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ABSTRACTS

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A NEW METHOD AND A NEW DEVICE FOR LIPIDS' FRESHNESS DETERMINATION

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Abstract. *The process of oils' oxidation results in a range of chemical compounds such as: peroxides, hydroperoxides, aldehydes, ketones, etc. Consequently an unpleasant odour and taste characteristic to the rinsed one may occur in food. In lipid oxidation processes, in the initial phase, peroxides occur, which further are turned into hydroperoxides, epoxides, and so on. The content of peroxides and hydroperoxides characterizes lipids' freshness. The classical method of determination the degree of lipids' oxidation is based on the reaction between oxidation products resulted from the analysed material and potassium iodide when iodine is released which has been titrated by a sodium thiosulphate solution of a known titre. The disadvantage of this method is that it requires important laboratory logistics in the preparation of samples, it is time-consuming and expensive. The authors propose a new method for determining the freshness of cooking oil using the optoelectronic measurement of surface area of an oil drop that is in a thermostatically controlled distilled water bath, followed by an automatic conversion of the surface amount area into degrees of oxidation, on a scale of 1 - 100, by means of electronically registered calibration curves. The proposed method is simple, fast and allows the achievement of inexpensive and effective miniature equipment used at rapid thermostatic control of the sample and determination of lipids' freshness degree. It consists of optoelectronic soil which is distilled on a thermostated water bath, followed by automatic conversion of the amount of surface area into degrees of oxidation, on a scale of 1-100, by the help of electronically registered calibration curves. The proposed method is simple, fast and enables an inexpensive and effective miniature device for rapid thermostatic control of the sample and rapid determination of lipids' freshness degree as well.*

Key words: *oil's oxidation, peroxides, optoelectronic measurement*

MONITORING OF CONTAMINATION OF THE ENVIRONMENT IN BUKOVYNA WITH HEAVY METALS

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Abstract. *The main sources of soils contamination with heavy metals have been analyzed. The results of monitoring agricultural soils contamination with heavy metals and the content of metals in the plant tissues in Chernivtsi region have also been registered. The average content of heavy metals in the agricultural soils of Chernivtsi region complies with the corresponding background values. An average content of the following heavy metals in a 0-5 cm horizon of the agricultural soils of Chernivtsi region was registered (mg/kg): 9,6 (Pb), 0,26 (Cd), 30,4 (Cu), 30,5 (Ni); 72,0 (Cr); 78,3 (Zn); 973 (Mn). Similar values for the urban soils within Chernivtsi were noticed as well: 51,3 (Pb), 0,3 (Cd), 79,2 (Cu), 25,3 (Ni); 41,0 (Cr); 73,4 (Zn); 654 (Mn). Heavy metals were arranged in a sequence according to their toxicity, which also varies for different organisms and content of free ions. The dependence of the metal ions content in food and the plants growing and cooking conditions has been analyzed. Some ways of heavy metals accumulation in plants are described. Local areas with higher concentration of heavy metals have been identified near roads and within some gardens. No such areas were found near industrial objects. The content of heavy metals in the soils of Prykarpattya and Prut-Dnister upland area remains below the background level, which ensures secure conditions for agricultural activities. A comparison between the heavy metals content in Bukovyna and other regions of Ukraine has also been made.*

Key words: *monitoring of soils, accumulation of heavy metals, plants, human body, food chain.*

**CONTRIBUTIONS TO THE DEVELOPMENT AND PROMOTION
OF A NEW METHOD AND DEVICE TO STUDY
GELLING KINETICS AND DEGREE**

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Abstract. *Gels are viscous-elastic fluids which rheological behaviour varies with time, the becoming kinetics of a gel being that from an ideally elastic fluid to an ideally viscous body. As for the gelling quantification and research the following means of investigation are of interest, allowing both the automatic mapping of gelling kinetic curve, under various conditions of temperature and composition and hydrodynamics as well and the determination of the gel point defined by the time elapsed up to the gelling starting moment when the lag angle reaches 45 °, value at which the investigated material turns from an elastic state into a viscous elastic one. The paper presents a constructive process and principle of a device based on the correlation of lag angle value occurring between the value of a sinusoidal voltage applied to the mobile coil of a linear electrodynamic motor voltage and frequency value generated by a fixed coil due to the oscillation of the support rod of a penetrator, in the form of conical needle, immersed up to a designated location in the examined medium and driven by the moving coil of a linear electrodynamic engine. The presented method and electronic device provides performing means for the advanced study of gelling phenomenon.*

Key words: *viscous-elastic fluids, rheological behaviour, lag angle, a linear electrodynamic engine, gelling phenomenon*

**LINGOCELLULOSICS:
CONVENIENT SORBENTS FOR WASTE WATER
TREATMENT FROM PHENOL AND FUFURAL**

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Abstract. *In this paper it has been introduced phenol and furfural sorption from water solutions as more important substances for chemical synthesis and as solvent in specially for oil refining solvent and the results of research in the field of the using of natural materials – as agricultural by-products, activated carbon from them as sorbents and as promising materials for waste water treatment from phenol and furfural. The advantages of agricultural by-products in comparison with other sorbents are their low cost, availability of extraction and others.*

Phenol and furfural exist in significant percentage of petroleum products as solvent and refining agent. This organic compound entering in soil and groundwater system are considered such a serious problem is that all have some acute and long term toxic effects. Apricot stones based acid-activated carbon has higher sorptive activity. The sorption activity of this sorbent as well as comparable with the commercial carbon - Carbonsorb-AB.

Key words: *natural materials, water solution, phenol, furfural, oil products, agricultural by-product, fruit stones and based on them activated carbon, adsorption, adsorbent, wastewater treatment.*

LEACHING OF ANTIMONY FROM BEVERAGE PET BOTTLES

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Abstract. *In the last few years some studies prove an increased level of antimony (Sb) concentrations in beverages. This is an alarming aspect because almost all Sb-compounds are somehow toxic and harmful to the environment. It is assumed that the Sb in the beverages originates from their packing material polyethylene terephthalate (abbr.: PET), because antimony trioxide (Sb₂O₃) is used as a catalyst in the production process. To investigate the influence of PET bottles on the beverages, first it is important to have an analysing method to quantify Sb in PET material. It is shown in this work that the quantitative results of a validatable graphite furnace atomic absorption spectrophotometer (abbr.: GF-AAS) after sample digestion correlates linear with a non validatable XRF method for direct analysis without sample digestion. A corresponding correlation formula could be calculated for the used systems. So it is possible to measure unknown samples with XRF and getting a secured result without the more labour intensive but validatable GF-AAS method. This study shows with GF-AAS that the different compositions of the beverages (e.g. model solutions and cola drinks) have a great influence on the increased Sb level. Here, especially phosphoric acid plays an important role. An elution rate for the Sb migrating out of the PET into the beverage is characterized for some cases using model experiments. Different kinds of cola drinks, containing amounts of phosphorous acid were analysed concerning their antimony content. Moreover these results signify that the increased Sb levels needs to have an additional source in the beverage production itself. Additionally the time/area dependence of the antimony leaching process is important and it could be shown, that the leaching rate in bottles is much lower, than in the raw granulate of PET.*

Key words: *Sb-compounds, graphite furnace atomic absorption spectrophotometer, phosphoric acid*

ELECTRONIC NOSE FAST METHOD FOR APPLES DISCRIMINATION TO DETERMINE OPTIMUM HARVEST MOMENT

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Abstract: Apples should be harvested before they are fully ripe, but after they have had time to mature. This varies according to cultivar and different apple varieties will often ripen at different times over a three-month period. Sugars are major soluble solids in fruit juice and therefore soluble solids are often used as an estimate of sugar content. As the fruit matures, the starch changes to sugar and the aroma and flavors develop, when generating volatile compounds. The perception of volatile compounds by the human nose is of great importance in evaluating the quality of foods; therefore, similar in principle to the human nose, the electronic nose was used. An electronic nose (E-nose) was used to classify apple samples based on their smell. Seven varieties of apples from Romania, Golden, Starkrimson, Jonathan, Gala were from the Reghin region and Pinova, Fuji, Golden, too, from the Insuratei area, were used. All the samples were analyzed using the E-nose FOX 4000 with 18 metal oxide coated or uncoated sensors. The resulting E-nose intensities were analyzed by Principal Component Analysis (PCA), Discriminant Factor Analysis (DFA) and Statistical Quality Control (SQC), which resulted in grouping the used varieties of apples or in grouping the types of samples (peel, homogenate or diluted homogenate from the same apple). The obtained results indicated that the E-nose could discriminate successfully among varieties of apples (% of variance >> 90; percentage of recognition ≈ 100 %). Choosing the proper harvest moment for apples gives us the possibility of long-term preservation in good quality conditions.

Key words: Multivariate statistics (PCA, DFA, SQC), correlating maturity indices, response surface.

GRINDING PROCESS OF THE WHEAT KERNEL WITH A NEW DESIGNED MICROMILL

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Abstract: *Wheat is one of the most important cereal crops in the world with various end-uses: food (bread, cakes, cookies and pasta), animal feed, raw material for beer and whisky, biodegradable plastic (from wheat starch). In all these technologies, grinding has great importance and is very energy consuming.*

The motivation to measure energy requirements for size reduction at specified roller mill settings, led to the development of instrumented roller mills of various designs. For this research, was used a new designed micromill which can perform in the grinding process of the wheat and of the middling too, in the same conditions as in the milling industry. The adjustment of the roller characteristics can be done for each type of milling product (grain, semolina, bran). The grains are in the same time under the compression and the shearing efforts. The energy consumption is represented by one single value for one pair of rollers. This single value is significant for the comparative appreciation regarding the energy consumption in the milling proces, for different wheat cultivars or different batches, but also for different characteristics of the rollers.

