microsatellite locus was in the range from five to fourteen, with relatively high average number of alleles of 9.1. The mean observed heterozygosity was 0.648 while mean expected heterozygosity was 0.729. These parameters indicate that Istrian cattle preserved a considerable amount of genetic variability, although heterozygote deficit of 11.5% was established. This deficit is mainly result of inbreeding and/or population subdivision. Serious demographic bottleneck has not occurred in this breed. Factorial correspondence showed genetic homogeneity in the population of Istrian cattle. Our results suggest usefulness of molecular information in order to preserve genetic variability of Istrian cattle.

Key words: *Istrian cattle, microsatellite markers, genetic variability*

THE POPULATION ABUNDANCE AND A REPRODUCTIVE GROWTH OF ROE DEER (*Capreolus capreolus* Linnaeus 1758.) AT THE ECONOMIC-SPORTING HUNTING GROUND "ŠATOR" BOSANSKO GRAHOVO

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Summary

Field researches of the population abundance and the reproductive growth of the roe deer *Capreolus capreolus* Linnaeus, 1758, at the economic – sporting hunting ground "Šator" Bosansko Grahovo were taken from January until December of the 2009. For the assessment of population abundance and the reproductive growth of roe deer two methods have been used: method of the relative number and method of the biological activity of game. The total estimated number of roe deer at the hunting ground "Šator" was 58. Absolute reproductive growth of roe deer at the research area was 8 or 53.33 % of the theoretical reproductive growth (60.00%). It's habitat at this hunting ground is narrowed and limited to the northern part of hunting ground, respectively Tičevo polje and border of Preodački prostor. Hunting – productive area for the roe deer at this hunting ground is 2.400 ha. Listed areas (Tičevo polje and the border of Preodački prostor) have ideal conditions for living of this attractive game species, for development of hunting tourism, an education of game species admirers.

Key words: *roe deer*, *population*, *reproduction*, *habitat*

EFFECT OF REST PERIOD IN LAIRAGE ON MEAT QUALITY OF SIMMENTAL BULLS AND HAIFERS

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Summary

In recent years a major problem in the beef chain production, which can lead to economic losses has been a frequent occurrence of dark, firm, dry beef. Consumers prefer a light pink to bright red colour and they will strongly reject dark coloured beef, believing that it is from old or sick cattle or that it is badly contaminated. The aim of this research was to examine the effect of rest period in lairage on the quality of Simmental bulls and heifers. The study was conducted on 400 cattle (200 bulls and 200 heifers), aged from 13 to 16 months. The cattle were divided in two groups; the first group rested for 18 hours in lairage prior to slaughter, while the second group (unrested) was taken to slaughterline immediately after being unloaded. Quality indicators pH, EC and meat colour values were measured 24 hours post-mortem. Heifers had significantly lower muscle pH_{24}, EC value and higher L* and b* value, while bulls had significantly higher parametars pH_{24} and EC value ($P<0.001$). Bulls rested in lairage had significantly poorer pH_{24}, L*, b* and h* value compared with unrested bulls, while rested heifers had significantly better pH_{24}, L* and h* value, compared with unrested heifers ($P<0.05$). Our results indicate that the rest period in heifers could have a beneficial effect on beef quality, while in bulls rest period is not recommended.

Key words: *beef, rest period, quality indicators, colour*

CARCASS CHARACTERISTICS OF NAKED NECK MALE AND FEMALE CHICKENS FATTENED IN SEMI-INTENSIVE SYSTEM

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Summary

This study was conducted on male and female naked neck chicks fattened in semi – intensive system until 84 days of age in order to produce organic meat, aligned with the methods of organic poultry production in EU. Until 28 days of age, chicks were kept in a litter housing system (about 8 birds/m^2), following which they were provided a free range paddock at 4 m^2/bird. The following parameters were evaluated in both sexes of broilers which were 84 days old: body weight at slaughter, carcass weight, yield of breast, thighs and drumsticks, wings, pelvis, backs, head, neck, legs (feet), abdominal fat and giblets (gizzard, heart, liver).
At the end of fattening period male broilers compared to female broilers had statistically significantly higer ($P<0.001$) body weigh at slaughter (1686.86 g – 1487.29 g) and carcass weight, and female broilers had higher relative yield of carcasses (conventional processing, ready to roast, ready to grill), and the differences obtained were statistically significant ($P<0.05$). Further more, female broilers had higher relative yield of breasts (25.40% - 25.31%) and wings (14.27% - 13.74%) and also smaller yield of drumsticks and thigs (34.21 – 34.38%), and back and pelvis (26.11 – 26.56%). The differences obtained were not statistically significant ($P>0.05$). Broiler sex had not statistically significant effect on relative yield of neck and abdominal fat but broiler sex had statistically significant effect ($P<0.001$; $P<0.05$) on yield of head, legs (feet) and giblets.

Key words: *naked neck, semi-intensive system, sex, carcass quality, organic production.*

PARAMETERS OF SLAUGHTERING VALUES OF LAMBS FED WITH DIFFERENT TYPES OF FOOD IN THE SLAUGHTERHOUSE „M.S. ALEM"- BOSANSKA KRUPA

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Summary

The study of parameters for slaughtering values of lambs fed with different types of food in the „M.S. ALEM" slaughterhouse was conducted on 30 lambs (13 male and 17 female lambs) which were divided into two groups. The first group consisted of 19 winter-breeding lambs (10 male and 9 female lambs) that were weaned off at the age of 60 - 90 days. These lambs were fed with mother's milk as well as with certain amount of concentrate and hay. The second group consisted of 11 summer-breeding lambs (3 male and 8 female lambs), which were after weaning off fed mainly on pastures without addition of concentrates. Lambs that were studied descend from pramenka (type of sheep) and hybrids of pramenka with other highbred stock. Slaughter of lambs was done in slaughterhouse, and the following parameters of slaughtering values were observed and expressed in the weight of: blood, lambskin, horns, forelegs, hind legs, heart, lungs, liver, milt, digestive tract with contents and mesenteric fat. An average weight of lambs in the first group before slaughtering was 26.47 kg. The weight of warm carcass was 12.64 kg and 12.27 kg when it got cold. The relation between the usable amount of meat and the complete mass of lamb was 46.44%, and the calculated cooling abatement was in the average of 0.36 kg or 3.09%. Lambs of second group weighed 25.36 kg before slaughter. Warm carcass weighed 13.01 kg and 12.71 kg when it got cold. The calculated relation between the usable amount of meat and of the total mass of lamb was 50.40%, while the cooling abatement was in the average of 0.30 kg or 2.40%.

Key words: *lambs, nutrition, slaughter values, randman*

FISHERY IN HERZEGOVINA-NERETVIAN CANTON

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Summary

Although Bosnia and Herzegovina is country with long tradition of fish production whose beginnings are dating long from Austro-Hungarian Monarchy, production and consumption of fish is still in a very low level. In this paper it is described production of fish in Herzegovina-Neretvian Canton. Data about fish and juvenile fish species producers are elaborated as well as review of situation in segment of sport-recreational fishing. Herzegovina-Neretvian Canton is leading canton in fish production with 50% of total production in Federation of BiH, and over 30% of total production in BiH. Total fish production in BiH is significantly in increase for the last few years: in 2009 it reached 7.658 tons, from which 46% belongs to trout, 50% to carps and 4% to see production. After war production was faced to difficulties, but since year 2000 it is in constant increase and will increase in future with new implemented technologies. Transfer to competitive economy in Bosnia-Herzegovina agriculture (including fish-aquaculture production) has influenced decrease of production, employment reduction, technological underdevelopment, indebtedness, deterioration in trade balance and illiquidity. Strategic priorities must be quickly defined and redefined in scope of reorganization and reallocation of existing water recourses by adapting aquaculture and fishery.
Grant system should include all family economies and fish processing should be increased to higher level in installed capacities. For purpose of satisfying basic assumptions mentioned in this paper it is necessary to educate existing structure of employees in aquaculture, sport's fishing and to employ highly competent staff from fresh water fishery.

Key words: *fishery, aquaculture, trout, production, technology*

KINETICS OF GROWTH OF NEW ZEALAND WHITE RABBITS SUBJECTED TO DIFFERENT FEEDING REGIMES

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Summary

The main aim of this study was to examine the effect of different feeding regimes on growth and development of young New Zealand white rabbits, with special emphasis on diet supplemented with vitamins and minerals. This study was based on experimental methods, which were not used in previous studies. The research and study of the feeding methods is usually performed on commercial farms. It has been suggested that such studies should be conducted in specially equipped premises under controlled conditions. This study took into account all the parameters that could have a positive or negative impact on the results. Rabbits were bred in a specially equipped room, under controlled conditions in accordance with EU standards. Also, special attention was paid to the categories or groups of rabbits which were subjected to the testing. The rabbits were divided into four groups, two of which represented experimental groups that were supplemented with vitamins and minerals. The intention of the study was to establish a detailed and comprehensive program that monitors influence of diet (with or without the addition of vitamins and minerals) on the growth and development. Significant differences in the kinetics of growth between the experimental the control groups were observed. Rabbits supplemented with vitamins and minerals had a higher growth rate and their development was much faster compared to the control group. As the role of vitamins and minerals is generally well known and widely researched, these results were expected.

Key words: rabbits, vitamins and minerals, kinetics of growth, EU standards

IMPORTANCE OF SOMATIC CELLS IN MILK PRODUCTION

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Summary

The quality of the milk is determined by the chemical composition, physical properties and hygiene. The main indicator of hygienic quality of milk is the total number of microorganisms and somatic cells. The increase in the number of somatic cells is_affected by many factors, such as a housing, herd size, breed, milking, udder disease.
In a study 45 samples of milk from the Holstein breed of cattle farm „Butmir“ from Sarajevo was analyzed. The analysis was done at the Central Laboratory for Milk Control Križevci, Croatia. Using the reference method Fluoro - opto-electronic - BS EN ISO 13366-2:2007. It was found 38 samples belong to the E-Class, 3 samples in class I, 2 in second class and 2 in class III. According to regulations in the European Union adopted in 1995, raw milk must not contain more than 400,000 somatic cells / ml. Federation Government in BIH adopted the „Regulation on the quality of fresh raw milk and the pricing of the fresh raw milk“ where the sorting is done according to the number of milk somatic cells and microorganisms.

Key words: *production milk, somatic cell*

PRODUCTIVITY OF HENS AND EGG QUALITY IN ORGANIC AND CONVENTIONAL HOUSING SYSTEM

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Summary

The research was conducted with two groups of hrvatica (dudica) chicken indigenous breed layers. A control group of layers was kept in the conventional housing system (deep litter), while experimental group was kept in the organic system. Layers from the organic system, compared to conventional system, laid fewer eggs (195:210), they consumed more feed on daily basis (140 g : 125 g), and more feed per kilogram of egg weight (4.16 kg : 3.62 kg). Eggs from organic layers, compared to those from the conventional system, had a significantly ($p<0.01$) higher weight (63.0 g : 60.0 g), thicker shell (0.35 mm : 0.33 mm) and more intensive yolk colour (12.00 : 10.75 Roshe). Considering egg yolk index, egg weight index, pH of yolk, pH of white, and Haugh units, no-significant differences ($p>0.05$) were determined between the organic and the conventional system of housing hens. Profitability of egg production in the organic system will mostly depend, on market evaluation of the production.

Key words: *organic system, conventional system, hens, egg quality*

SLAUGHTER QUALITY OF CHICKEN FROM ORGANIC AND CONVENTIONAL HOUSING SYSTEM

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Summary

The research was conducted on carcasses and meat of 16 chicken birds of the Croatian indigenous breed hrvatica (dudica) from organic and conventional fattening (deep litter). Chickens from both of the analyzed groups were fattened until the age of 98 days. The chickens from the organic group were fattened in accordance with the Regulations on organic production of animal products (Official Gazette 13/02). The average finishing live body weight of the chickens from organic fattening was 0.765 kg, and from conventional fattening it was 0.890 kg. The average slaughter weight mass was 0.530 kg and 0.590 kg respectively. Carcasses from organic fattening, compared to those from conventional fattening, had a significantly ($p<0.05$) higher share of breast (18.52% : 17.00%). Considering the share of drumstick (12.62% : 12.80%) and thigh (12.46% : 13.18%) no significant differences were found ($p>0.05$) between the analyzed groups. Chicken meat from organic system, compared to those from conventional system, had a significantly ($p<0.05$) better water-holding capacity (4.30 cm^2 : 5.15 cm^2), a very significantly ($p<0.01$) lower L* for colour (62.00 : 63.90), very significantly ($p<0.01$) higher a* and b* values (12.00 : 9.29 and 20.00 : 17.00) and a very significantly ($p<0.01$) better consistency (2.20 cm^2 : 2.50 cm^2). In terms of pH_1 value (6.30 : 6.25) and pH_2 value (5.80 : 5.75) no significant differences were found ($p>0.05$) between the analysed groups. Chicken meat from organic system, compared to the one from conventional system, had a very significantly ($p<0.01$) higher crude protein content (24.30% : 23.25%), as well as a very significantly ($p<0.01$) lower fat content (0.75% : 1.55%) and ashes content (1.15% : 1.20%).

Key words: *slaughter quality of chicken, organic system, conventional system*

EFFICACY OF ORGANIC ACIDS IN BROILER

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Summary

Intensive production of broilers has constant growth in recent years. Genetics, associated with nutrition, made it possible high production potential of broilers. In order to achieve high productivity results using the various additives to diets of broiler chickens. Since 2006 the EU banned the use of antibiotics as growth promoters in diets for feeding animals used for human consumption. One of the possible replacement of antibiotics are organic acids. Acid used as a supplement in feeding poultry. They have the role of optimizing the activity of enzymes digestion, relieving the metabolism and thus improve the health, utilization of protein and amino acids, and improved availability of minerals and. trace elements. The study was conducted on three groups of broiler Coob. The control group (C) was fed with feed mixtures without added organic acids. Experimental group G1 is given a combination of formic, propionic, lactic, citric and sorbic acids concentration of 0.4% in the feed mixture, while the experimental group G2 had the concentration 0.8 % of same combination of organic acids. Retrospectively, health, consumption, daily gain and feed consumption per kilogram of gain from the second week until the end of fattening. Statistically significant difference between groups was not observed.

Key words: *broiler, breeding, organic acids, weight gain, feed conversion*

GROWTH AND CARCASS PERFORMANCE OF CALVES BORN FROM HOLSTEIN COWS SIRED BY HOLSTEIN, CHAROLAIS, SIMENTAL AND ABERDEEN ANGUS BULLS

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Summary

Study was conducted from 2007 until 2009s. A total of 32 calves (n= 8 heads of each group) was included in experiment. The calves were randomly chosen and allocated in the treatments. The aim of this study was to evaluate the effect of crossbreeding beef breeds on Holstein cow in F_1 Performance. The resulting data were statistically processed using JMP SAS 2008 package. The analysis comprised purebred Holstein bull calves (H) and crossbred bull calves born from crossings: (CH♂ x H♀); (S ♂x H♀); (AA♂ x H♀). Body weights at birth, weaning and final weight were measured. In addition, daily gains from birth to weaning and post weaning as well as the post-slaughter evaluation were carried out. Weight at slaughter, carcass weight (hot and cool) and dressing percentage were evaluated. The CH × H and S x H crossbreds reached significantly higher body weights at birth and weaning, and weights at finishing, as well as significantly higher daily gains ($P<0.01$, $P < 0.05$;). The CH × H and S x H crossbreds were characterized by the heaviest carcasses ($P<0.05$). The CH x H and S x H crossbreds had the highest dressing percentage ($P<0.05$; $P<0.01$), whereas pure bred Holstein bull calves had the lowest one ($P<0.05$). AA x H crossbred bull calves had the lowest body weights at birth ($P<0.05$).

Key words: crossbreds, body weight, daily gains

POLYMORPHISM OF PRP EXON 3 GENE IN BOSNIAN AUTOHTONIOUS SHEEP BREEDS PRAMENKA

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Summary

Transmissible Spongiform Encephalopathy's (TSE) are the group of fatal disease, which is known for more than 100 years. They are contagious inside the species and between different species. They are caused by prions, protein particles, and 250 amino acids long. The most famous TSE in sheep population is scrapie which is a fatal, degenerative disease that affects the nervous systems of sheep and goats. Genetic predisposition for disease was determined and defined by prion protein gene polymorphism. Main task of this work is estimate PrP gene polymorphism in sheep population of Bosnia and Herzegovina (privorski strain). On the basis of result genetic risk would be estimated, trough definition of different genotypes presented in population. This would be helpful for increasing selection with excluding of undesired genotypes, preventing and decreasing of frequency of disease. This work is based on blood samples taking from sheep population in Bosnia and Herzegovina, DNA extraction from fool blood, PCR amplification, sequencing and defining of genotypes. Part of PrP gene, exon 3 was sequenced for 53 sheep belonging to Bosnian autochthonous breed (pramenka). Analyses has shown that alleles ARQ, ARR and AHQ were predominant with frequencies 45.28%, 36.79% and 16.98% respectively, while VRQ 0.94% allele were rare. Synonymous mutations on codons 231 (R) and codon 237 (L) has shown.
The polymorphism of PrP gene in Bosnian sheep breed pramenka was not critical with respect to scrapie susceptibility and with some efforts number of "favorable" genotypes can be increased.

Key words: *Scrapie, Sheep, PrP, Prion*

PLANT PRODUCTION

ANALYSIS OF THE PRESENCE OF AUCHTHONOUS, USEFUL AND ORNAMENTAL PLANTS IN THE AMBIENCE OF HISTORICAL CITY OF PRUSAC

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Summary

Cultivation of useful and ornamental plants in Bosnia and Herzegovina has its peculiarities: dating and the place of origin. Historic city of Prusac, called "the bead of white pearl" by Evliya Çelebi in his travels from the XVII century, is a place of various monuments and legends, unique for its natural beauty. During the research of organization and structure of individual family holdings in the old part of town - Čaršija and areas Srt, Tepedžik and Musala, the presence of autochthonous, useful and ornamental plants, and their cultivation and use were evaluated. The analysis of the organization of the tenements gave an insight into the specificity of the garden heritage and potential capacities in the preservation of traditional plant varieties, that appear as solitary trees and shrubs in front yards and backyards, or as a part of a group of ornamental and useful plants, in front gardens of residential buildings, that are separated from the main road in the neighborhood by the wooden gate.
The evaluation of the diversity of autochthonous plants of historic city of Prusac, made in this study represents a modest contribution to the overall efforts invested in preserving the garden heritage in Bosnia and Herzegovina, and refers to the importance of traditional and ambiance values and conservation of indigenous fruit trees and cultivated plants, that quietly disappear in the last few decades.

Key words: *Prusac, autochthonous plants, growing*

PROGRESS IN CULTIVATION OF OREGANO IN TURKEY

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Summary

Turkey has three phytogeographic regions rich in plant diversity: Mediterranean, Irano-Turanian and Euro-Siberian. *Origanum* species, belongs to Lamiaceae family, is mostly distributed around Mediterranean basin of Turkish flora. And Turkey is a leading supplier of oregano herbs all around the world. Initial researches on oregano were started in Ege University, Faculty of Agriculture, Department of Field Crops in Turkey early seventies of last century. Determination of the main principles for cultivation of oregano and breeding for higher yield and essential oil content were the main motivations for the first studies. For these purposes, a large-scale project with governmental and commercial organizations were started to conduct in order to develop new cultivars by using clone selection method in 1991. Natural flora of Antalya, Izmir and Muğla provinces were the source of collected seeds of oregano. The initial population size of the breeding programme was established with 1964 individual plants. As a result of these long-term studies on *Origanum onites* L., two new cultivars, "Ceylan 2002" and "Tayşi 2002", were registered. Finally noticeable decrease in collection of oregano herbs from natural flora of Turkey and increase in cultivation has been observed in last decades.

Key words: *oregano, Origanum onites L., Turkey*

RECONSTRUCTION AS A METHOD OF RENEWAL AND DEVELOPMENT OF THE BOTANICAL GARDEN OF THE NATIONAL MUSEUM OF BOSNIA AND HERZEGOVINA

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Summary

The National Museum of Bosnia and Herzegovina is the oldest cultural and scientific institution in Bosnia and Herzegovina. It is located in Italian Renaissance style buildings in the center of Sarajevo, on an area of 24070 m², and it contains the Botanical Garden, which has an area of 14270 m², and represents a valuable monument of cultural heritage. With the urban characteristic of the National Museum of Bosnia and Herzegovina in Sarajevo in mind: its location, style, tradition and the publicity, it is necessary to adjust it to the new concepts, without changing the established environmental and biological principles. By incorporating renaissance elements in a particular parts of the Garden, in the ratio 14270.00 m²: 1110.53 m² (landscape style : classic style), the aesthetical and decorative functions of the Garden would fully meet the urban characteristic of the Austro-Hungarian period building, and fulfill the National Museum's role as a public institution of national importance. The aim of this paper is to propose the reconstruction as a method of renewal of the park architecture, and to indicate the possibility of development process in the Botanical Garden of the National Museum of Bosnia and Herzegovina.

Key words: *reconstruction, renewal, Botanical Garden, National Museum of Bosnia and Herzegovina*

SHARE OF FRUITING BRANCHES TYPES IN SOME PEAR CULTIVARS

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Summary

Results of examination of the percentage share of individual bearing branches in five varieties of pears (Williams, the June beauty, a Conference, Santa Maria and General LeClerc) in year 2009 showed the highest average representation are spur branches 63%, then long slender fruiting branches 22.6%, while least represented 14.4% are fruiting-branches length 10 cm. In 2010 the highest average representation have spur branches with 68.5%, then fruiting-branches length 10cm with 17.7% and the lowest average representation have long slender fruiting branches 13.8%. In both study years the most common were short fruiting branches. The results indicate significant differences in representation of individual bearing branches between the tested cultivars.

Key words: *fruiting branches, pear, cultivar*

INVESTIGATION OF THE ECONOMIC VALUE OF SOME CULTIVARS OF FLUE-CURED TOBACCO IN ENVIRONMENTAL CONDITIONS OF CROATIA

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Summary

Growing of flue-cured tobacco in Croatia has a long tradition, and production is mainly located in the Podravina and Slavonia regions. Many tobacco cultivars were grown until now, and the primary goal in choosing the varieties was to select the one which will deliver the best results in the appropriate conditions. Today, due to intensive breeding work in developing new varieties of tobacco, there is a large number of cultivars that can meet the demands of growers and consumers. In order to investigate the properties of some new tobacco cultivars in the Croatian growing areas the experiment with six tobacco cultivars of different genetic and geographic provenience at Slatina region was performed. The two tested varieties are bred in Croatia, three of them originate from Brazil and one from the United States. The experiment lasted two years (2009-2010), and was set by a random block design in four replications. Each plot had the irrigated and non-irrigated treatment. The growth and development of plants as well as resistance to prevalent diseases were tested during the growing season. The yield, the quality, expressed through the average purchasing price, and the total income per hectare were determined after curing and qualitative assessment. The chemical composition of tobacco was also tested. The research has shown that there were significant differences in economic characteristics among the tested cultivars, and irrigation has proven to be very useful cultural practice in increase of productivity, especially in years with drought stress during growth and development of tobacco.

