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FOLIA VETERINARIA, 54, Supplementum: 47, 2010

CONTENTS

STATE VETERINARY AND FOOD ADMINISTRATION OF THE SLOVAK REPUBLIC
UNIVERSITY OF VETERINARY MEDICINE AND PHARMACY IN KOŠICE
DEPARTMENT OF FOOD HYGIENE AND TECHNOLOGY

HYGIENA ALIMENTORUM XXXI

Safety and Quality of Milk – current problems

International scientific conference
May 5–7, 2010
ŠTRBSKÉ PLESO – THE HIGH TATRAS
THE SLOVAK REPUBLIC

Abstracts

of lectures and posters

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- State Veterinary and Food Administration of the Slovak Republic, Bratislava
- Slovak Dairy Association, Bratislava

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FOLIA VETERINARIA, 54, Supplementum: 5, 2010

ROLE AND POSITION OF THE UNIVERSITY OF VETERINARY MEDICINE AND PHARMACY IN KOŠICE IN EDUCATION, SCIENTIFIC RESEARCH AND INTERNATIONAL COOPERATION

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ABSTRACT

The University of Veterinary Medicine and Pharmacy in Košice is a one faculty university providing higher education in accredited study programmes of all three levels of higher education. The University of Veterinary Medicine and Pharmacy in Košice is the only institution in the Slovak Republic offering higher education in the veterinary field. The main mission of the University is to provide higher undergraduate and postgraduate veterinary education on the basis of creative scientific research in the field of veterinary science and pharmacy.

Higher education of the 1st level is provided in the study programmes Cynologist and Safety of food and feed and higher education of the 2nd level in doctor study programmes General veterinary medicine and Food hygiene and, since the academic year 2006/2007, also in master study programme Pharmacy.

The University of Veterinary Medicine and Pharmacy in Košice has been providing the veterinary education in English for 15 years.

On the basis of results of evaluation of the approximation of education in the field of veterinary medicine between the Slovak Republic and EU, carried out by Commission EU-TAIEX in 2002, a document issued by the Commission stated that the University of Veterinary Medicine in Košice complies with the EU standards and the Diplomas issued by the University of Veterinary Medicine and Pharmacy in Košice should be accepted in EU countries.

Key words: higher undergraduate and postgraduate veterinary education; University of Veterinary Medicine and Pharmacy in Košice

ACTIVITIES OF THE MINISTRY OF AGRICULTURE IN THE DAIRY PROGRAM

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ABSTRACT

The Government Department of Agriculture creates preconditions for achieving a high level of consumer protection in the supply of high quality and safe food produced in Slovakia and also from imports, including performance checks of the food chain. The basis of all official inspections of products of animal origin, including dairy products, is verification of compliance with the existing legislative provisions. The data on the control of milk and milk products obtained by the Ministry of Agriculture of the SR have been stored since 1986. The database stores 3.7 billion results of contaminants in food, of which 15.6 percent are the results of milk and milk products (about 580 thousand analysis). Suppliers of these data are the State Veterinary and Food Administration, the Food Research Institute, Research Institute of the dairy industry, and some dairy plants.

Key words: consumer protection; inspection of milk and milk products; food chain

FOLIA VETERINARIA, 54, Supplementum: 6, 2010

ROLE OF THE STATE VETERINARY AND FOOD ADMINISTRATION OF THE SLOVAK REPUBLIC IN THE FIELD OF HYGIENE OF MILK AND MILK PRODUCTS

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ABSTRACT

The Regulation (EC) No. 178/2002 of the European Parliament and of the Council established a horizontal frame for food law and is linked to other vertical food law provisions. Official inspections in the Slovak Republic are performed according to the Act No. 39/2007 Coll. on veterinary care, as amended, and according to the Act No. 152/1995 Coll. on foodstuffs, as amended, and in accordance with the regulations of the Community. Out of 25 815 registered and/or approved food business operators, 20 484 were subjected to official inspection (79.35 %). In 2009 there were 57 128 official inspections. The State Veterinary and Food Institutes subjected to laboratory testing 22 126 samples of foodstuffs and tobacco products. Of this number, 1033 (4.67 %) samples were not in compliance. Of the total number of samples 11 986 were samples of food of animal origin; 569 (4.75 %) of these samples were not in compliance, which is an insignificant decline (0.12 %) in comparison with the year 2008. As for milk and milk products, 4117 samples were taken and tested. Of this number 143 (3.47 %) samples were not in compliance, which is a small improvement (0.96 %) in comparison with the year 2008. The highest number of non-compliance samples (244) involved shortcomings related to labeling of foodstuffs.

Key words: official inspections; State Veterinary and Food Administration of the Slovak Republic

SPECIAL INSPECTIONS OF MERCHANDIZING RETAIL CHAINS CARRIED OUT BY THE INSPECTORS FOR OFFICIAL CONTROLS AND FOOD HYGIENE OF THE STATE VETERINARY AND FOOD ADMINISTRATIONS IN THE SLOVAK REPUBLIC

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ABSTRACT

The presentation contains the results of special official inspections carried out in the merchandizing retail chains supplying the foodstuffs to large numbers of consumers. The official inspections were performed by the special teams of inspectors of the State Veterinary and Food Administration in the Slovak Republic outside of/after working time, during the evening and night and also at the weekends. They focused on the safety and quality of foodstuffs placed on the market in the Slovak Republic and on the hygiene of sale and compliance with hygiene requirements.

Key words: competent authorities for official inspections; official inspections

FOLIA VETERINARIA, 54, Supplementum: 7, 2010

HYGIENE OF RAW MILK PRODUCTION

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ABSTRACT

The State Veterinary and Food Administration of the Slovak Republic methodologically directs and manages performance of official inspections carried out by the Regional, District and State Veterinary and Food Administrations institutions in accordance with the Act No. 39/2007 Coll. on veterinary care, as amended. Up to December 31, 2009, there were registered 997 milk production holdings, from that 723 production holdings for raw cow milk, 266 production holdings for raw sheep milk and 8 production holdings for raw goat milk. In these production holdings, according to the veterinary control plan, there were carried out totally 1251 veterinary inspections. Since the 1st September, 2009, the Ordinance of the Government of the Slovak Republic No. 352/2009 Coll., which also regulates the sale of raw milk, has been applied.

Key words: official inspections; residues of antimicrobial substances; somatic cell count; State Veterinary and Food Administration of the Slovak Republic; total plate count

THE DETERMINATION OF SIGNIFICANT COMPONENTS IN MILK AND MILK PRODUCTS IN RELATION TO THE REQUIREMENTS AND HEALTH OF THE 21st CENTURY CONSUMER

Vorlová, L., Borkovcová, J., Dračková, M., Janštová, B., Navrátilová, P., Standarová, E., Batelková, P., Procházková, Z., Přidalová, H., Štoudková, H.

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ABSTRACT

Milk is one of the best balanced foodstuffs. It is widely known as an excellent source of calcium. It is a good medium for microorganism culturing and thus for production of dairy products which have many other positives. It is a foodstuff which has no competitor considering the variety of important nutrients. Several studies are therefore devoted to the investigation of micronutrients and their dietary consumer health benefits.

Key words: cholesterol; lactoferin; milk; milk products; nutrition; riboflavin

FOLIA VETERINARIA, 54, Supplementum: 8, 2010

TESTING OF RAW MILK QUALITY BY ACCREDITED LABORATORY EXAMINALA

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ABSTRACT

The accredited laboratory EXAMINALA (a part of Dairy Research Institute, a.s., Žilina) has been oriented for several years on testing of raw milk quality (cow, sheep and goat). Results obtained in the laboratory have been used to asses the safety, technological properties, quota and price determination of raw milk. The paper stressed the most problematic issues of milk quality. Good microbiological quality reflects positive progress in hygiene on farms. On the other hand, somatic cells are permanently high. As a possible indicator of mastitis in cows, it is necessary to improve prophylaxis and the treatment in herds. Also introducing rapid methods for detection of pathogens responsible for illnesses should be beneficial. Residues of antibiotics are occasionally present in milk. They are mostly residues of ß-lactams. The major problem in sheep milk production involves deliberate addition of cow or sheep milk.

Key words: microbial quality; raw milk; residues of inhibiting agents; somatic cells; testing of sheep milk

ANTIMICROBIAL RESIDUES IN RAW MILK – THE RESULTS OF MONITORING TESTING PROGRAMME

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ABSTRACT

Antimicrobial residues in milk are an important risk factor for consumer health and technological problems in milk industry. According to the requirements of the Council Directive 96/23, milk is included in the national programme of monitoring of residues of veterinary medical products in live animals and products of animal origin. We present the results obtained in the period of 2005–2009.

Key words: antimicrobial residues; milk; official monitoring

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RELEVANT HYGIENE AND TECHNOLOGICAL RISKS (HAZARDS) RELATED TO MILK COMMODITY

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ABSTRACT

Good hygiene conditions in dairy husbandry is a crucial precondition of high quality raw milk production because, in some regions of Slovakia, mobile sale of raw cow milk is in high demand. Very important is the fact that milk is obtained from large cattle herds. Another important factor is the fact that milk, as a biological material, is a perfect substrate for growth and reproduction of micro-organisms that can spread into milk from the infected mammary gland or hands of personnel during manipulation with milk – secondary contamination. In addition to the common microflora, the contaminated milk can contain micro-organisms capable of causing alimentary diseases or presenting other hazards to the consumer.