The micromill is designed to determine the grinding resistance of the cereals. The method has the same accuracy as the classical one and it has the advantage to be quicker and less demanding as work volume. The new designed equipment can be used in laboratory for the benefice of students as well in the milling industry.

Key words: *conditioning, grinding resistance, energy consumption.*

OXIDATIVE STABILITY OF IRON ENRICHED OIL –IN-WATER EMULSIONS

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Abstract : *In the present work the oxidative stability of sunflower oil-in-water emulsions has been researched on. Proteins can prevent or promote lipid oxidation by various mechanisms depending on their physicochemical characteristics. Sodium caseinate (NaCas) can prevent lipid oxidation, essentially by chelating metals ions, but other mechanisms such as free-radical scavenging may also be involved. Conjugated dienes (CD) were evaluated (primary products of lipid oxidation), and the volatile compounds: pentane, hexanal, 1-octen-3-ol, and 2-(E)-octenal were selected as markers of secondary products of lipid oxidation (GC/SPME). The affinity of milk proteins to bind free iron ion is the first factor that controls the transfer to oil/water interface. All the soluble iron that could be present in the emulsions was likely bound by caseins. At pH = 6.5, the oxidative stability of NaCas-stabilized emulsions greatly depends on metal availability. The chelating properties of NaCas and electrostatic interactions favored positioning of the metal ions at the interface, a key place to initiate the oxidation reactions. A change in pH modifies the complex formation between metallic ions and proteins: hydrogen ions compete with metallic ions to bind the protein. At low pH, the anionic groups of aminoacyl residues tend to become protonated. As a consequence, their affinity for cations decreases, and therefore reduces their complexation with the protein. The presence of ferrous ion influences the oxidation rate. The ability of the complex to retain iron ion and to avoid “free” ferrous ion is very important factor to be controlled.*

Key words: *caseinate; iron; lipid oxidation*

SUBLETHAL EFFECTS OF NICKEL TO RAINBOW TROUT ONCORHYNCHUS MYKISS BIOLOGICAL PARAMETERS

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Abstract. *The aim of this study was to assess sublethal effects of nickel on rainbow trout juveniles evaluating alterations in fish biological parameters - behavioral responses, hematological, morphological parameters and physiological indices. The study of the responses of rainbow trout to different concentrations of nickel demonstrated their different effect on fish organism. Feeding behavior of test-fish showed their adaptation to lower nickel concentrations (0.1 mg/L, 0.2 mg/L). Higher concentration of nickel (0.4 mg/L) had affected fish feeding irreversibly. There was no significant effect on fish ventilation frequency during exposure to 0.1 mg Ni/L concentration. Ventilation frequency decreased during exposure to 0.2 mg Ni/L, and 0.4 mg Ni/L, which led to increase in coughing rate. Hematological indices of fish were affected during exposure to 0.2 mg Ni/L, and 0.4 mg Ni/L concentrations. Erythrocyte, leucocyte count, haematocrit level and haemoglobin concentration had decreased significantly at 0.2 mg Ni/L, and 0.4 mg Ni/L concentrations. No significant changes in glucose concentration were found during the exposure to all nickel concentrations tested. Present investigation confirmed different sensitivity of the morphophysiological parameters studied, the most sensitive ones were: gill somatic > liver somatic = spleen somatic indices. This study showed that nickel even at low concentrations can affect biological parameters of fish. This phenomenon can lead to revision of Maximum-Permissible-Concentration of nickel in ambient water.*

Key words: *fish, nickel, sublethal effects, biological parameters*

ANTIOXIDANT ACTIVITY OF PLANT EXTRACTS CONTAINING POLYPHENOL COMPOUNDS

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Abstract: Antioxidants are compounds that can delay or inhibit the oxidation of lipids or other molecules by inhibiting the oxidizing chain reactions [1]. Polyphenol compounds are strong antioxidants, and their antioxidant activities are dependent on their structural properties [2-4]. Recently, interest has increased considerably in finding naturally occurring antioxidants for use in foods to replace synthetic antioxidants, which are being restricted due to their carcinogenicity [5, 6]. The objective of this study was to determine influence of total polyphenol content on the antioxidant activity of herbs extracts.

Two herbs were analysed: lovage and parsley. Extracts were prepared from herbs, dried before extraction by different methods: convection and super-high frequency (SHF) drying. The total content of polyphenols was determined using the Folin-Ciocalteu method and antioxidant activity by the use of DPPH free radical method.

The parsley extract was the most abundant source of polyphenols and showed the highest value of antioxidant activity in the group of the studied extracts. There was a direct relationship between the total polyphenol content and antioxidant activity in the extracts of different herbs.

Polyphenol compounds are one of the most diverse classes of phytochemicals widely distributed in herbs. Polyphenol compounds found in analyzed herb extracts are a potent source of antioxidants and can be used as dietary supplements.

Key words: parsley, lovage, drying, UV/Vis spectra, DPPH and Folin - Ciocalteu assays

LIFETIME OF FREEZING - ACTIVATED WATER

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Abstract. *Special properties of the “activated” water have been reported in numerous papers. Water activation can be achieved either through applying electromagnetic field, through consequential freezing-melting of the water or using some other methods. Freezing-melting activation is the simplest yet still effective method of activation. Activated water ensures better growing of some plants and can be helpful in order to prevent negative effects of unsatisfactory environment conditions. On the other hand, mention should be made that the activation effect is limited by some time frames, which depend on many factors. Activated water can lose its special properties during quite short period of time and then it turns into regular water, which does not reveal any special characteristics. This work reports the results of investigation of the activated water lifetime, which has been determined through measurements of the activated water electroconductivity in comparison to conductivity of the regular one. This method assumes that some nano-sized clusters can keep the ice crystal structure in the freshly melted state for some period of time, which should influence electro conductivity of the melted water. The approximated lifetime of the activated water was found equal to about 3,5 hours at the temperature of 18⁰C, 2 hours – at 23⁰C and immeasurably short at 28⁰C. This result proves that any special properties of the activated water can be expected only within rather very short time after melting. Then the activated water loses its special features and turns into regular one.*

Key words: *ice nano-associates; melted water; electro conductivity measurements*

ELECTROCHEMICAL MODIFICATION OF GRAPHITE SURFACE

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Abstract: *Thermodynamic and electrochemical parameters of intercalation and deintercalation of hydrosulfate ions into the graphite substrate have been investigated using electrodes after preliminary intercalation and without this stage and involving methods of the cyclic voltammetry, electronic microscopy and general principles of the irreversible thermodynamics. Potentials of the intercalation and deintercalation starting points, potentials of the anodic and cathodic maximums have been determined and changes in the free Gibbs energy for the intercalation and deintercalation processes, changes in the enthalpy and entropy of these processes, diffusion and migration fluxes of the hydrosulfate ions were calculated using the experimental data. Criteria of Shtakelberg, Tomesh and Shevchik and measurements of an amount of electricity required for the processes were used to evaluate the reversibility ratio of intercalation and deintercalation. It was found that raise in the intercalation-deintercalation cycles number results in increase in the limit anodic current value. This increase may be caused by partial decomposition of the graphite substrate structure and faster intercalation of the hydrosulfate ions during next cycles. Evaluation of the diffusion and migration fluxes of hydrosulfate ions has been made using an electronic microscopy. Thermodynamic moving forces of the fluxes have been analyzed. The higher is the concentration of sulfuric acid, the higher is the surface concentration of sulfur. A value of the flux of the electrochemical intercalation of hydrosulfate ions from a 1 M solution of sulfuric acid is about 42 times higher comparing to the physical intercalation flux value. A contribution of the latter flux into the total intercalation flux is only 3.8 % from the electrochemical intercalation flux contribution.*

Key words: *intercalation; sulfuric acid; electrochemical; parameters; diffusion; ions migration*

USE OF FISH BEHAVIORAL RESPONSES IN IDENTIFYING SUBLETHAL EXPOSURE TO POLLUTANTS

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Abstract. *In present the controlling of pollution of aquatic environment is performed basically by use of analytical investigations. However, biological control of effluent toxicity before effluents are discharged into receiving waters is still seldom used. Therefore, the search into suitable, easy available and maintainable test-objects, their rapid, sensitive, and non-specific test-functions which provide information not only about lethal but also about sublethal effects of pollutants is needed. Fishes are considered to be among the best test-objects. Alterations in a number of fish behavioral responses are sensitive indicators of sublethal exposure to aquatic pollutants. These are no standardized procedures yet.*

*Laboratory tests were conducted on rainbow trout *Oncorhynchus mykiss*. Behavioral responses, such as: leaving the nest, response to external stimuli and breathing rate in larvae as well as detection-avoidance, locomotor activity, gill ventilation frequency, and coughing rate in juveniles and adults were investigated.*

Obtained data showed that fish behavioral responses can be successfully applied in solving not only theoretical but also practical problems of aquatic toxicology, such as bioassay testing for hazard assessment of separate toxicants and their mixtures, industrial and municipal wastewaters as well as natural inland waters containing complexes of pollutants of different chemical origin.