Key words: *Flue-cured tobacco, cultivar, yield, quality, irrigation*

MANAGEMENT OF AGRICULTURAL LAND

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Summary

Land area or land (FAO 1975), covers an area that includes: soil, climate, hydrology, geology, vegetation to an extent that affects the ability to use it, and the results of human activities and socio-economic parameters.
Management of agricultural land is regulated by the Law on Agricultural Land (Sl.n., 52/09), Law on Agriculture (Sl.n.,88/07), Medium-Term Development Strategy of the agricultural sector in the Federation 2006-2011 (Sl.n.,23/06) as well as other laws and regulations. Land, in different ways, was treated with several laws that partially treat the sustainable management of this resource. Often these laws are not in agreement with each other, or are not compatible.
Law on Agricultural Land defines the priority commitments, which are reflected in land policy measures that include: development strategy and program management of agricultural land in the FBiH, Project of Multipurpose evaluation of agricultural land, land use, transport and protection of agricultural land, agricultural land management, monitoring, land information system (LIS FBiH as a part of AIS) and other measures.
Guidelines and principles for the protection and rational use of agricultural land resulting from the Law on Agricultural Land and other laws and regulations. In this respect the basic principles of protection and rational use of agricultural land are: the principle of prevention, to prevent further degradation of agricultural land, the principle of rehabilitation, reclamation and remediation of areas that have been contaminated or damaged, the principle of sustainable use, intensification of production and rural development, the principle of management, proper management and protection of agricultural land.

Key words: *agricultural land, prevention, protection, rational use, sustainable use, remediation, reclamation*

THE EFFECT OF VARIOUS DOSES OF CHICKEN MANURE AND MINERAL FERTILIZERS ON THE YIELD OF CORN AND SOYBEAN

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Summary

The aim of this study was to determine the impact of different doses of chicken manure from farm "Posavina koka" LLC Orasje on the yield of field crops in the area of Posavina in comparison with mineral manures.
The experiment was conducted with two cultures followed, corn and soybeans where he set up a randomized trial in five fertilizing with control plots. Fertilization with chicken manure had 3 variants or 3 different doses of manure application of 3, 6 and 9 tones/ha, a variant of the N: P: K manure formulation of 10:20:30 at the rate of 600 kg/ha and a variant in combination 6 tons/ha manure + 600 kg/ha, 19% of super phosphate.
Demonstrative experiments with field crops in the area of Orasje, where they applied different doses of chicken manures indicated the following conclusions:
- Trials are set with the aim of proving the feasibility of using chicken manures in crop production.
- Chicken manure has positive influence on the content of protein and cellulose in corn and protein content and fat content of soybean.
- Apply chicken manure in crop production, had its justification for planting corn in the amount of 3-6 t/ha, while the soybean harvest did not give satisfactory results as was the case with corn.
The actual effects of fertilization will be more seen only after 3 or 5, years because it chicken manure will completely broken down in this period, so that the continuation of this research is planned in the future.

Key words: *fertilization, chicken manure, quantity, yield, profit*

ANTIOXIDATIVE ACTIVITY OF *IN VITRO* CULTIVATED BROCCOLI (*Brassica oleracea* L. Var. *Italica* Plenk.)

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Summary

We have established a rapid protocol for *in vitro* germination and cultivation of *Brassica oleracea* var *italica*. Three, ten, twenty and thirty days old seedlings, cultivated on three different Murashige-Skoog (MS) media, and two types of callus were used for extraction. Fifteen ethanol plant extracts were tested for their antioxidative potential. Antioxidative activity of the herbal extracts were determined using 2,2'-diphenyl-1-picrylhydrazyl ($DPPH^{\bullet}$) radical method. Extracts of three days old seedling demonstrated the highest antioxidative potential. The efficient concentration (IC_{50}) measured by DPPH method was higher than IC_{50} of two positive probes (thymol 6.06 $mgml^{-1}$ and thymokinon 6.15 $mgml^{-1}$). On the other hand, extract of broccoli seedlings cultivated on basal MS medium have shown prooxidative properties that can be contribute to prooxidative properties of some unknown component in the presence of free transition metal ions.

Key words: *broccoli, in vitro culture, plant growth regulators, ethanol extracts, antioxidative activity*

MONACO, NEW VARIETY OF POTATO IN BOSNIA AND HERZEGOVINA

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Summary

In three-year experiments (2008, 2009. and for 2010) carried out in two localities: Butmir (elevation around 500 m) and Glamoč (elevation around 900 m) the Dutch early potato variety Monaco was analyzed. Variety Adora was used as a standard. The subject of this study was the yield and quality of tubers. During the vegetation, the other characteristics of the cultivars were also observed. Experiments were carried out according to a randomized block system with four repetitions. Data on tuber yield were analyzed using variance analysis for three factorial experiments, for the significance of 5% and 1%.
The soils at both sites were with low humus content, acidic, and poorly supplied with physiologically active phosphorus. The archived average yield of tubers in the analyzed period of three years for the variety Monaco in Glamoč was 1.55 t/ha or 6% higher than in Butmir. Archived average yield at both sites was 27.05 t/ha, which is 4.96 t/ha or 22% more than yield of the used standard (Adora). In year 2009 yield was 28.14 t/ha and was for 5.693 t/ha or 25% higher compared to 2008. In 2010 it was 23.13 t/ha and was higher by 0.68 t/ha or 3%, compared to year 2008, and in 2009 in relation to 2010th it was higher for 5.01 t / ha or 21%. In third year of experiment, the analysis of dry matter and starch content in tubers was conducted at the locality Butmir. Variety Monaco dry matter and starch content was 22.80% and 17.60% and variety Adora 22.00% and 16.80%.

Key words: *potato varieties, yield, quality, location, year.*

EFFECT OF BUD LOAD ON YIELD OF THE TABLE VARIETY GRAPE VICTORIA

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Summary

Environmental conditions Mostar vineyards allow the successful cultivation of table grape varieties. The paper study the influence of different bud load levels (19, 24, 28 and 33 buds per vine) on yield of the introduced table grape variety Victoria under given environmental conditions. Based on test results can be concluded that this table cultivar under the ecological conditions of the Mostar vineyards showed high and stable yield. The average two-year percentage buds not burst per vine totaled 27.5%, number of developed shoots per vine was 18.6, and the percentage of developed shoots was 72.5%, while the number of shoots with inflorescences was 15.9. Fertility coefficient of cv. Victoria was 1.26, the number of bunches per vine totaled 22.9, while grape weight per vine totaled 11.3 kg.

Key words: *table variety, cv.Victoria, bud load, yield*

ANALYSIS OF MAIN SOURCES OF PHENOTYPIC VARIABILTY IN APPLE CULTIVARS CURRENTLY INTRODUCED TO B&H

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Summary

Field trials that deal with introduction of new cultivars to a certain region often include analyses of large number of traits on numerous subjects (genotypes). Using standard, univariate statistical approaches (ANOVA and *post hoc* tests) on data generated from such trials, rarely provides a comprehensive insight in the structure of the examined cultivars. In recent times, use of multivariate statistic methods has grown much more common in the analyses of data collected from agronomic field trials. However, some of the multivariate methods that offer most insight often lack statistic certainty obtained through testing of the *P* value. In previous study on 23 apple cultivars, currently being introduced to Bosnia and Herzegovina, six main sources of phenotypic variability (fruit weight, fruit width, width of stalk cavity, surface of the leaf, length of the stalk, length of the shoots) were identified using principal component analyses. The main goals of this study were following: (*1*) to compare 23 apple cultivars, currently being introduced to B&H, based on main sources of phenotypic variability, using both univariate (ANOVA and Tukey tests) and multivariate (PCA) statistical approaches; (*2*) to provide a recommendation for farmers, which of the analyzed apple cultivars have the optimal values for all the observed traits. The results of the study indicate that conclusions based on the use of univariate statistical methods were in fact more subjective than the ones based on principal component analyses, even though the latter lacks statistical probability tests. Seven apple cultivars ('Archarm', 'Golden orange', 'Jonagold decosta', 'Golden reinders', 'Breaburn', 'Gold star' and 'Angold') have been identified to hold optimal values for all the analyzed traits, based on multivariate analysis.

Key words: *apple cultivars, PCA, phenotypic variability, univariate statistics*

COMPARISON OF FOUR CABERNET SAUVIGNON CLONAL SELECTIONS FROM SKOPJE'S VINEYARD REGION, R. MACEDONIA

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Summary

Some of the agrobiological and technological characteristics of four Cabernet Sauvignon clonal selections (15, 337, 341, VCR5) were cultivated in Skopje's vineyard region, R. Macedonia during the period from 2005 to 2007. Certificated seedling material is introduced in 1999/2000 from Italy and France and the seedling was taken from examination- productivity department of viniculture and viticulture at the Institute of Agriculture.
The aim of the research was parallel comparison examination of the agrobiological and technological characteristics of the four Cabernet Sauvignon clonal selections (15, 337, 341, VCR5) cultivated in same agroecological conditions and application of optimal agrotechnical and ampelotechnical measures.
The result is different values of the examined characteristics because of the selection specification and the ecological conditions during the years of examination.
During the years of examination, yield is most stabile at Cabernet Sauvignon clone 15 with a variable coefficient of 10.4, and the biggest variation of 23.15 is noticed at Cabernet Sauvignon VCR 15. Considering the chemical composition of the must, more significant variation is present at the sugar content at clone 15, and the content of all acids at all clones is with insignificant variations. With most average degustation grade of 18.7 points is Cabernet Sauvignon clone 341.

Key words: *clonal Cabernet Sauvignon, yield, wine, degustation grade*

CHEMICAL PROPERTIES OF DANDELION POPULATION FROM KRIŽEVCI AND RIJEKA AREA

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Summary

Dandelion (*Taraxacum officinale* L.) is a meadow plant that grows and blooms from early spring to late autumn. The whole plant is edible and medicinal (rich in vitamin C and minerals such as potassium, iron, sodium and phosphorus, as well as essential oils and fatty acids), and therefore it is often collected from natural habitats. Young leaves are picked before the dandelion begins to flourish, and are used to prepare salads. The flowers are used for honey production, while the roots are removed in the autumn, and due to a high inulin content they are used as a substitute for coffee, and have a good effect on intestinal peristalsis. Since nutritional value of plants depends on agroclimatic conditions in which they grow and on the amount of available nutrients in the soil, we wanted to determine whether these factors affect the chemical composition of dandelion leaves.
Samples of dandelion were taken at four Križevci locations and at two locations in Rijeka, and agrochemical soil properties and concentrations of nutrients in plants were established. The descriptive statistical parameters show that the chemical properties of soil are variable. The most variable feature is physiologically available phosphorus (CV = 159.92%), while the least variable is soil reaction (CV = 5.91%). Concentrations of biogenic elements (N, P and K) in the leaves, as well as vitamin C have a low coefficient of variability. Correlations between tested chemical properties of dandelion and soil properties show that the nitrogen and phosphorus concentration is in a significantly strong ($P<0.05$) negative correlation with nitrogen in the soil, and positive with phosphorus. Vitamin C concentration indicates negative correlation with phosphorus concentration.

Key words: *dandelion (Taraxacum officinale L.), chemical composition, soil, correlations*

DRY MATTER PARTITIONING IN AUTOCHTHON POTATO CULTIVAR POLURNAKA DEPENDING ON DIFFERENT NITROGEN FERTILIZATION MANAGEMENT

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Summary

Cultivar type, seasonal changes and crop managements are factors who determine the growth and dry matter (DM) production of a potato crop *(Solanum tuberosum L.)*. The rate and duration of vegetative growth largely determinates a final tuber yield. The objective of this experiment was to evaluate dry matter partitioning in different part (leaf, steam, root and tuber) of autochthon potato cultivar Poluranka. In this survey dry matter allocation in potato plant is highly affected by applications of different nitrogen fertilization treatments (0, 50, 100, 150 i 200 kg N ha^{-1}). Observations include measurements of dry matter during different growth stages. The distribution of dry matter in potato crop was determined by analyzing data from experiments in which were plants parts sampled periodically during the early stages of their growth. Increscent of nitrogen rates significantly decrease the dry matter content in plant parts which makes potato cultivar Poluranka highly responsive to nitrogen fertilization.

Key words: dry matter partitioning, nitrogen fertilization, autochthon potato cultivar Poluranka

HYDROPONIC CUCUMBER PRODUCTION IN PERLITE MEDIA BY EBB AND FLOW SYSTEM

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Summary

The major problems present in the cultivation of vegetables in greenhouses are a variety of pests and residuals of the applied pesticides and fertilizers which accumulate in the soil as a result of the intensive production.
Efficient way of solving these problems is the cultivation of vegetable crops to different systems of hydroponic production, among which the “ebb and flow” system makes it especially attractive. The main advantage of this system is that plants do not have any contact with the ground, and the residual from production process is not discharged into the external environment but it’s recycled, thus making major contributions to environmental protection.
The aim of this study within "ebb and flow" system was to examine the influence of using different nutrient solutions, and different planting densities on yield and morphometric characteristics of fruits of cucumber (*Cucumis sativus* L., cv. Edona F_1). In order to gain a fuller insight into the advantages and disadvantages of their application, the determined values were compared with values obtained for the same parameters examined in the conventional production methods.
The experiment was conducted under controlled conditions in a greenhouse located in Čapljina, and is set according to the randomized block design with three varieties in four replications.
The obtained results show that all applied variations of "ebb and flow” system had a statistically significant impact on increasing the examined parameters in comparison to conventional production method. "Ebb and flow" system also satisfies all environmental standards, from which it can be assumed that it will have a tendency to spread in our country, especially in Herzegovina, where the climatic conditions for growing vegetables in greenhouses is very favorable.

Key words: “*ebb and flow” system, perlite, cucumber, greenhouses*

RESULTS OF PEACH AND NECTARINE CULTIVAR TESTING

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Summary

10 new peach and nectarine cultivar was planted in March 2006 (yellow flesh peach: Rich May, Rubirich, Red Moon and Kaweah; white flesh peach Crizia; yellow flesh nectarines: Laura, Guerrieri and Amiga, white flesh nectarines: Maria Lucia and Silver giant. Trees were grafted on GF 677 rootstock, growing spindle, at planting distance of 4 x 2 m. For each cultivar we planted 15 plants (3 x 5). Flowering and harvest date, number of fruits/tree, yield per tree and hectare, fruit dimension and organoleptic grade were observed. In 2008 we already had the first crop. The highest yield had cvs. Kaweah (8.75 t/ha), Amiga (8.75 t/ha), Crizia (5.75 t/ha) and Guerreira (2.87 t/ha). Cultivars Rich May, Rubirich and Red moon didn't have yield in 2008 yet. The highest yield in 2009 had cvs. Guerreiro and Amiga (26.2 t/ha and 24.0 t/ha), folowed by Laura (23.9 t/ha) and Red Moon (21.2 t/ha). Yield less than 10 t/ha had cvs. Rich May, Rubirich and Kaweah. Other cultivars had a yield between 12 and 20 t/ha. Production in 2010 was on average less than half than in 2009. The highest yield in 2010 had cvs. Red Moon (13.6 t/ha) and Laura (13.0 t/ha), followed by Crizia (8.8 t/ha) and Amiga (6.7 t/ha). The yield below 5 t/ha had cvs. Silver Giant (1.2 t/ha), Rich May (2.2 t/ha), Rubirich (3.8 t/ha) and Kaweah (4.8 t/ha). Other varieties had a yield of between 5 and 11 t/ha.

Key words: *peach, nectarine, cultivar testing, yield, pomological characteristics*

INFLUENCE OF THE ANTHROPOGENIZATION PROCESS ON THE CHANGE IN THE PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS FORMED ON THE SILICEOUS SUBSTRATES IN THE REGION OF BOSANSKA KRAJINA

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Summary

This paper investigated the physical and chemical properties of natural and corresponding antropogenized soils developed on the siliceous substrates in the region of Bosanska krajina. The study was carried out on acid brown soils developed on clay shale (locality in Buzim; the cultivation method of garden soil and forests) and acid brown pseudoglenus soil developed on alluvial-diluvial clay (locality in Cazin; the cultivation method of fields and pasture land). Sampling was carried out from the profile on the horizons, and by taking the average sample with the application of the probe. The main aim of the research was to assess whether and to what extent the changes made from the anthropogenization have had degradation or progressive character.

We have analyzed the following indicators of the quality of the soil: the density of the bulk, the aggregate stability, the content of the organic matter in the soil, the pH value, the content of available forms of P_2O_5 and K_2O, and the analysis of the soil's adsorption complex. Furthermore, the content of available forms of heavy metals (Pb, Ni, Cd, Zn, Mn) in the average samples did not exceed the permissible limit.

After comparing the results of the analysis of the surface horizons of the natural and anthropogenized soils, the research came to the conclusion that the application of agricultural technical systems generally did not cause negative effects on the properties of these soils, and often showed a positive effect.

The yields of major crops harvested from the soil types that have been developed on the silicate substrates are below the potential limits. The above mentioned indicates the need for the reparation of these types of soils through anthropogenic progressive action.

Key words: *siliceous substrates, anthropogenization*

TOBACCO NECROSIS VIRUS ISOLATED FROM WOODY AND HERBACEOUS PLANTS IN SARAJEVO AREA

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Summary

Tobacco necrosis virus (TNV) is the type member of the genus *Necrovirus* from the family *Tombusviridae*. The virus is transmitted by the fungus *Olpidium brassicae* and has an extremely wide host range including many cultivated species.
The aim of this study is survey and analysis of investigation of TNV occuring on plant species in green urban zones of Sarajevo.
Identification of the virus isolated from the leaves of naturally infected plants with prominent symptoms was performed on the basis of results of bioassays and DAS-ELISA tests.
Two woody plants: *Ailanthus altissima* (Mill.) Swingle and *Prunus avium* L. as well as two herbaceous plants: *Conyza canadensis* Cronquist (L.) and *Cirsium arvense* Scop(L.) were identified as natural hosts of TNV. Diseased plants, especially trees, represent reservoir species for long-term survival of TNV in Sarajevo area.
Further epidemiological investigation of TNV isolates in Sarajevo valley should be directed to their detailed molecular characterization and accordingly recommendation of adequate control measures.

Key words: *Tobacco necrosis virus, host, woody plants, herbaceous plants*

REACTION OF TWO DIFFERENT CUCUMBER CULTIVARS TO CUCUMOVIRUS INFECTION IN SARAJEVO REGION

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Summary

Cucumber mosaic virus (CMV) represents one of the five most important viruses which is infectious to vegetable plants. In infected plants CMV cause different morphological and physiological changes.
The main goal of this study is to carry out the comparative analysis of morphological and physiological alterations in two different cucumber cultivars - 'Delikatess' and ' Cornichon' - caused by CMV infection.
As a source of virus we used CMV isolate from *Buddleia davidii* Franch. indentified by one-step RT-PCR with CMVAu1u/CMVAu2d primer. On infected and control cucumber cultivars the following morphological parameters were measured: total leaf surfaces and length of internodes, while among physiological characteristics analyzed were: intensity of photosynthesis, concentration of chlorophyll and intensity of transpiration.
It is established in the course of the study that in both infected cultivars leaf surfaces, internodes length, intensity of photosynthesis and concentration of chlorophyll were reduced while intensity of respiration was increased compared to control, healthy plants.
Obtained results demonstrated the smaller intensity alterations in the infected plants of cucumber cultivars 'Cornichon' compared to the 'Delikatess' cultivars. The knowledge of sensitivity of different vegetable cultivars to specific viruses in particular geographic region is of essential importance for their selection in vegetable production.

Key words: *CMV, reaction, cucumber, cultivars*

INTRODUCTION OF NEW TECHNOLOGIES OF CULTIVATION PICKLING CUCUMBERS INVEST WITH A VIEW TO PROTECTING THE ENVIRONMENT

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Summary

Production of pickling cucumbers for inserting is the most profitable vegetable activity in Bosnia and Herzegovina. Producers could achieve high yields and favourable economic results on relatively small growing areas.

Large problem over cultivation of cucumbers is the choice of inappropriate variety/hybrid, sensitivity of plants to disease, inadequate farming technologies and thus the excessive use of phyto-pharmaceutical. In the two-year experiment (2008 and 2009) we were tested four pickling cucumbers hybrids in the three growing systems, using integrated pest management.

Key words: *pickling cucumbers, variety/hybrid, technologies*

IMPACTS OF AMELIORATIVE FERTILIZATION BY PHOSPHORUS AND POTASSIUM ON MAIZE YIELDS

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The field experiment of phosphorus (triplephoshate 45% P_2O_5) and potassium (muriate of potash 60% K_2O) fertilization was conducted on planosol (pH 1n KCl = 3.67) of Central Croatia (Bjelovar-Bilogora County) in spring 2004 (*a* = ordinary fertilization, *b* = a + P1, *c* = a + P2, *d* = a + P3 , *e* = a + P1, *f* = a + P2, *g* = a + P3 , *h* = a + P2K2). The amounts of added either/or P_2O_5 and K_2O were (kg/ha) 500, 1000 and 1500, for the step 1, 2 and 3, respectively. The experiment was conducted in four replicates (basic plot 77 m^2). In the next years (2005-2009) the experiment fertilized uniformly (maize: 160 N + 60 P_2O_5 + 80 K_2O kg/ha). Aim of this study was testing residual effects of the fertilization on maize in 2008 and 2009. Maize yields was for 17% higher in 2008 than in 2009 (11. 37 and 9.69 t/ha, respectively) mainly due to summery differences in precipitation and temperature regimes (July+August: 2008 and 2009 = 136 and 72 mm, 21.8 and 22.5^{o}C). By the fertilization yields of maize were increased up to 9% in 2008 and 14% in 2009. With that regard, by *g* (P3) and *h* (PK) treatments were achieved the highest yields (*g* + *h* means: 11.81 and 10.21 t/ha, for 2008 and 2009). Also, by the P3 treatment grain moisture was decreased for 4.7% (2-year means: 25.2% and 20.5%, for *a* and *g*, respectively).