The most frequent and costly production disease in dairy husbandry of all dairy animals is inflammation of the mammary gland – mastitis

Key words: microbiological hazard; milk quality; mastitis; somatic cell count

ACKNOWLEDGMENT

The paper is part of the projects VEGA 1/0123/08 and VEGA 1/0472/09.

CURRENT SITUATION IN THE PRODUCTION OF SHEEP CHEESE SPECIALITIES

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ABSTRACT

The production of sheep cheese specialities has had a long tradition in Slovakia, recently showing visible signs of increase. This production has a significant impact on rural development, improves the use of mountain grasslands, and helps to maintain traditions and promote rural tourism. It offers a rich selection of traditional products, the consumption of which has a positive influence on human nutrition, too. In this paper, the recent development of sheep dairy industry is evaluated but primarily it focuses on the current state and problems, which are faced in the production of sheep cheese. It is a good news that the production of sheep cheese specialties has an increasing trend and that they became steady items on consumer's menu. These products include first of all: Slovak Bryndza, assorted steamed sheep cheeses, ostiepok cheeses as well as old and not so typical cheese products.

Key words: development of Slovak country; sheep cheese specialities

FOLIA VETERINARIA, 54, Supplementum: 10, 2010

NEW SCREENING METHODS ECLIPSE 50 AND KALIDOS FOR RESIDUE DETECTION IN RAW MILK

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ABSTRACT

Incidence of residues of veterinary drugs in milk is still of a great health risk for consumers and also brings technological problems in food production. Veterinary medicines are used for infection diseases treatment, mainly mastitis, and if the withdrawal period is not observed there is a danger that veterinary residues can be present in milk of treated animals.

According the EU legislation, food business operators must ensure that raw milk is not placed on the market if contains residues of antibiotics in such amounts that exceeds the limits stated by Regulations of European Parliament and Council (EC) No. 470/2009 of 6th May, 2009, laying down the procedures for establishing residue limits of pharmacologically active substances in foodstuff of animal origin.

According to the HACCP system for milk investigation concerning the presence of residues, the producers use different screening tests which help them minimize residue occurrence in milk and ensure the milk and dairy products safety.

Key words: Kalidos; RIL in raw milk; screening tests Eclipse 50

THE SUITABILITY OF CHARM ROSA MRL BL/TET TEST FOR RAPID DETECTION OF BETA-LACTAMS AND TETRACYCLINES IN MILK

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ABSTRACT

Rapid and sensitive methods for the detection of antimicrobial residues in raw milk are especially needed in milk industry, when the time of milk classification play important rule. Beta-lactams and tetracyclines are used for the treatment of milking cows very often. Usually we don't have problem with the detection of beta-lactams, but many commercially available tests are not able to detect of tetracyclines at the level below of MRL. The aim of study was evaluation of Charm ROSA MRL BL/TET test for rapid, simultaneous detection of both groups of antibiotics in raw milk.

Key words: antibacterial residues; milk; rapid detection

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CURRENT POSSIBILITIES OF MOLECULAR-BIOLOGICAL ANALYSIS OF MILK AND MILK PRODUCTS

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ABSTRACT

Several molecular-biological real-time polymerase chain reaction (PCR)-based and DNA sequencing-based methods have become useful for the microbiological analysis of milk and milk products due to simplified applicability, excellent analytical parameters and better economical affordability. Methods employing cultivation enrichment and real-time PCR facilitate detection of *Listeria monocytogenes, Staphylococcus aureus, Cronobacter sakazakii* and other pathogenic bacteria, compared to the time required by classical microbiological methods. Methods based on microfiltration and real-time PCR facilitate sensitive detection of protozoan parasites in milk, such as *Cryptosporidium parvum*. PCR-based and DNA sequencing-based methods facilitate detection of important genes, typing and identification on the species level of microorganisms. On the other hand, PCR is not suitable for quantitative identification of cows', ewes' and goats' milk. No sufficiently sensitive methods have been developed yet for rapid quantification of pathogenic bacteria (e. g. *L. monocytogenes*) in milk and milk products.

Key words: DNA; *Listeria monocytogenes*; milk; PCR

ACKNOWLEDGMENT

The paper is part of the project ASFEU 26240220013.

MILK AND DAIRY PRODUCTS IN PREVENTION AND DEVELOPMENT OF CIVILISATION DISEASES

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ABSTRACT

The paper deals with the current situation in nutrition of Slovak population and the negative impact of the recent developments on human health. Mainly the changes in the field of agriculture, the present offer of dairy products and their low consumption in comparison with other countries are analysed. Despite apparent negative development signs, no goal-oriented measures have been taken at the state level to improve the livestock production and to create projects, which would support education and agricultural development with the purpose to increase the general agricultural production, use of abandoned grasslands and pastures, consumption of dairy products and the general knowledge of healthy nutrition. These up-to-date problems in primary agricultural production and the lack of knowledge in the field of healthy nutrition are issues, which should be addressed urgently.

Key words: civilization diseases; healthy nutrition; milk and dairy products

FOLIA VETERINARIA, 54, Supplementum: 12, 2010

PROTECTIVE PROPERTIES OF SELECTED *LACTOBACILLUS* STRAINS

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ABSTRACT

Ten lactobacilli strains were isolated from cow and ewe milk to study their antimicrobial activity against selected bacteria and moulds by diffusion method. From among the antimicrobial substances, production of lactic and phenylactic acids in MRS broth was monitored by HPLC UV/RID.

Key words: antimicrobial activity; HPLC; lactic acid; lactobacilli; phenylactic acid

ACKNOWLEDGMENT

The paper is part of the projects APVV-0158-07 and VEGA 1/0570/08.

ASPECTS OF QUALITY OF PRODUCTS FROM NON-PASTEURIZED SHEEP MILK

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ABSTRACT

Operators of food factories are required to observe the microbiological criteria. That includes testing of samples for complying with relevant criteria, analysis of implementation of relevant corrective steps in accordance with the food law and instructions published by competent authorities. The arrangements which have to be accepted by the operators of food factories to secure compliance with the criteria determining the process acceptability include *inter alia* inspection of raw materials, hygiene, temperature and product shelf life.

Key words: hygiene process criteria; process acceptability; sheep milk

FOLIA VETERINARIA, 54, Supplementum: 13, 2010

ETIOLOGY OF MASTITIS IN SHEEP HERDS

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ABSTRACT

The principal aim of our experiment was to observe etiology of mastitis in two sheep herds with different technology of milking and define specific abundance of *Staphylococcus* sp. The experiment was carried out on 180 machine- milked sheep (the first herd) and 200 hand-milked sheep (the second herd). We observed that 17 % of machine-milked sheep and 8.3 % of hand-milked sheep were infected. The bacteria involved the most in infecting both herds were *Staphylococcus* sp. (13.1 % in the first herd and 8.3 % in the second herd). The proportion of *Staphylococcus aureus* and coagulase negative and positive staphylococci was in favour of coagulase positive staphylococci.

Key words: environmental bacteria; mastitis; *Staphylococcus* sp.

RESISTANCE OF *STAPHYLOCOCCUS* SP. BACTERIA ISOLATED FROM SHEEP MASTITIS

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ABSTRACT

Our study focused on the occurrence of resistance to 15 antibiotics in 70 tested *Staphylococcus* sp. bacteria, isolated from latent subclinical and clinical sheep mastitis. The most numerous were *Staphylococcus pulvereri* (20), followed by *Staphylococcus epidermidis* (15), *Staphylococcus aureus* (132), *Staphylococcus chromogenes* (11) and *Staphylococcus hyicus* (4). A common trait of all tested bacteria was a high level of resistance to erythromycin, lincomycin, neomycin, novobiocin, streptomycin, amoxicillin +sulfbactan and tetracycline. Our results proved that the high level of resistance to the mentioned antibiotics was a significant factor of virulence in sheep mastitis pathogenesis.

Key words: coagulase negative staphylococci; resistance; sensitivity; sheep milk; *Staphylococcus* sp.

ACKNOWLEDGEMENT

The study was part of the projects APVV-0629-07 and VEGA1/0384/08.

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EVOLUTION TRENDS IN SAFETY OF FOODSTUFFS OF NON-ANIMAL ORIGIN

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ABSTRACT

In 2009 the State Veterinary and Food Administration carried out audits in plant commodities food business, focusing on verification of the food hygiene control system and good manufacturing practice and their compliance with the current legislative provisions. A total of 368 audits were performed and 477 non-compliances were identified.

Key words: analysis of samples; audit; food of plant origin; food safety; inspection; sanitation

RISKS RELATED TO RAW MATERIALS AND FOODSTUFFS OF PLANT ORIGIN

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ABSTRACT

All potentially harmful components or characteristics of foodstuffs present a risk to human health, particularly from factors of chemical, biological, and physical character. They are naturally related to raw materials as contamination can occur in the process of plant growth, treatment of raw materials and production of foodstuffs. Every link of food chain can affect the characteristics related to health safety. Food risks are directly proportional to the level of disobeying principles for safe manipulation with food at basic production, distribution and marketing of foodstuffs and, of course, consumers' manipulation with them. Methods for limiting and decreasing the risks related to raw materials and food of plant-origin include issuing of appropriate legislative requirements on health safety and use of raw materials, producer's and raw-material importer's responsibility and inspecting activity of the supervising bodies. Preventive mechanisms based on risk analysis and critical points detection, rapid alert system for food and feed, and obligation of traceability within the food chain are available.