KEY WORDS: *rainbow trout; behavior; aquatic pollutants; toxicity*

INFLUENCE OF SOME NONIONIC SURFACTANTS AND FLOCCULANTS ON STABILITY OF DILUTED DISPERSIONS OF KAOLIN AND HYDRO-MICA

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Abstract. *An influence of some nonionic surfactants and flocculants on aggregation and sedimentation stability of diluted dispersions of the argillaceous minerals has been investigated.*

The substances with a branched structure of the molecules can disaggregate the dispersed phase particles, which causes a rise in the sedimentation stability of the suspensions. The substances with linear structure of the molecules promote aggregation of the particles, which leads to the opposite effect on the sedimentation stability.

The results can be applied to enhancement of technologies of the natural and waste waters treatment and cleaning from the clay-like particles or used in the mineral raw materials refining and concentration.

Key words: *nonionic surfactants and flocculants, aggregation and sedimentation stability, the natural and waste waters treatment*

**MIXTURES WITH GRADIENT OF MOBILE PHASES UTILIZED
IN HPLC SEPARATIONS OF 2,4-DINITROPHENYLHIDRAZONES
PROVIDED BY INFERIOR CARBONYL COMPOUNDS**

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Abstract. Many mixtures of small quantities of carbonyl compounds are present in foods, concerning sensorial qualities (aroma and fragrance). The inferior carbonyl compounds (C₂-C₄, boiling point <100°C) – mono and dicarbonyl – can be identified and their concentrations can be measured, after being separated by distillation on water bath. They are transferred into a strongly acid solution of 2,4-dinitrophenylhydrazine (2,4-DNPH), generating a mixture of insoluble 2,4-dinitrophenylhydrazones (2,4-DNPH-ones). The 2,4-DNPH-ones are organic compounds with weak polarity, solids, crystallized, yellow and water insoluble, but soluble in organic solvents. The mixture of 2,4-DNPH-ones may be separated by liquid chromatography, using HPLC the reverse phase mechanism [1-3]. This paper contains experimental and theoretical considerations on the means of separation through liquid chromatography of two models and a natural mixture containing 2,4-DNPH-ones provided by inferior carbonyl compounds; to obtain decisive results, in the model mixtures 2,4-DNPH-ones provided by carbonyl compounds having three (acetone and propanal) and four atoms of carbon (isobutylaldehyde) were introduced.

Key words: acetaldehyde, diacetyl, 2,4-dinitrophenylhydrazone, reverse phase, low polarity, gradient of mobile phase

ATOM-ABSORPTION DETERMINATION OF MICROELEMENT COMPOSITION OF THE HUMAN HAIR FROM DIFFERENT AREAS OF CHERNIVTSI REGION

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Abstract. *An atom-absorption microelement analysis of the human hair taken from people living in different areas of Chernivtsi region (Ukraine) has been performed. Microcontent of zinc, iron, manganese and copper was determined in relation to the examinees' residence place, sex and age. A comparative analysis of the hair microcomposition proved that concentration of copper and iron in the man's hair from all age groups was higher than in the corresponding woman's hair while concentration of manganese and zinc in the man's hair was lower. An average content of Zn, Fe, Mn and Cu in the men hair remains within corresponding normal ranges. Exceeding concentrations were determined for the men from Novodnistrovsk (Zn), Novoselytsya district (Fe and Cu) and Chernivtsi (Mn). An average content of Fe and Cu in the women hair remains within the normal ranges. Exceeding concentrations of Zn were reported for the samples from Putyla district while in some samples from Novodnistrovsk this parameter was lower than the mean value. Concentration of Mn was above normal for all the women hair samples from Chernivtsi. Significant exceeding in the concentration of Zn and deficiency of Cu have been found for the samples from the first age group (17-25 years). Samples from the fourth age group (50-83 years) have shown deficiency of Zn and some excess of Mn and Fe.*

Key words: *microelement composition, hair, pollution, environment*

OPTIMIZATION OF THE EXTRACTION OF POLYPHENOLS FROM GRAPE SEEDS

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Abstract. *In the present work the extractability of polyphenols from grape seed has been studied. In winemaking, the degree of use of grapes as a material for the production of wine or juice reaches the maximum value of 80%, leading to the formation of considerable amounts of secondary products (marc, stalks, yeast, tartaric acid salts). Regarding the chemical composition, secondary winemaking products represent a valuable bonus material for the manufacture of a wide variety of products with an important role in the national economy. The determination of the quantity of the total amount of polyphenols with the help of Folin-Ciocalteu method in a stirred reactor at laboratory scale was made. Different values of temperature, time and concentration of the reagent were applied during the extractions to search for the optimal parameters where the extractability will be the most efficient in quantity and quality. A pulsed electric field was applied on the raw material to study its effect and check its fiability. The effect of the extractability was influenced by the parameters of the applied electric field, due to different values of intensity of the electric field, the number and the duration of impulse. The greater amount of extracted polyphenols was obtained at high temperatures, 30 minutes of extraction, with a concentration of ethanol of 40 %. The grape seed represents a valuable material which contains precious components and therefore the study of extractability is interesting from both scientific and economic point of view.*

Key words: *Solid-liquid extraction, grape seed, polyphenols*

EXPLORE OPTIONS TO EXTEND THE BERRIES'SORAGE TIME BY PACKAGING IN MODIFIED ATMOSPHERE

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Abstract. *Strawberries are one of the most popular fruits. A major problem is storage. There are several basic technologies for pre-processing and subsequent packaging. What technology will choose depends on the purpose of fruit. The article discussed technology for packing strawberries in a modified atmosphere. Based on experience, the analysis of information in the literature and continuing experimental work has developed technology for packaging a variety of strawberry. We presented some part of the results regarding the modern packaging materials. The above film is perforated by laser technology and allows permeability to water vapor, oxygen and carbon dioxide. These results enable the development of technology for pomishleno packaging and storage of strawberries.*

Key words: *storage, pre-processing, subsequent packaging, strawberry*

SELECTIVITY OF CALIX [6]ARENE-COATED PIEZOELECTRIC QUARTZ CRYSTAL SENSOR FOR THE DETECTION OF SOME ORGANIC AMINE IN GAS FLOW

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Abstract: *In this study, we developed calixarene-coated PQC sensors for the determination of organic amines in gas phase and study the selectivity of this coated sensor for normal and iso- form of propyl and butyl amines. p-tert-Butylcalix[6]arene compound was applied as piezoelectric quartz crystal (PQC) sensory coatings for the selective detection of volatile organic in gas phase. The AT-cut quartz crystals used in this study (Stanford Research Systems) having a diameter of 25.4 mm and a thickness of 0.33 mm. An oscillator circuit providing an alternating voltage will produce a fundamental frequency of 5 MHz for this particular crystal diameter and thickness. About 10.0 µl of analyte was injected into the mixing chamber with an approximately volume of 250 ml. The measuring chamber with coated PQC has a volume of approximately 5 mL. The concentration of amine sample in mixing chamber and respectively in gas flow was around 40 ppm. All experiments were conducted at 30°C. The complexation based on the host-guest interaction between the calixarene coating and the analyte makes the coated PQC sensors sensitive to organic amines and results in quasi-irreversible frequency changes. A PQC sensor coated with a p-tert-Butylcalix[6]arene exhibits different selectivity for amines in gas phase, in the order: iso-propylamine < iso-butylamine << n-butylamine. The relative selectivity of the analytes is explained by the cavity inclusion of analyte molecule, complete or partial, or by steric hindrance interaction. The application of PQC sensors to gas phase has provided new analytical possibilities for the food control, environmental science, biotechnology and medicine.*

Key words: *food quality, volatile amines, calixarene, sensitive membranes*

DEVELOPMENT OF LATERAL FLOW IMMUNOASSAY FOR RAPID DETECTION OF OXYTETRACYCLINE IN HONEY SAMPLES

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ABSTRACT. *A lateral flow immunoassay (LFIA) was developed in the competitive reaction format and applied to test residues of the antimicrobial oxyteracycline (OTC) in honey samples. To prepare the assay test, a nitrocellulose membrane was stripped with hapten OTC3 conjugate to ovoalbumin egg protein (OVA-OTC3) and goat anti-rabbit antisera (OTC3-I) as capture and control reagents, respectively. Polyclonal antisera against oxyteracycline was conjugated to colloidal gold nanoparticles and used as the detection reagent. The visual detection limit (cut-off value) of the oxyteracycline LFIA was 20 ng/g, and qualitative results were obtained within 10 min without expensive equipment. The assay was evaluated with OTC spiked honey samples from different geographical origin (n = 25). The results were in good agreement with those obtained from liquid chromatography separation and mass spectroscopy detection (LC-MS), indicating that the LFIA test might be used as a semi quantitative method for the determination of oxyteracycline. The system was also highly specific, showing no cross-reactivity to other chemically similar antibiotics.*

Key words: *lateral flow immunoassay, oxyteracycline, colloidal gold nanoparticle*

RISK TO HUMAN HEALTH CAUSED BY NON CONDITIONAL DRINKING WATER

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Abstract: *The paper includes information on current state of basic health factors for Chernivtsi citizens depending on their place of living. Non quality contact medium risk analysis and some peculiarities of this function application for problem modelling are under discussion as well. The paper deals with the analysis of risk increase effects during natural nitrification process. An attempt to forecast health quality factors for citizens taking into consideration intermediates is made. A model of immune status of people under chemical pollution of potable water is considered as well. Comparison of the results of simulation with real statistic illnesses data and contaminant dispersion is the subject of the study.*

Key words: *drinking water pollution, risk assessment, mathematical model, illnesses, contaminant dispersion.*

SOFTNESS AND FRESHNESS – WAYS TO OBTAIN IT IN BAKED GOODS

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Abstract Softness is usually used to judge the freshness and, consequently, the quality of bread. The bread producer is therefore interested in keeping bread soft as long as possible. Any loss of bread crumb softness is often referred to as staling. Staling is usually defined as any change other than microbial spoilage that occurs in bread after baking, making it less acceptable to the consumer. Such changes may be of a physical as well as a sensory nature: loss of crumb softness, tendency to become crumbly, loss of flavor, change of mouth feel. Investigation into the nature of staling indicate that one of the factor involved ,the firming of the crumb, is caused by a phenomenon known as retro gradation.