Key words: *ameliorative fertilization, phosphorus, potassium, yields, maize*

MACRONUTRIENTS CONTENT IN ORGANICALLY AND INTEGRATED GROWN STRAWBERRY CULTIVARS

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Summary

Strawberries (*Fragaria* L.) are low-growing plants which contain a high amount of essential minerals like potassium, phosphorous and magnesium. The content of minerals in plants depends on the supply of minerals to the soil and on their availability to plants. The aim of this study was to investigate the influence of major plant nutrients supply of soil on their content in strawberries, and also, to investigate whether the characteristics of the cultivar affect their accumulation in fruits. For this purpose, the soil samples and strawberries of cultivars 'Thuchampion' and 'Sugar Lie' were taken from two locations, Brežice and Maribor. In Brežice, strawberries were organically grown, while in Maribor they were produced by integrated farming. The content of nutrients was determined using atomic absorption spectrometry. Agrochemical properties of soil in Brežice were as follows: slightly acid soil reaction ($pHCaCl_2$ = 6.30), poorly supplied with phosphorous (21.5 $mgkg^{-1}$), moderate with potassium (107 $mgkg^{-1}$) and very rich in magnesium (232 $mgkg^{-1}$). In Maribor soil reaction was acidic with pH of 5.75. The soil was found to be very rich in phosphorous and potassium (269 $mgkg^{-1}$, 328 $mgkg^{-1}$) and moderate in magnesium (100 $mgkg^{-1}$). According to production techniques, 'Thuchampion' has not showed statistically significant differences in the content of P, K and Mg, while statistically significant differences were found in 'Sugar Lie'. Based on the obtained results it can be concluded that the contents of minerals in strawberries are affected by agrochemical properties of soil, but the influence of variety is more pronounced.

Key words: *strawberries, soil, macronutrients, production techniques*

EFFECT OF DIFFERENT FERTILIZATION SYSTEMS ON YIELD AND YIELD COMPONENTS OF LETTUCE AND SPINACH

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Summary

Efforts to increase yields by intensive vegetable production could result in environmental pollution and endangering consumer health. In order to avoid possible adverse consequences of excessive use of mineral fertilizers, different ways of reduced and organic fertilizer are studied. The aim of this study was to determine the effect of different fertilization systems on yield and yield components of lettuce and spinach.

In the randomized block design with four replications, followed by the lettuce yield in 2010 and 2011 yield of spinach under different fertilization systems: conventional (1000 kgha^{-1} NPK 7:14:21, and 300 kgha^{-1} KAN in two applications), integrated (500 kgha^{-1} NPK 7:14:21, and 150 kgha^{-1} KAN) and organic (5 tha^{-1} of composted chicken manure).The experiment was set up in Velika Kladuša, in which weight, height and diameter of the plant and calculation of the market yield were determined on average 10 plants.

Chemical analysis of soil showed that the soil is neutral reaction, poor in organic matter, poorly supplied with phosphorus, but richly supplied with potassium. Analysis of variance showed statistically significant ($P < 0.01$) effect of the considered factors and their interactions on the average yield, weight, height and diameter of the plant. Comparing them, there is no statistically significant difference in yield components between conventional and integrated fertilization of lettuce while it is very significant ($P<0.01$) with spinach.

Results of two years research showed that the values obtained in conventional farming are average 28% higher than those given only by organic fertilizers, and spinach showed stronger response to the different fertilization then lettuce.

Key words: *lettuce, spinach, a system of fertilization, yield, yield components*

SUDAN GRASS (*Sorghum sudanense Pers.*) GROWTH WITH GREEN MANURING IN SANDY DEPOSOL

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Summary

In this paper the results of Sudan grass (*Sorghum sudanense* Pers.) growing on the reclamated deposol part of the mine Stanari are presented. The implementation of the Sudan grass growth was performed with the green manuring fertilization of deposol soil and it presents the agro-technical phase of reclamation within the mine. The research was performed in two year period (2009/2010), on the experiment plot of technogenic soil of the mine, within the inside part of overburden deposition site, near Raskovac pit, wich is the part of the Stanari coal mine. The two varieties of Sudan grass were used, with two treatments of fertilization. The analyses of soil types show sandy and not very fertile soil. The highest yield of green mass (28.45 t ha^{-1}) as well as dry matter (9.90 t ha^{-1}) has shown the fertilization with nitrate fertilizer with genotype Piper Sweet. The lowest yield of green mass (14.40 t ha^{-1}) and dry matter (4.42 t ha^{-1}) was observed with genotype Srem without any fertilization in 2010. Statistically significant differences were present in between treatments as well as different years of growth have shown some influence. Only the certain variety of grass and fertilization with the reasonably high amount of nitrate will be able to significantly increase the organic matter in deposol.

Key words: *reclamation, nitrate, variety, green mass, Stanari.*

WORK ON BREEDING OF AUTOCHTHONOUS VARIETIES OF MONTENEGRO

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Summary

Montenegro is known as significant wine destination, primarily due to its autochthonous grapevine varieties (Vranac, Kratosija, Krstac, and Zizak). This paper presents multi-year results of breeding (genetic identification of variety, fortification of variability of population of variety, clone selection), and all that in order to improve their agro-biological, economic and technological characteristics.

Key words: *autochthonous variety, genetic identification, selection, potential clone*

APPLICATION OF EXTRACTION METHODS IN ANALYSIS OF AVAILABLE PHOSPHORUS IN TERRA ROSA AND CARBONATED ALLUVIUM SOILS

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Summary

Phosphorus is one of the essential elements for plant nutrition and it belongs to the group of macro-elements. However, its dynamic in soils and availability for plant nutrition is still the subject of numerous studies and vagueness. In Bosnia and Herzegovina for many years to diagnose the available phosphorus in soil used as a standard method AL method (Enger-Riehm-Domingo). This method is standardized in other countries, although in some countries, for the determination of phosphorus used some other methods such as CAL method, the method according to Bray-in, Olsen, etc. The differences between these methods are mostly in the used extraction medium.

The aim of this study was to compare the study of three methods (AL, CAL and Olsen) determine the state of available phosphorus in two different soil types represented in Herzegovina (Terra Rosa and Carbonated Alluvium). At the same soils as the potatoes grown cultures and monitored the content of phosphorus in it leafs. In this way we seek to determine the correlation between the content of available phosphorus in soil and its total content in your potatoes, or which of the three tested methods related to the content of available phosphorus in the soil the best correlation with the content of this element in the leafs. The results of these studies have shown that, AL methods as standard method in Bosnia, has performed the not best for the diagnosis of available phosphorus in the studied soil types in Herzegovina.

Key words: *phosphorus, extraction methods, AL, CAL, Olsen*

INTRODUCTION OF THE GERMAN TYPES OF POTATOES TO BE GROWN IN THE DIRECTLY RE-CULTIVATED STRIP-MINING AREA OF SICKI BROD TUZLA

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Summary

The challenges in this study were related to the two main goals:
- Introduction of two varieties of potato from Germany, which until now were not raised in Bosnia and Herzegovina, and based on planned research to suggest their general play in the environmental conditions of our country. On the recommendation of the Institute of potatoes from Berlin were selected two varieties, "Rita" and early "Exquiza" medium late variety, with a task to determine its productive properties in the field conditions.

By differentiated fertilization with other identical agro-technical measures, determine the response of the genetic potential of these varieties to the application of various organic and mineral fertilizers with particular emphasis on the use of lignite coal, unconventional as organic fertilizer.
In accordance with set goals, some studies were conducted referring to:
- Soil studies on a new plot, before establishing the experiment and after research,
- Laboratory studies of small fractions of lignite,
- Research in field conditions using the exact field trials.

The results of these studies are elaborated in detail in this paperwork. The most important is the recovery of the value of lignite as an organic fertilizer, with a high content of organic substance which is proven by this research. Xerothermic rekultisol which is based on the experiment, after only one year, had a certain improved physical and chemical properties of the variant treated with lignite. In addition the yield of potatoes in this version was the best.
Biometric analysis of quantitative characteristics of the obtained results was processed by using the statistical "t" test.

Key words: *potato, fertilizer, lignite, soil*

INTENSIVE PRODUCTION OF CUCUMBER GHERKINS (*Cultivar: Motiva RZ*) IN THE MUNICIPALITY ZIVINICE

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Summary

Intensive production of pickling cucumber cultivars, "Motiva RZ" the row with the use of irrigation systems (drip), a profitable vegetable production in the world and us. Culture that in its production requires a high involvement labor (especially during harvest), and application of appropriate practices and measures to protect the reason is also called a "culture of valuable hands". Pickling cucumber production in the area of Zivinice up every day faced with new challenges and problems encountered during the season. From year to year, pickling cucumber production recorded a progressive increase in terms of area under plantations and in terms of yields per unit area.

Key words: *intensive production, gherkin, cultivars "Motiva RZ", row*

TESTING OF THE QUALITY AND USE VALUE OF THE NEW FC CULTIVARS IN THE TOBACCO PRODUCTION OF BOSNIA AND HERZEGOVINA

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Summary

The production of FC tobacco in Bosnia and Herzegovina has a long tradition and is mainly located in the area of Bosanska Posavina, region of the Municipality of Orašje, Šamac. In recent years, several different cultivars have been changed in the production in order to select those cultivars which will give the best results in such conditions regarding the yield and farming characteristics. Considering the intensive breeding work in the development of the new tobacco cultivars, nowadays, there are many lines in the world that can satisfy the requirements of the manufacturers and tobacco factories. In order to define the behaviour of some of the new cultivars in the tobacco production area of Bosnia and Herzegovina, an experiment was carried out in the village Baktuša with six tobacco cultivars of different genetic and geographical origin. Two examined varieties were selected in Croatia, three of them originated from Brazil and one from the USA.
The examination lasted for three years (2008 to 2010), set up by the random block arrangement of the plots with four replications. Each plot had an irrigated and non irrigated version. During the growing season, the growth of the plants and their resistance to prevalent diseases were followed. The yield, quality expressed through an average price and the total revenue per hectare were defined after drying and qualitative evaluation. The chemical composition of the tobacco was also examined. The examination showed that there are statistically justified differences in the farming characteristics among the examined cultivars and irrigation proved to be very useful agro technical measure to increase productivity especially in the years with dry periods during growth and development of tobacco.

Key words: *flue-cured tobacco, cultivar, yield, quality, chemical characteristics, irrigation*

RESPONSES OF *Ocimum basilicum* L. TO ALUMINUM TREATMENT

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Summary

Aluminum (Al), as an element in trace can produce a positive effect on plant growth. According to some authors small quantities of Al stimulate some enzymes to control physical properties of plasma and membrane permeability. In contrary, high availability of Al in soils could be one of the limiting factors for plant growth. In this research, the effect of different concentrations of aluminum (0, 100 and 200 mg/kg soil) on growth and development of *Ocimum basilicum* under controlled conditions was studied. Changes in morphological and physiological parameters were noticed. Applied concentration of aluminum led to changes in stem length, leaf number and their surface area, as well as stomatal size and density. Similar effects were observed in concentration chlorophyll *a* and *b*, carotenoids, total proteins and peroxidase activity.

Key words: *aluminum, Ocimum basilicum, morphological and physiological parameters*

PRODUCTIVENESS OF SOME BLACKBERRY VARIETIES IN SARAJEVO CONDITIONS

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Summary

Productiveness examination of some blackberry varieties (Darou, Blek saten and Čačanska bestrna) have been done on trial field in Klek near Sarajevo in 2004 and 2005.
Flowering period, time of fruit ripening, weight of fruits and productiveness of blackberry per shrub were studied.
Darou variety has shown the earliest flowering (June 3rd), while the latest flowering was expressed in Blak saten variety (June 16th).
The lowest average fruit weight was established in Darou variety (2.85 g) and the highest in Blek saten variety (7.48 g).
The earliest ripening of fruits was noticed in Darou variety (August 4th - September 25th) while the latest was registrated in Čačanska bestrna variety (August 6th – September 25th).
In Darou variety the smallest yield per shrub was established (5.33 kg) and the greatest one in Blek saten variety (9.87 kg).
Based on obtained results it can be stated that Blek saten variety showed the best characteristics, Čačanska bestrna variety had satisfactory results, while the modest results were achieved in Darou variety.

Key words: *blackberry, varieties, fruit weight, yield*

CONTENT OF NUTRIENT ELEMENTS IN VINE LEAVES OF GRAPE VARIETY VRANAC DEPENDING ON THE TYPE OF FERTILIZER IN IRRIGATED AND NO IRRIGATED CONDITIONS

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Summary

In this paper we presented the results of the influence of different kinds of fertilizer and irrigation on nutrient content in the leaves of Vranac grape variety, dominant grape variety of vine for the production of red wines in Montenegro.
Eight different methods of fertilizing were applied. Results of three-year study (period 2003-2005), showed that the nitrogen content showed a greater impact of different variants of fertilizing, then the application of irrigation. The highest content of nutrient elements in leaves had a variant where poultry - manure combined with peat, while the lowest content was in no irrigated surface.
In all variants of the application of organic fertilizer phosphorus content was significantly higher than the variant with mineral fertilizer. Application of irrigation had no significant effect on the content of this nutrient element in leaves.
Different versions of fertilizing did not express considerable influence over the content of potassium in the leaves of Vranac grape variety. The highest content of this nutrient element had a variant of the peat. All variants of fertilizing in the general average for the growing season, had a slightly higher content of potassium in irrigated than in no irrigated areas, but these differences were not significant.
The ratio of nitrogen and potassium as a whole is above the optimal value, which indicates primarily on insufficient level of potassium in this grapevine.
Applied fertilizers are positively influenced the nitrogen content in leaves of grape vine Vranac, while the content of phosphorus and potassium were below the optimal values for this vine.

Key words: *Vranac, fertilization, irrigation, nutrition elements*

EFFECT OF FERTILIZATION AND IRRIGATION ON YIELDING ELEMENTS OF CV. VRANAC GRAPE

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Summary

Montenegrin viticulture is mainly represented in Podgorica, where the cultivation of grapes and produce of wine are an integral part of the economy of this region. In the structure of the vine, leading position occupies autochthonous grape variety Vranac, which produces high quality grapes.
The paper presents three-year results of the effects on different types of mineral and variants of organic fertilizers on the yielding elements of grape variety Vranac. The experiment was conducted in experimental vineyards of Biotechnical Faculty in the locality "Ljeskopolje", which belong Podgorica sub region.
It was applied eight different types of fertilizers:
1. Control (without fertilization)
2. NPK (8:16:24) - 500 kg/ha
3. Cattle manure – 20 tones/ha
4. Poultry manure – 10 tones/ha
5. Peat – 10 tones/ha
6. Cattle manure + poultry manure - 10 + 5 tones/ha
7. Cattle manure + peat - 10 + 5 tones/ha
8. Poultry manure + peat - 5 + 5 tones/ha

All variants of nutrition were investigated in irrigated and not irrigated conditions. The results showed that both examined factors significantly affect the yielding elements of grape variety Vranac.

Key words: *Vranac, fertilization, irrigation, yielding elements*

THE INDICATORS OF YIELD AND GRAPE QUALITY OF INTRASPECIES GRAPEVINE HYBRIDS DEVELOPED AT THE CENTRE OF VITICULTURE AND ENOLOGY IN NIŠ

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Summary

This paper presents the results of the research of the yield and quality of grape for 3 new intraspecies grapevine hybrids developed at the Centre of viticulture and enology in Niš. The hybrid NI 11-92 derives from the crossing combination Prokupac x Gamay Noir, the hybrid NI 4-91 from the crossing combination Tamjanika White x Smederevka, and the hybrid NI 8-92 from the crossing combination Smederevka x Red Traminer. Major agrobiological, economic and technological characteristics were examined in the tested hybrids for the time period from 2006 to 2008. The earliest date of bud burst and ripening time were observed in the hybrid NI 11-92 (14.04.; 18.09.), and the latest in the hybrid NI 4-91 (16.04.; 22.09.). The beginning of flowering in all hybrids was in the last decade of the month of May. Based on ripening time and the number of days from bud burst to harvest, tested hybrids can be characterised as medium-late or late. The highest yield per vine plant was observed in a hybrid NI 8-92 (5.03 kg) and the lowest in a hybrid NI 11-92 (4.14 kg). Bunch weight of the tested hybrids ranged from 165.37 g (hybrid NI 11-92) to 208.50 g (hybrid NI 4-91). The lowest sugar and total acids content in the must was found in the hybrid NI 8-92 (20.19%, 6.20 g/l), and the highest in the hybrid NI 11-92 (22.06%, 7.43 g/l). The investigated properties showed fruitful and high quality hybrids that have met the objectives of selection.

Key words: *grapevine, selection, hybrid, yield, quality*

THE PRESENCE OF INORGANIC POLLUTANTS IN SOME VEGETABLE CROPS IN THE AREA OF ZENICA

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Summary

The main purpose of this study was to determine the degree of accumulation of pollutants in the studied plants and their distribution in the organs, and to assess possibilities for agricultural production and crop safety in local communities located near large industrial facilities in Zenica.
This experiment was conducted at ten location belonging to local communities: Podbrežje, Tetovo, Pehare, Donja Gračanica I Banlozi, at the distance of 100-500 m by air lines. Taken were a total of 44 samples of plant material including: vegetable and fruit crops, corn, grass mixture and nettles.
Research related to the total forms of the following elements: lead (Pb), cadmium (Cd), mercury (Hg), zinc (Zn), copper (Cu), nickel (Ni), chromium (Cr) and cobalt (Co).
Based on the research we can conclude that certain samples of plant material are contaminated with inorganic pollutants. It was found that there is a large accumulation of lead in the nettles, grass, leafs pears, apples, plums, cherries, apricots, lettuce, spinach, and apricot fruit. Also the content of cadmium, zinc, copper, nickel, cobalt and chromium in some cultures is above the allowable concentrations.
We proposed decontamination measures, as well as the choice of crops that can grow in soils with high content of certain pollutants.

Key words: *contamination, heavy metals, plants*

MORPHOLOGICAL AND AGRICULTURAL CHARACTERISTICS OF KALE POPULATIONS (BRASSICA OLERACEA L. VAR. ACEPHALA) FROM THE HERZEGOVINA REGION

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Summary

Kale is an important vegetable in Herzegovina. Despite being one of the most common and most recognizable vegetable species in Herzegovina, it is very poorly explored. For the first time a systematic study was carried out by collection and description of the existing gene pool of kale in Herzegovina, which will contribute to the preservation of genetic erosion. According to the official descriptor inventory situation has been allocated 17 kale populations. This data were collected trough investigation of most important morphological and agricultural characteristics. To exploit the potential of local populations in future breeding populations were evaluated as superior.

Key words: *kale, population, variability*

ELEMENTS OF GRAPES QUALITY OF GODOMINKA VARIETY

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Summary

Godominka is a new variety created on Demonstration Field ”Radmilovac” at Faculty of Agriculture, University of Belgrade. It was obtained by variety Smederevka´s (Dymiat) self-pollination. The paper presents results of studies on grape quality of Godominka variety comparated with parental variety (Dymiat). Differences came to the fore in grape maturing season: Godominka ripens at the end of the second and Smederevka (Dymiat) in the fourth epoch. Vine growth habit, morphological characteristics of shoots and leaves are close to the varieties Smederevka (Dymiat). The characteristics of grape and berry can not be said, are smaller (135.0 g) in comparison with the variety (Dymiat) Smederevka (402.0 g). Grape quality rated through the sugar and acids in the satisfactory. It accumulates more sugar in must compared to mother-variety, and in our investigations it amounted, on average, to 20.2%. The content of total acids in the average level ranged from 7.0 g/l (Godominka) to 8.0 g/l (Dymiat).
The results of this study confirm the possibility of successful cultivation of tested variety Godominka in appropriate wine-growing regions of Serbia.

Key words: *Godominka, variety, grape yield, grape quality*

PHENOLOGICAL AND POMOLOGICAL-TECHNOLOGICAL CHARACTERISTICS OF PRESENT AUTUMN AND SUMMER VARIETIES OF RASPBERRIES

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Summary

According to the structure of fruit, raspberry belongs to a group of berrylike fruit and according to the importance, it comes in second place, right after strawberry. Recently, there has been a significant spread of autumn varieties of planted raspberries, and some of them were investigated in this paper. The aim of this work was to look into pomological and phenological characteristics of some current summer varieties and autumn varieties of raspberries and analyze the basic parameters of the chemical composition of the fruit, in order to give contribution to the study of current and newly introduced varieties of raspberries in our area.
In this paper, eight different varieties of raspberries have been looked into, out of which two were autumn varieties (Autumn Bliss and Fallred) and six of them were summer varieties (Glen Ample, Tulameen, Meeker, Fertodi Karmin, Wei-rula and Willamette).
It was observed phenophases (early growing season, beginning of blooming, full blooming, end of flowering, beginning of ripening, end of ripening), then pomological features of varieties (weight, height and width of fruit), and chemical analysis of fruit.
Taking into consideration complete pomological characteristics, *Wei-rula* cultivar has outstanding mass, height and width of fruit, while the cultivar Fertodi Karmin failed with its pomological characteristics. Wei-rula variety has the biggest percentage of natural and total invert (sugar).

Key words: *raspberry, phenophases, pomological characteristics, chemical analysis*

POMOLOGICAL VARIABILITY OF SWEET CHESTNUT POPULATIONS (*Castanea sativa* Mill.) IN BOSNIA AND HERCEGOVINA

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Summary

European chestnut (*Castanea sativa* Mill.) occupies the area of Bosnia and Herzegovina as continued natural populations in three main locations: northwest part of Bosnia, area of north Herzegovina and third locations East Bosnia. The study includes 130 trees of chestnut from all three populations. The study was conducted during a three years long period and they included analyses of fruit mass, fruit height, fruit width, fruit thickness, hilum length and width. Adequate statistical tests ANOVA – test and Scheffe – test ANOVA were used for the analyses of results. Measuring results were statistically processed with SPSS 17. Pomological analyses were used for determination of high variability of examined genotypes of chestnut between the mentioned populations. Medium values of fruit mass of analyzed samples was within a range from 5.11 to 7.10 g (average 6.26) which brings us to the conclusion that BH chestnut has small up to medium large fruit, and as a support to this conclusions we can take really law values and the other analyzed fruit characteristics, such as its height, width and thickness. All the mentioned values are significantly lower in relation to the values detected in foreign populations, such as Turkish, Spanish and Slovenian natural populations of chestnuts. Such fact indicates urgent necessity of conduct of breeding programs on BH chestnuts in order to enlarge its fruit. Details on agronomical significant characteristics which have been spotted during this comprehensive study, presents valuable information important for future breeding programs of this fruit variety.