Key words: allergens; contaminants; foodstuffs; GMO; pathogens; risk

FOLIA VETERINARIA, 54, Supplementum: 15, 2010

HIDDEN ALLERGENS IN FOOD LEGISLATIVE SOLUTION OF THE PROBLEM

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ABSTRACT

In order to protect the health of consumers against food allergens and to provide all consumers with better information, the EU food labeling Commission Directive 2007/68/EC specified 14 potential food allergens. Foodstuffs labels must indicate all ingredients with allergenic effect present in the respective food product in any amount. For public health reasons, the draft Regulation extends the current requirements for allergen labeling to cover non pre-packed food, including food sold in restaurants and other catering establishments (Commission proposal to overhaul EU food labeling Rules, Brussels, 30th January, 2008).

Key words: Commission Directive 2007/68/EC; Directive 2003/89/EC; Directive 2000/13/EC; EU food labeling Rules; food allergens

ACKNOWLEDGEMENT

The paper is part of the projects VEGA1/0472/09 and VEGA1/0123/08.

PLANTS ALLERGENS IN FOODSTUFFS

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ABSTRACT

The paper discusses law regulations in the Czech and Slovak Republic concerning plant allergens. It describes threshold doses of potentially allergenic raw materials in food and basic division of these allergens according to protein origin.

Key words: allergens; food; plants

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THE MILK FAT FATTY ACIDS PROFILE IN RELATION TO PRODUCTION CONDITIONS

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ABSTRACT

The aim of the study was to extend the knowledge about current fatty acids (FAs) profile in cow milk fat from cow herds kept on mountain dairy farms in Slovakia. Milk samples were collected from 181 cows of 5 different herds during summer pasture period and from the same cows at winter feeding with grass haylage and maize silage. The most interesting was the conjugated linoleic acid (CLA). The highest level was detected in milk from Pinzgau – 0.82 %, lower ($P = 0.015$) in Slovak pied – 0.62 %, and significantly lower ($P < 0.001$) in Holstein – 0.44 %, cross-breed Holstein x Pinzgau – 0.45 % and Holstein x Pinzgau x Red – 0.43 % in the summer period. In the winter period, similar to summer, the highest content of CLA was found in Pinzgau herd – 0.74 %, lower ($P = 0.015$) in Slovak pied – 0.60 % and significantly lower ($P < 0.001$) in Holstein – 0.46 %, cross-breed Holstein x Pinzgau – 0.44 % and Holstein x Pinzgau x Red – 0.35 %. The results obtained confirmed the assumption that there is a basis for genetic variation among breeds, which is related to rumen output of trans-11 C18 : 1 and to a lesser extent cis-9, trans-11 CLA, and to the amount and activity of Δ^9-desaturase in the mammary gland tissue.

Key words: breed; fatty acids; milk

Protected LABELING of milk products and RELATED laboratory experiences

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ABSTRACT

It is important to notice that protected labeling of agricultural products has its own importance for both producers and consumers. It is necessary to provide to consumers all relevant information concerning origin and specification of the agricultural product. The product with protected labeling has to comply with those specification criteria under which it was authorized. The Member States shall appoint the competent authority or authorities responsible for inspections in respect of the obligations established by valid legislation. Products with protected designation are rarely controlled in official control. Accredited laboratory methods (HPLC, GC) were used in the official control of the mentioned products. Analysed parameters of two samples were suspected not be up to the criteria of the protected labeling.

Key words: benzoic acid; cheese; foreign fats; protected labeling; sheep cheese; sorbic acid

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DETERMINATION OF NATAMYCIN IN CHEESE BY THE HPLC/MS METHOD

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ABSTRACT

Natamycin is effective against moulds, yeasts and various fungi. It prevents their growth and formation of potentially carcinogenic mycotoxins. Currently, natamycin is allowed as a food additive, mainly for the surface treatment of cheese and processed meat, such as dry sausages. In the EU it has the additive number E 235. Determination of natamycin in cheese is necessary because natamycin penetrates into cheese.

Natamycin was extracted from cheese with methanol. The extract was diluted with water and fat and proteins were precipitated by freezing the samples at – 20 °C. The cold extract was filtered and concentrated by SPE. Natamycin was determined in the eluate by HPLC/MS and HPLC/MS/MS methods.

Key words: cheese; HPLC/MS; natamycin

ANTAGONISM OF *LACTIC ACID BACTERIA* TOWARD *STAPHYLOCOCCUS AUREUS* DURING CHEESE MAKING

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ABSTRACT

Ability of lactic acid bacteria to inhibit growth of *Staphylococcus aureus* was determined during semi-pilot production of cheeses. Two types of starters were validated – cream culture S, culture MT 53 and a supplement culture of *Lactobacillus rhamnosus* 123. More rapid inhibition was observed with the culture MT 53 – the same colony counts were present after two days of ripening as in cheeses with cream culture, but after up to 9 days of ripening. Faster inhibition was due to the presence of *Streptococcus thermophilus* strain in the MT 53 culture which enhanced acid production in cheese. The effect of supplemental culture of *Lactobacillus rhamnosus* 123 was noticeable only in the later stage of maturation.

Key words: fermented milk starters; inhibition of growth; pH-value; *Staphylococcus aureus*

ACKNOWLEDGEMENT

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EWE'S MILK AS A RAW MATERIAL FOR THE FURTHER PROCESSING FOR HUMAN NUTRITION

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ABSTRACT

Totally, 240 coagulase negative staphylococci and 29 strains of *S. aureus* were detected in raw ewe milk samples. The following isolates and biotypes were detected: *S. epidermidis* (n = 87), 20 biotypes; *S. caprae* (n = 51), 7 biotypes; *S. hominis* (n = 15), 7 biotypes; *S. warneri* (n = 12), 10 biotypes; *S. chromogenes* (n = 15), 8 biotypes; *S. capitis* (n = 11 biotypes; *S. xylosus* (n = 14), 7 biotypes; *S. sciuri* (n = 2), 1 biotypes; *S. lentus* (n = 6), 5 biotypes; *S. simulans* (n = 5), 2 biotypes; *S. haemolyticus* (n = 8), 3 biotypes; *S. kloosii* (n = 1 biotypes); *S. cohnii cohnii* (n = 1), 1 biotype; *S. auricularis* (n = 1), 1 biotypes; *S. lugdunensis* (n = 2), 1 biotype.

Key words: ewe milk; quality; safety; staphylococci

ACKNOWLEDGEMENT

The paper is part of the projects VEGA1/0638/09 and KEGA 3/128-001UVL-4/2010.

EXPLOITATITON OF SOFTWARE SOURCES FOR ADVISORY SERVICES IN STRATEGY OF SECURE MILK PRODUCTION AND ITS INDUSTRIAL PROCESSING

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ABSTRACT

Quality control and quality assurance, namely food safety, are the measures ensuring effective consumer protection. This involves control programmes with respective software outputs and effective advisory systems. Management of risk analysis and preventive principles can guarantee the quality of the entire sphere of public goods.

Key words: food safety; management of risk analysis; preventive principles

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REDUCTION OF OCCURENCE OF *STAPHYLOCOCCUS* SP. IN DAIRY HERD BY IMPLEMENTATION OF ANTIMASTITIC METHODS

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ABSTRACT

The aim of the study was to reduce mastitis induced by bacterium *Staphylococcus* sp. in a herd of 120 dairy cows. Implementation of preventive, anti-mastitis methods and consecutive treatment of 12 cows with acute and subacute mastitis reduced the occurrence of mastitis of staphylococcal etiology within the first six month from 53.8 to 32.1 %. Within the 6-month treatment of 14 dairy cows with clinical form of mastitis, *Staphylococcus* sp. was reduced from 32.1 to 17.0 %.

Key words: cow; mastitis; milk; prevalence; prevention; reduction; *Staphylococcus* **sp.**

ACKNOWLEDGEMENT

The paper is part of the projects APVV-0629-07 and VEGA1/0384/08.

GROWTH OF SELECTED LACTOBACILLI IN CHEESES DURING THEIR RIPENING

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ABSTRACT

The study monitored changes in numbers of selected probiotic cultures in the cheese during its ripening. The technology for production of semi-hard low-scaled cheeses uses probiotic cultures *Lactobacillus acidophilus, Lactobacillus casei and Lactobacillus plantarum* 96. Samples were taken every month from January 2009 to June 2009. Cheese samples were analysed microbiologically using standard microbiological methods for determination of ingested probiotic cultures. Physico-chemical parameters (fat content, sodium chloride on dry matter basis, titratable acidity, pH and in the last month lactic acid and protein content) were determined during the four months of ripening for each sample (marginal and central zone of the cheese). The results of physico-chemical parameters changed significantly throughout the period of observation but corresponded with the values required by the relevant legislative provisions for the cheese. After six month minimum storage, the level of relevant microorganisms reached 10^6 CFU.ml^{-1}.