Starch is regarded as the main component in flour responsible for staling as it is liable to crystallize or retrograde after the baking process. Flour consists of approximately 70% starch which, as it retrogrades, increases the firmness of the bread. Today the tailor-made ingredients are present in almost every loaf of bread produced by the bakery industry. As the bakery industry becomes more and more industrialized, the needs for extended shelf life and improved dough handling is increasing. Bakery enzymes and emulsifiers can provide the necessary support. High temperature stable amylase retains its activity even at baking temperature and breaks the hydrated starch in small fragments which do not retrograde. Enzymes are the ideal ingredients for use in the modern food industry according to new customers' needs and market trends which are demanding for extended shelf life.

Key words: bakery, enzymes, starch, shelf life

EFFECT OF TQ PROCESSING ON CELL WALL IN RELATION TO FIRMNESS OF CARROT TISSUE – PART I. THE TISSUE MODEL

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Abstract *The cell being the basic element of the products of vegetal origin, in this paper there is studied the influence of the heat transfer on the relationship between the cellular wall and the structural-textural firmness of the carrot tissue. By applying the 3 temperature regimes, water begins to eliminate itself by exoosmosis causing the detachment of the plasmalene from the cellular wall determining the decrease of the relative dimension of the cells, differentially, according to the freezing zone. As methods of determination there are used the tissue model (Voronoi-Delaunay theory) and the firmness test. The tissue model is based on the behavioral study of the cellular matrix, of the cells and of the intercellular space. The firmness test, the parameters are obtained during a puncture test is maximum force that can be correlated with firmness. Electron microscopy technique (SEM) have been used in exploring physical changes in carrots frozen matrix related to both modification of the thickness of cellular membrane and of the relative dimension of the cells. The theory Voronoi-Delaunay a study of the resultant microstructure of carrots frozen matrix based on firmness can provide useful information about the physical state of matrix. The firmness test is widely used in texture measurement of carrots frozen.*

Key words: *freezing by fluidization, heat transfer (TQ)*

DIETARY FIBRES ROLE IN MANUFACTURING BREAD WITH LOW CONTENT OF GLUCIDES

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Abstract. *Nowadays the food producers meet the demands of the consumers that want food products with an important role in health preservation. Thus, the bread producers focused their attention towards the researches of the functional food. A functional role it is attributed especially to the soluble fibres, that help controlling the level of glucose and lipids in the blood. Therefore, the practical and theoretical researches were made in order to obtain bread with a low content of glucides, and comply with legal requirements. The aim of this paper is to prove that adding soluble fibers in bread products it is possible to obtain functional food with glucides low content, with good sensorial characteristics, fated consumers with different diseases. It was make a study on bread made with added insoluble (bran) and soluble fibres (inulin), in different amounts. Inulin was obtained from chicory and Helianthus tuberosus (topinambur). It was analyzed the percent of inulin retrieved in the final product relatively to the initial supplementation, the percent of protein and glucides. Sensorial tests were performed on the products containing inulin and compared to a free inulin control sample. It was calculated the energetically value and it was estimated the intake of the fibres in comparison with the recommended daily dose, without passing over the economical aspect. Based on results that were obtained, it is recommended the use of 3% inulin (irrespective of source) related to the flour content.*

Key words: *insoluble fibres, soluble fibres, functional food, bran, inulin, chicory.*

MICROBIOLOGICAL EVALUATION OF BREAD WITH SPIRULINA DURING MANUFACTURING AND STORAGE

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Abstract *The current trend is that food producers to receive the requirements of consumers who want to eat healthy food. The bakery products are the most claimed foodstuffs so the bakery specialists focused on functional food research. One of the ways to increase the nutritional level of bakery product is to add spirulina. The questions is if the self life of the bread improved with spirulina is similar to typical wheat bread and, at the same time, if the products are safe from the microbiological point of view. Microbiological quality of bread with spirulina over 3 days at room temperature was evaluated according to SR EN ISO 4832/2006 quality standard. Starting from ten samples of wheat flour mixture with different amount of spirulina, ten breads were made using the direct method of preparation. Because the final contamination depends on the initial level of microorganisms, we determined the evolution of microbiota starting from flour mixtures to breads and we made microbiological determination for each sample. The quantitative evaluations followed the Total Number of Germs (NTG) in ufc/g, the yeasts and mould number (ufc/g). At the same time we carried out qualitative evaluation regarding the species determinates. The analytical data obtained show that the initial level of flour contamination was within the legal limits, in the flour mixture founding yeast, moulds and typical flour bacteria. After manufacturing, the levels of initial contamination have a spectacular decrease (almost zero), remaining at the same level during storage.*

Key words: *yeast, moulds, bacteria, contamination*

STUDIES REGARDING NEW WAYS TO RENDER WHEY PROFITABLE

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Abstract. *Whey may be defined broadly, as the serum or watery part of milk remaining after separation of the curd resulting from the coagulation of milk by acid or proteolytic enzymes. The whey has been used by many researchers as raw material for alcoholic fermentation process as it contains a high lactose quantity and it is largely available. One of the most simple and economical solutions to render whey profitable as a secondary product of cheese fabrication by cheese/ dairy manufacturers is to obtain whey drinks. It is known that whey has been used for long time by many researchers as raw material in the alcoholic fermentation process. One of the whey drinks proposed is the whey beer made from deproteinized whey (as by-product of sweet cheese fabrication). The paper presents the research results in view of obtaining a drink from deproteinized whey resembling beer. Three samples have been subjected to experimentation. Further on the three beer samples have been analyzed from the sensorial and physic-chemical point of view. The second one, containing 30% deproteinized whey has been the most appreciated. The finished product - whey beer is a product with traits similar to those of normal beer: pleasant, specific smell, hop flavour, bitter-sweet pleasant taste.*

Key words: *by-product, deproteinized whey, whey beer, dairy industry, lactose*

CORRELATION ANALYSES BETWEEN SOME TECHNOLOGICAL PARAMETERS OF SOME ROMANIAN WHEAT VARIETIES GROWN IN THE SUCEAVA AREA

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Abstract. *The wheat technological properties are mainly given by the particularities of the gluten structure, respectively by the protein compounds.*

The research in the area of gluten were focused to identify the gluten protein fractions complex and to find out the ratios between those fractions. The establishment of protein fractions of glutenines and gliadines are considered as mainly variables for the bakery potential of grains. The flour quality, the proteins content and the ratio between glutenines and gliadines influences to great extent the rheological properties of dough and, implicitly, the quality of bakery products.

This paper presents the research following the selection and characterisation, according to quality indexes, of eight wheat varieties, grown in the Suceava area. The objectives of this paper are the study of correlations between some technological parameters (acidity, pH, wet gluten, protein content) from the selected wheat varieties and identification of their gluten proteins (gliadines and glutenines). From the statistical analysis we obtained significant direct correlations between raw protein and gliadines ($r = 0.649$), glutenines ($r = 0.720$), between wet gluten and glutenines ($r = 0.741$), gliadines ($r = 0.704$) and between gliadines and glutenines ($r = 0.876$).