Key words: *Castanea sativa Mill., European chestnut, pomological analysis, populations*

USE OF FLORAL BAITED TRAPS IN PLANT PROTECTION: SEASONAL MONITORING OF *Tropinota (Epicometis) hirta* (Poda) (Coleoptera: Cetoniidae)

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Summary

Commercially available VARb3k traps and baits (Csalomon®, Plant Protection Institute, Budapest, Hungary) were used for seasonal monitoring of *Tropinota (Epicometis) hirta* (Poda), an important pest attacking many cultural plants in different countries in Europe and some regions of Asia, in five sites in Bulgaria: Karbobat, Kyustendil and Plovdiv in 2009 and 2010, and Petrich in 2009 and Knezha in 2010. Significant catches of the pest were recorded in all five sites investigated during these two years. The most numerous catches were recorded in Kyustendil (1700 beetles) and Petrich (701 beetles) in 2009 and in Knezha (1408 beetles) and Kyustendil (660 beetles) in 2010. The trend of the seasonal flight of *T. hirta* in all the sites of investigations was similar in both 2009 and 2010. As a whole the beetles appeared in the very end of March – beginning of April, reached their peak flight in the second half of April – beginning of May and disappeared in the end of May - first half of June. The latest catches were recorded in Karnobat – July 2, 2010 and Kyustendil – 14 July 2010. The bait/traps system used in our field work showed very high species selectivity. In seven of the all eight cases the catches of *T. hirta* exceeded 90% and in six of these this percent was equal or more than 98%.

Key words: *Tropinota (Epicometis) hirta, Coleoptera, floral baited traps, seasonal flight*

EFFECT OF POST-HARVEST TREATMENT OF APPLE FRUITS WITH CALCIUM CHLORIDE ON STORAGE AND FRUIT QUALITY OF APPLE CULTIVARS IDARED AND GRANNY SMITH

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Summary

Content of calcium in apple fruits is one of the most important fruit characteristics for possibility of storing as well as for preventing physiological diseases.
The purpose of this study was to examine the effect of storage time and treatment with $CaCl_2$ on the apple fruit on the possibility of storing and preserving the quality of the fruits at selected apple cultivars.
The research is carried out by drowning fruits of apple cultivars Idared and Granny Smith in $CaCl_2$ solutions (concentration of 2.5 % of pure Calcium).
The analyses of fruits were conducted into three periods- (immediately after the harvest, 2 months after storage and 15 days after keeping of storage). The fruits were stored for the period of 60 days, at temperature of 4º C and relative humidity of 72 %.
In the research of project were analyzed following fruit quality parameters of apple: fruit weight, fruit flesh firmness, soluble dry matter expressed in °Brix, acid contents, phenol contents, contents of Ca-pectates and Calcium content.
The results show statistically remarkable increase of Calcium content in fruit dry matter for 17.95 %, according not treated fruits. Increase of Calcium content in the fruits of cultivar Idared was for 22.15 % and it is more significant than increase of 12.89 % achieved by cv. Granny Smith.

Key words: *apple, content of calcium in a fruit, fruit storage, $CaCl_2$*

POSSIBLE MECHANISMS UNDERLYING YIELD REDUCTION IN WHEAT UNDER POST-ANTHESIS DROUGHT: PHYSIOLOGICAL AND BIOCHEMICAL PROPERTIES OF FLAG LEAF

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Summary

Drought is usually perceived to be one of the most important limiting factors for plant production. Water scarcity in Mediterranean type environments has been more pronounced as a result of irregular and inadequate rainfall. Wheat which is a main crop in such environments is mostly cultivated under rainfed conditions and any rainless period after anthesis stage causes severe yield losses. In order to understand mechanism underlying yield reduction, 5 bread wheat cultivars were evaluated in 2 years field experiment (2009-2010) in terms of their response to post-anthesis drought. Grain yield of all cultivars in control plots were significantly higher than that of plants imposed drought stress after anthesis stage. Rapid lose in soil water content through grain filling period lead to significant decrease in relative water content of flag leaves (28.4 %) and eventually decrease cell membran stability (89.8 %). Chlorophyll pigments degradation (28.2 %) and prolin synthesis (190 %) as a compatible solute increase in flag leaves of all cultivars as a result of drought stress.

Key words: *wheat, drought, proline, chlorophyll, cell membrane.*

POMOLOGICAL CHARACTERISTICS OF FIG CULTIVARS (*Ficus carica* var. *edulis*) IN HERZEGOVINA

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Summary

The paper was described 16 varieties of figs, what confirmed the rich diversity of this type in Herzegovina. The names of cultivars were varied from one locality to another. Description of the trees was performed using IPGRI list by analyzing the properties of growth, leaf and fruit (*fornito*): tree habitus, strength, morphological characteristics branching, lateral shoot development, tendency of branching, leaf shape, leaf lobes, leaf stalk length; full maturity, fruit weight, shape, external color, stalk and neck length, ostiol width, internal color, skin cracking, flesh thickness, the quantity of nuts etc.

Early harvest had cultivar *Jakuša*, whose full ripening was recorded in early August, and the duration of the harvest was long. The lowest fruit weight had cultivars *Tenica* and *Školjarica sitna*. A big ostiol width was by cultivar *Murgulja*.

Key words: *fig, cultivars diversity, morphological and pomological characteristics*

EFFECTS OF ASSOCIATIVE BACTERIA ON GROWING FLAX (*Linum usitatissimum* L.)

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Summary

Flax (*Linum usitatissimum* L.) is one of the oldest cultures and dates from the Neolithic Age in Europe. Flax seeds are grown over 5,000 years and are used for different purposes. A few years ago a re-growing of flax began in the northwestern part of Bosnia and Herzegovina. The aim of this study was to determine whether there are differences among flax seeds based on qualitative and quantitative characteristics of flax grown on the principles of organic agriculture and on the conventional way. In order to investigate the above mentioned thesis, the experiment was set up in an open field in the northwestern part of Bosnia and Herzegovina, the municipality of Bihać, Bakšaiš site. The research was conducted during the growing season in 2010. Sample plots with organic methods flax growing were inoculated with associative bacteria "AZOTER" 14 days before planting. At the end of the growing season, for each mentioned cultivation method a sample was taken from 30 plants and quantitative analysis was made for the following: the determination of plant height, the length of the grain and the determination of yields. Protein content, moisture, cellulose, ashes and fat were determined from the qualitative characteristics of flax seed. All these tests were conducted in the laboratory of the Biotechnical Faculty, University of Bihać and at the Agricultural Institute of the Una-Sana Canton. Statistical analysis of the obtained data showed significant differences in quantitative and qualitative characteristics of the flax grown in the organic way, and for this reason it is recommended to use the associative bacteria "AZOTER" in the cultivation of flax.

Key words: *Flax, associative bacteria, organic and conventional growing*

OPTIMIZATION AND MATHEMATICAL MODELING OF THE SEED SPACING UNIFORMITY PERFORMANCE OF A PRECISION SEEDER ON THE EXAMPLE OF CANOLA SEEDS

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Summary

The objective of this study was to optimise the seed spacing uniformity performance of a precision seeder using response surface methodology (RSM) and to verify the optimum levels of the variables. The variables considered in the study consisted of the vacuum on the seed plate, the diameter of the seed holes and the peripheral speed of the seed plate. Canola seeds were used for sowing and experiments conducted in this study were based on the central composite design (CCD), one of the designs in RSM.
The data obtained in the laboratory were divided into three different groups in order to obtain the values of the multiple index, quality of feed index and miss index. An additional performance criterion was also proposed and used as an indicator of the sowing performance in this study and this was called root mean square deviation. The data obtained in the laboratory were then used to develop functions in polynomial form that allowed the calculation of the optimum level of each independent variable considered in the study. The optimum levels of diameter of holes, the vacuum pressure and the peripheral speed of the seed plate for precision seeding of canola seeds were found to be around 4.1 kPa, 0.96 mm and 0.069 ms^{-1}, respectively.

Key words: *mathematical modeling, seeding uniformity, central composite design.*

GROWING OF TOMATO SEEDLING ON SERBIAN SUBSTRATE DEPOSITS

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Summary

Tomato seedling in Serbia is usually produced on foreign substrates, but since there are natural peat deposits in Serbia, special attention has been given in the last few years to research this peat to consider the possibility of their application in seedling production. The main aim of these researches is to find optimal feeding and water-air regime and to enrich them with water-soluble fertilizers and mineral components of zeolite type. In order to supply sufficient fertilizers for young tomato seedling during the whole seedling period, zeolite is being enriched with additional fertilizers so there is no need for additional fertilization of seedling. The aim of our research was to investigate the possibility of producing tomato seedling of standard quality on two selected peats from Serbian deposit (Gaj-Kovin and Negotin) with additional enriched zeolite. The results showed that additional zeolite significantly influenced the researched parameters of quality of tomato seedling, comparing to control, while there have been no significant differences between variants with once enriched zeolite comparing to double enriched zeolite.

Key words: *tomato seedling, Serbian peat deposits, enriched zeolite*

TOMATO SELECTION AT THE INSTITUTE FOR VEGETABLE CROPS, SMEDEREVSKA PALANKA – ACHIEVEMENTS AND TENDENCIES

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Summary

The first tomato hybrid has been included on variety list of former Yugoslavia in 1974 (Rapid F1). Tomato selection has been done by using conventional methods (pedigree and bulk method). Selected lines originate from segregation of recombined dialelle crossings and foreign hybrids. Nutritive and traits important for good sales depend on gene expression, so selection can influence its increasing and decreasing. Big work and good results have been accomplished in: selection of quantitative traits such as yield and yield components, fruit firmness, number of fruits per plant, early ripening; selection of genotypes with favourable characteristics for certain ways of production; general tasks and selection of this vegetable. The most common mutated genes part of the Institutes hybrids today, refer to specific tomato traits such as: *sp* (*self pruning*) in determinant hybrids (Balkan F1, Marko F1, Rebus F1) and varieties (Narvik SPF, SP-109, Adonis), *u (iniform ripening*) - Lido F1, Atina F1, Sampion F1, Danubius F1, *rin (ripening inhibitor*)- Nada F1, Sampion F1, Sef F1, Sidra F1, Rebus F1, *j (jointless*) – Narvik, Adonis, SP-109, *c (potato leaf*) - Mi-13, Enigma F1, Rebus F1, *Ph* -2 (*Phytophtora infestans resistance*) – Luna F1, Zlatni jubilej F1, Sef F1.
In the last few years, selection has been going towards producing genotypes tolerant to drought conditions by using bio-technological methods, with the aim of shortening the selection process. Besides the abiotic stress and selection to tolerance to it, researchers at the Institute deal with resistance to economically most common diseases Good knowledge of genetic constitution of genotypes from gene bank and selected material in various selection processes.

Key words: *tomato, selection, achievements, tendencies*

SUSTAINABLE DEVELOPMENT OF AGRO-INDUSTRY AND RURAL DEVELOPMENT

ANATOLIAN WOMEN: THE WEAKEST LINK IN RURAL DEVELOPMENT

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Summary

Turkey has always been an agricultural country. To the last quarter of the last century, the majority of Turkey's population lived in the rural part of the country and the agriculture occupied the major part in Turkish economy. For these reasons, rural development has always been a priority in Turkey. During the last 30 years, however, above mentioned situation has changed rapidly due to economic policies (transition to free market economy, privatization, terror, etc.), which ended up with: reduction in population in rural population due to the migration from rural areas to urban areas and reduction in the share of agriculture in the country's economy due to increase in industrialization.

These changes however have not devalued the importance of rural development. In contrast, they have created new problems like overcrowded cities, formation of shanty towns on the suburbs of the major cities and increase in crime rate. Thus, rural development has become even more important in Turkey as a solution to these problems.

To overcome these problems, several strategies/policies (technical, administrative) have been applied by the governments time to time. None of these strategies/policies have unfortunately completely reached the set goals for rural development, so far. It is because; the role of the status of women in rural development has mostly been underestimated. Amongst many, the patriarchal family structure is the biggest handicap hindering the rural development. Whereas, as a feminist approach, rural women is the key determinant for rural development. It is because women have direct impact on rural economy as employees and they also act as a cement to keep the family functioning which has a social importance to rural life.

It can be surely claimed that Anatolian women is the weakest link in rural development. She has been kept weak purposely by insufficient education, health, patriarchal family structure, marriages not recognized by the state but only by religious authorities, weakened status due to religious reasons, polygamy, no birth control etc.

Improving the status of women, particularly rural women, has found its place in the Millennium Development Goals (MDGs) of the United Nations and in the policies of the Ministry of Agriculture and Rural Affairs of the Republic of Turkey recently. As a last word, rural development in Turkey will have not been fully successful unless the status of rural women will have improved.

Key words: agriculture production, patriarchal society, Anatolian women's status, feminist approach

GRAZING LAND POTENTIAL AND HANDICAPS AND OVERCOMING PROCEDURES IN TURKEY; LAST DECADE PRACTICES AND EXPERIENCES OF RANGE ACT 4342

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Summary

The greatest potential for increased livestock production in Turkey lies in more effective and efficient utilization of land already devoted to livestock production primarily by cattle and sheep (Tan et all, 2002). Because animal numbers are greatly in excess of the available feed supply, severe overgrazing has caused deterioration of the existing grazing land resource in many places (Munzur, 1989). Not only is animal performance reduced but grazing land deteriorated because of soil erosion and replacement of desirable species with unproductive vegetation. It is apparent that major attention must be given to different dimensions of the problem. It is evident that situation calls for urgent measures in the country and the resembling Mediterranean ecologies.

In this article, problems and overcoming techniques of grazing lands of both Turkey and neighbouring countries will be discussed considering Range Act 4342 enacted by Turkish Great Assembly in 1998 and Practices and Experiences gained in the course of the last decade. Extending and sharing the information derived from the technical practices of range improvement projects in the country among all participants having similar ecologies and handicaps will also be targeted.

Key words: *Turkish grazing land, Mediterranean ecologies, Range Act 4342*

GEOGRAPHICAL INDICATION SYSTEM AS A NEW TOOL FOR RURAL DEVELOPMENT IN TURKEY: AN OVERVIEW

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Summary

Geographical indication (GI) is a system which ensures and preserves the quality and reputation of origin products of a particular culture or geographical conditions. GIs has been used for:

- Prevention adulteration of consumers
- Prevention rights and earnings of producers
- Improving rural development and overall economy
- Preventing decolization of the product
- Preventing migration from rural to urban
- Forming a light monopoly for the advantage of small producers
- Reducing unemployment
- Acting as a cement for small producers to act collectively

In countries where GI system is not effective, the commercial success and reputation of a particular traditional product is open to exploitation by others rather than original owners.

Anatolia, having been a cradle of many civilizations and possessing a variety of ecological conditions, is rich with its more than 2000 of traditional products. These products now provide a new tool for rural development should they be fully exploited. Turkey has recently adopted the regulations about GI from European Union (1995). One hundred and thirty nine origin products have been registered with The Turkish Patent Institute, and the registrations for application of 138 products have been made so far. In this study, the potential of GI system for rural development in Turkey and the procedures as well as regulations will be discussed.

Key words: *Geographical indications, rural development*

AGRICULTURAL CENSUS – EXPERIENCES GAINED THROUGH PILOT AGRICULTURAL CENSUS IN BIH

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Summary

Statistical Farm Structure Survey in European Union is carried out through a comprehensive Agricultural Census every ten years, and every three years (between censuses) through sample based survey. Agricultural Census/Farm Structure Survey (AC/FSS) is the most important survey in agricultural statistics, through which comparable structural data on agricultural farms (agricultural enterprises and family farms) is obtained. Agricultural Census provides a complete picture of the structural data in agriculture: the number of farms, farm location by geographic coordinates, utilized agricultural land by categories, the numbers of livestock by types and categories, use of machinery, data on the workforce and others. Data related to agro-environmental indicators is also collected (use of mineral fertilizers, use and storage of manure, production methods in agriculture and irrigation (irrigated area, the sources and methods)). In addition, agricultural census is necessarily required to determine the different typologies of farms that are used in the European Union. Necessary typology farms should be established in Bosnia and Herzegovina based on the results of the Agricultural census. The importance of the Agricultural Census is also reflected on establishment of the Farm register (total population), which opens the possibility of developing other agricultural statistical surveys based on sample.

In this paper the importance of Agricultural Census in Bosnia and Herzegovina is shown considering the fact that the last Census was conducted 1960th year. The review to the requirements of the acquis communautaire and requirements and policies of Eurostat in the context of Agricultural Census is given. Also, an experience in implementing a pilot census in Bosnia and Herzegovina within BiH AIS project, and relationship between Population Census and Census of Agriculture is considered.

Key words: *Agricultural Census, FSS, farms typology, family farms (households), acquis communautaire*

PUBLIC ATTITUDES OF WIND ENERGY IN TURKEY

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Summary

Turkey's total energy demand is increasing rapidly. Turkey is an energy importing country and energy consumption is met by imports which continue to grow each year. As fossil fuel energy becomes scarcer, Turkey can face energy shortages and higher energy prices. Turkey has substantial renewable energy resource potentials and they are the second largest domestic energy source after coal. Wind energy is recognized as an important energy resource in Turkey. Turkey's technical wind energy potential is 88,000 MW but the current wind energy potential that is economically viable is 10,000 MW and the share of renewable energy supply by wind energy is 0.01%. Even though wind is an important energy resource, proposals for the construction of new wind turbines are often met with strong reactions from the public people. The objective of this paper is to identify and analyze factors that are important for acceptance of wind energy turbines on the local level. To reach this objective, an extensive study is conducted, concerning the public attitudes toward wind energy applications in Hatay, Turkey.

Key words: *Turkey, energy, wind, attitude*

STUDY OF THE IMPACT OF THE TUZLA THERMO POWER PLANT ON THE SOIL QUALITY

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Summary

The Tuzla Thermo Power Plant (TPP) is one of the most significant power production facilities in B&H. The impacts of the Tuzla TPP are transferred to the soil by different mechanisms: emission of the polluting substances to the air through chimneys, emissions to the air and water from coal depots, the flyash transfer depot, ash and cinder disposal sites, etc.
Among the most important factors of the contamination of soil and vegetation caused by the TPP production are heavy metals (Hg, Mn, Cu, Pb, Ni, Fe, Cr, Cd, Co, Zn, Sb, etc.), which are released into the environment in different concentrations. In case of high concentrations of heavy metals in the soil, these substances may become a significant environmental problem, as most of the living organisms possess little tolerance to these elements.
This paper presents the results of the soil quality research carried out in the area of the Tuzla TPP. The analysis of heavy metals in the soil revealed significant concentrations of some trace metals in the study area. Arsenic and nickel are particularly important because of high concentrations recorded; for As up to 47.17 mg/kg, and for Ni as much as 712.77 mg/kg. Other heavy metals analyzed (Zn, Pb, Cd) are below threshold values according to the regulations on maximum contaminant levels for hazardous substances in soil.

Key words: *soil quality, heavy metals, thermo power plant, Tuzla*

LAND IN THE STATE OF ENVIRONMENT REPOERT OF FEDERATION OF BOSNIA AND HERZEGOVINA

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Summary

State of the Environment Report of Federation B&H provides an overview of the status of individual environmental components, and view the status of institutional and legislative framework of the sector of environmental protection in the Federation B&H, in an integral approach, but also individual components of the environment. For this purpose were used, the available relevant data and information, using results of the analysis, evaluation of environmental indicators and the calculation spent in the previous period. For the purposes of determining the state of the environment in the first cycle of development indicator's approach for making the report on the state of the environment in FB&H is defined by the rate of 80 environmental indicators for the following environmental components: nature, water, land, air, energy management and waste management . For the area of land (soil) 16 indicators are established. Some of these indicators have taken from the CSI (Core Set of Indicators) - list of indicators defined by the European Environment Agency, with the aim of harmonizing data formats with the requirements of international dana exchange, while the rest of the indicators defined to show the specific environmental parameters in the Federation of B&H. What is the perspective of Bosnia and Herzegovina, problems related to waste management, through institutional and legislative aspects and issues of data management and information in this area is particulary challenging issue that must give answers.

Key words: report, environment, land, soil, indicators, institutions

MAIN FEATURES OF THE CORINE NOMENCLATURE ADAPTED TO BOSNIA AND HERZEGOVINA

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Summary

The European Union has adopted and developed the programme for coordination of information on the environment and natural resources named CORINE - ***CO**o**R**dination of **IN**formation on the **E**nvironment*. The aim of the CORINE programme is identification and classification of land cover that includes defined nomenclature and creation of high quality database necessary for purposes of monitoring, organization and management of natural resources at regional and national level.
In this paper methodological approach and basic principles in preparation of the CORINE nomenclature for scale 1:5.000, adapted to the characteristics of Bosnia and Herzegovina, are presented. As examples, some specific classes for each CORINE classification level are described in details and presented on ortho-photo images. Main source of information for this paper is CORINE project for Canton Sarajevo.

Key words: *CORINE programme, identification of land cover, CORINE nomenclature, land cover classes*

SOIL CHARACTERISTICS AND LANDSLIDE PROBLEMS IN SARAJEVO AREA

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Summary

The most common causes of landslides in the Sarajevo area include: i) loss of support due to natural causes or human activities, ii) presence of a less permeable part of the soil profile, or less permeable layer of the substrate, iii) lack or insufficient presence of vegetation on the slopes susceptible to sliding, iv) soils with particle texture which shows poor cohesive properties, as a consequence of the mineral composition of clay. Specific quality of the soil or geological substrate in landslide cases, is conditioned by clay's ability to expand.
In the area of Sarajevo, landslides most frequently occur in the areas of unlicensed individual construction on clay and marly geological substrates, as well as areas of unmethodical wood cutting. During the war activities, vast land areas were left without any forest vegetation which has significantly accelerated the land erosion. Majority of active and potential landslides are located in the central part of the city of Sarajevo, which includes the settlements of Pofalići, Velešići, Hum, Hrasno brdo, Ugorsko, Tihovići, Blagovac, areas of large population influx. The area of active and potential landslides in the Sarajevo Canton totals approximately 2694 ha. Overview of landslides by municipalities in the city of Sarajevo existing at 532 locations.: Centar 131, Stari Grad 111, Novo Sarajevo 101, Novi Grad 177 and Ilidža 12. From this number 64 has been rehabilitated, ongoing rehabilitation taking place at 6 locations and in preparation phase is 14 locations. Physical and mechanical properties of the soil and it´s relation with landslides in Sarajevo will be main topic in this research paper.

Key words: *landslide, soil properties, geological substrates*

CHANGES OF PROCESSOR-RETAIL PROCUREMENT PRACTICES FOR COW MILK IN THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA AND THEIR EFFECT ON THE DAIRY CHAIN

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Summary

The retailing in the Former Yugoslav Republic of Macedonia (FYROM) is highly fragmented with small shops constituting 66% of the total retail market body. Supermarkets have a share of 18% and the rest of the retail sale is performed by street traders and green markets Dairy products have a significant contribution it the total turnover of the retail shops, with 13% to 15%, and they have one of the largest shares of a product group growing by 10% to 15% per year in the supermarkets. In this research we map the organization and distribution of processed cow milk in the retail/dairy processing part of the supply chain. By interviewing the main foreign and domestic retail chains and the key actors in the dairy processing we investigate if the restructuring and enlargement of retail will require adaptation of the procurement practices of processed cow milk downstream. The logistics and distribution in the processing/retail part of the chain have very important part in dairy chain mainly because of milk's perishable nature, and their adaptation is expected to: improve the safety standards, provide consistent volumes and quality of processed milk, and improve the coordination in the milk transport from the processor to the end consumer.