Key words: cheese; probiotics; technology

ACKNOWLEDGEMENT

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CHARACTERISTICS OF UNDESIRABLE SAPROPHYTIC BACTERIA AND POSSIBILITIES OF THEIR DEVELOPMENT IN CHEESES

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ABSTRACT

The paper focuses on issues related to cheese production. It characterizes undesirable saprophytic bacteria which may be present in cheeses as well as on their possible development in these products. Contamination of milk or cheese with certain microflora may result in many flaws in both ripening and non-ripening cheeses. The most common microbiological defect is early or late swellings of cheeses. In the majority of cases this is caused by strong re-infection with coliform bacteria (about 5 log $CFU.g^{-1}$) and less often by lactose-positive yeasts (about 4 log $CFU.g^{-1}$). This results in development of slight cracks with irregular sides resulting in swelling of cheeses. This problem may be prevented by correct production hygiene (closed cheese vats) and addition of 0.02 % $KNO_3/NaNO_3$.

Key words: cheeses; milk; saprophytic bacteria

FACTORS AFFECTING THE GROWTH OF STARTER BACTERIA IN CHEESES

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ABSTRACT

The paper investigated factors which influence the growth of starter bacteria used in cheese production. The main factor deciding upon the quality of the cheese is the quality of milk used for its production. The milk should have the highest possible microbiological quality, should come only from healthy cows and should not contain residues of inhibitory substances. Starter bacteria are added to different kinds of cheeses during their production. The bacteria are select, specified microorganisms, possessing the ability to multiply. They appear in the form of pure or mixed cultures of controlled content, having particular properties. In the production process, mesophilic starter cultures can be used for which the optimum growth temperature ranges from 22 to 26 °C. They are used for production of English type cheeses, such as Cheddar, Dutch type cheeses, such as Gouda or Edam, or mould cheeses, such as Camembert. The second group are thermophilic starter cultures with optimum of growth at 42 °C. They are used for production of high temperature ripening cheeses of Italian or Swiss type, such as Emmentaler.

Starter bacteria influence lactose metabolism and production of lactic acid and reduce pH, thus limiting to a large extent the undesirable microorganisms and pathogens that could worsen the quality of the product.

Key words: cheeses; milk; starter bacteria

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DESIRABLE QUALITIES OF LAB STARTER CULTURES USED FOR PRODUCTION OF SELECTED MILK BEVERAGES

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ABSTRACT

The study focused on production of selected milk beverages, such as cream, yoghurt, kefir, particularly on LAB starter cultures used in their production. Desirable qualities of LAB starter cultures intended for kefir production are important for each group of the microbes forming a starter, as well as for proper ratio between them. Bacteria (coccidia, bacilli) form 85 % of kefir seed microflora and yeasts account for 15%. *Coccidia Lactococcus* are the quickest to proliferate and reduce pH, whereas *Leuconostoc* are responsible for development of the right aroma and taste and for viscous properties. The role of yeasts is to produce CO_2 and alcohol and to ensure symbiosis between particular types of microbes. Acetobacters are also responsible for keeping symbiosis between different elements of kefir seed microflora and for improved cohesiveness of kefir. Today's kefir industrial production uses mostly group B Streptococci and lactobacilli with only little addition of yeast, which often do not ferment lactose so, consequently, there is no alcoholic fermentation. In such case the kefir bulging lid does not signify a faulty product, on the contrary, it is a result of alcoholic fermentation inside.

Key words: cream; LAB starter cultures; milk; kefir; yoghurt

PRESENCE AND DETECTION OF SALMONELLA IN MILK AND DAIRY PRODUCTS

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ABSTRACT

Review of *Salmonella* presence in milk and dairy products and outbreaks caused by these products indicated that despite low level of detection, routine monitoring of salmonella in bulk milk should be considered. Selected rapid, specific and sensitive methods were compared for its usefulness for food hygiene and official control purposes. Use of a real-time PCR and FCM assay after pre-enrichment provides a rapid, accurate, and sensitive method for monitoring of the presence of Salmonella, but from among the tested methods the PCR method with pre-enrichment (ISO 20838:2006) has the greatest value, especially for official inspection when standardization is of an essence.

Key words: detection; PCR; *Salmonella*

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DIVA STRATEGY FOR THE CONTROL OF BHV-1 INFECTIONS IN DAIRY COWS

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ABSTRACT

The paper describes DIVA strategy used to control BHV-1infections in dairy cow herds. One of DIVA (Differentiating Infected From Vaccinated) strategies allows to distinguish between naturally infected animals and those vaccinated with marker vaccine containing strain BHV-1 devoid of glycoprotein E (gE). Vaccination virus may be inactivated or attenuated. After vaccination organism produces immunoglobulins (antibodies) against antigens of the virus, except for gE. The presence of antibodies against gE distinguishes animals infected with the field strain of BHV-1 from those vaccinated with a marker vaccine. ELISA test detects antibodies against gE in serum and thus identifies animals infected in a natural way. The aim of the study was to implement a programme of combating BHV-1 infections in dairy cow herds (Holstein-Friesian breed).

Key words: BHV-1; dairy cows; DIVA strategy

STUDY ON PREVALENCE OF STAPHYLOCOCCAL ENTEROTOXINS ON PRODUCTION LINES AND IN RAW MILK

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ABSTRACT

The National Veterinary Research Institute – State Research Institute in Pulawy, Poland, has been taking part in a project concerning monitoring of presence of banned substances in food of animal origin since 2009. In a frame of this project, Department of Hygiene of Food of Animal Origin carried out research on the presence of staphylococci enterotoxins in milk and milk products. It involved collection of samples from production lines of cheeses and powdered milk products, determination of counts of coagulase-positive staphylococci (CPS) and detection of staphylococci enterotoxins in samples where CPS were present. During 2009, 97 samples were analyzed. CPS were found in 39 samples at a level between 5 $CFU.g^{-1}$ and 10^6 $CFU.g^{-1}$ in raw milk and raw milk cheese. Staphylococci enterotoxins were not detected in any of these samples but 6 of the isolated strains were enterotoxigenic. All isolated strains of CPS were further analyzed using biochemical tests. The aim of the project was to estimate occurrence of staphylococcal enterotoxins in milk and milk products and microbiological safety of these products. The research will continue until 2013.

Key words: CPS; microbiological safety; milk products; staphylococci enterotoxins

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ESTIMATION OF ANTIBIOTIC RESISTANCE OF *STAPHYLOCOCCUS* SPP. ISOLATED FROM MILK AND MILK PRODUCTS BY MIC METHOD

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ABSTRACT

Antibiotic resistance in bacteria is considered a major public health problem. The most dangerous bacterial strains are methycillin resistant *Staphylococcus aureus* (MRSA), which occur commonly in food. The European Union legislation requires inspection of food for staphylococci. The aim of the present study was to determine antibiotic resistance by the MIC method and to classify isolates of Staphylococci to MRSA or MSSA strains by the PCR method and chromid MRSA agar test. Moreover, detection of enterotoxigenic strains by ELFA method was performed. Ninety seven samples of milk, milk products and swabs from production lines were examined. Coagulase-positive strains were detected in over 40 % of samples. Three antibiotypes (A, B, C) were identified, 5 of the strains were defined as enterotoxigenic. MRSA strains were not found.

Key words: antibiotic resistance; MIC; milk and milk products; MRSA; PCR; *S. aureus*

DETERMINATION OF ALKALINE PHOSPHATASE IN MILK AND CHEESES AS VALIDATION OF COMPLETENESS OF THE PASTEURIZATION PROCESS

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ABSTRACT

Determination of alkaline phosphatase (ALP) in milk and dairy products is used to assess the completeness of pasteurization or addition of raw milk to pasteurized products. European Union legislation presents the level of 350 mU.l^{-1} of ALP activity as safe for consumption of milk and milk-based drinks. For cheese ALP limit has not yet been established for cheese. According to AFFSA, tentative limits for cheese from pasteurized milk ranged from 2 to 11 mU.l^{-1}. Fluorimetric method is the official reference method for the measurement of ALP activity. The aim of this study was to monitor the pasteurization process by means of determination of ALP in dairy products from retail outlets of various producers and various types. Moreover, precision of the method was determined by demonstrating its repeatability, reproducibility and uncertainty. The method was validated and verified in a laboratory and precision requirements of the method included in ISO 11816:1 and 2 were fitted. Monitoring of ALP activity serves as an indicator of completeness of the pasteurization process of most of dairy products.

Key words: alkaline phosphatase; cheese; milk; pasteurization

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MOLECULAR-BIOLOGICAL AND CULTURING METHODS FOR DETECTION AND DETERMINATION OF *B. CEREUS*

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ABSTRACT

The main aim of the study was to compare cultivation plate methods for enumeration of *B. cereus* spores in milk and to confirm results by PCR methods. Seventy samples of raw cow milk were inactivated at 85 °C for 10 min, inoculated onto standard medium (MYPA, i. e. mannitol-yolk emulsion-polymyxine agar) and test media (PEMBA, i. e. polymyxine-pyruvate-egg yolk-mannitol-bromthymol blue agar, and two chromogenic media – Brilliance™ *Bacillus cereus* agar, HiCrome *Bacillus* agar) and incubated at 30 °C for 24–48 hrs. Both positive and negative colonies were transferred to respective media and *B. cereus*-like but non-typical colonies were isolated and their genus confirmed by the PCR method only as bacilli. Their species identification as *B. cereus* was not confirmed by the designed primers. All cultivation methods were approved quantitatively but differed in demands on laboratory worker's experience.