Key words: *wheat, gliadins, glutenins, statistical analysis*

MULTIVARIATE STATISTICAL ANALYSIS OF ROYAL FETEASCA WINE QUALITY FROM DIFFERENT REGIONS OF ROMANIA COUNTRY

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Abstract: *The objective of this study is to establish a relation between the physical-chemical parameters and the sensorial characteristics of the Royal Feteasca wine from eight viticulture regions from Romania. The correlation between the physical-chemical parameters of wine and the sensorial characteristics were analyzed using the Principal Component Analysis (PCA) method. The analysis of the variation and the principal component analysis showed that there were significant correlations between the wines from the Hills of Banat viticulture region – the winegrowing centre Recas, the Hills of Dobrogea viticulture region – the winegrowing center Murfatlar and the Danube’s Terraces viticulture region – the winegrowing centre Fetesti. The wines from these viticulture regions were the best renowned (the silver medal) both sensory – using the sensorial analysis of the wines, with denotation in the penalty points, and physical-chemical through parameters – density, alcoholic concentration, total acidity, volatile acidity and total dry extract. The multivariate analysis of the data show significant differences between various variables that were used for the quality assessment of wine. Significant direct correlations were obtained between taste-quality, taste–intensity, odour- intensity and clarity ($r = 0.800$, $r = 0.775$, respectively $r = 0.800$) and reverted correlations between odour–quality and wine density and volatile acidity ($r = - 0.712$, $r = - 0.771$), correlation is significant at the 0.05 level.*

Key words: *Romanian wines, Principal Component Analysis, physical-chemical parameters, sensory evaluation*

INFLUENCE OF κ -CARRAGEENAN, AGAR-AGAR AND STARCH ON THE RHEOLOGICAL PROPERTIES OF BLUEBERRIES YOGURT

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Abstract: *The purpose of this work is to observe the rheological differences generated by three hydrocolloids on the behaviour of blueberries set yogurt. For this study we used three hydrocolloids (κ -carrageenan, agar-agar and starch) in different concentration (0, 0.2, 0.4 and 0.8% respectively) and starter culture (*Lactobacillus bulgaricus* and *Streptococcus thermophilus*). The rheological properties of the blueberries yogurt obtained from the milk were investigated by a Brookfield RV Pro II+ viscometer at different shear rates, using RV spindles. All the three hydrocolloids increased the viscosity of samples. The sample with the highest concentration of κ -carrageenan presented the highest viscosity, shear stress and consistency, while the samples without hydrocolloids presented the smallest viscosity. Even the κ -carrageenan increased the viscosity of yogurt samples; the structure of sample with 0.8% κ -carrageenan has not been one which characterizes the yogurt, this sample having the same aspect as a gel. The concentration of hydrocolloid does not have great influence on the flow index amount. The temperature of hydrocolloid insertion has a great impact on the syneresis of yogurt samples. If the hydrocolloid is inserted at a temperature higher than the gel formation temperature (proper for each hydrocolloid), it generates the syneresis of the sample.*

Key words: viscometer, flow index, consistency

**BENEFITS OF MULTILATERAL LIBERALIZATION FOR THE
COUNTRIES WHICH ARE EXPORTING LIGHT INDUSTRY PRODUCTS IN
A KNOWLEDGE BASED SOCIETY**

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Abstract. *The evolution of international economic processes, interdependencies between countries, between production and goods movements under the incidence and the impact of scientific and technical progress required, in the middle of the 20th century, the institutionalization of the economic liberalization process by laying the foundations of GATT (General Agreement for Tariffs and Trade - transformed later in WTO - World Trade Organization). Initially, GATT's rules were applied only for goods trade but gradually it had broadened its sphere of activity.*

Based on interpretative approach, in this paper we analyze the degree in which GATT - WTO activity can solve the business problems of the countries which are exporting industrial light products (we are talking especially about developing countries).

WTO multilateral agreements concern among others agriculture, textiles, food products and industrial standards. In this paper, we want to show that exporting countries of light products can enjoy many advantages due to the signing of agreements in a multilateral frame. This type of benefits are directly reflected in the economic growth and development of the society based on knowledge.

Key words: *economic liberalization, knowledge society, export, light industry products, economic and social growth, development.*

USE OF SOME CLAY MATRICES IN BIOTECHNOLOGY OF ACID DAIRY PRODUCTS

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Abstract. *In this paper we analyze the use of some clay matrices in the cultivation process of lactic acid bacteria, in dairy industry. The object of this paper is the use of anionic clays - hydrotalcite type, with food purity grade, that are synthesized in laboratory, and can be conditioned in porous tablets or pellets form. These are introduced into the culture medium and help optimal growth parameters achievement of lactic acid bacteria by temporary retention of lactic acid. After multiplication and cellular growth, the tablet or pellet insoluble clays, can be removed, washed and recovered. The lifetime (using) of such materials and devices is practically unlimited. According to this study, the cultivation process of lactic acid bacteria includes the immersion in culture medium of a hydrotalcite clay matrix, with anions exchange role, cultivated through continuous cycle of hydrotalcite matrices immersion, removing and recovering, the lactic anion is continuously fixed, achieving at the same time the proton neutralization of lactic acid, with an aqueous phase, separated from the culture medium, with subsequent extraction and separation of lactic acid. The advantages of the proposed process are: about four time decrease of achieved period of lactic bacteria cultivation phase; 2 - 3 time decrease of final cultures productivity growth; increase with 50-70% rate of bacteria growth in fermentative process; decrease with 30-60% of lactic bacteria cost for industrial fabrication of acid dairy products.*

Key words: *hydrotalcites, lactic fermentation, lactic cultures, lactic acid*

CONCERNS ON THE DEVELOPMENT OF ECUMENICAL TOURISM IN BUCOVINA

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Abstract: *The purpose of the study was to investigate the possibilities of the ecumenical tourism in Northern Moldavian monasteries' area. The monasteries of Putna, Sucevita, Moldovita, Humor and Voronet are great touristic attractions of the beautiful Bucovina lands and being visited by a large number of foreign and Romanian tourists. Ecumenical tourism is a matter that already exists for centuries. It keeps some of the characteristics of pilgrimage, but it has greatly evolved over years. Today, ecumenical tourism asks for a higher level of culture and conditions for tourists. Thus, if in this context the tourists could assure their own necessities, they would be able to appreciate all the cultural objectives as well as the architecture, constructions, values, spiritual connotation and art. There are only two programs in Romania for this kind of tourism: “Know Bucovina” and “Easter in Bucovina”, both promoted by ANAT and by the Council of Suceava County.*

The accommodation facilities for the monasteries' visitors have been studied as well as transportation and advertising points of view in order to enlarge the sizes of the actual tourism which converge to a higher number of tourists. In order to improve the touristic activity it was developed a ten-question questionnaire which had been distributed to a sample of 200 tourists.

Key words: *pilgrimage, “Know Bucovina”, “Easter in Bucovina”, questionnaire*

THE INFLUENCE OF THE TECHNOLOGICAL PARAMETERS ON THE ELECTRODEPOSITION OF NICKEL-TUNGSTEN ALLOY

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Abstract: *The aim of the present research was to electrodeposit and characterize Ni-W alloys for different technological parameters. The investigated characteristics were the efficiency current, the average thickness and the structural properties of the obtained deposits. The current efficiency decreases with an increased applied current density and the tungsten content remains constant around 11% for different current densities (10 mA/cm² and 16 mA/cm² respectively). An increase in the temperature of the electrolyte leads to the inclusion of more tungsten. The deposit tungsten content and the current efficiency are directly related to pH. The hardness of the deposit is directly related to the alloy composition, the morphology of the deposit and the coating thickness. The higher hardness, approximately 100 HV, was measured and the optimal brightness was observed for the alloys obtained at increased current density ($i = 16 \text{ mA/cm}^2$, $T = 50^\circ\text{C}$, $\text{pH} = 8$), or to a basic pH ($i = 10 \text{ mA/cm}^2$, $T = 50^\circ\text{C}$, $\text{pH} = 9.23$). The scanning electron microscopy (SEM) technique was used to analyze the surface morphology; and the electron diffraction spectroscopy (EDS) analysis was carried out to determine the composition of the alloys. The evaluation of the metallic surface brightness (%) was carried out using the miniature spectrometer, based on the reflection property of the electrodeposited metallic layer, scanning all the wavelength range between 200-1100 nm. In addition, the investigations include the characterization of complex formation at different pHs in citrate-containing Ni-W bath by UV-VIS spectrometry.*

Key words: *codeposition, current density, temperature, pH, SEM*

FRESHNESS EVALUATION OF CHICKEN MEAT USING MICROBIOTA AND BIOGENIC AMINE INDEX

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Abstract. *The purpose of our study was to evaluate freshness of raw chicken meat using microbial and biogenic amines content. The objectives were to determine the variation of microbiota (total viable count, psychrotrophic and Pseudomonas spp.), to study the variation of some important biogenic amines and to calculate a biogenic amine index for refrigerated chicken carcasses aerobically stored for one week. Hereby, we used microbial analysis and HPLC determination for the following biogenic amines: tryptamine, β -phenylethylamine, putrescine, cadaverine, histamine, serotonin, tyramine, spermine and spermidine. Our determinations showed that total viable count increased in value from the first to the seventh day (the last day of storage), psychrotrophic microorganisms also increased in number and Pseudomonas spp. increased from the first day to the seventh day of storage. Regarding biogenic amines variation, tryptamine had a low initial content and after a week of storage the content was below 5mg/kg, β -phenylethylamine had also a small initial value and after a week of storage its value is slightly higher than 5 mg/kg, serotonin had a similar compartment with β -phenylethylamine and tyramine the same with β -phenylethylamine only that the final value was slightly higher. Cadaverine and putrescine were detected beginning with the third day of storage and they had the highest values after a week refrigeration of chicken meat. After one week of refrigerated storage, spermine had a particular allure because it decreased permanently. Spermidine had a very slow increase, from 4.8 mg/kg to 6 mg/kg. Biogenic amines index were calculated according to the mathematical relation proposed by researchers from Barcelona University.*

Key words: *meat, freshness, microbiota, Pseudomonas, biogenic amine index*

INFLUENCE OF FERTILIZATION TREATMENTS ON NITRATES CONTENT OF SOME VEGETABLE SPECIES CULTIVATED IN THE FIELD

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Abstract. *The existing amount of nitrates in plant at a given time is the result of balance between the amount absorbed and used in protein-genesis. A main cause of nitrate accumulation in vegetables is the use of nitrogenous fertilizers on crop land. High concentration of nitrates in plants (especially in vegetables) means a hazard for human and animal body, for two reasons: possibility of methemoglobin appearance at children and nitrates conversion to nitrites in saliva and formation of cancerigen nitrosamines in the intestinal tract.*

This paper presents the results of researches made in order to establish the influence of fertilization treatments on nitrates content of some vegetable species, cultivated in the field: egg plants, green peppers, bell peppers and carrots. In the culture technology of these vegetables, the following fertilization variants were applied (fertilizer being ammonium nitrate with 33% nitrogen): V1 = 0 kg nitrogen/ha; V2 = 100 kg nitrogen/ha; V3 = 200 kg nitrogen/ha; V4 = 400 kg nitrogen/ha; V5 = 800 kg nitrogen/ha. In order to establish the accumulation potential of nitrates in vegetables cultivated in the field, an enzymatic method was used.