Key words: *processor-retail, procurement, cow milk, coordination, distribution.*

ECONOMICS OF INTEGRATED APPLE PRODUCTION IN BOSNIA AND HERZEGOVINA

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Summary

High demand for product quality and problems caused by the negative impact of conventional fruit growing are the main reasons for developed countries' orientation towards integrated fruit production. Within the fruit growing practices in Bosnia and Herzegovina, conventional production of semi-intensive nature is still the most widespread method of production. Although market oriented, such production is not capable of satisfying requirements even of domestic market alone, neither quantitatively, nor qualitatively. Therefore, there is a growing need in Bosnia and Herzegovina for quantitative and qualitative fruit production improvement through the integrated production concept. The main objective of the study was to establish economic criteria for integrated apple production on selected farms and to determine, based on the study results, whether this system of production is economically justified in Bosnia and Herzegovina. The following methods were used in the research: document analysis, questionnaires, interviews, and analytical, calculative and comparative methods. In accordance with the study objective, the following expenses for the ten selected farms had been determined: the cost of apple orchard establishment, value and cost of production, and financial results within the three years of the exploitation. Economic efficiency was measured based on the cost-effectiveness, profitability and productivity.The analysis of economic indicators resulting from the study shows that integrated apple production in Bosnia and Herzegovina is economically justified.

Key words: integrated production, apple, farm, economics

SYSTEMATIC INTEGRATION OF ENVIRONMENTAL PROTECTION WITH AGRICULTURAL PRODUCTION - PROJECT OF SEPARATE BIO WASTE COLLECTION AT SOURCE

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Summary

Waste management has been emerging as a priority issue of environmental protection in Croatia in recent years. Examples of good waste management are limited to noteworthy initiatives of some cities and individual companies seeking to raise standards of social development and environmental protection. At the beginning of April 2011, in the area of City of Koprivnica, City utility company Komunalac started a pilot project for separate collection of bio waste at source of production. The project is conducted on a sample of people with prior assumption that significantly larger amount of green waste will be collected by separate collection of it at the source of production. City utility company Komunalac has built a composting facility where they plan to collect the bio waste generated as a result of company activities on the renovation and maintenance of green areas, as well as biological waste collected from citizens and municipal and organic waste from agricultural cultivation. This is just one way of systematically linking environmental protection with agricultural production and promoting sustainable and ecological agriculture. The project aims to reduce the amount of waste deposited on landfills and to use the green waste as raw material for production of quality bio compost. It is foreseen that produced bio compost will be used as a quality ecological fertilizer on farms and by individual citizens in their vegetable gardens and orchards. This paper will present an example of mutual dependence of environmental quality and ecological and sustainable agricultural production, and point to the role and importance of individual initiatives in promoting sustainable development at local level.

Key words: *bio waste, composting, bio compost, ecological agriculture, sustainable development*

PARITY PRICES OF VEGETABLES VS. FUEL AS AN AGRICULTURAL INPUT

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Summary

The parity of prices of agricultural inputs, especially fuel, whose price is controlled by a government commission and corrected twice monthly, in this paper was paired with the prices of vegetables. Vegetable production is one of the major subsectors in the Republic of Macedonia. Vegetable crops are produced in open filled and in protected areas (plastic tunnels and glasshouses), hence fuel is an important input, both in terms of machinery and for heating. In this paper, the main vegetable crops are analysed which are on the markets during all of the months in the year. Vegetables prices typically fluctuate during the year. Price is influenced by market movements, season and also depends on prices of inputs. Prices for vegetables and fuel were used monthly for the period of three years. Fuel price have direct influence on production costs in agriculture, thought machinery use. Vegetables production costs including costs for fuel, have almost no direct influence on the selling price which is depending on market and seasonal conditions, but have impact on distribution of income in the vegetables market chain. This research contributes to the understanding of the input-output relations in vegetable production in the Republic of Macedonia, and is therefore provides significant outlook and contribution to the management and decision making at vegetable farms.

Key words: *parity, price, vegetables, fuel.*

CURRENT STATE AND DEVELOPING POTENTIALS AND LIMITATIONS OF AGRO TOURISM BRODSKO POSAVSKA COUNTY

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Summary

Rural tourism, including agro-tourism, fulfils an important role in the activation of rural areas, especially regions of high unemployment and particular natural and cultural qualities. Croatia is designated majorly as rural area according to OECD and EU standards. About half of total population lives in rural areas, therefore the needs of rural communities in frames of sustainable living and income conditions are important.

Well-developed selective forms of rural tourism (like agro-tourism) in rural areas have the potential to reverse negative economic trends by bringing in visitors and creating new jobs and local business ventures for rural residents. Although it will not create a massive amount of jobs in any one rural region, agro-tourism can create opportunities for individuals to financially sustain a rural lifestyle. Lack of permanent income, high average age level, low education level, unsatisfactory equipment of basic services and infrastructure, and disordered property situation (land, building and other properties) are the main obstacles in the development of rural and agro tourism.

In this paper the research included the agro-tourism enterprises in Brodsko-Posavska county. Analysis is based on primary research by questionnaire which was conducted on thirty agro-touristic enterprises in 2011. The aim of the paper was paper to present the current state of rural tourism and agro-tourism in the region and suggest activities for improving the agro-tourism position in Brodsko-Posavska county, as well as to present its role in the development of rural area.

Key words: *agro-tourism, rural tourism, rural areas, development*

TOURISTS' INTEREST IN ORGANIC FOOD – SEGMENTATION BY COUNTRY OF ARRIVAL - EVIDENCE FROM ISTRIA COUNTY, CROATIA

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Summary

On the scientific project „Valorisation of selective forms of tourism in sustainable development of rural spaces", during 2007 a survey was pursued on a sample of tourists with intention to determine their interest for ecologically produced food during their stay in Istria. Total of 1.028 questionnaires were collected. According to set hypothesis and sub hypothesis the differences occurred between tourists of different origin and related to certain socio demography features. According to set hypothesis and sub hypothesis the differences occurred between tourists of different origin and related to certain socio-demography features. The occupation of British tourists was strongly connected to purchase and consumption of ecologically produced food. To Italians ecologically produced food was interesting if offered in restaurants as menu offer, while Russian tourists were most indifferent to purchases of such food. German tourists were most interested in enlargement of ecologically produced food offer in shops, green markets etc., while Austrian were interested in consumption in hotels and purchases in local and specialised shops

Key words: *Istria, tourists, ecologically produced food*

WINE DISTRIBUTION IN ISTRIA COUNTY

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Summary

Wine is very important product of Istria County. Its relevance can be seen in various economic aspects like tourism i.e. indirect export through tourism offer, domestic market offer, income source for family farms, employment etc. Wine distribution has two distinctive distribution and sales channels: on market sales through different intermediary (shops, restaurants, distributors etc.) and through direct sales in wine cellars or on site. There are a relatively large number of wine producers in Istria County that are focused on two line productions. First production line is perceived through production of quality wines, while the second line production is manifests in the production of table wines. During March and April 2009 a survey on wine producers was conducted with the purpose to determine and quantify wine offer in Istria County and to identify wine distribution channels. The goal of this paper is to present family farms wine distribution channels (on market as well as through direct sales on spot i.e. in wine cellars) from the aspect of wines offered to the public.

Key words: *Wine distribution, types of wine, Istria county, empirical study*

FARM ACCOUNTANCY DATA NETWORK (FADN) – EXPERIENCE IN ESTABLISHING SUCH SYSTEM IN BOSNIA AND HERZEGOVINA

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Summary

This is a sample survey of the quantities of the full range of variable and fixed inputs including manpower and equipment, used in production including their unit prices so as to generate accountancy and management information. The accountancy data provides a review of farm income and profitability and the management data provides individual assessment of farm enterprise gross margins. These can be used to compare a farm's performance with others and to plan farm production to maximize profits or minimize costs.
In this paper the concept of the FADN system is presented as well as a need for establishing and developing such system in Bosnia and Herzegovina for statistical purposes. Requirements of the acquis communautaire are presented as well. In addition to this, the experiences in establishment of the FADN system in Bosnia and Herzegovina (Project BiH AIS) and its sustainable development in the context of European Union is discussed.

Key words: FADN, acquis communautaire, accession to the European Union, statistics, development of farms

LAND CAPABILITY FOR THE AREA OF THE CITY OF MOSTAR

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Summary

This paper analyzes the area of the City of Mostar, respectively land capability using different databases. The main data source is the project *Study of land capability for the City of Mostar*. The paper specifically analyzes soil types and their quality as well as spatial distribution of agricultural, forest and unproductive land. Area zoning was prepared by creating a relationship of different parameters and databases, while defining the possibilities of use for each zone. The attention is also paid to GIS (Geographic Information System) as a tool for spatial analysis and data manipulation.

Key words: *land capability, agricultural, forest and unproductive land, agrozones, GIS, planning*

LAND COVER CHARACTERISTICS OF SARAJEVO CANTON

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Summary

This paper analyzes the methodological approach and basic principles in the preparation of a database on land cover of Sarajevo Canton. The main source of data is the CORINE project for Sarajevo Canton. Special attention in this paper is paid to a method of identification of land cover by using ortho-photo and satellite imagery, as well as on the importance of working materials in the identification of CORINE classes. The paper presents general technical characteristics of CLC mapping and CORINE nomenclature per levels. Classes are shown in the examples. Special attention is given to the analysis of human pressure in the Sarajevo Canton.

Key words: *CORINE land cover, CLC mapping, CORINE classification, land cover classes, ortophoto and satellite images*

CONTEMPORARY TRENDS OF FEEDING IN SERBIAN FISHERIES WITH PRODUCTIONS AND FOREIGN TRADE INDICATORS

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Summary

There are large possibilities for Serbia to develop its fisheries due to favourable bio-ecological characteristics of our region. However, domestic fish production is insufficient and it is entirely concentrated in Vojvodina. In the period from 2001 to 2010 oscillations in the production were very pronounced which was largely influenced by the climate conditions. Feeding with natural feed and grains is almost completely abandoned in most ponds in Serbia. Intensive production is inevitable in carp production systems. The main goal is to get the most from the available area with adequate technological measures and the optimum way of feeding. The most of carp systems in Serbia apply carp feeding with extruded feed. Fish import had an enormous growth in the investigated period and in the recent years the import of catfish from Vietnam has been dominant. On the other hand, export also recorded a growth rate, but it covered only 1.66% of the total import, indicating a significant trade deficit. It is expected in the future that the consumption of fish will increase and it is clear that this quantity must be either imported or produced. It is only by increasing export that further increase of production may be affected, and for this the state needs to support this economic sector more.

Key words: *fisheries, production, extruded feed, foreign trade, consumption*

GEOGRAPHICAL AND BASIS RISK OF SOYBEAN PRODUCTION

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Summary

In this paper the mutual interdependence of rainfall and yield of soybean in some municipalities in Vojvodina in the period from 1975 to 2005 is analysed by applying the regression and correlation analysis. The results show that the amount of rainfall in the period from April to August has an important impact on yields height of soybean. If we want to use the weather derivatives, it is necessary to take into this fact account, since successful application of weather derivatives is based on reduction of the geographical and production-related basis risk that arises when there is a weaker correlation between the rainfall and the yield of soybean.

Key words: *geographical and basis risk, rainfall, soybean, yield, weather derivatives*

CHARACTERISTICS OF MAIN COMPONENTS OF THE AGRICULTURAL INFORMATION SYSTEM

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Summary

Agricultural information system is an information technology system that manages information dealing with agricultural data. However, there are no generally agreed norms, structures or a coherent view of the functions of an AIS. At the moment, there are neither specific standards nor specifications for what constitutes an AIS, there is no EU standard for an AIS.
This paper presents the need for the establishment and sustainable work for the development of the Agriculture information system in Bosnia and Herzegovina. Main subcomponents of the system required to support the administrative structures in the country to support the operation of CAP (Common Agricultural Policy) and to satisfy the relevant acquis communautaire chapters related to agriculture for accession to the European Union are described (including the Land Parcel Identification System, Farm and Client Register and the Integrated Administrative Control System). Requirements of the acquis communautaire, with reference to main acquis chapters related to the Agricultural information system as well as current status of the development of such a system in Bosnia and Herzegovina is presented.

Key words: *Agricultural information system, acquis communautaire, Common Agricultural Policy, administrative system control, accession to the European Union*

AGROECOLOGICAL ZONE UNA NATIONAL PARK IN TERMS OF SUSTAINABLE MANAGEMENT OF SOIL

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Summary

Agro-ecological zones as well as smaller agricultural areas with similar characteristics, suitability and potentials are a significant component of the general concept of sustainable soil management. This paper presents the results of research within a protected area of national park Una. The total area of the research was 19,800 ha. The goal of the research was to determine the agro-ecological management zones and soil bonity categories. The basic principles of agro-ecological zoning (AEZ) methodology and the GIS system (GIS) were used. Four agro-ecological zones are presented as the research results: zone of agricultural land (2,721.84 ha), zone of pastures and meadows (4,368.29 ha), zone of forests (10,778.11 ha) and urban zone (129.93 ha). General measures of sustainable soil management were proposed for each agro-ecological zone. There are seven soil bonity categories defined by their usability and classified into two groups: the soils suitable for cultivation (category I-IV) with a total area of 2.721,84 hectares and the soils less suitable for cultivation (category V-VIII) with a total area of 4.368,30 ha.

Key words:*agro-ecological zones, soil, national park, bonity categories*

LAND RESOURCES AS A FACTOR IN THE DEVELOPMENT OF AGRICULTURAL PRODUCTION IN THE MUNICIPALITY ŽIVINICE

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Summary

Agricultural production, with many of its specifics, is not like other production activities. These specifics emerges from its dependence on the natural environment and the fact that it is essentially based on a series of biological and biochemical processes of converting inorganic substances into organic.
This paper gives an overview of the land resources of the Municipality Živinice as one of the basic natural resources supporting agricultural production. The paper deals with the structure of agricultural land and sufficiency of certain categories per capita, as well as its comparison with other municipalities of Tuzla Canton and the world and European indices. In order to successfully define this strategy of further utilization of land resources in the Municipality, the comparison between the situation in Bosnia and Herzegovina and neighboring countries and EU countries has been made.
The data in the paper have proved that the total available agricultural land fund in the Municipality of Živinice is small or insufficient, indicating the need to protect and stop further reduction of the resources in it. At the end, the paper gives recommendations for future activities necessary to improve the situation in agricultural production in this area.

Key words: *municipality, agricultural production, natural resources, agricultural land.*

FOREIGN TRADE OF BOSNIA AND HERZEGOVINA IN MILK AND DAIRY PRODUCTS – TRENDS AND PERSPECTIVES

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Summary

Bad economic situation in Bosnia and Herzegovina is also reflected in pronouncedly negative foreign trade balance in majority of economic activities, among others in agriculture and food industry. Reasons for such situation should be looked for in insufficiently recovered and developed food industry, insufficient government support to domestic agricultural production, and insufficient harmonization with EU legislation. Still, increase of agricultural and food stuff export has been noticeable year by year. Besides, it can be noticed that export of some groups of agricultural and food commodities has been increasing faster than the sector's average. The group with the most profound increase is the group with the tariff number 04 – Milk and dairy products. Thus, the focus of this paper was foreign trade of Bosnia and Herzegovina in milk and dairy products. The share of dairy sub-sector in total BH import and export was investigated, as well as the structure of foreign trade by products. Trend line of this indicator was determinate, as the basis for assessment of future changes regarding this issue.
Milk and dairy products are the most important group of products regarding export of food and agricultural sector of Bosnia and Herzegovina, so in 2009 the share of this group in total sector's export was 14%. The share of this sub-sector in sector's import varied over the period. Coverage of import with export for dairy products has been increasing from 18.64% in 2005 to 48.29% in 2009.

Key words: foreign trade, milk and dairy products, Bosnia and Herzegovina

ECONOMIC ANALYSIS OF AN AGROTOURISM MODEL IN ISTRIA COUNTY, CROATIA

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Summary

Agrotourism present a relatively new selective form of tourism in rural areas as an activity on family farms and based on sustainable use of natural resources, nature and traditional features of the rural community.
The family farm presents an organizational and production unit which has agricultural production in the form of trade company, craft, cooperative, or family farm in the tax system or out of the tax system as family agricultural estate or peasant family farm.
In this paper the research included the agro-tourism enterprises in Istria county. Analysis is based on primary research by questionnaire which was conducted on forty agro-touristic enterprises in 2009. The aim of the paper was paper to present a model of agricultural production that is sustainable for tourism activities on farm
The model presents an average farm that has 50 sitting places, 6 beds in 3 rooms and performs 3600 meals per year.
The economical indicators showed that these factors results in a positive economical sense of cca 26.000 euro per annum while sole agricultural production sold as raw products result in economical loss.

Key words: *agrotourism, model, Istria county, empirical study, economic indicators*

CHARACTERISTICS OF THE LAND PARCEL IDENTIFICATION SYSTEM (LPIS) AS THE MAIN SUBCOMPONENT OF THE AGRICULTURE INFORMATION SYSTEM

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Summary

Land Parcel Identification System (LPIS) is one of the main GIS part within the EU Common Agricultural Policy. It is core element of the Integrated Administration and Control System (IACS) which is used for subsidy payments. LPIS is a spatial register of agricultural parcels maintaining the exact information on position, size, and unique identifier for each parcel. One of the main functionalities of the LPIS register is to prevent subsidy payments to the farmer for non-eligible areas and to avoid double payments on the same areas.
In this article the authors researched the LPIS methodology used in some member states (SI) with the approach proposed in the candidate (HR, FYROM) or potential candidate countries (BiH). Different models are analysed and its main characteristics described. A possible solution for the most appropriate LPIS model in Bosnia and Herzegovina has been analysed, taking into account the current situation of available registers, cadastral data, national payments, agricultural parcel structure and other elements of the Agricultural Information System (AIS) in the country.

Key words: *LPIS, Agricultural information system, Common Agricultural Policy, payment control, accession to the European Union*

LUCAS – LAND USE LAND COVER AREA FRAME STATISTICAL SURVEY – ITS IMPORTANCE AND DEVELOPMENT IN BOSNIA AND HERZEGOVINA

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Summary

At a European level the statistical series arising from GIS LUCAS work aims to provide comparable and harmonized statistical information on land cover and land use in the EU to meet the data needs of the Commission, the EEA and others, by setting up an integrated system for land cover/use statistics in Europe. In preparation for future policy orientation including CAP 2014-2020, the European Commission has been intensifying the specification and development of environmental and agri-environmental indicators. Although not originally organized for this purpose the GIS LUCAS methodology and system is now recognized as a key element in helping sectors prepare and manage the environmental and agri-environmental data collection using synoptic analysis and field visits. GIS LUCAS is becoming a multi-functional platform and not one just limited to the original LUCAS and frame sampling concept on land use and crop areas and production.
In this paper the concept of LUCAS system is presented as well as its importance in defining and assessing the EU CAP. Additionally, review of the actual policies in the European Union where LUCAS is becoming more important is presented. When it comes to activities in Bosnia and Herzegovina, the methodological approach based on LUCAS (Project BiH AIS) is presented. This approach is used for the preparation of following data: Agriculture Land Cover data, Total Agriculture Area, Total area under specific crops and Total production of main crops and yield. Results are shown for Sanski Most Municipality. The importance of developing of such system in Bosnia and Herzegovina in the context of European Union accession is discussed.

Key words: *GIS, LUCAS, land cover and land use, Common Agricultural Policy, accession to the European Union*

ECONOMIC EFFECTS OF INTRODUCED VARIETIES OF STRAWBERRY CULTIVATION OUTDOORS IN SKOPJE

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Summary

Prices of the fresh strawberries, which can result in positive financial results, are directly related to the period and speed of realisation. Those marketing characteristics can directly influence the quality and at the same time the total income. The total production value was obtained through measuring of yields and price for realization during the analyzed period. This paper reviews and calculates data on the average income from the varieties and classes during the analyzed period, the average term structure of income between the varieties and classes, the dynamics of retail prices by class and variety, according to income classes for each sample year depending on cultivar, harvest time, and an average total income for all three years. Due to certain uniform growing conditions – climate and land conditions, breeding system and agro technical measures, age of plants, their origin and quality of planting material, assuming that all the cultivars have the similar costs for planting, its maintenance and exploitation, based on the total three year and average annual income. There were analyzed 17 varieties of strawberries. 15 varieties were introduced from renowned Italian nurseries. Two standard varieties are used as controls. The trial is set to double row in the open, irrigated by drip system with controlled doses of water on the surface Scientific Public Institution - Institute of Agriculture, site Dolno Lisiche, Skopje. The varieties that showed the highest financial effects were Madalene, Onda, Honeoye and Eris.

Key words:Prices, income, strawberry, varieties

CONSUMERS BEHAVIOR AND ATTITUDES REGARDING NATURAL BOTTLED WATER, DEPENDING ON THE GEOGRAPHIC AREA

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Summary

Production and consumption of natural bottled water has been growing through the past 30 years. In this regard, it is the most dynamic sector of all food and beverage industry and its consumption has increased to an annual average of 7%. All of this is happening despite the extremely high prices that consumers pay compared with tap water.

Drinking Natural Bottled Water in the world has become a habit of large number of consumers. Currently people are increasingly aware of its health priorities, and decide to consume natural bottled water with a great confidence in the purity and safety of the water that comes from urban water sources.

This work was conducted as a sample of 200 respondents on the consumption of natural bottled water on two sites - Sarajevo and Tuzla. The habits of consumers were explored and the corresponding conclusions were recorded.

Key words: *natural bottled water, consumers behavior, consumption*

ANALYZES OF INVESTMENTS IN RECONSTRUCTION OF CATTLE FARMS USING THE FUNDS FOR RURAL DEVELOPEMENT

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Summary

Cattle production in the Republic of Macedonia, especially dairy farms, as well as most of the agricultural producers and companies related to agriculture are highly dependent on funding related to possibilities for bank loans. Slow turnover and dependence of the climate conditions are characteristics that make agriculture less attractive for banking support. Domestic and European union funds are sources that can be used under certain conditions on one side and possibility for generating appropriate income and profit to cover all of the expenses including material and financial obligations. In this paperwork on one specific example are presented possibilities and calculation for funding and planned returning of funds during the investment and returning period. Due to the fluctuations on the market on input prices, and also prices of outputs (in case of dairy farms the main product – milk) have in previous period extremely high oscillations. One of the main calculations are focused on sensibility analyses which are shown the main risks under enlarging or reducing input and output prices.