Key words: *Bacillus cereus;* culturing methods; PCR methods

ACKNOWLEDGEMENT

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PREVALENCE OF SELECTED BACTERIAL SPECIES ON SURFACES IN DAIRY INDUSTRY

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ABSTRACT

Sixty swabs were taken from surfaces of equipment and technological environment of two dairy companies on 4 occasions (April, May, August, November) as a part of inspection of the efficiency of sanitation. We focused on some microorganisms characterized by affinity to formation of biofilms and the related food hazard. The most common of them were ***Bacillus cereus*** (24 isolates), *Staphylococcus epidermidis* (18 isolates), coagulase-negative staphylococci (16 isolates), *Staphylococcus warneri* (8 isolates), *Klebsiella* spp. (4 isolates), *Staphylococcus aureus* (2 isolates) and one isolate of each *Staphylococcus chromogenes, Escherichia coli, Pantoea* spp., *Listeria monocytogenes, Bacillus firmus* and *Bacillus laterosporosus.* The most diverse and numerous group of bacteria was recovered from quark factory operation (more specifically tank and piping) followed by the salt bath, cheese factory and UHT operation.

Key words: dairy companies; hygiene; organic production; sanitation

ACKNOWLEDGEMENT

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RESULTS OF OFFICIAL INSPECTION OF FOOD OF ANIMAL ORIGIN PLACED ON RETAIL MARKET IN THE KOSICE REGION IN 2009

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ABSTRACT

The inspectors of District veterinary and food administrations in the Kosice region performed 7234 inspections of food placed on the market in 2009. In 789 cases (from 3058 controlled units) violations of food law were ascertained. The most frequent non-compliances concerned hygiene of sale, good manufacturing practices, food labeling, food composition, temperature regimens and sale of expired products.

Key words: market food inspection; sale of expired products

MONITORING OF MARKET BASKET MILK AND MILK PRODUCTS IN SLOVAKIA

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ABSTRACT

The objective of the Market Basket Monitoring is to gain relevant information on food and water contamination directly within the consumer network The data obtained will be used as data source for national nutrition policy and dietary exposure assessment of the population to contaminants. Within the Market Basket Monitoring, staple food commodities as well as the most frequently used food commodities from the retail network were included.

Key words: contaminants; market basket monitoring; milk; milk products

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COMPARISON OF THE QUALITY OF HOMEMADE AND INDUSTRIALLY PRODUCED BUTTER

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ABSTRACT

The content of fatty acid methylesters (FAMEs) was used as an index of butter quality. We compared the quality of homemade and industrially produced butter. Samples of butter made at home in a traditional way and samples of butter from two different dairy plants bought in retail stores were used as experimental material. The comparison of % fat FAMEs in the analyzed samples suggested similar composition of butter samples. No marked differences were found in the content of individual fatty acids. Higher levels of stearic acid, oleic, linoleic and linolenic acid in the samples of butter compared with their average content could indicate other than milk fat origin.

Key words: butter; fatty acid methylesters (FAMEs)

ACKNOWLEDGEMENT

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RESIDUES OF QUINOLONES IN RAW COW'S MILK

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ABSTRACT

A high performance liquid chromatography – fluorescence detection method was developed for determination of enrofloxacin and ciprofloxacin residues in raw cow's milk. Bulk milk samples (n = 150) were obtained from 58 milk farms and analysed for quinolones by HPLC assay. The HPLC analysis was performed using an Alliance 2695 separation module with 2475 fluorescence detector (Waters, USA) on the Atlantis T3, 4.6 × 250 mm, 5 μm chromatographic column (Waters,USA). The limits of quantitation were determined by analysis of milk samples spiked with standards and ranged between 1.6–4.4 $\mu g.kg^{-1}$ for individual analytes. The levels of investigated quinolones were below the recommended maximum residue limit.

Key words: enrofloxacin; milk; residues

ACKNOWLEDGEMENT

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OCCURENCE OF ENTEROTOXIGENIC BACTERIA *STAPHYLOCOCCUS* SP. IN COW MILK SAMPLES

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ABSTRACT

The aim of this study was to test 141 *Staphylococcus* sp. by the PCR method to determine the presence of gene (***seg***) responsible for production of staphylococci enterotoxins (SE). They were isolated from 671 milk samples from three dairy cow herds from different locations in Slovakia. The presence of *(seg)* gene was confirmed in 18 *Staphylococcus* sp. (12.8 %) bacteria. Using a kit Ridascreen® Set A, B, C, D, E, we detected production SE *in vitro* by six bacteria (4.3 %). Three species: *S. aureus* (SEA, SEC), *S. gallinarum* (SEC, SED) and *S. chromogenes* (twice SEC) were positive for the presence of SE. The gene was detected in 12 bacteria (8.5 %) (*sea* 3, *seb* 1, *sec* 6, *sed* 2, resp. *sea+sec* 1). The study showed potential ability of *Staphylococcus* sp. to produce SE in the cow milk.

Key words: cow milk; enterotoxins (SE); mastitis; SE gene *(seg)*; *Staphylococcus* sp.

ACKNOWLEDGEMENT

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EFFECT OF STORAGE CONDITIONS ON THE QUALITY OF CULTURED CREAM

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ABSTRACT

The microbiological, chemical and sensory quality of cultured cream samples after the production and at the date of their consumption with and without cold chain break were evaluated. During the cultured cream storage, the count of lactic acid bacteria and titratable acidity decreased and bitter taste appeared. Pronounced sensory changes were detected in cultured cream samples stored with cold chain break.

Key words: cultured cream; lactic acid bacteria; organoleptic characteristics; storage; titratable acidity

ACKNOWLEDGEMENT

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THE USE OF MILK AMYLOID A AND SELECTED SERUM PROTEINS IN THE LABORATORY DIAGNOSIS OF MASTITIS

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ABSTRACT

The study evaluated the influence of clinical and sub-clinical mastitis on the level of milk amyloid A (MAA) in quarters milk samples and on the concentration of selected acute phase proteins in blood serum of dairy cows (n = 41). Significantly highest mean MAA concentration was detected in mammary quarters with clinical mastitis ($P < 0.001$). On the other hand, mean MAA concentration in mammary quarters without clinical signs of mastitis and with negative Californian Mastitis Test (CMT) was also relatively high. The analysis of haptoglobin and amyloid A concentration in serum showed higher values in cows with mastitis. Our results indicated elevated production of MAA by cows with clinical and sub-clinical mastitis and suggested that the measurement of MAA directly in milk would be more useful to discriminate between cows with various signs of mastitis than the measurement of acute phase proteins in the serum.

Key words: haptoglobin; milk amyloid A; serum amyloid A; sub-clinical mastitis

ACKNOWLEDGEMENT

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EFFECT OF AN AUTOMATIC MILKING SYSTEM ON PHYSICAL AND CHEMICAL PARAMETERS IN MILK

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ABSTRACT

The aim of this study was to asses the quality of raw cow's milk from an automatic milking system. Chemical parameters, freezing point, titratable acidity, somatic cell count and inhibitor residues were determined in samples of bulk tank milk (n = 48). Milk analysis data from two farms using conventional machine milking and 2008 milk analysis report data for the Czech Republic were used for comparison. All chemical parameters were within the established limits. No inhibitor residue was detected in any of the samples. These findings indicate that none of the results obtained would pose risk to the quality of milk. Therefore, the automatic milking system seems to be excellent in terms of milking and milk hygiene. Advantages of automatic milking include promotion of good general health of animals and animal welfare and decreasing labour demands.

Key words: automatic milking system; freezing point; milk; somatic cells

ACKNOWLEDGEMENT

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HYGIENE CONDITIONS DURING STORAGE AND AGING OF SELECTED TYPES OF CHEESE

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ABSTRACT

The study evaluated hygiene conditions during production of cheese Niva by determining at regular intervals the total plate counts (TPC) of bacteria and coliform bacteria as indicators of operation hygiene. Using 3M Petri-film plates we evaluated three different surfaces (wall, floor, door) in five different areas with a total of fifteen checkpoints (75 samples for TPC and 75 for coliform bacteria). Coliform bacteria were regularly found on floor in a salt-room (3–40 coliform bacteria) and on the worktops (3–60 coliform bacteria). The TPC detected in different areas differed and was relatively high in relation to hygiene requirements. High counts of TPC were found on the floor in the production plant, in a salt-room, ripening cellars, room for cutting and in packing and in the shipping store (80–500). Similar counts were identified on the worktop in a salt-room (390–500).

Key words: contamination; detection methods; cheese; 3M Petri-film; production plant; processing plant; sanitation control

POTENTIAL ELIMINATION OF UNDESIRABLE EFFECTS OF *STAPHYLOCOCCUS AUREUS* DURING PROCESSING OF MILK PRODUCTS

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ABSTRACT

Milk and milk products can, under certain circumstances, present biological hazard due to the presence of microorganisms. One of important bacteria is ***Staphylococcus aureus,*** posing most important hazard to other than bovine type of milk (goat, sheep) and products from such milk. Very important way of decreasing this hazard involves adequate and correct steps during processing of milk, particularly during maturation. They can contribute significantly to safety of the final products. Antibacterial substances, bactericins, can also play an important role. We tested the effects of correct technology and the influence of some shortcomings during maturation of cow and sheep cottage cheese on reduction of *Staphylococcus aureus.*

Key words: milk; hazard; *Staphylococcus aureus;* toxins

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GROWTH MODELING AND PRODUCTION OF STAPHYLOCOCCI ENTEROTOXINS A, B, C IN MILK AND DAIRY PRODUCTS

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ABSTRACT

The aim of the study was to evaluate the influence of extrinsic (temperature, incubation time) and intrinsic factors (pH, NaCl) on growth ability of *Staphylococcus aureus* and production of staphylococci enterotoxins (SEA, SEB, SEC). The intrinsic factors were defined close to those in fresh cheese. The samples were cultivated on Baird-Parker agar medium for quantitative analysis. Staphylococcal enterotoxins were detected by ELFA (miniVidas®). Experiments were carried out in the period of 7–10 days of incubation, with cultivation broth pH 5.5 and the temperature of 15 °C. The limit 10^5 CFU.ml^{-1}, set by legislative provisions as a risk for the production of SEs, was confirmed by our model experiments. Formation of SEs at the incubation temperature of 8 °C in the broth of pH = 4.5 was not detected in any of the strains rested.