When no fertilizer was added in the culture, bell peppers had the minimum value of the nitrates content (11.53 mg NO₃⁻/kg), and carrots the maximum one (90.42 mg NO₃⁻/kg). In the case of the highest fertilization level, carrots had the highest nitrates content (391.20 mg NO₃⁻/kg), and bell peppers the lowest one (63.08 mg NO₃⁻/kg).

Key words: *egg plants, green peppers, bell peppers, carrots, nitrates*

ROMANIAN TRADE LIBERALIZATION OF FOOD PRODUCTS IN TERMS OF EXPORT BENEFITS IN THE KNOWLEDGE SOCIETY

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Abstract. *The aim of this work is to demonstrate that the export of food products is an important factor of economic growth and development, regardless of the economic situation, especially in terms of recession mainly in the situation of Romania, without claiming to consider that exports are the only “engine” capable to restore the economic balance at both national and international level.*

The current recession of the global economy brings new challenges and each country must be responsible to overcome it. Romania has to use all its advantages and all the market opportunities to find the best solutions which can help the economic recovery.

In this paper, we want to show that exports are a “trampoline” for the national economy, especially in the case of food products exports, because Romania has a relatively high agricultural potential, able to support the light food industry – a traditional economic sector. By creating some brand names recognized in other countries and by the orientation on profitable niches on the foreign markets, the export of Romanian food products will be a stimulating factor of economic growth and development in a knowledge based society.

The methods used in this study are theoretical, based on analysis, observations, synthesis, induction and deduction.

Key words: *export, international trade, economic growth, development, economic liberalization, knowledge society.*

BIOTECHNOLOGY OF EDIBLE MUSHROOMS CULTIVATION ON VINE AND WINERY WASTES

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Abstract. Every year, in Romania huge amounts of wine and vine wastes cause serious environmental damages in vineyards as well as nearby winery factories, for instance, by their burning on the soil surface or their incorporation into soil matrix. The optimal and efficient way to solve these problems is to recycle these biomass wastes as main ingredients in nutritive composts preparation that could be used for edible mushrooms cultivation. In this respect, the main aim of this work was to establish the best biotechnology of winery and vine wastes recycling by using them as appropriate growth substrata for edible and medicinal mushrooms. According to this purpose, two mushroom species of Basidiomycetes, namely *Lentinula edodes* as well as *Pleurotus ostreatus* were used as pure mushroom cultures in experiments. The experiments of inoculum preparation were set up under the following conditions: constant temperature, 23°C; agitation speed, 90-120 rev min⁻¹; pH level, 5.0–6.0. All mycelia mushroom cultures were incubated for 120–168 h. In the next stage of experiments, the culture composts for mushroom growing were prepared from the lignocellulose wastes as vine cuttings and marc of grapes in order to be used as substrata in mycelia development and fruit body formation. The tested culture variants were monitored continuously to keep constant the temperature during the incubation as well as air humidity, air pressure and a balanced ration of molecular oxygen and carbon dioxide. In every mushroom culture cycle all the physical and chemical parameters that could influence the mycelia growing as well as fruit body formation of *L. edodes* and *P. ostreatus* were compared to the same fungal cultures that were grown on poplar logs used as control samples.

Key words: biomass, composts, edible mushrooms

DETERMINATION OF DIOXINS AND FURANS FROM EGGS AND OILS, THROUGH HIGH RESOLUTION GAS CHROMATOGRAPHY IN COMBINATION WITH HIGH RESOLUTION MASS SPECTROMETRY

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Abstract. *Dioxins (polychlorinated dibenzo-p-dioxins – PCDD) and furans (polychlorinated dibenzofurans – PCDF) represent a group of chemical substances with high toxicological potential, which are persistent within environment and which can be accumulated within organisms through food chain. In this paper we present the results of the performed researches for dioxins and furans determination in eggs and oils, through high resolution gas chromatography in combination with high resolution mass spectrometry. Egg and oil samples available in commerce were analyzed. Within the performed experiments, some steps were taken: sample preparation for testing, fat extraction, extract clean-up and concentration, separation, identification and quantification of different native compounds of dioxins and furans. Fat extraction from eggs was achieved in many more steps with organic solvents. Extracts cleanup was achieved on multiple columns, using different absorption materials (silica gel, aluminium oxide, florisil). Concentration of cleaned extract was achieved under nitrogen flow, at 40°C and pressure 5 psi. Separation, identification and quantification of different compound PCDDs/PCDFs were achieved by complex equipment: a system of two high resolution gas chromatographs coupled with high resolution mass spectrometer. In the case of analysed oil samples, no item of the native congener of dioxins and furans was detected. The total concentration of dioxins and furans in the analysed egg samples was expressed in toxic equivalents (TEQ) and was in the range: 0.0216 – 0.034 pg WHO-PCDD/PCDF-TEQ/g fat, being under maximum allowed limit by Regulation of the European Commission 1881/19 of December 2006 (3 pg WHO-PCDD/PCDF-TEQ/g fat).*

Key words: *dioxins, furans, eggs, oils, mass spectrometry*

THE INFLUENCE OF PROCESSING AND MEDIUM COMPOSITION ON THE THIOL AVAILABILITY OF WHEY PROTEIN CONCENTRATE

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Abstract. *Whey protein concentrates (WPC) play an important role in the development of functional foods with an increase in global demand. Whey proteins are highly soluble over a broad range of pH, a property that is important in their application as foaming, emulsifying, gelling, and water-binding agents in various types of food products.*

Denaturation of whey proteins is critical in modifying the functional behavior of dairy products. A knowledge of the thermal behavior of WPC occurring in different medium conditions, might allow to choose the most appropriate technology and to manipulate the thermal regime for a particular process or/and products, so that the final product possesses the optimal desirable properties.

The objective of this study was to investigate the heat induced changes in whey protein concentrate solution at pH 7.5 and 6.6 in salt conditions (CaCl₂) on thiol availability.

The results presented in this paper demonstrate that heat-induced changes in WPC greatly influence their degree in surface SH exposure. The exposure was more pronounced at higher temperatures. However, above 80°C, the formation of disulfide bonds seems to be favored, resulting in a lower level of surface reactive SH groups after prolonged heating compared with the lower treatment temperatures.

The increase was related to the intensity of applied temperature-time combination and medium composition. The thermal denaturation of WPC is regarded as a complex reaction involving several unfolding steps and ending in aggregation reactions.

Key words: *heat-treatment, sulfhydryl groups, functional properties*

STUDY ON THE PARAMETERS' VARIATION IN FRUITS DRYING PROCESS

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Abstract. *The aim of the study was the pursuing of the parameters' variation of fruits drying process. As materials we use fruits with hard texture (apple, pear, quince) and as methods we used the conventional drying (with air convection) and unconventional drying (with microwave and infrared radiation).*

We determined the variation of the following parameters : mass, product's core temperature, humidity, drying time. We used hydration as an estimation method of the drying products' texture modification.

The conventional drying one was done at 100°C for 120 minute. The microwave treatment was performed at 30% from oven maximum power – 900 W, in this case the drying period depending on each kind of fruit, so the thermic treatment lasted different intervals (30 minutes - apple, 36 minutes - pear and 20 minutes - quince). The IR drying depends also on fruit type, as at 70°C the drying time for fruits was variable (apple - 49 minutes, quince - 25 minutes and 73 minutes for pear).

The experimental determinations pointed out that the drying duration is sensitively decreasing as compared to the conventional drying process (~1/3) for the same content of moisture.

Also, we found out that the quince texture is the hardest one leading to an easier drying and hydration process. The pear had very high water content and is a very rich source of carbohydrates, which are the principal responsible for the changes happened during the drying treatment, resulting in some colour transformation.