Key words: Financing, prices, sensibility, cattle, dairy.

COST ANALYSIS OF RAISING REPLACEMENT DAIRY HEIFERS

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Summary

Study was conducted from 2008 until 2010s. The financial analysis of the cost of raising calves and heifers of Holstein breed was carried out for two districts (Tirana and Durres). Average number of heifers was 108.57 and 78.46 for milking and custom heifer operations respectfully. A sample of 18 and 15 milking and custom heifer operations were evaluated by using the cost analysis spreadsheet. The objective of this study was cost analyze and validation of data set on 18 and 15 milking and custom heifer operations respectfully. A cost analysis was carried out with an Excel 2003 Microsoft file. The spreadsheet estimated the costs to raise a replacement heifer by specific age classes. Results from the validation showed the performance of the cost analysis. The average total cost to raise a replacement heifer for this data set was €1207.14 and €1091.25 for milking and custom heifer operations, respectfully. Feed costs contributed 62.4 and 66.7% of the average total cost for milking and custom heifer operations respectfully.
The age classes, weaning until 6 month of age and 6 month until bred are the periods of least expensive rearing as showed by the average costs per head per day values. Average total cost to raise a replacement heifer for the age class bred until prefresh was €538.87 and €417.73 for milking and custom heifer operations respectfully. Labor was the second largest expense contributing 9.2 and 11.8% of the average total costs from birth until prefresh for milking and custom heifer operations, respectfully. Average per day cost was estimated to be 1.66 and €1.57 for milking and custom heifer operations respectfully. The findings presented by this study emphasize the importance of understanding the economics of raising replacement dairy heifers on an individual operation basis.

Key words: *milking and custom operations, heifer, cost*

THE SOIL ADSORPTION COMPLEX OF REPRESENTATIVE TYPES OF SOIL IN BOSNIA AND HERZEGOVINA UNDER DIFFERENT LAND USE AND DIFFERENT SOIL MANAGEMENT

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Summary

Elements of analyze of the soil adsorption complex CEC (Cation Exchange Capacity), percent base saturation and the nature of adsorbed cations are strongly related to important soil properties: buffering, filtration, pH reaction, potential for storage plant nutrients, aggregation. The standard pedological praxis in analyzes of soil adsorption complex are used data obtained by Kappen procedure. However, these data did not give us insight in the composition and abundance of adsorbed cations, and these values of the total capacity of adsorption (T by Kappen) yet differ from the values of CEC obtained by leaching exchangeable bases (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}) and exchangeable acidity (H^{+}, Al^{3+}) with 1M NH_4Cl (pH 4,6) and summarizing their equivalent quantities.
This paper presents the results of analyzes of the soil adsorption complex of representative types of soil in Bosnia and Herzegovina (dystric cambisol, pseudoglay and terra rossa) under different land use (arable soil, meadow and forest) and different soil management. There is a known positive correlation between CEC and clay content, soil organic matter content, and pH value. In such a manner, data shows that terra rossa contains the highest values of CEC (10-13 cmol kg^{-1}) and total percent base saturation 99%, and the most abundance exchangeable cation is Ca^{2+} (80%). Lowest values of CEC are recorded in pseudoglay (6,5 cmol kg^{-1}). Al^{3+} is the most abundance cation in native soils in dystric cambisol (65%) and pseudoglay (75%) and in these soils the recorded total percent base saturation is less then 50%. However, in these two types of soil are evident positive influence of soil management. So, in soil under a vegetable garden (dystric cambisol) and arable land on pseudoglay where liming is made, records show an increase of values of total percent base saturation (60-70%), and the most abundance cation is Ca^{2+}.

Key words: soil adsorption complex, land use, soil management

BIODIVERSITY OF ANTS (Insecta: Hymenoptera: Formicidae) INHABITING CULTIVATED AREAS AND FRUIT GARDENS IN THE MUNICIPALITY OF BREZA

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Summary

Ants themselves, directly, are not considered serious pests of fruit gardens. Their role in distribution and protection of plant lice (*Aphidae*), and their mutual symbiosis due to ants feeding on honeydew of plant lice has been known for a long time. Presence of ants induced by their correlation with plant lice, important pests of fruit crops and vectors of plant viruses on fruits, may be indicative of a need for a chemical protection of plants.
An analysis of the myrmecofauna of fruit gardens with 110 pear trees, 180 apple trees and 120 plum trees in the village of Podgora was conducted (municipality of Breza). Along with the analysis of the biodiversity of ant fauna, regression analysis of the ant and lice numbers on trees was also conducted and yielded in statistically significant results. These analyses resulted in records of three species belonging to the subfamily Formicinae Lepeletier, 1836: *Lasius alienus* Foerster, 1850, *Formica fusca* Linnaeus, 1758 and *Formica cunicularia* Latreille, 1798 form symbiotic interaction with plant lice. Apart from the aforementioned species, colonies of species, *Formica pratensis* Retzius, 1783 were recorded in the soil.

Key words: Formicidae, Aphidae, Biodiversity, fruit gardens.

COMPETITION POLICY AND ITS EFFECTS ON TRADE WITH AGRICULTURAL AND FOOD PRODUCTS AT THE SERBIAN MARKET

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Summary

In the process of transition of Serbian economy in the agricultural and food sector, an important issue is the competition.
Having in mind the situation for the transition starting in 2000, in which state companies dominate in the agriculture and food industry, privatization in some cases changed just the owner without changing structure. As a result of this, situation was created in which not all competitors are in the same position.
This was the case, although new local and foreign retail chains, as well as large number of small retailers appeared on the Serbian retail market. The trade volume of agricultural and food products had increased significantly.
A new phase in development of legislation and policies of protection of competition in Serbia started with adoption of the Law on Protection of Competition in 2005 with adoption in 2009.
The Commission for the Protection of Competition was established and has adopted decisions on mergers and abuse of dominant positions. There is also a record of this activity. Serbia is cooperating with UNCTAD for the peer review on competition law and policy.
This paper presents the current situation in the trade with agricultural and food products, competition policy and its effects on the trade development with agricultural and food products in Serbia.

Key words: *competition, agricultural and food products, market, trade, Serbia*

DETECTION AMMUNITION WITH DEPLETED URANIUM IN SOIL AND PROTECTION OF RURAL AREAS

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Summary

Depleted uranium projectiles are used in modern warfare for destruction of armored military facilities. During the intervention of NATO armed forces in the territory of Bosnia and Herzegovina, depleted uranium ammunition was used.UNEP team found the existence of 15 sites in Bosnia and Herzegovina, where he worked with depleted uranium ammunition.
In our research, we attempted to establish the radiation doses in various distances from the point of impact.
We studied the activity of ammunition in various types of land, and safety distances ranged up to 50 cm
Considering that depleted uranium is characterized by low energy gamma radiation, a great number of radiation detectors cannot be used effectively for living environment prospect.
We examined three different detection systems and have shown which of the existing devices can be effectively used for detection of depleted uranium.
Characterization was performed with four different detectors, (KOMO-TM, MC-PHARE and the SSM-1), shows that the safety distance of uranium ammunition ranges from 40-50 cm. Detectors DR-M3 shows deviation and is not suitable for monitoring the occurrence of uranium in nature.

Key words: *uranium ammunition, detectors, distance, soil.*

DROUGHT ANALYSIS IN SARAJEVO USING STANDARDIZED PRECIPITATION INDEX (SPI)

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Summary

Drought in general term is the result of rainfall deficiency from its normal value in a particular area. This is a temporary deficiency, unlike aridity, which is a permanent character of the climate. Agriculture is often the first sector to be affected by the onset of drought due to dependence of precipitation and soil moisture reserve during various growth stages (Narasimhan and Srinisvasan, 2005).
The aim of this study is to use the standardized precipitation index (SPI) for 2- and 6-months time intervals to determine the occurrence, duration, severity, frequency, magnitude and trend of drought in the area of Sarajevo. A series of data for 50 years (1961-2010) for the meteorological station Aerodrom – Butmir were used.
The longest drought in the area of Sarajevo was during the 1989/90 hydrological year, drought lasted for 11 months (from January to November). Throughout the whole analyzed period of time, there were 98 (or 16.4%) of dry months and 10 (or 20%) dry vegetation periods. This means there is one dry vegetation period every five years in this area. During the last decade (2001-2010.) of analyzed time period, the highest number of dry vegetation periods was determined. The greatest drought magnitude was during 1995/96 hydrological year (DM 13.1).

Key words: *SPI, drough, Sarajevo, agriculture, precipitation*

THE RELATIONSHIP BETWEEN STANDARDIZED PRECIPITATION INDEX AND YIELD REDUCTION OF SIGNIFICANT AGRICULTURAL CROPS IN NORTHEASTEN BOSNIA

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Summary

According to generally accepted definition, the impact of the drought in agriculture can be quantified by the consequent yield reduction (Todisco et al., 2008). In this paper, we analyzed the correlation between the value of the yield reduction depending on the developmental stages of crops and soil properties, and the standardized precipitation index (SPI) based on data on the amount of precipitation, in order to determine the possibility of its use in predicting the yield reduction.
The study was conducted in northeastern Bosnia, which has been recognized as one of the most attractive area in the continental part of B&H, in terms of possibilities of organizing agricultural production (Žurovec et al., 2010).
Climate data from two meteorological stations were used: Tuzla and Bijeljina, for a total period of 48 years (1961-2008). The research involved the following crops: maize, soybean, tobacco, peppers, potato and alfalfa.
Calculation of yield reduction (Yr), for selected crops, and SPI for 3- and 6-months time intervals was conducted with the use of CROPWAT and the SPI monthly computer programs.

Key words: *SPI, yield reduction, agriculture, precipitation, northeastern Bosnia*

FOOD TECHNOLOGIES

CONSUMER ATTITUDES, BEHAVIOURS AND RIGHTS TOWARD FOOD MARKET IN UNA SANA CANTON

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Summary

The aim of this study was to examine consumer attitudes and behaviours related to food products in the market of Una Sana Canton. The research was conducted during period from 2009 to 2011 in the eight municipalities. Questionnaires were accomplished through direct contact with 280 adults and consisted of several group of questions related to the socio-demographic characteristics, attitudes of consumers according to the food choice, quality and labelling, as well as the consumers rights. The sample of subjects was mainly females (62.4%), average age 43 years, mostly with just secondary education (61.4%). Average earnings of examines were around 400 €, while the unemployment rate was around 40%. The decision to purchase some food product over 80% of consumers made on the basic of quality, however, 22.6% of them know what the product quality is, which indicates the high degree of ignorance. Their perception of quality is not based on assumptions and/or wrong perceptions of the various media. Also, 74.5% of examines believes that domestic products have better quality, but over 80% of them don't know why. In accordance with labelling of food product, 84.6% of examines check the data of product usage, but only 11.2% are interested to the nutrition and health claim. There were statistically significant differences (ANOVA, Duncan's *post-hoc* test $p < 0.05$) in the attitudes of consumers depending on their location and gender. Consumers' do not have a proper perception about their consumer rights which leads to the recommendation that state institutions in the system should be intensified to inform consumers.

Key words: *Consumer behaviour, consumer rights, food products; food labelling*

AFLATOXINS IN PLANT FOODS WHICH ARE PRESENT ON LOCAL MARKET

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Summary

Mycotoxins are secondary metabolites of moulds. Moulds are microscopic fungi that produce metabolites and release them to the surface where growth. *Mycotoxins* are classified in class 21 with over 400 different toxins produced by about 350 fungi.
Aflatoxin is mycotoxins whom the favourable conditions of humidity and temperature produces the fungus *Aspergillus flavus*. *Aflatoxins* were first isolated and identified 1960th in England as a cause of "Turkey-X disease" of which over 100 000 turkeys died. There are four main types of *aflatoxins*: *B1, B2, G1* and *G2*, and two additional metabolic products *M1* and *M2*, which were isolated from milk. *Aflatoxins* belong to a group of extremely toxic *mycotoxins*, and are therefore placed on this group I carcinogens by the International Agency for Research on Cancer /IARC/, and especially distinguished as *aflatoxin B1* human carcinogen - 1993. The IARC has placed him on the list of human carcinogens. Man is exposed to the effect of *aflatoxins* by eating food that is contaminated products of developed fungi. *Aflatoxin B1* is the strongest natural carcinogen for the liver and *aflatoxin B1* and hepatitis B /HBV/ are considered as major risk factors in the etiology of hepatocellular carcinoma /HCC/. The aim of our work is to be seen whether in foods of plant origin present in our market have *aflatoxins B1*. From the 32 samples tested of foods of plant origin, in 11 samples were found certain concentration of *aflatoxins* which ranged from 0.23 ppb to 11.67 ppb. The results obtained show that with contaminated food entered a certain amount of *aflatoxins B1* and if they are in small quantities a threat to human health and animals - *aflatoxins B1* have a cumulative effect.

Key words: *mycotoxin, aflatoxin B1, human carcinogen, mold, HCC*

SPECTROPHOTOMETRIC DETERMINATION OF QUININE IN TONIC WATER AND BITTER LEMON

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Summary

Quinine is an alkaloid that gives bitter flavor to some soft drinks. The quinine content in this study was determined by two methods. For this purpose Quinine-contained beverages were degassed and prepared for determination. The methods were applied on five samples of commercial tonic waters and five samples of bitter lemon.
In the first method complex formed between quinine and Alizarin brilliant violet was determined by 3rd derivative spectrophotometry (578 nm). The second method was determination of quinine in soft drinks at UV area (320 nm). All determinations were repeated five times.
It was concluded that both of methods are suitable for quinine determination in tonic waters and bitter lemon, and in comparing methods better agreement was in quinine content in tonic waters than in bitter lemon.

Key words: *quinine, tonic waters, bitter lemon*

THE EFFECT OF PROCESSING AND LIMITED PROTEOLYSIS ON PROTEASE INHIBITOR AND LYPOXIGENASE ACTIVITY OF PEA PROTEIN ISOLATE

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Summary

The aim of this work was to investigate the influence of processing mode and limited proteolysis of pea protein isolates on protease inhibitor activity and activity of lypoxigenase. Pea protein isolates of two different genotypes (Maja and L1-experimental line) were prepared in laboratory by selective isoelectric precipitation. Isolates were modified with three different proteases (papain, hymosin, commercial protease from *Streptomices griseus*) for 15, 30 and 60 minutes.
Protease inhibitor activity of unmodified and modified isolates was determined according to method of Liu and Markakis (1989). Residual activity of lypoxigenase was assayed according to Axlord et al (1981). Nature of these compounds was determined by SDS-polyacrilamide gel electrophoresis and densitometric analysis of obtained patterns. SDS-PAGE was conducted according to procedure by Fling and Gregerson (1987).
Initial pea flour were characterised by low level of inhibitor and lypoxigenase activity. Protease activity was ranged from 17.69±0.01 to 7.31±0.01 TUI/mg, while lypoxigenase activity was from 20,09-25,98 μmol $g^{-1}min^{-1}$. At the same time, these proteins represented 6.67%-8.02% and 4.81%-2.45% of total extractable proteins, respectively. Selective isoelectric precipitation had different effect on activity of inhibitors and lypoxigenase. Namely, the activity of protease was reduced to 7.23±0.03 TUI/mg - 2.81±0.0 TUI/mg, while lipoxigenase activity increased to 41.14-89.48 μmol g^{-1} min^{-1}. Limited hydrolysis caused decrease of activity and content of both compounds. Depending on time of hydrolysis and enzyme used, inhibitor activity was reduced to 0.40±0.01- 6.14±0.03 TUI/mg. In the case of papain-modified and commercial protease-modified isolates lypoxigenase almost completely disappeared.

Key words: *Pea protein isolate, Inhibitor activity, Lypoxigenase, Partial proteolysis*

EFFECT OF GENOTYPE AND WAY OF MACERATION ON THE CONTENT OF BIOACTIVE COMPOUNDS OF CHERRY NECTAR

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Summary

Cherry is a valuable raw material for of nectar production, due to its aroma, but also because of its rich pigments, anthocyanins, powerful antioxidants that are giving the characteristic dark red color, which together contribute to sensory attributes of nectar.
The aim of this study was to investigate the influence of three genotypes of cherry (Maraska, Schattenmorelle and Domaća Oblačinska) and way of maceration (with or without stone) on the physical and chemical parameters (yield, total dry matter, total acidity, sweetness index and pH value), sensory properties, as well as content of anthocyanins and total phenols of cherry nectar.
The results showed a statistically significant effect of genotype and maceration, on the physical and chemical parameters of nectar samples, which is also confirmed by sensory evaluation where the highest overall score gained nectar of Schattenmorelle genotype, while generally nectars without stones obtained the highest overall ratings. Compared with other genotypes, nectar produced from genotype Schattenmorelle contained an extremely high level of anthocyanins (220.44 mg/L) whereas the influence of stone showed a negative effect on the anthocyanins content in nectar. The highest content of phenolic compounds (0.968 mg/ml) was found in nectar produced from genotype Schattenmorelle, and the way of maceration had significantly influence on their content in nectar.

Key words: *Cherry nectar*, *genotype*, *maceration*, *quality parameters*, *bioactive compounds*

EFFECT OF INTERACTIONS OF HIGH INTENSITY ULTRASONIC PROCESS PARAMETERS ON PHYSICAL PROPERTIES OF SHEEP MILK

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Summary

The primary objective of this investigation is influence of parameters of high intensity ultrasound and their interactions with constant frequencies of 30 kHz on physical properties of goat milk. Influence of high intensity ultrasound is followed by given process parameters: amplitude (A=20, 60 and 100 %), time of treatment (t = 2, 6, 10 and 15 minutes), cycles (0.6; 0.8; 1) and probe diameters (d = 7, 10 and 14 mm) on changes of temperature, pH – value and density. Influence of process parameters and their interactions are shown with Probability plot expressed over p – values and β – standardized coefficient (ANOVA) and calculated using linear and quadrate model. Process parameters and their interactions have influence on increasing of temperature of goat milk. Influence on decreasing of pH – value is obtained with maximum intensities of 7mm probe. Influence of interactions between amplitude and cycles results on increasing of density which is indicated with high β – value. Obtained results indicated that linear model have better interpretations of influence of process parameters on temperature while quadrate model have better interpretations of process parameters on pH – value and density.

Key words: *ultrasound, physical properties, interactions, goat milk*

PCR BASED ANALYSIS OF GMO CONTENT IN CANNED PÂTÉS OFFERED ON THE MARKET OF B&H

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Summary

GMO Law in Bosnia and Herzegovina is rather precise regarding the distribution and import of GMO containing products as well as regarding the labeling of GMO content. No GMO was authorized for use in our country by the end of 2010 which implies absence of GMO in B&H market. We tested this presumption by analyzing a sample of choice food products for GMO content. We selected 29 pâtés that are available to B&H consumers, which did not carry GMO label. All the analyses were based on PCR, which represents a golden standard for the detection of GMO in food. Soltis Lab CTAB DNA extraction protocol (Doyle&Doyle 1987; Cullings 1992) was used for DNA extraction. The quality of DNA extracts was observed in 1.2% agarose gel. GeneScan kit (Eurofins) was used for testing the samples for the presence of the common elements of transgene construct (35S and tNOS). Detection of amplicons was performed in 1.5% agarose gel. Successful amplification of trnL sequence has revealed the absence of inhibitors. TrnL sequence was not amplified only in two cases. Possible cause may be the plant DNA concentration below the limit of detection of the test. Only three pâté samples tested positive for the two transgene elements. Soy is frequent component of this type of products and its GM form is widely distributed. Therefore, the samples were also tested for the presence of soy.

Key words: *PCR detection, GMO, B&H*

THE SIGNIFICANCE OF MONITORING PESTICIDE LEVEL IN FOOD

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Summary

With food monitoring we are establishing the modalities and procedures in verification of sanitary check and food hygiene in order to identify dose of nutrients, additives, contaminants, genetically modified organisms (GMO) microbiological criterion of food, that are indicators of intake of some adverse ingredients in organism, risk assessment and threatened consumers health. Sampling of food for laboratory examination during monitoring is maintained where the consumers are buying food. In BiH the project of food monitoring was conducted, It was collected 3300 samples in total and sent for analysis in order to identify the danger that can occur from food. In BIH after conducted food monitoring 143 samples and vegetable and animal source, 100 bakery products, was sampled, and samples were analysed on 59 pesticides. In the members of EU the continuous monitoring of pesticide remains is conducted on the national level and EU level. Average number of samples that are taken for analysis to pesticide on 100 000 residents in EU is 11. It is estimated that BIH has around 3.8 million of residents which is pointing that the number of samples for analysis should be over 400 to achieve average level of EU. In EU, average number of analysed pesticide in test sample is 161.

In accordance with results of sample analysis it has been estimated that consumers in BIH are not exposed to pesticide remains in food that is over allowed level or any other danger that can originate from food.

Key words: *food monitoring, danger, residue.*

ANTIOXIDANT ACTIVITY DETERMINATION OF NATURAL ANTIOXIDANT PRESENT EXTRA VIRGIN OLIVE OIL DERIVED FROM OBLICA VARIETY

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Summary

Olive oil was always important food in daily diet of Mediterranean people, and from the second half of the twentieth century it becomes more frequent in diet of people whose main source of fat was animal fats. The main reason for rapid expansion of table olives and olive oil production is its nutritional, preventive and therapeutic benefits.
Some minor compounds are phenols, chlorophylls and carotenoids. Olive oil phenols are important for the flavor and the bitter taste of the oil, while virgin olive oil color is the result of green and yellow hues due to the presence of chlorophylls and carotenoids.
In this research the samples of extra virgin olive oil from two regions of Bosnia and Herzegovina, derived from Oblica variety, were analyzed by determination of phenol, chlorophyll and carotenoid content.
There was not found statistically significant difference in phenol, chlorophyll and carotenoid contents between the samples of extra virgin olive oil from the region of Ljubuški and Neum. There were no statistically significant differences in the temperature and humidity air in examination area.

Key words: *olive oil, phenols, chlorophylls, carotenoids*

HPLC DETERMINATION OF CAFFEINE CONTENT IN COFFEE SAMPLES

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Summary

Some popular brands of coffee, collected from local markets in B&H, analyzed for caffeine content. The caffeine concentration in coffee samples was quantified by high-performance liquid chromatography. Analytical HPLC unit consists of Thermo Finnigan Autosampler, Thermo Finnigan LC Pump, Thermo Finnigan PDA Detector, a 100 x 4.6 mm i.d.Thermo Scientific C-18 column with 5 µm particle sizes. The instrument was used with a flow rate of 1 mL/min and a 24:76 solution of methanol and deionized water, respectively, as the mobile phase. Caffeine was separated as a single peak with a retention time of 3.44 min. The levels of caffeine in several brands of coffee were found to be within the documented range.