Key words: ELFA; food safety; *S. aureus;* staphylococci; ELFA

ACKNOWLEDGEMENT

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OCCURRENCE OF *STAPHYLOCOCCUS AUREUS* IN COW'S MILK IN THE CZECH REPUBLIC

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ABSTRACT

The aim of the study was to determine the prevalence of ***S. aureus*** in raw bulk cow's milk samples from different farms in the Czech Republic and genotypic characterization of the obtained isolates. Our results revealed that the prevalence of *S. aureus* in milk reached 32.2 %, but there were differences among individual farms tested ranging from 0 to 66.6 % of positive samples. The prevalence of toxigenic strains was lower (11.1 %). The most common genotype found was *seg, sei. S. aureus* still remains one of the major causative agents of food-borne intoxications, therefore tracing *S. aureus* in raw materials can lead to the improvement of quality and safety of food.

Key words: staphylococcal enterotoxins, ses, pvl, tst, exA and B

ACKNOWLEDGEMENT

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VIRULENCE FACTORS OF *STAPHYLOCOCCUS* SP. ISOLATED FROM DAIRY COWS WITH ACUTE AND SUBACUTE MASTITIS

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ABSTRACT

The paper focused on virulence factors of 48 bacterium *Staphylococcus* sp. isolated from dairy cows with subacute (33) and acute (15) mastitis. In the set of isolated strains we identified 5 species which were involved in both mastitis forms. Additional species, although differing to some degree, also showed virulence factors characteristic of both acute and subacute mastitis. *S. hyicus* 5/4 was distinguished by production of DNAse 3/2, gelatinase 2/2 and biofilm 1/1. *S. chromogenes* 6/3 was characterized by production of lipase 2/1, gelatinase 1/1, hyaluronidase 2/1 and biofilm 1/2. The virulence factors in all cases of mastitis with involvement of *S. pulvereri* 7/1 were distinguished by production of lysins β 2/1, lecitinase 3/1, hyaluronidase 3/1 and biofilm. Almost both forms, acute and subacute mastitis, with involvement of *S. simulans* 5/3 were distinguished by production lyzins α 3/2 and biofilm 2/1. *S. aureus* bacteria showed most complete range of virulence factors with minimal difference at acute and subacute mastitis.

Key words: acute and subacute mastitis; cow; milk; virulence factors; *Staphylococcus* sp.

ACKNOWLEDGEMENT

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STAPHYLOCOCCI AS CONTAMINANTS OF COW'S MILK AND MAMMARY GLAND

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ABSTRACT

Strains of *S. aureus* were isolated from individual milk samples of 500 lactating cows from different areas in Slovakia (PH 1 – Košice region; PH 2 – Žilina region. Results on the presence of genus *Staphylococcus* isolated on Baird-Parker agar from milk samples from the two investigated farms differed significantly ($P < 0.0001^{***}$). Totally, 122 milk samples were positive for the presence of *S. aureus* (83 Košice region, 52 Žilina region). All the tested *S. aureus* presented haemolysis on blood agar plates: 69 strains (83.13 %) showed β-haemolysis, 14 (16.8 %) α-haemolysis. All 122 isolates of *S. aureus* were sensitive for methicilin as detected by interpretative criteria developed by NCCLS (2002). The results obtained were confirmed by PCR analysis according to which none of the tested isolates of *S. aureus* from 122 individual milk samples from both experimental dairy farms were positive either for the *mec*A gene, encoding methicilin resistance, nor for genes producing staphylococci enterotoxins *(sea, seb, sec, sed, see)* production.

Key words: cow milk; PCR analysis; *S. aureus*

ACKNOWLEDGEMENT

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OPTIMIZATION OF THE CHEMILUMINESCENCE METHOD FOR DETERMINATION OF ALP ACTIVITY IN MILK

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ABSTRACT

For specific purpose we validated and introduced to practice a chemiluminescence method intended for checking of pasteurization of cow, sheep and goat milk. We also investigated some factors which could influence the results of analyses carried out by this method. The validity requirements (limit of detection, repeatability, reproducibility), established by French National Reference Laboratory for milk and diary products AFSSA, Paris, were complied with. The chemiluminescence method corresponded to the purpose for which it was intended. The limit of detection was 17 $mU.l^{-1}$, which corresponded to the addition of approximately 0.001 % of non-pasteurized milk into pasteurized milk. In order to obtain accurate results we recommend to construct separate calibration curve for each type of milk tested.

Key words: cow milk; chemiluminescence method; goat milk; sheep milk

CHECKING HEALTH OF DAIRY COWS AND QUALITY OF COW MILK

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ABSTRACT

Mastitis is one of the most costly diseases on dairy farms. This polyfactorial disease presents permanent hygiene and technological problems. Changes in composition of milk cause serious problems during milk processing to a wide assortment of products but such milk may pose hygiene hazard, too. We compared spectrum of whey proteins from healthy mammary gland with milk from cows suffering from mastitis during different steps of milk processing. The mammary gland health influences qualitative and quantitative properties of milk. Changes in the somatic cell count, increased enzyme activities, changes in protein structure, content of lactose, minerals and other milk constituents resulted in technological problems, altered hygiene and nutritional quality of milk products and affected classification of milk into milk quality classes.

Key words: hygiene, quality, mastitis, proteins, microorganisms

ACKNOWLEDGEMENT

The paper is part of the projects VEGA 1/0123/08 and VEGA 1/0472/09.

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MONITORING THE COUNTS OF SELECTED PROBIOTIC MICRO-ORGANISMS IN YOGHURT DURING STORAGE

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ABSTRACT

The study investigated survival of *Lactobacillus acidophilus* and *Bifidobacterium animalis* spp. *lactis* in yoghurt during storage. Experiments were carried out from April 2008 to January 2009. Yoghurt produced under laboratory conditions was incubated at 43° C for 3.5 h and stored at 4° C. Changes in the acidity (pH and °SH) and microbiological properties of yoghurt were observed on day 1, 3, 7, 14 and 21 of storage. We recorded an increase in the number of probiotic bacteria. Counts of *Bifidobacterium animalis* spp. *lactis* increased from 0.3×10^9 CFU.g^{-1} to 1.7×10^9 CFU.g^{-1} in the first 7 days of storage regardless of season. *Lactobacillus acidophilus* bacterial counts increased from 0.8×10^9 CFU.g^{-1} to 5.5×10^9 CFU.g^{-1} CFU.g^{-1} during the 7 days of storage in four seasons. A significant relationship was observed between decreasing pH and increasing counts of individual species of bacteria in the samples. Microbiological examination showed higher increase in counts of *Lactobacillus acidophilus* during the observation period. Quantitative proportion of *Lactobacillus acidophilus* at the end of storage corresponded to quantity of probiotic bacteria needed to ensure therapeutic minimum. The counts of the genus *Bifidobacterium animalis* spp. *lactis* were by one order higher (2.0×10^9 per 1 g) than the counts of *Lactobacillus acidophilus.*

Key words: probiotics; seasons; yoghurts

ACKNOWLEDGMENT

The paper is part of the project VEGA 1/0123/08.

PHYSIOCHEMICAL AND SENSORY PROPERTIES APPRAISAL OF EVE'S CHEESE „BRYNDZA“

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ABSTRACT

We investigated physiochemical and sensory properties of 20 samples of eve's milk cheese "bryndza" purchased in retail network in Košice in November 2009. The percentage content of dry matter was 45.85± 0.68, fat content on dry matter basis 47.64 ± 0.46, NaCl content 2.37 ± 0.33, mean level of pH 5.32 ± 0.11 and water activity a_w 0.962 ± 0.004. Sensory properties (appearance, texture, smell and taste) were analysed by 7 panellists. Atypical odour and taste was found in "bryndza" with lower eve's cheese content. Mistakes in labelling were detected too.

Key words: bryndza; dry mater; fat; physiochemical and sensory properties

ACKNOWLEDGEMENT

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CHANGES IN PROPERTIES OF CHEESE EIDAM AFTER IRRADIATION

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ABSTRACT

Vacuum packed sliced cheese Eidam was irradiated by 1.0, 2.5 or 5.0 kGy and stored for 7, 14 or 21 days at 8 °C. Values of the colour parameters L*, a*, and b* depended significantly on the irradiation dose and on duration of storage. After 7 days storage the cheese became remarkably yellow in all groups tested. The total number of microorganisms on non-irradiated cheese was approximately 10^7 g^{-1}, while on irradiated cheese it decreased down to 10^3 g^{-1}. Consequently, the irradiation prolonged the storage stability of cheese for at least 21 days, as evaluated in these experiments. Broad usage of cheese irradiation is rather limited due to some loss of characteristic taste and smell at doses higher than 2.5 kGy.