Key words: *air convection, microwave, infrared radiations, fruit drying, texture.*

AN OBTAINING METHOD FOR CARBON NANOTUBES WITH MODIFIED SURFACE

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Abstract: *It is well-known the fact that carbon nanotubes (CNTs) contain carbon atoms in different hybridization states (sp^3 and sp^2), that generates complex structures (diamond and graphite respectively). These multiple connections generate strong interaction of forces between particular CNTs, that means Van der Waals forces and also π - π type those immediate result in the agglomerates obtaining and, singularizing the composite materials, the first effect is clusters generation process. The physical-chemical properties of nanocomposite materials are influenced by the appropriate CNTs dispersion obtaining in the matrix. This fact is efficiently obtained when the interactions energy between CNTs themselves is lower than the dispersion energy cumulated with the interactions energy between CNTs and the matrix. The dispersion energy considers CNTs blending techniques inside the matrix and the interactions energy between CNTs and the matrix supposes the chemical bond obtaining and physical-chemical interactions between CNTs and the matrix. The aim of this paper is to present some techniques of oxidative chemical treatment in order to obtain a CNTs functionalized surface as well as some techniques of coating with ceramic materials molecular layers in order to increase the chemical bond energy and the physical-chemical interactions between CNTs and the matrix. We used simple treatment methods of CNTs in acidic solutions ($HNO_3 - H_2SO_4$) and basic solutions (NH_3) having hydrogen peroxide as the oxidant agent (H_2O_2 30%). CNTs coating process with ceramic materials was made by using the precipitation method of their components (Fe_2O_3) from the supersaturated aqueous solutions.*

Key words: *nanoparticles, functionalization, ceramic materials, multi wall carbon nanotubes (MWCNTs).*

DIELECTROPHORETIC DEVICES FOR SEPARATING FOODBORNE PATHOGENS

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Abstract. *Today an increased interest in bioparticle separation research field is shown. Microtechnology and nanotechnology opens new perspectives in food quality analysis such as bioMEMS (Micro-Electro-Mechanical-Systems) devices for simultaneous detection of microorganism in food products with improved sensitivity and velocity [1].*

Diseases caused by different foodborne pathogens such as bacteria, viruses, fungi, parasites, etc. have been a serious problem. Classical microbiological methods are taking a long time to confirm results for a particular pathogen organism. At present numerous rapid methods are being studied, for example polymerase chain reaction (PCR) [2], enzyme linked immunosorbent assay (ELISA) [3], dielectrophoresis (DEP) [4,5], dielectrophoresis combined with ELISA, dielectrophoresis combined with electro rotation (ROT), travelling wave dielectrophoresis, etc. Dielectrophoresis is a method of manipulation of a micro particle in an electric field gradient which results from the interfacial polarization [6]. Using low voltages and temperatures below 39 degrees allows us no permanent damage to the cells. Theoretical modelling of behaviour in electric field is very important for the applications we need. Electrode arrangement from bioMEMS and channel geometries affects abilities to separate foodborne pathogens. This article describes the results obtained by our research team for manipulating bacteria with a specific electrode type of DEP.

Key words: *bioparticle, dielectrophoresis, separation*

**FRUIT-BASED CONCENTRATED PRODUCTS, IRON FORTIFIED,
INTENDED FOR PREVENTION AND DIET THERAPY OF IRON
DEFICIENCIES OF VULNERABLE POPULATION GROUPS**

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Abstract. *Enrichment of food products by micro-nutrients is an essential element of strategies against nutritional deficiencies, such as iron deficiency, especially, in populations within developing countries. The addition of a micro-nutrient has to be done on the basis of scientific researches, so that its concentration in product is optimal for correction of nutritional deficiency, but, at the same time keeping the sensorial properties of product (appearance, colour, taste and smell). This paper presents some results of researches made to obtain two fruit-based concentrated products (apricots, plums) fortified with iron. As fortification agents, ferrous sulphate, ferrous lactate and ferrous gluconate were used, and the fortification levels were of 4 mg/100 g in the end product and 6.5 mg/100 g, respectively. The increase of iron bio-availability in the human body and, at the same time, assurance of an optimal acidity of fruit-based concentrated products should be done by addition of ascorbic acid into their composition. The fruit-based concentrated products fortified with iron were analysed from sensorial, biochemical and microbiological point of views. The used fortification agents have not modified the product sensorial characteristics (appearance, colour, taste and smell), in comparison with the control sample (jams non-fortified with iron). The iron content of the fortified products with iron, achieved within the National Institute of Research&Development for Food Bioresources – IBA Bucharest, was determined through atomic absorption spectrometry ($\lambda = 248.3 \text{ nm}$) from samples mineralised on dry way. The iron content of fruit-based concentrated products fortified with iron varied in the range 4.27 – 7.05 mg Fe/100g.*

Key words: *iron, fortified, food, content*

RESEARCHES ON THE EVOLUTION OF CONCENTRATED FRUIT JUICES QUALITY AT STORAGE

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Abstract. *The purpose of the study was to compare some concentration methods of clear fruit juices without added chemicals, foaming agents, clarification.*

For this study we chose three apples varieties (Idared, Golden Delicious and Red Delicious) and they were processed into clear juice using a robot type fruit squeezer. Apple juices were concentrated in a Rotavapor type concentrator at 40°C temperature and 175 mbar pressure from almost 12% dry matter to almost 25%. The samples were examined over a period of 30 days shelf life at refrigeration temperature. The physical and chemical determinations were: acidity, pH and dry matter variation.

We also made for juice the following microbiological determinations: total number of yeasts and moulds, mesophilic aerobic bacteria and osmofile yeasts.

The three types of apple juice concentrates have shown stability all over the storage period at refrigeration temperatures (6-8°C), their aspect being determined by the acidity variation of the products.

We also noticed that the dry matter variations in the three types of concentrated juices are constant during the storage period. The difference between the values of the dry matter is made by the apple varieties, as follows: for Golden Delicious is higher (26.3%) than the one for Idared which is the lowest (25%).

After the microbiological analyses have been made we reached the conclusion that the concentrated apple juice of Idared variety has the greater loading number of microorganisms (mesophilic aerobic bacteria - 13×10^6).

Key words: *concentration, Idared, Golden Delicious, Red Delicious, clear juice*

NEAR INFRARED SPECTROSCOPY – AN ALTERNATIVE TO DETERMINE THE CRUDE FIBER CONTENT OF FORAGES

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Abstract. *In our days NIR spectroscopy represent a promising alternative to the chemical methods for crude fiber contents of forages. The main objective of this study was to obtain a NIR calibration model for prediction this parameter of forages harvested in June 2009 from hill permanent grassland (Grădinari, Caraș-Severin District). The experimental field was organized in ten experimental trials fertilized organic, mineral, and organo-mineral. The floristic composition of forages from this period was determined gravimetrically. From Poaceae were present Festuca rupicola and Calamagrostis epigejos. Fabaceae family was represented by Trifolium repens and Lathyrus pratensis. From other botanical family: Rosa canina, Filipendula vulgaris, Galium verum and Inula britannica.*

Like input data for NIR calibration were used the results for this qualitative parameter by chemical method and the reflectance values from 150 NIR spectra for all analysed samples. Partial last square (PLS) regression was used to obtain the "NIR - Total Fiber" model, implemented in Panorama program (version 3, LabCognition, 2009). The statistical parameters ($R^2=0.80$; RMSEC=2.73) and the differences between references and predicted values situated in range 0.03 and 9.24% suggest a medium quality of calibration model, but it is promising to use it to predict the crude fiber contents of forages from grassland in this period of year using higher number of samples for calibration.

Key words: *forages quality, complex fertilizers, PLS- NIR model, grassland.*

SOME METALS (Fe, Mn, Zn, Cu, Pb, Cd) CONTENTS IN VEGETABLES FROM A NONPOLLUTED PLAIN AREA OF CENAD-BANAT (ROMANIA)

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Abstract: *This paper presents original studies about the occurrence of some heavy metals (Fe, Mn, Zn, Cu, Pb and Cd) in soil and different vegetables (pepper, cucumbers, tomatoes, eggplants, green beans, cauliflower, cabbage, dill-leaves, parsley-leaves and roots, celery-leaves and roots, onion, garlic and potatoes) cultivated in nonpolluted plain area in Cenad-Banat County. The accurate determination of toxic heavy metals in vegetables is of importance because of the toxicity of these elements and their compounds. Total heavy metals in vegetable samples were analyzed after wet digestion with mineral acid, and in the soils they were analyzed after digestion in aqua regia. All metals were analyzed using high-resolution continuum source spectrometer ContrAA-300, Analytik-Jena in the acetylene flame (99.99 % purity). In comparison with official imposed limited the average values for heavy metals contents in soil are in the normally interval for **Zn**, **Cu** and **Pb**, for **Cd** the limit is exceeded, but under warning threshold. The smaller content of total heavy metals (around 2.5 ppm) was identified in cucumbers, cauliflower and cabbage. In pepper, tomatoes, eggplants, green beans, onion and potatoes the total content of heavy metals are between 3-6 ppm. In root of carrot, celery and parsley the total content is between 3-7 ppm with maximum in parsley root. The highest values were identified in leaves of parsley, dill, celery and garlic. For all soil and vegetables samples the average concentrations of all analyzed metals are lower than the limits established by the present Romanian legislation.*

Key words: *heavy metals, toxicity, soil, plants, FAAS*

ASSESSMENT OF MILK ALLERGENS INTO FOODSTUFFS

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Abstract. *Allergens represent specific substances, such as certain proteins, that are able to give an immune reply very dangerous in the case of the sensitive individual. Food allergens are normally harmless for the non-allergic individuals; but for some people these allergies result in severe symptoms, reasons for which these substances have engendered food safety issues.*

Allergens represent biological hazards for animals and people as well. It is obvious necessary to detect the presence of allergens in agri-food raw materials, food products and fodder for their entire monitoring of the food and feed chain, also taking into account the major financial losses generated by contamination. Food producers must protect allergic people using clear labelling for their food products. As regards the food allergens, in the EU legislation there are no limits specified in the legislation, only the mention of their likely presence on the labels is compulsory.

The paper shows the incidence of certain compounds with potential allergen activity in foodstuffs containing milk by using the S-ELISA Veratox method. We tested milk allergens from a few types of food matrix containing undeclared milk or its derivatives (wafers with cream, instant coffee, sauces). The results indicated different degrees of contamination with potentially allergenic proteins depending on the food matrix type.