Key words: *reverse phase, High Performance Liquid Chromatography (HPLC), caffeine, coffee*

THE INFLUENCE OF DIFFERENT WAYS PROCESSING OF SPINACH FOR CHLOROPHYLL CONTENT

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Summary

The processing of spinach, especially blanching, leads to the degradation of chlorophyll to other colored or colorless derivatives. Such treatment leads to change its color, which is especially important from the aspect of the consumer acceptance of products, although there is no evidence that the resulting derivatives have different bioactive properties. Mechanisms and intensity of degradation of chlorophyll are conditioned by factors such as temperature, pH-value, enzymatic activity, the presence of oxygen, light and length of storage.
In this study, it was tracked the influence of blanching and freezing storage spinach during the three month period.
Spinach for research, Matador varieties, was grown at the site Podorašac Konjic municipality, according to the practice of individual manufacturers. Sampling was done one month after sowing the spinach according to standard procedure. The experiment was conducted in a total of 50 samples. In 10 samples of analysis were performed on the same day. 30 samples were blanched for 30, 60 and 90 seconds, and 10 samples not treated by some method. All 40 samples were frozen and stored at -20°C, and analyses were performed after 30 and 90 days storage period.
Chlorophyll a and b were extracted from spinach with absolute acetone and determined spectrophotometrically at wavelengths of 663 and 645 nm.
It was concluded that highest retention of chlorophyll in spinach was in samples blanched in water at 80°C for 90 sec and spinach samples that were frozen without blanching.

Key words: *Chlorophyll, blanching, processing*

MICROBIOLOGY OF FOOD IN THE LIGHT OF NEW LEGAL REGULATIONS

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Summary

Today, at the time of transition in which is Bosnia and Herzegovina, there are two approach to the application of currently applicable legislation and food control. In accordance with those in Bosnia and Herzegovina and today are currently in force and some outdated implementing regulations, which are defined by the commitments with the force of the Regulation on the takeover of federal laws and other laws of the former SFRY, Bosnia and Herzegovina is still using a republican laws and other implementing regulations in the field of food.
The old approach is based on old rules and principles *"see, touch, smell",* mainly based on detection of potential risks, where the risk of diseased animals and physical pollution of the main concerns. When it comes to food microbiology is still in the application of Regulation on microbiological food safety in transport ("Official Gazette of SFRY", No. 45/83, 43/89) and Ordinance on the methods of carrying out microbiological analysis and superanalysis of foodstuff (("Official Gazette of SFRY", No. 25/80).
The modern approach is based on a new concept and policy of food safety in the world in recent decades has experienced a fundamental change in moving from control of the final product of a comprehensive integrated security system *"from farm to table",* and the prevention of risks where greater attention is paid to microbiological and chemical pollution.
New Regulations on microbiological criteria for foodstuffs, shall be determined by microbiological criteria for certain microorganisms in food and the implementing rules, which operators with food, must respected when applying the general and specific hygiene measures based on hazard analysis critical control points - HACCP.

Key words: *microbiological criteria, sampling, food safety, foodstaff*

INFLUENCE OF EXPANDED MATERIAL CONTENTS ON PHYSICAL-CHEMICAL CHARACTERISTICS OF THE BLEND AND PHYSICAL CHARACTERISTICS OF CIGARETTES

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Summary

The physical parameters of the quality of cigarettes were directly related to the chemical composition of raw materials. It has a significant influence on the properties of cut rag tobacco blend, and indirectly on the properties of cigarettes, burning conditions, and thus the properties of smoke. Expanded stem are rolled, flattened, and shredded tobacco leaf stems that are expanded by being soaked in water and rapidly heated.

In this work, the effects of added quantities of expanded steams of Burley on physical-chemical properties of cut rag blend and physical characteristics of cigarettes were investigated.

The study involved three cut rag blends for cigarettes, which are identical in all components, except the percentage of expanded steams (10, 15 and 20%). As control was used cigarette that does not contain expanded material.

The results showed that with increased of expanded steam content, there was a change in the fractional part of the blend, which results in a significant increase of filling power of tobacco. The result is a significant reduction in weight of the analyzed cigarettes.

The amount of 20% of expanded steams has no effect on resistance to draw of C_4 test-cigarette compared to C_3 test-cigarette, while compared to other cigarettes, were observed significant differences.

With increased amounts of expanded steam in cut rag blends of cigarettes, the concentration of nicotine was reduced, whereas the concentrations of nitrate and chloride increased significantly. No statistically significant difference was observed between reducing sugar contents in tobacco blends with 10-15% and those with 15-20% expanded steams.

Key words: tobacco, expanded steams, blend, cigarettes, nicotine

DEFINING OF TRAVNIK CHEESE SENSORY CHARACTERISTICS RELATED TO TYPE OF MILK

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Summary

Travnik cheese is nowadays more often by cheese producers titled as Vlašić cheese. Regardless of its name it is probably one of the most consumed cheese type in Bosnia and Herzegovina. It has been producing on Vlašić mountain traditionally of ewe's milk for more than one century. However, cow's milk and mixing of cow's and ewe's milk has been more participating with time in manufacture of this cheese. Despite the fact that sensory characteristics of Travnik cheese have been studying through years they were yet clearly defined. The aim of this work was to define sensory characteristics of ewe's and cow's milk Travnik cheese. And to test consumer favour towards this cheese depending on type of milk. Therefore, the survey was conducted among consumers. Travnik cheese samples were sensory evaluated both by laymans and expert panel. Ewe's milk cheeses were purchased at local market while cow's milk cheeses were bought in local shoping centers.
The survey showed that many consumers knew Travnik cheese but majority did not consume it (65%). The lack of habit was mentioned as main reason for it. Sensory evaluation done by laymen showed that consumers like Travnik cheese especially ewe's milk one. Supporting this, the ewe's milk cheeses gained better score than cow's milk ones by expert panel. Results obtained showed great variability with respect to sensory characteristics of Travnik cheese.

Key words: *sensory properties, ewe's milk, cow's milk, cheese*

FREQUENTLY DETECTED HEAVY METALS IN SOME GRAIN PRODUCTS

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Summary

There is significant number of heavy metals in the soil because of application chemicals in industrial and agricultural processes. Those are, for example lead (Pb), mercury (Hg), cadmium (Cd) and arsenic (As). Sources of heavy metals entering the soil may be some mineral fertilizers and pesticides. Many heavy metals are introduced with resources for plant protection, and also urban garbage (municipal waste) is mentioned as a potential source of these elements often.
Grains as a raw materials used in the manufacturing industry in our country are largely imported, and there are possible omissions regarding the contents of potential contaminants of finished products as a result of insufficient surveillance. Research in this paper include two widely used wheat products: flour and bread with the aim of verifying possible presence of heavy metals over the allowed limits regulated by the relevant Regulations for this type of food (content of Pb, Cd, Hg and As).
In tested samples of bread cadmium is usually detected with values from 0.2 to 0.15 ppm, and mercury with 0.04 ppm. Part of tested flour samples contained unalloyed concentrations of cadmium (0.1 to 0.18 ppm). The presence of lead and arsenic has not been detected.

Key words: *heavy metals, cadmium, mercury, wheat, flour, bread*

USAGE OF RAW MATERIALS IN PRODUCING FOOD IN THE SECTOR OF WILD ORGANIC PRODUCTION IN BOSNIA AND HERZEGOVINA

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Summary

Wild edible herbs are the subject of interest of many scientists for many years, especially from the aspect of nutritional value. The results suggest that the edible wild plant species are valuable sources of nutrients which as quantitative indicators are beyond the cultivated forms. The greater value of stated is fully harmonized balance of certain nutrients in the edible parts of wild plants with the requirements of the human organism. Estimated values of mentioned wild plants and their parts make them recognized and high valuable foods with medicinal properties.
The fact is that the domestic market is flooded with imported products based on wild edible plants, with specific processed food intended for people with special needs and indicates that all possibilities of local natural resources are not used.
In the system of organic certification wild edible plants are covered through the certification of the system of collecting raw materials, while processing is represented with a small number of products. Organic certification for products that can go to the markets of other countries are as follows: liquid (alcohol) extracts from about 10 plant species, essential oils from 22 plant species, cranberry and apple tea, frozen products from 16 edible species, dry products from 9 edible species, two types of frozen organic mushrooms, 4 kinds of dried organic mushrooms, one type of finely ground organic mushrooms. Similar situation is among the manufacturers who certify their products as organic only for the market in B&H.

Key words: *organic products, wild edible plants, frozen, dried*

HACCP SYSTEM AND ITS IMPACT ON QUALITY AND HYGIENIC SOUNDNESS OF DAIRY PRODUCTS

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Summary

Practical implementation of HACCP system in dairy industry is demanding and a long-term process. In period 2004-2007, Meggle (Bihac, B&H) conducted a research on the quality of raw milk and it's impact on the quality of dairy product, including implementation of HACCP system.
At the beginning of the research (pre-HACCP implementation), 80 samples of raw milk and 80 samples of dairy products UHT Milk were tested for their microbiological and physicochemical properties. The same testing was repeated on the same number of samples post HACCP implementation to determine if and to what extent did implementation of HACCP system impacted the quality and hygienic soundness of dairy products.
On average, protein content of raw milk increased from 3.37% to 3.53%; content of milk-fat from 3.77% to 3.96%, while the lactose levels remained the same. In correlation to the increase in protein and milk-fat, an average level of the total dry mater increased from 12.56% to 12.79%. The total dry matter excluding fat on average increased from 8.79% to 8.83%. few sample of raw milk did not meet regulatory minimum of 8.5% total dry matter excluding fat. The total number of microorganisms reduced on average from 1,139.588/ml to 402.875/ml, while the number of somatic cell increased from 477.713/ml to 563.088/ml, which points to the increased presence of subclinical mastitis.
In UHT milk, an average level of the total dry mater increased from 11.42% to 11.80%, while the total dry matter excluding fat on average increased from 8.29% to 8.65%. Fat content remained the same with minimal variations, while levels of acidity remained within regulatory guidelines.
HACCP's focus on the control of raw material used in production led to the improved quality of the raw milk.Improved physicochemical properties of the finished product is a direct result of improved quality of raw milk. Microbiological soundness of sterilized milk was in line with regulatory guidelines both before and after the implementation of HACCP standard .

Key words: *HACCP, raw milk, UHT milk, milk quality*

TURMERIC EFFECTS ON GENETIC MATERIAL IN HUMAN CELL CULTURES

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Summary

Turmeric (*Curcuma longa* L.) is a rhizomatous herbaceous perennial plant that grows wild in the forests of Southeast Asia. Turmeric, grounded into orange-yellow powder, is widely used as a spice in South Asian and Middle Eastern cooking. As a food additive and colorant (E100) is used in canned beverages, baked products, ice cream, yogurt, biscuits, sweets, cereals, sauces, drugs and cosmetics. For a long time health protective effects of turmeric are known and currently turmeric is being investigated for a variety of neoplastic, preneoplastic, neurodegenerative, inflammatory conditions and other clinical disorders. In the relevant different studies, turmeric has been shown to express genotoxic but also antigenotoxic and anticarcinogenic effects. In this study, turmeric effects on genetic material and cell proliferation and integrity were examined using cytokinesis-block micronucleus cytome assay in human peripheral blood lymphocytes. The obtained results may contribute to the investigation of food additives and provide additional data for suggestion of turmeric use in cooking and food industry.

Key words: *food additives, micronuclei, genotoxicity, cytotoxicity.*

RISK FACTORS INFLUENCING OVERWEIGHT AND OBESITY AMONG ADOLESCENTS IN SARAJEVO

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Summary

Proper nutrition is the foundation of health of any individual whose patterns must be adopted in early childhood and cherished throughout life. Adolescence is a special period in life and considered as the deadline period for correction of incorrect food habits.
The aim of this research was to define risk factors which influence overweight and obesity among adolescents.
Participants were 652 students aged 13, 14 and 15 years from eight schools in Sarajevo. First author conducted measurements of body weight and body height needed for calculation of Body Mass Index and also introduced students to the Questionnaire which was filled in anonymously. Data was processed with SPSS 10.0.
Nutritional status expressed by BMI z-score shows that half (50.5%) of adolescents have normal weight. There is underweight, but overweight is more prevalent (26.3%) and obesity level I (10.2%). Using binary logistic regression in the processing of results, parameters influencing overweight and obesity were gained as follows. Risk factors influencing obesity: sex, age, consumption of fish and the number of meals, and for overweight: sex, age, number of meals, breakfast eating habits, frequency of consumption of snack foods and reduction diet.
Overweight and obesity are present among adolescents in Sarajevo. The causes should be researched further and prevention should be made through education of parents, children and teachers about the importance of adopting a form of proper nutrition.

Key words: *binary logistic regression, risk factors, overweight, obesity, adolescents.*

DETERMINATION OF CAFFEINE CONTENT IN NON-ALCOHOLIC BEVERAGES USING HPLC METHOD

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Summary

Caffeine is a well-known stimulant added as an ingredient to various non-alcoholic drinks. Due to its stimulatory and other physiological effects, determination of the caffeine concentration in beverages is very important step in caffeine research. The purpose of this study was to determine the amount of caffeine in non-alcoholic drinks using reverse phase HPLC. Caffeine was extracted from 8 different types of non-alcoholic beverages from market in Sarajevo, B&H. The samples were analyzed alongside a caffeine standard of 99% purity by use of HPLC-PDA detector at the wavelength of 272nm, Thermo Scientific column 100mmx4.6mm, oven temperature of 23°C, mobile phase 24:76 (v/v) of methanol: water and mobile phase flow rate of 1.0 mL/min. For quantization purposes, serial dilution of the caffeine standard in range of 5-25 ppm gave correlation coefficient (r) of 0.9999 and the retention time of 3.495±0.175 minute. Limits of detection and quantization were found to be 2.04 and 6.12 mg/L respectively.

Key words: *Reverse Phase High Performance Liquid Chromatography (HPLC), caffeine, non-alcoholic beverages*

SPECTROPHOTOMETRIC ANALYSIS OF TOTAL ASCORBIC ACID CONTENT IN VARIOUS FRUITS AND VEGETABLES

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Summary

Total ascorbic acid (ascorbic acid + dehydroascorbic acid) has been determined in twenty-one different samples of fruits and vegetables by spectrophotometric method. In this method bromine water oxidizes ascorbic acid to dehydroascorbic acid in presence of acetic acid. After coupling with 2,4-dinitrophenylhydrazine at 37°C temperature for three hours, the solution is treated with 85% H_2SO_4 to produce a red color complex. The absorbance of a red color complex was spectrophotometrically measured at 521 nm.
Linear range for standard solution of ascorbic acid was obtained up to 10 µg mL^{-1} with a correlation coefficient of 0.9929. The contents of ascorbic acid were found between 9 and 49 mg/100 g of fresh fruits and between 3 and 90 mg/100 g of fresh vegetables. The interference of glucose, fructose and sucrose that can interfere was also investigated. The low detection limit of ascorbic acid was found to be 0.01 µg mL^{-1} (3σ from 10 determination of 3 µg mL^{-1}) and limit of quantization of ascorbic acid was 0.017 µg mL^{-1}. A relative standard deviation was 2.4% (n = 10, c = 7 µg mL^{-1}).

Key words: *Total ascorbic acid, 2,4-dinitrophenyl hydrazine, spectrophotometric method, fruit and vegetables*

COMPARATIVE ANALYSIS OF CHEMICAL AND SENSORY PARAMETERS OF RAINBOW TROUT *(Oncorynchus mykkis Walbaum),* BROWN TROUT (*Salmo truta m. Fario Lineus*) AND BROOK TROUT *(Salvelinus alpinus)*

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Summary

The research covered a total of 60 samples of fish, in 20 samples of brown trout (*Salmo truta m. fario Lineus.),* Brook trout (*Salvelinus alpinus)* and rainbow trout (*Oncorynchus mykkis Walbaum*), average weight of 200 grams. To assess the freshness of the fish were used sensory method by point system. Examined the appearance, color, smell, taste and consistency of the flesh of fish, and to determine any pathological changes in the skin, as well as the appearance of the eyes and gills. The rating is made fresh three times in 48 hours. In the chemical search determined the amount of water, fat, protein and ash.

Sensory analysis of samples, which was conducted at room temperature showed that the freshness of fish during periods of downtime worsened, because the number of points increased (after 48 hours the number was 20 points out of a maximum 24), while the control samples (from the fridge), even after 48^h since the beginning of assessment is not observed any changes, so the fish is fresh vote. The experimental data obtained by the chemical composition of fish did not differ significantly from literature sources.

Key words: *fish meat, chemical composition, freshness of fish meat, sensory analysis*

SPECTROPHOTOMETRIC DETERMINATION OF ANTHOCYANINS IN WINES

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Summary

The positive effects of wine consumption on human health that is greatly influenced by the richness of the grape and wine, as a fermentation product, with compounds that are not essential for human health but showing biological activity in the human body. The most common anthocyanines of the grape are the cyanidin-3-glucoside and the malvidine-3-glucoside. Purpose of this study was to develop a spectrophotometric methods for determinantion of the concentration of monomeric anthocyanins in red wines from the territory of Bosnia and Herzegovina. A partition of monomeric anthocyanins was determined by the pH differential method, while the potassium metabisulphite method gave the partition of polymeric colour in the final wine colour. Of the ten samples of wine the highest content of monomeric anthocyanins was recorded in quality wine Hercegovačka blatina (45.3738 mg / l) while the table wine Bećar contained lowest values of anthocyanins (15.548 mg / L). All wine samples tested contained very low values of anthocyanins, atypical for red wines, while the content of tanin materials was very high and the average value in a quality wine Hepok vranac reached 99.992% of tanins. Sensory determination of wine colour showed that the evaluators at a lower intensity of the colours more accurately determine the actual order wine by the colour intensity.
Comparison of results in dependence of the election in analytical method indicated the necessity of fitting the method into a large number of criteria during the selection of methods for the analysis of certain substances in food and drink.

Key words: *red wines, anthocyanins, spectrophotometry, sensory analyses*

SOYBEAN BIOMASS AS FUEL AND FERTILIZER

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Summary

Increase of world energy demands is in connection with world population grows. According to IIASA model it is predicted that the world energy consumption by the year 2030 will be 306.6 10^{12} kWh. Development of energy sector is the basis for development of society and demand for different sources of energy is constant and very urgent. Energy strategy of EU "20-20-20" has a long term goal of high energy production with low emission of glasshouse gases. Within this strategy EU countries have to reduce glasshouse gases emission for 20%, raise energy efficiency for 20% and, 20% of energy consumption should be from renewable resources. Biomass from agriculture is one of the renewable energy resources that is not enough exploited. Aim of this paper is to evaluate the possibility of soybean straw usage as an efficient energy resource and efficient fertilizer. Research results are pointing out validity of that usage.

Key words: *biomass, energy, fertilizers, renewable resources*

APPLICATION OF IMAGE ANALYSIS FOR ASSESSING THE QUALITY OF THE SPRAY COVERAGE ON WATER SENSITIVE PAPER (WSP)

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Summary

Several investigators have studied the relationships between spray application parameters (droplet density and pesticide concentration) and the efficacy of pest control under laboratory and field conditions. The effect of pesticide on the environment is a major concern throughout the world. All this led to increased use of biological or 'natural' materials for pest control, which are not as effective as synthetic pesticides and require extensive coverage of plant canopies. In other words, the application of these materials requires detecting their spray coverage quality.

This paper presents the usage of a fully automatic methodology based on image processing which is proposed to evaluate the quality of spray application sampled by water-sensitive papers (WSP). The aim was to estimate the homogeneity and quality of spray coverage on WSP by testing different mist-blowers.

Three commercial mist-blowers were tested (Hardi, Tifone and Myers) in an apple orchard using pure water and WSP. The WSP were photographed and taken images were analyzed by using Photoshop and ImageJ software. After image processing result were shown as number of individual droplet size, their distributions, total droplet number, and percentage of spray coverage on the WSP and saved in a spreadsheet. According to results best coverage on the WSP were provided with Tifone mist-blower.

Key words: *image analysis; water sensitive paper; spray coverage*

CENTRAL COMPOSITE EXPERIMENTAL DESIGN AND FATTY ACIDS PROFILE DETERMINATION OF SOYBEAN OIL OBTAINED BY SUPERCRITICAL CO_2 EXTRACTION

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Summary

Response surface methodology (RSM) with central composite rotatable design (CCRD) was applied to optimize the process parameters of supercritical CO_2 extraction of soybean oil in the experimental range 11.6- 28.4 MPa, temperature 37-53 °C and during the extraction time of 4.7 h. The statistical analysis showed that the linear term of pressure and extraction time, the quadratics of the pressure, the interaction between pressure and extraction time, as well as the interaction between temperature and pressure had significant effects on the oil yield. The optimal extraction conditions within the experimental range were extraction temperature of 50 °C, pressure of 25 MPa and extraction time of 4 h. The experimental values agreed with those predicted, thus indicating suitability of the model employed and the success of response surface methodology for optimising supercritical CO_2 extraction of soybean oil. The chemical composition of soybean oil was analysed by gas chromatography. The main fatty acids were linoleic acid (51.49%), oleic acid (23.60%), palmitic acid (12.68%), stearic acid (5.87%) and linolenic acid (5.34%).

Key words: *Supercritical CO_2 extraction, soybean oil, response surface methodology, fatty acids*

PREDICTION METHODOLOGY OF MALT LEVEL USING ARTIFICIAL NEURAL NETWORKS

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Summary

Significant use of computer chemistry is the prediction of different physical-chemical properties, thermodynamic properties, and biological and chemical activity on the basis of molecular structure.
These investigations include the application of artificial neural networks with back propagation error in predicting of various compounds properties important for the food industry. One such characteristic is the malt degree of artificial sweeteners. According to the literature, previous prediction results using neural networks, applied to a number of properties, indicate that the good prediction of compound property is possible. In addition, the results of predictions were compared with results obtained using the previously developed regression models. Comparison of errors obtained on the same set of data shows that the neural networks predict more successfully the properties of materials than regression models. Nevertheless, neural networks predict the properties of materials with much wider interval of independent variables in relation to the regression models.
The aim of this paper is to develop and test a reliable model for the prediction of malt degree based on neural networks, and consider the same model with regard to the possibility of one or more receptors for sweeteners.
Set of 13 molecules with the same number of descriptors was used. The results obtained (correlation coefficient 0,997) give satisfactory deviation, which indicates the fact that application of neural networks in predicting malt level is possible.