Key words: colour; food safety; ionizing radiation

ACKNOWLEDGEMENT

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MICROBIOLOGICAL SAFETY OF UHT MILK

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ABSTRACT

The goal of the study was to examine the microbiological safety of UHT milk. Analysis of the impact of heat treatment of milk (pasteurisation and UHT heating) on the growth and multiplication of micro-organisms, showed that the heating temperature was set correctly and the UHT treatment substantially contributed to the hygiene level and microbiological safety of milk. Observation of microbiological quality of preserved milk stored at 21 °C for the period from 2 days to 6 months after the heat treatment showed no significant increase in total count of micro-organisms.

Key words: analysis; microbiological safety; UHT milk

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THE MINIMUM INHIBITORY CONCENTRATIONS OF AMINOGLYCOSIDES IN MILK

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ABSTRACT

The presence of antimicrobial residues in milk is currently detected by two official methods: Screening Test for Antibiotic Residues (STAR) and Delvotest®SP-NT. In our experiment, the minimum inhibitory concentrations (MIC) of five aminoglycosides (AMG) in fortified milk samples were determined. Streptomycin, gentamicin, neomycin, spectinomycin and kanamycin standards were tested using the concentrations from 0.01 $\mu g.ml^{-1}$ to 1 $\mu g.ml^{-1}$ by both microbial inhibition tests mentioned above. The MIC of AMG for Delvotest®SP-NT were 0.05 $\mu g.ml^{-1}$ for gentamicin, 0.1 $\mu g.ml^{-1}$ for neomycin, 0.2 $\mu g.ml^{-1}$ for streptomycin and 0.5 $\mu g.ml^{-1}$ for kanamycin and spectinomycin. The MIC of AMG for STAR method were 0.05 $\mu g.ml^{-1}$ for gentamicin, 0.2 $\mu g.ml^{-1}$ for streptomycin, neomycin and kanamycin. Spectinomycin did not caused any inhibition even at the concentration of 1 $\mu g.ml^{-1}$.

Key words: antibiotic residues; Delvotest®SP-NT; microbial inhibition tests; milk; STAR

MONITORING OF ALLERGENS IN FOOD PLACED ON THE MARKET IN THE KOSICE REGION IN 2006–2009

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ABSTRACT

Official inspections (in the area of Regional Veterinary and Food Administration) targeted on allergens labeling of food in food processing plants and on retail market were performed in 2006–2009. The results showed relatively high percentage of violations of legislative provisions in the field of food labeling.

Key words: allergens; food labeling; official control

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COMPARISON OF SELECTIVE MEDIA FOR THE GROWTH OF MOULDS AND YEASTS ISOLATED FROM DAIRY PRODUCTS IN TERMS OF APPLICABLE LEGISLATION

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ABSTRACT

The aim of the study was to assess and characterize different cultivation methods with regard to the validity of the new ISO standards and examine the growth of selected genera (and species) of moulds and yeasts on the respective cultivation media. When assessing the importance of moulds and yeasts in foods, the number of mould and yeast colonies is not always sufficient. Growth and characteristic morphology of individual species of moulds were observed best in Malt Extract Broth agar.

Key words: cultivation media; dairy products; moulds and yeasts

SAFETY AND QUALITY OF SHEEP CHEESE FROM THE MARKET

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ABSTRACT

We determined composition and selected physical and chemical parameters of 32 samples of sheep cheeses from the market in the Czech Republic. The following average values were obtained for the relevant parameters: pH 5.19, titratable acidity 66.9 SH, dry matter 53.63 %, fat on dry matter basis 43.23 %, sodium chloride (NaCl) 1.56 %, and a_w (water activity) 0.928. Microbiological tests were used to detect *Escherichia coli, Enterococcus* spp., *Staphylococcus aureus* and *Listeria monocytogenes.*

Key words: microbiological safety; physical and chemical parameters; sheep cheeses

ACKNOWLEDGEMENT

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EFFECT OF TEMPERATURE ON CHANGES IN HUMIDITY AND WATER ACTIVITY DURING STORAGE OF CHOCOLATE

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ABSTRACT

The aim of this study was to determine the value of water activity and moisture content in the samples of chocolate Kofila. Changes were observed in water activities, depending on the temperature of storage and humidity changes. Water activity reflects the presence of water in food. This water is osmotically available and can be used by micro-organisms. Water activity is known in abbreviation as aw. The higher the aw, the better the microorganisms can reproduce and cause damage to the food. Water activity describes the energy level of water in the food and thus its availability to act as a solvent and ability to participate in chemical and biochemical reactions.

Key words: humidity; storage of food; temperature; water activity

QUANTITATIVE IMMUNOHISTOCHEMICAL DETERMINATION OF WHEAT PROTEIN IN MEAT PRODUCTS

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ABSTRACT

Nowadays it is a common practice to add vegetable proteins to meat products. Because of the possible substitution of high quality raw meat with vegetable proteins without mentioning it on the product package label and because of the allergenic potential of many vegetable proteins it is important to develop as accurate as possible methods for determination of these proteins. Our study investigated immunohistochemical determination of the wheat protein addition followed by quantification using an image analysis software. The results obtained were compared with the known values of additives added to model meat products.

Key words: correlation coefficient; image analysis; immunohistochemistry; meat product

ACKNOWLEDGEMENT

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DUAL LABELING FOR DETECTION OF PLANT PROTEINS IN MODEL MEAT PRODUCTS

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ABSTRACT

Vegetable proteins (in particular wheat and soya proteins) are commonly used in meat products for their technological and economical aspects. As a vegetable additive, several forms of wheat and soya proteins are commonly used. However some of the proteins can cause allergic reactions in sensitive people and thus reliable methods for their detection are needed. One possibility is the immunohistochemical methods which are very time-consuming. For this reason, the aim of our study was to develop a two-colour immunohistochemical method which could save time and allow for parallel determination of several parameters by one examination.

Key words: dual labeling; immunohistochemical methods; wheat and soya proteins

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DETECTION OF SHEEP MILK AND CHEESES ADULTERATION USING IMMUNOENZYMATIC AND MOLECULAR-BIOLOGIC METHODS

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ABSTRACT

Milk species identification in cheeses has received great attention in recent years. Different analytical approaches have been applied for this purpose. An immunoenzymatic method was used to detect sheep milk and cheeses adulteration in 2009. The ELISA assay for detection of bovine casein was applied to 59 samples (3 sheep milk and 56 sheep cheeses). Bovine milk was detected in 13.5 % of analyzed samples. The ELISA results were confirmed by species-specific PCR.

Key words: detection; ELISA; milk species identification; PCR; sheep cheese; sheep milk

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CHARACTERISTICS OF SALMONELLA STRAINS ISOLATED FROM CALVES IN THE CZECH REPUBLIC FROM 2004 TO 2009

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ABSTRACT

The aim of the study was to determine the incidence of *Salmonella* in calves in the Czech Republic, characterize the isolates obtained by serotyping and phage typing and to monitor resistance to antimicrobial agents. We obtained 59 isolates of eight *Salmonella* serotypes. The most common serotypes in calves on farms in the Czech Republic were *S. Typhimurium* and *S. Enteritidis* which were further characterized by phage typing. The most common phage type in serotype ***S.*** Typhimurium was DT 104 and in *S. Enteritidis* the phage type PT 8. All isolates were tested for resistance to antimicrobial agents. Multiple resistance to ampicillin, chloramphenicol, streptomycin, sulfonamides and tetracycline was detected only in *S. Typhimurium.* This type of resistance is typical of multidrug-resistant *S. Typhimurium* DT 104. Further resistance was confirmed only in monophasic S. 4,5,12: i: -.

Key words: antimicrobial resistance; calves; phage typing; serotyping

ACKNOWLEDGMENT

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MICROSCOPIC ANALYSIS OF THE INNER STRUCTURES OF COFFEE BEANS USING IMAGE ANALYSIS

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ABSTRACT

The main goal of the coffee bean microscopic analysis was to ascertain inner structure changes during the technological procedure of coffee bean roasting. An additional aim of the study was to determine elementary quantitative microscopic parameters and to document, with the help of statistical analysis, demonstrable differences between robusta and arabica coffee beans and between green beans and roasted beans. On the basis of this we recommend more detailed analysis of chlorophyl deposits and their fission products in green beans and further analysis of Maillard polymers production in roasted coffee beans.

Key words: coffee beans; image analysis; statistical analysis

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DETERMINATION OF RUTIN (QUERCETIN-3-RUTINOSIDE) IN SELECTED BULK TEAS AND TEA BAGS

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ABSTRACT

Rutin (quercetin-3-rutinoside) belongs to the group of flavonoids and is located mainly in the green leaves of *Camellia sinensis* L. The aim of our study was to compare the content of rutin in different types of teas and in bulk teas and tea bags. The highest content if rutin was detected in average black teas and tea bags. This indicates that the rutin content is not affected by the size of tea leaves but by growing area and production technology (fermentation).

Key words: quercetin-3-rutinoside; tea; tea bags; teas in bulk; UV-VIS spectrophotometry

MICROSCOPY OF SELECTED TYPES OF SPICES AND THEIR IDENTIFICATION IN FOOD

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ABSTRACT

Spices are included in the majority of foods. Spices are very important and expensive raw materials imported from foreign countries but there importance is often undervalued. Results of microscopic analysis showed no significant differences in the investigated spice samples although confrontation of the results with legislative provisions indicated slight discrepancies.

Key words: adulteration; microscopic examination; sensory analysis

ACKNOWLEDGEMENT

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OCCURRENCE OF BIOLOGICALLY ACTIVE CAROTENOIDS IN TOMATO KETCHUPS

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ABSTRACT

The main goal of this experimental work was to determine three biologically active carotenoids, namely β-carotene, β-carotenone and lutein. Extraction with organic solvents and subsequent determination by UV-VIS spectroscopy has been used. Further, we have determined ratio of β-carotene to its oxidative product lutein in ketchups available at local market network. According to the ratio of these two substances it is possible to assess the value of biological activity of ketchup in relationship to its nutritional value.

Key words: carotenoid; ketchup; tomato

COLOURED WHEAT – GENETICS, BREEDING AND FOOD INDUSTRY

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ABSTRACT

There is wheat with different, genetically determined, grain colour: purple, blue yellow and white. These grains can be used in food industry for production of new products which could be not only attractive for consumers but also good for their health. The purple and blue forms contain different anthocyanins, compounds well known as antioxidants. The genes responsible for production of these compounds have been described and the chromosome localised with the tools of conventional genetic and breeding methods. The nutritional value of this wheat was also studied. Better chicken performance was described and some traits interesting for baking industry were also noted.

Key words: anthocyanins; grain colour; *Triticum aestivum*

ACKNOWLEDGEMENT

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CONTENT OF ESSENTIAL FATTY ACIDS IN OILY SEEDS AND NUTS

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ABSTRACT

In this study the fatty acid methylesters (FAMEs) of soybean *(Glycine max),* hazelnut *(Corylus avellana L.),* walnut *(Juglans regia L.),* peanut *(Arachis hypogaea L.)* and sunflower *(Helianthus annuus L.)* were determined. The samples analysed exhibited maximum content of FAMEs as follows: C16 : 0 13.51 % in peanuts, C18 : 0 4.516 % in soybeans, C18 : 1 78.23 % in hazelnuts, C18 : 2 54.58 in sunflower and soybeans and C18 : 3 in walnuts 14.02 %. The results showed that these values may be useful for evaluation of the respective dietary aspects.

Key words: FAMEs; GC; hazelnut; peanut; soybean; sunflower seed; walnut

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USING OKARA AS A FIBRE SOURCE FOR HUMAN ORGANISM

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ABSTRACT

The aim of the present study was to evaluate the quality of some food products, made by Alfa Bio Banská Bystrica, containing okara – a white or yellowish pulp consisting of insoluble parts of the soybean which remain in the filter sack when pureed soybeans are filtered in the production of soymilk or tofu. Three kinds of spreads (Francúzska nátierka – French spread, Nátierka s hubami – Mushroom spread and Alfa Bio Treska – Alfa Bio Codfish) and one byproduct (Fašírková zmes – Mince-meet) have favourable flavour and texture as healthy and palatable food products of Slovak gastronomy.

Key words: okara; soy bean fibre; soy milk; tofu

ACKNOWLEDGEMENT

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ACCUMULATION OF HEAVY METALS IN POPPY SEEDS (*Papaver somniferum* L.)

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ABSTRACT

The content of heavy metals Hg, Cd and Pb was determined in 54 different samples of poppy seeds *(Papaver somniferum* L.*)*. The mean content of total mercury was 0.0097 mg.kg^{-1} poppy seeds, mean content of cadmium 0.137 mg.kg^{-1} and mean content of lead 0.030 mg.kg^{-1} poppy seeds. The content of Cd exceeded the respective hygiene limit (SR) only in one sample.

Key words: AAS; Cd; heavy metals; Hg; Pb; poppy seeds *(Papaver somniferum* L.*)*

ACKNOWLEDGEMENT

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EVALUATION OF SELECTED MICROBIOLOGICAL AND QUALITATIVE PARAMETERS OF PEPPER

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ABSTRACT

The present study focused on microbiological parameters (counts of coliform bacteria – CB, microscopic fungi and *Bacillus cereus*) and qualitative indicators (moisture, total ash and dyeing capacity) of pepper. Microbiological examination of 40 peppers showed that 39 samples corresponded to the limit on CB (1.10^3 CFU.g^{-1}) and 1 sample exceeded the acceptable level. With regard to microscopic fungi all 40 samples complied with the requirements (max. 1.10^5 CFU.g^{-1}). *Bacillus cereus* count corresponded to the limit (1.10^3 CFU.g^{-1}) in 39 samples and was exceeded in 1 sample. Fifty six samples of pepper were evaluated for qualitative parameters. None of them exceeded the humidity limit (11 % by weight).

Key words: content of substances; microbiological indicators; pepper; qualitative indicators; spices

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GEOGRAPHIC CONDITIONS IN THE MANUFACTURING PROCESS OF SHEEP FARM CHEESE AS A GUARANTEED TRADITIONAL SPECIALITY

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ABSTRACT

The aim of the study was to point to the importance of cooperation among producers of traditional guaranteed specialities and researchers defining geographic authenticity of products, and other qualitative parameters important for the manufacturing process of sheep farm cheese as a traditional guaranteed speciality.

Key words: geography; sheep lump cheese; traditional guaranteed specialities

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THE EFFECT OF PROBIOTIC CULTURES ON THE GASTROINTESTINAL TRACT OF CONSUMERS

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ABSTRACT

Probiotics were here long before they got their own name or description of their self effectiveness. They have been a subject of many research activities from the time of their discovery to the present, which resulted in qualification of their common or essential applications in food industry. The probiotic bacteria most commonly used in food production are *Lactobacillus, Bifidobacterium, Lactococcus and some others, e.g. Enterococcus,* ***Staphylococcus*** and *Propionibacterium.* These are well-known as a group of lactic acid bacteria. Probiotic bacteria affect positively the health of consumers provided that they are consumed in specific concentrations and fulfil some other relevant requirements.

Key words: fermented meat products; probiotics; starter cultures

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QUALITY OF GOAT CHEESE MADE UNDER LABORATORY CONDITIONS

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ABSTRACT

The aim of the study was to determine composition, some physico-chemical parameters and counts of lactic streptococci and *Enterococcus* spp. in two groups of semi-hard goat cheeses maturated for 3 weeks. The cheeses were made under laboratory conditions (1st group – cheese surface treated by wax, 2nd group – cheese surface treated with *Penicillium camemberti*). The following mean values were obtained: pH 5.29–5.35 (1st group) *versus* 5.53–5.58 (2nd group), titratable acidity (°SH) 62.0 *versus* 80.0. The NaCl content varied from 2.47 % to 2.63 % (1st group) and from 2.98 % to 3.54 % (2nd group). The count of lactic streptococci in the third month of cheese maturation varied from 4.4×10^{20} CFU.g^{-1} (1st group) to 3.6×10^{20} CFU.g^{-1} (2nd group). The final count of *Enterococcus* spp. in experimental cheeses was 2.4×10^{6} CFU.g^{-1} (1st group) and 1.4×10^{4} CFU.g^{-1} (2nd group).

Key words: Enterococcus; LAB; semi-hard goat cheese

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APPLICATION OF RED FERMENTED RICE IN MILK INDUSTRY

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ABSTRACT

Colorants are often added to fruit flavoured yoghurt to enhance or replace the natural colour of the fruit. Pigments produced by the mould *Monascus purpureus* offer a potential alternative to certified food dyes or natural pigments used nowadays. The aim of this study was to add red fermented rice as natural food colorant to yoghurt and carry out organoleptic evaluation of the final milk product.

Key words: colour; red fermented rice; yoghurt

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SENSORY ANALYSIS OF YOGURTS

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ABSTRACT

One, who starts to concentrate on the sensorial analyzing more closely, will realize that it is really interesting and not so simple department, in which consistently standardization and objectification play a very important role. During sensorial ranking of white yogurts and their descriptors of taste, the highest preferences were given to yogurt B (Zvolen's yogurt) in the first and second week of ranking. The characteristic of excellent was given to yogurt B in the first week of ranking, samples A and C were rated as standardly good in the first as well as in the second week.

Key words: sensory analysis; white yogurts

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Virulence factors of bacterium *Staphylococcus* sp. Isolated FROM sheep WITH INDIVIDUAL FORMS OF MASTITIS

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ABSTRACT

In this study we isolated 23 bacteria *Staphylococcus* sp. from sheep suffering from mastitis. Within the 23 isolated bacteria *Staphylococcus* sp. we identified 7 species and three of them *S. pulvereri* (13), *S. aureus* (4) and *S. chromogenes,* (2) were isolated more frequently from mastitis cases. The monitoring of virulence factors of *S. aureus* strains associated with acute, subacute and subclinical mastitis showed minimal difference. *S. aureus* produced lipase, lecitinase and all monitored virulence factors. The ***sea*** gene was detected in *S. aureus* associated with acute mastitis. Genes ***sea*** or ***sec*** were detected from subacute mastitis associated with *S. pulvereri* and *S. hyicus* associated with subclinical mastitis. ***In vitro*** diagnostics with kit Ridascreen® Set A, B, C, D, E, did not confirm production of SE. All 13 bacteria *S. pulvereri* isolated from latent and subclinical mastitis produced biofilm.

Key words: acute; latent; mastitis; sheep; subacute; ***Staphylococcus*** sp.; virulence factors

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