Key words: *malt, neural networks, computer chemistry, model*

THE COMPOSITION AND PROPERTIES OF KAJMAK FROM DIFFERENT PRODUCERS

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Summary

Kajmak is a traditional dairy product with specific composition and unique sensory properties. Nowadays, kajmak is usually produced in households and small dairy craft plants based on the traditional method of manufacture, which results in products of uneven composition and quality.
The objective of this work was to investigate chemical composition, textural properties, microbiological status, as well as sensory quality of kajmak from different producers. The changes of proteins were investigated by UREA PAG electrophoresis. Textural properties of kajmak (hardness) were determined at 7^0C and 18^0C by the penetration test, with a texture analyzer.
Chemical composition and sensory quality of tested kajmak samples showed great diversity as result of significant differences of raw milk quality as well as maufacturing method. Electrophoretic patterns depended on the kajmak composition and degree of maturation. A textural property of kajmak, especially hardness, is in correlation with composition as well as temperature of measurements.
Detailed examination of the composition and properties of kajmak enables a better understanding of the processes in the manufacturing procedure which can provide guidance for the development of standardized production and obtaining standard high quality product.

Key words: *kajmak, composition, texture, sensory properties*

THE INFLUENCE OF COMMERCIAL AND POTENTIAL PROBIOTIC BACTERIA ON THE PROPERTIES OF LOW FAT UF CHEESES

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Summary

The influence of adjunct commercial probiotic bacteria (cheese A) and potential autochthonous probiotic strains *Lactobacillus paracasei* (cheese B) on the composition, proteolysis, microstructure and sensory properties of low fat cheeses during ripening was investigated. The viability of probiotic strains was also analysed. Low fat ultra-filtered (UF) cheeses were produced according to the defined production procedure by mixing milk protein powder, skim milk and cream. A significant influence of different starter and adjuncts bacteria on the composition, primary proteolysis and microstructure was not found. The number of adjunct probiotic bacteria in both cheeses were maintained on the high level during the overall ripening period that are necessary for acquirement of their terapeutic effects. Cheeses made with autochthonous bacteria showed a higher rate of secondary proteolysis, as well as higher flavour scores, and were more acceptable than cheese made with commercial probiotic bacteria. However, both low fat UF cheeses characterized with good dietetic and functional properties as well as very acceptable sensory properties.

Key words: *low fat UF cheese, probiotic bacteria, proteolysis, microstructure, sensory properties*

THE PRODUCTIONS OF PROCESSED FRUIT IN MONTENEGRO

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Summary

The importance of fruit comes from their specific nutritional values based on biological rather than the energy value. This feature is related to the chemical composition and organoleptic properties of fruit. It is precisely this fact tells us about the relatively high technological requirements in the processing and preserving of fruits.
Tests were conducted at the factory processed fruit "Eco Medusa" in Bijelo Polje. For the purposes of our research in 2009 and 2010 year follow-up we described in detail the technological process of production of fruit products including: canned plum, plum jam and marmalade from rose hips. The method included the presence and getting to know the line for these products and determine their most important parameters (composition of jams and marmalades, conservation practices, pasteurization and their organoleptic properties).
Stewed plums, the fruits of its composition contain plums, sugar, citric acid and dry matter content is a minimum of 18%. Plum jam and marmalade rose hips in its composition containing fruit in a changing relationship, sugar, gelling agent, citric acid and dry matter content of 67%.

Key words: *jams, marmalades, solids, citric acid, pasteurization*

DETERMINATION OF TOTAL HEME PIGMENTS CONCENTRATION AND METMIOGLOBINE CONCENTRATION IN CHICKEN MEAT

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Summary

The pigment concentration is very important parameter in determination of meat quality since it provides first information about meat fresness. In this paper the influence of animal breeding on concentration of heme pigments in broiler samples was investigated. The influence of different meat storage conditions was investigated too (room temperature, -4°C, -18°C).
The concentration of total heme pigments was determined by spectrophotometric method. The process of decolorization of meat is in correlation with meat storage and can be evaluated through determination of metmioglobine concentration. The methmioglobine concentration was determined with spectrophotometric method too.

Key words: *heme pigments, chicken meat, metmioglobines, spectrophotometric determination, meat freshness.*

POSSIBILITIES FOR PRODUCTION OF SPELT WHEAT (*Triticum spelta* L.) BREAD AND PASTA

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Summary

Spelt (*Triticum spelta* L.) is an old species of wheat which was developed 6000-7000 years ago in the area of Middle East by cross pollination of the wild weed species.
This sort has very modest requirements in terms of environmental conditions and production technology. It is highly resistant to diseases and pests and it has very modest requirement in terms of fertilizer, which makes it very advantageous for organic production. Despite the fact that production of spelt is more profitable than production of wheat, which has considerably lower yield and it is more difficult to de-hull, it is generally less grown than wheat.
Exploring the possibilities of using wholegrain spelt flour was, hence, the primary reason for conducting the studies for this paper.
Purpose of this paper was to establish the quality of grain and wholegrain spelt flour produced by *Bionatura* based on principle of organic agriculture, and benefits related to production of bread and pasta made of wholegrain spelt flour.
Results of the studies showed that spelt flour can be used in production of good quality pasta due to its properties during cooking and in production of bread with the acceptable physical and sensory features. One can expect that these types of products will have the place in market due to their inherent features.
However, the future studies should focus on improvement of physical and sensory features of the spelt wheat bread, primarily in terms of shape and softness of bread.

Key words: *wholegrain spelt flour, quality of bread, spelt bread and pasta*

TECHNOLOGICAL AND POLYPHONIC CHARACTERISTICS OF THE MONTENEGRIN AUTOCHTHONOUS GRAPE VARIETIES VRANAC AND KRATOSIJA IN MONTENEGRO AND MACEDONIA

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Summary

In this study, we have presented the results regarding the technological and polyphenolic potentials of the grape varieties Vranac and Kratosija and the quality of the produced wines. Vranac and Kratosija are two Montenegrin autochthonous grape varieties and also the most widespread red wine varieties in the Montenegrin and Macedonian vineyard regions, where they achieve the best results.
The experiment was conducted from 2005 to 2007. One part of the experiment was done at the Faculty of Biotechnology in Podgorica, using the grapes from the experimental vineyards in the Podgorica subregion. The second part of the experiment was conducted at the Agricultural Institute in Skopje, using the grapes from the vineyards of the Skopje wine-growing region. Both wine-growing regions have similar agro-ecological and pedological characteristics and similar harvesting conditions. The process of wine-making was carried out applying the traditional method.
The results of this research showed that the examined grape variety Vranac had a uniform texture of its cluster and berries, whereas the grape variety Kratosija displayed differences depending on the wine region. The chemical composition of the must was quite uniform for both varieties examined. The results of the examined polyphenolic potential showed that the grape variety Vranac had a higher content of anthocyanins in the skin compared to Kratosija, in both areas investigated.
The results of the chemical analyses of the wine showed that the wines Vranac and Kratosija had a high content of alcohol, total extract, glycerol and trash. The wine Vranac, as compared to the wine Kratosija, had a higher content of all polyphenolic compounds.

Key words: *technological characteristic, polyphonic potential, Vranac, Kratosija*

APPLICATION OF POTENTIAL PROBIOTIC IN THE SOFT GOAT CHEESE PRODUCTION

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Summary

The use of goat milk in combination with probiotic bacterial strains represents one of the options for production of new functional dairy products.
The aim of this work was to investigate the survival of probiotic bacteria and their effect on the chemical composition and sensory quality of soft goat cheeses.
Three variants of soft goat cheeses were produced using mesophilic lactococci starter culture CHN 11 (Chr. Hansen): 1. control cheese; 2. starter + autochthonous potential probiotic strain *Lactobacillus paracasei* 08 (Culture Collection of the Department for Food Microbiology, University of Belgrade); 3. starter + commercial probiotic *Lactobacillus acidophilus* LA-5 (Chr. Hansen).
Through 5 weeks of soft goat cheeses storage, the survival of probiotic bacteria, the changes of starter bacteria counts, as well as the chemical composition, pH values and sensory evaluation were examined. *Lactobacillus paracasei* 08 counts were at the level of $>10^7$ cfug^{-1} and *Lactobacillus acidophilus* LA-5 counts were approximately 10^8 cfug^{-1}. Starter bacteria counts were maintained at the level of $>10^6$ cfug^{-1}. The chemical composition and pH values of produced cheeses did not significantly differ. Sensory evaluation has shown that control cheese and cheese produced with *Lactobacillus paracasei* 08 had a high sensory quality, while cheese produced with *Lactobacillus acidophilus* LA-5 had an acceptable sensory quality.
High viability of examined potential probiotic *Lactobacillus paracasei* 08, as well as very acceptable cheese sensory properties, indicates that this strain can be successfully used in the production of soft goat cheeses as a new functional dairy product.

Key words: *soft goat cheese, potential probiotic, chemical composition, sensory quality*.

EFFECT OF ENCAPSULATED POTENTIAL AND COMMERCIAL PROBIOTIC BACTERIA ON THE SOFT GOAT CHEESE PROPERTIES

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Summary

The aim of this work was to investigate the survival of encapsulated potential and commercial probiotic bacteria and their effect on the chemical composition and sensory quality of soft goat cheeses**.** According to phenotypic, technological, biochemical and probiotic characterization, autochthonous strain *Lactobacillus plantarum* 564 was selected for spray-drying using reconstituted skim milk.
Three variants of soft goat cheeses were produced using mesophilic lactococci starter culture CHN 11 (Chr. Hansen): 1. control cheese; 2. starter + spray-dried potential probiotic *Lactobacillus plantarum* 564 (Culture Collection of the Department for Food Microbiology, University of Belgrade); 3. starter + freeze-dried commercial probiotic *Lactobacillus acidophilus* LA-5 (Chr. Hansen).
The survival of encapsulated probiotic bacteria, the changes of starter bacteria counts, as well as the chemical composition, pH values and sensory evaluation were examined during 5 weeks of soft goat cheeses storage. Count cells of encapsulated potential probiotic *Lactobacillus plantarum* 564 and commercial *Lactobacillus acidophilus* LA-5 $cfug^{-1}$ were maintained at the level of 10^7-10^8 $cfug^{-1}$. Starter bacteria counts were $>10^6$ $cfug^{-1}$. The chemical composition and pH values of produced cheeses did not significantly differ. Sensory evaluation has shown that control cheese and cheese produced with *Lactobacillus plantarum* 564 had a high sensory quality, while cheese produced with *Lactobacillus acidophilus* LA-5 had an acceptable sensory quality.
Results of high viability of spray-dried potential probiotic *Lactobacillus plantarum* 564, as well as very acceptable cheese sensory properties, indicate that this strain can be successfully used in the production of soft goat cheeses as a new functional dairy product.

Key words: *encapsulated potential probiotic, sensory quality, soft goat cheese*

INFLUECE OF OAK CHIPS ON POLYPHENOLIC CONTENT AND SENSORIAL PROPERTIES OF VRANEC WINES

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Summary

Influence of oak chips on the polyphenolic content, as well as, on the sensorial properties on Vranac wines was studied. Wines were produced on a tradicional way, during the three consecutive years (2008, 2009 and 2010) in the cellar of Biotechnical faculty in Podgorica, Lješkopolje region, Podgorica sub-region. For wine production, French oak chips has been used, applied at concentration of 1g/l. Results showed that the oak chips influeced better extraction of polyphenols and better sensorial properties of the wines compared to the control wine, produced without chips, containing only yeast for fermentation. Addition of the oak chips during macuration, allowed production of wines with higher content of total polyphenols, anthocyanins, flavan-3-ols, higher color intensity and hue, as well as, better sensorial properties. The chips influenced a higher color stability and overall, better wine profile.

Key words: *Vranac, oak chips, total polyphenols, anthocyanins, flavan-3-ols*

THE RESEARCH ON ICE-CREAM QUALITY PROPERTIES AT SARAJEVO REGION

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Summary

Ice-cream and frozen desserts are colloidal suspensions of protein, fat, sugar and other ingredients to achieve color, aroma and stabilization of system. This mixture is then subjected to whipping a controlled amount of air and freezing. Normally, ice-cream contains approximately 30% ice, 50% air, 5% fat and 15% sugar and thus, it represents economically high cumulative product.
The aim of investigation was to research the quality of ice-cream and frozen desserts at Canton Sarajevo market. Seven types of family ice-cream each with two different tastes were tested, in total 14 samples. Following parameters were determined for each single sample: dry solids, fat, pH value and titration acidity. pH values of frozen and thawed ice-cream were detected. The average content of dry solids was 29.32% (from 21.71% to 35.08%), fat 6.82% (from 1.10% to 11.22%) while the mean value of titration acidity was 17.85ºSH. The difference between average pH of frozen (6.99) and thawed ice-cream (6.42) was observed. All ice-cream samples were sensory evaluated and dynamics of thawing was measured.

Key words: *Ice-cream, chemical composition, pH value*

DETERMINATION OF PESTICIDE RESIDUES IN SAMPLES OF LETTUCE AND CARROT BY GAS CHROMATOGRAPHY

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Summary

The sample preparation is the most important and most difficult step in pesticide analysis. Due to that, our goal was to develop and compare two different methods for sample preparation in pesticide analysis of vegetable samples by gas chromatography. Two cultures (lettuce and carrot) were analyzed. Lettuce was prepared with standard method (Method L: Extraction with acetone, liquid-liquid partition with dichloromethane and clean up on silica gel /charcoal column), carrot with QuEChERS method (EN Method). Samples were taken randomly, from market places and shopping centers in the area of Sarajevo.

Key words: *GC, pesticide residues, standard method, QuEChERS, maximum residue levels*

CHARACTERISTICS OF FLOUR WITH THE ADDITION OF SOURDUGH STARTERS

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Summary

Application of sourdough starter in bread production becomes increasingly important, especially in the production of rye-based products because the rye flour dough requires more sourness during fermentation. Modern technology applied in bakery plants makes the application of sourdough easier in contrast to the bread production in the past, which were hours long preparations of dough and pre-fermented, indirect procedures up to the applications of emulsions and powders. This study focuses on the testing of the row material quality, wheat flour and wholemeal rye flour. Chemical and rheological characteristics of flour mixtures with and without addition of sourdough starters together with recommended and reduced amounts of additives were theologically and microbiologically tested.
Implementation of sour dough in bread production is an alternative to various bakery additives, which in the technological development trend. Production of healthy food without chemical supplements (additives) may contribute to the improvement of nutritive value for these types of products.
For the preparation of all samples, semi-white wheat flour Type -710 and wholemeal rye flour (70:30) respectively, were used. The starters used were: the emulsion and powder („*Backaldrin*“ Linz, Austria): *Bas hell*-light emulsion, liquid multi-component sour means and *Anifarin* powder *hell*-light, dry sour yeast. Five different samples were made: standard mixture without fermentation means; mixture with 5% emulsion – recommended dose; mixture with 2.5% emulsion, mixture with 3% powder – recommended dose; mixture with 1.5% powder. Chemical and rheological characteristics of flour samples were determined using standard methods. Microbiological analysis of flour mixtures were pursued in accordance with methods prescribed by the Regulations.
Sourdough acted as an enhancer in the mixture with the rye and wheat flours. Addition of starters led to increased capacity of water absorption. Optimal use of semi-white and wholemeal rye flour as well as optimal use of starters can make very positive effects on technological, microbiological and sensory characteristics of finished products.

Key words: wheat flour and wholemeal rye flour, sourdough starters, rheological characteristics of flour

RELIABILITY OF THE DECLARED CONTENT IN PÂTÉS PRESENT ON B&H MARKET AS ESTABLISHED BY DNA TEST

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Summary

In Bosnia and Herzegovina Law on Food and Consumers Protection Act guarantee the consumers' rights to information regarding the content of the food products present on the market. In that respect, a list of ingredients must be clearly displayed on every prepackaged food item offered to the consumer. We applied DNA testing to examine whether the declared content in pâtés found on B&H market concurs with our findings. We were able to identify 29 various types of pâtés including those based on beef, fish, poultry and pork recipes as well as vegetarian option. The sample included both imported and locally manufactured products. DNA was extracted from the pâté homogenate using Soltis Lab CTAB DNA extraction protocol (Doyle&Doyle 1987; Cullings 1992). The quality of DNA extract was tested by agarose gel electrophoresis. Four specific genetic markers were analyzed by PCR to test for the presence of bovine, porcine and poultry DNA as well as for soy. The results were analyzed against the declared content. Bovine DNA was found to be omnipresent as most of the products contained either milk powder or whey. Four samples tested positive for porcine DNA although pork was not amongst the declared ingredients. One sample labeled "chicken pâté" tested negative for poultry DNA and positive for porcine DNA. All the disputable samples were imported products. The samples produced in B&H were in compliance.

Key words: *PCR detection, food content, B&H, pâtés*

EFFECT OF COLOR ON THE PERCEPCION OF SENSORY ATTRIBUTES OF STRAWBERRY AND APPLE JUICE

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Summary

The senses considered as perceptual systems. In that term this paper investigated the effect of color on sensory perception of fruit juice. Two type of fruit juice were investigated, strawberry and apple juice each presented with three different brand names. The four sensory attributes were evaluated: odor, taste, flavor and overall sensory impression. Twenty tasters were evaluated a series of samples in two sessions. In the first session tasters were evaluated a color of juice together with other sensory attributes. During second sensory sessions tasters were evaluated sensory attributes of juice with closed eyes (they could not see the color of juice). In strawberry juice the type of sensory session significantly affected perceived overall sensory impression ($p< 0,001$) while in apple juice has not reported any significant differences in perceived overall impression and type sessions. This indicates that color of apple juice has less influence on overall impression of sensory quality then color of strawberry juice.
The assumption of the existence of a perceptual interaction between color and other sensory attributes in colored juices is confirmed.

Key words: *sensory attributes, color and perceptions, fruit juice*

PRODUCTION TECHNOLOGY, COMPOSITION AND QUALITY OF INDIGENOUS BANJA LUKA COTTAGE CHEESE

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Summary

Cottage cheese from whole milk was always produced in households area of Banja Luka, for their own needs and for the local market. He is white, soft, with characteristic aroma and slightly sour taste made by the traditional procedure from cow's milk; packed into a square baking pan with the rest of the whey, cut into squares, size 10x10 cm, has a shelf life up to 7 days.

This paper gives the results of physical-chemical composition and microbiological quality for fresh homemade cheese 10 samples from Banja Luka, as well as a description of production technology of this indigenous product. Moisture content ranged from 15.36% to 23.06%, protein from 8.40% to 12.24%. Fat content showed great variability ranging from 2% to 10%, while values of acidity (°SH) were quite uniform and had an average value 49.68°SH, NaCl content was 0.29 %. In the microbiological analysis from 0.2% samples were isolated: *Escherichia coli*, *Proteus* species and bacteria of the genus *Citrobacter*.

Key words: *Banja Luka Cottage Cheese, production technology, physical-chemical composition, microbiological quality*

DYNAMICS OF MOISTURE CONTENT IN THE PRODUCTION OF WHITE BRINED CHEESE

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Summary

In this paper dynamics of moisture content in the production of white brined cheese with 3 different types of starter cultures was examined. The greatest migration of moisture in all tested variants is determined at the time of maturation in brine at 18-20 ^{0}Be (4.4-7.2%). The type and composition of starter cultures used, significantly affect the acidification of the cheese curd and consequently of the percentage of moisture in the product. After 60 days maturation of the cheese, moisture was 52.10% (variant A), 53.10% (variant B) and 53.30% (variant C). Fastest technological maturity with pH 4.54 was achieved in the variant C, which contributes to get the best yield 6.62 litres milk per 1 kg of cheese in terms of other variants.

Key words: moisture, white brined cheese, starter cultures.

EFFECT OF BENTONITE CONCENTRATION APPLIED IN FINING ON CHROMATIC PROPERTIES OF YOUNG WINE

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Summary

Due to the presence of various colloidal and suspended substances young wines are usually unstable and turbid. In practice, fining with different organic and inorganic agents is the common way to obtain wine clearness and stability in a longer period. However, clarification could endanger some wine chromatic properties. This study examines the influence of eight different concentrations of 5% solution of bentonite (30, 60, 90, 120, 150, 180, 210, 240 g/hl), applied in the fining of Žilavka (white) and Vranac (red) wines produced in 2010, on their chromatic properties. Based on the measured absorbance, six wine chromatic indicators were calculated: (colour intensity (IB), hue (NB), spectrum shape (dA%) and proportions of yellow (A420%), red (A520%), and blue (A620%) in the colour intensity. The obtained results showed that increased concentration of bentonite decreased absorbance values, except those measured at 520 nm with Vranac wine. Bentonite as a fining agent significantly affected chromatic properties of the wines. For instance, 240 g/hl bentonite treatment caused reduction of Žilavka color intensity from 0,303 to 0,171. Increase of bentonite concentration increased hue (NB) of Žilavka, but not Vranac wine. Increase of bentonite concentration reduced the share of blue both in Vranac and Žilavka. The changes of share of yellow in colour intensity had different patterns with Vranac and Žilavka wines, as well as with Vranac with increase of concentrations of bentonite.

Key words: *wine, fining, bentonite, chromatic properties*

THE EFFECT OF EXTRACTED PARAMETERS ON THE ANTIMICROBIAL ACTIVITY OF BEETROOT

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Summary

Beetroot is natural anticancerogenic, antibacterial, antipyretic, antioxidant, antisklerotik, detoxifier, diuretic and cure for anemia. This vegetable is known as a remedy for 2000 years. Beet juice regenerates the liver and prevents the aging process. This study examined extraction efficiency as affected by maceration performed for 24 hours at different temperatures (25 and 50°C) and 30-minute ultrasonic extraction at 4°C. Both processes involved the use of extraction agents containing different water and ethanol concentrations and having different pH values. The extracts obtained were evaluated for extraction efficiency and antimicrobial activity using Eur.Ph., diffusion and MIC methods and *Bacillus subtilis, Staphylococcus aureus, Pseudomonas aeruginosa* and *Candida albicans* strains. The results showed that both the extraction efficiency and antimicrobial effect of the extracts are dependent upon ethanol concentration in the extraction agent, with 80% ethanol showing the best performance. The change in the pH of the extraction agent does not contribute significantly to the extraction or antimicrobial activity of the extract. Regardless of the technique and extraction parameters used, the aqueous extracts exhibited weak antimicrobial activity. Maceration at an elevated temperature (50°C) induces increased extraction efficiency and stronger antimicrobial effect of the extracts on the Gram-positive bacteria species tested. However, the rate of extraction and the low temperature used in the process to prevent thermal degradation of bioactive components make ultrasonic extraction the method of choice in the preparation of beetroot extracts that show the highest antimicrobial activity.

Key words: *beetroot, maceration, ultrasonic extraction, antimicrobial activity*