Key words: *food allergens, food safety, milk protein, ELISA, label*

COMPUTERIZED SYSTEM FOR CLOSURE CONTROL OF PACKAGES IN FOOD INDUSTRY

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Abstract: *Canned food and beverages, currently, comprise a total area of approx. 59 billion cans per year, of which 23 billion cans for food. They represent 18% of total global annual 321 billion cans. In North America, annually, over 32 billion steel cans are produced and sent to the use of packaging [1].*

The quality of a food container is determined by its ability to protect the product it contains from chemical deterioration or microbiological spoilage [2].

In the area of industrial applications the problem of closure control for packages used in the food industry is very important as canned products should resist long time (2-3 years), and the consequences of a package defect (content alteration) are not immediately detectable; occurring after a long time and may become extremely dangerous for consumer's health.

One of the can integrity and leakage detection investigation methods is the seam projector measuring system.

The computerized system presented was designed for closure control of packages used in the food industry. It contains an integrated system of computing and control which shall be used for a total control of the encasing of the canned product. Thus, there shall be measured the encasing parameters and the dimensional and shape parameters of the packages subject to the sterilization process to find out the defects that may lead in time to the alteration of the content.

Key words: *package encasing, sterilization, canned food*

METHOD OF CARBON NANOTUBES DISPERSION IN POLYMERIC MATRIX

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Abstract: *In order to obtain better homogenous composite material, different carbon nanotubes (CNTs) dispersion techniques in the polymeric matrix are very well known. Due to the strong interactions between CNTs, the efficiency of these dispersion techniques is highly limited. The aim of this paper is to present improvement techniques considered as new step in the global dispersion process before the composite material final shape finalization. At this moment, it is very difficult to carry out a classical dispersion from technological point of view. In this paper, more than the acknowledged mechanical and ultrasonic dispersion method, the introduction of a genuine dispersion technique is proposed; it refers to an external vibrant magnetic field able to determine a vibration movement of CNTs covered by a molecular Fe (III) oxide. This external vibrant magnetic field is made by using a permanent magnet involved in a rotational movement around its own axis and also interacts with the individual CNTs own magnetic fields. The maintenance of a tensioned vibrating state at the individual CNT level contributes to a good dispersion state preservation and increases the connections and physical-chemical interactions hindering. The dispersion efficiency in a vibrant magnetic field was studied using the comparative methods, correlating the electronic microscopy analysis with the mechanical strength tests. With respect to the composite material obtained under these conditions, a significant quality improvement as well as a mechanical strength increase was observed.*

Key words: *magnetic properties, composite material, polymer matrix composites.*

QUANTIFICATION OF CAROTENOIDS AND CHLOROPHYLL LEAF PIGMENTS FROM AUTOCHTHONES DIETARY

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Abstract: *Chlorophylls are the preponderant photosynthetic pigments of the verdant tissues of vascular plants, liverworts, and various algae. Carotenoids are essential for the survival of photosynthetic organisms. They function as light-harvesting molecules and provide photoprotection. Information gathered from the screening of secondary plant metabolites is vital for the accurate determination of the dietary intake of these micro-nutrients, and in the development of comprehensive food tables. Determination of basal levels is also necessary for the rational engineering of health-promoting phytochemicals in food crops. In addition this approach can also be applied to the routine screening of products to determine metabolic differences between varieties and cultivars, as well as between genetically modified and the corresponding non-genetically modified tissue. Beta -carotene accounts for more than 90% of total carotenoids in vegetables. In human beings, beta-carotene not only serves as valuable source of vitamin A, but also serves as a potent antioxidant, scavenging free radicals and quenching singlet oxygen. By this latter property, beta-carotene is understood to reduce the risk of development of certain types of cancer. This study therefore is aimed at determining the beta-carotene and chlorophyll contents of some selected autochthones plants (*Allium ursinum*, *Alliaria petiolata*, *Urtica dioica*) from Macin Mountains harvested on spontaneous flora. Photosynthetic pigments of investigated plants were extracted from leaves using appropriate solvents. The pigment quantification of individual plants was investigated by spectrophotometric analysis. The levels of carotenoids, and chlorophyll varied in each plant and the results were similar to the previously results reported in the literature.*

Key words: *Allium ursinum, Alliaria petiolata, Urtica dioica*

THE INFLUENCE OF COLD CONVENTIONAL STORAGE ON FRUITS QUALITY

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Abstract: *To determine the most suitable method of cold fruits preservation, we used three types of fruits: pome fruits (apples, pears and quinces), citrus (oranges) and exotic fruits (kiwi and bananas). The fruits were stored, using a household refrigerator, operating at refrigeration temperature (5°C) and freezing temperature (-10°C). The storage was made in two variants: bulk and packed fruits (using LDPE bags) for a total period of 14 days. Temperature measurements were made with a two day frequency, inside the storage space and in the fruits' core. To determine the water losses during evaporation, the fruits were weighted, before and after the storage.*

During the refrigeration of the bulk fruits, the quince, the orange and the banana registered a constant evolution, while the behaviour of the same packed fruits was irregular. The evolution of bulk fruits represented by quince, orange and banana, during freezing period, was regular while for the packed ones such as banana, apple and orange we registered the best results.

The results lead to the conclusion that the refrigeration storage of the bulk pome fruits had a lower quantity of moisture losses (2.5-4.1%) comparing to the exotic fruits (6.5-21.3%). In packed fruits case the lowest quantities of moisture losses were registered in the pome fruits (0.6-1.1 %).

To draw a final conclusion, orange and apple presents the best evolution during the conventional cold preservation, while the behaviour of banana and kiwi is not proper for this kind of storage.

Key words: *fruits preservation, refrigeration, freezing, pome fruits, bulk, packed, LDPE bags*

STUDY ON FREE RADICAL SCAVENGING AND TOTAL POLYPHENOLS OF SOME ROMANIAN WINES

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Abstract: *Phenolic compounds contribute to organoleptic characteristics such as colour, astringency and bitterness of grapes and wines. Some relevant analytical parameters of the wines produced by R & D Station for Viticulture and Wine Bujoru and Regional Laboratory for quality control and hygiene wine Odobesti, are given in this paper.*

Free radical scavenging activity was determined for several red and white wines from different grape varieties cultivated in the south-east of Romania vineyards region. The free radical scavenging activity of the wine samples was analysed by using the 2,2,-diphenyl-1-picrylhydrazyl (DPPH) assay. The absorbance was read at 515 nm.

The amount of polyphenols in selected wines was investigated by means of UV–VIS methods according to the Folin–Ciocalteu colorimetric method.

The mean concentration of total polyphenols (TPs) content of the analyzed red wines was 639.5205 mg/L gallic acid equivalent and for the white wines was 180.5233 mg/L gallic acid equivalent. The investigated red wines showed antioxidant behaviour in the range of 89.85% to 76.60%. The free radical scavenging activity of the wines was correlated to total polyphenol compounds content. The polyphenolic compounds content in the investigated wines contributes to their antioxidant activity.

The hypothesis of a protective effect of red wine is supported by obtained results which show that the red wines with higher amounts of polyphenols possess higher antioxidant properties.

Keyword: *antioxidant capacity, DPPH, gallic acid, red wines, white wines, Tg Bujor, Odobesti*

EFFECT OF SOME NATURAL HERBS INCORPORATION IN SUNFLOWER OILS ON ITS RESISTANCE AT FRYING TEMPERATURES

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Abstract: *Sunflower oil is an excellent source of essential fatty acids necessary for human body. Extending the frying life of oil is of commercial and economic importance. Therefore, improving the thermal stability of cooking oils could provide considerable savings to the food processors. The present work aims at evaluating thermal resistance of sunflower oil after the incorporation of three species of natural herbs, from Salvia genus and Allium ursinum, used in food as condiments or under other forms. By this treatment, we seek to preserve almost unchanged the oil quality during thermal treatment, by increasing the level of antioxidants from oil.*

For this study, four different frying temperatures i.e. 110, 150, 180 and 200°C were applied for 30 minutes to sunflower oil before and after the addition of plants. At 110 °C we have also made a kinetic study on samples stability in time. Official AOAC methods were used to determine free fatty acids content (FFA) and peroxide value (PV) of all samples during heating.

The quality parameters of sunflower seed oil were improved by treatment with either Salvia officinalis., Salvia sclarea or Allium ursinum (wild garlic). Salvia and wild garlic exhibited a comparable high ability in reducing peroxide value (PV), probably due to their high content of polyphenols and flavonoids.

In conclusion, the incorporation of Salvia and wild garlic into sunflower oil helped improve its thermal resistance and stability, which sustains their use in order to extend frying life of oils during food processing.

Key words: *sunflower oil; Salvia; wild garlic; heat treatment; PV; FFA.*

COMPARATIVE STUDIES OF COMPOSITE COATINGS WITH CeO₂ AND Nd₂O₃ IN COPPER MATRIX BY ELECTROLESS PLATING

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Abstract: *The study presents the influence of CeO₂ and Nd₂O₃ particles as dispersed phase in copper coatings. These coatings were obtained by electroless deposition from copper sulphate electrolyte bath. Advantages of electroless plating include excellent uniformity, bulk processing capability and ability to produce unique catalytic coatings. The main disadvantage of electroless plating method is the fact that thin layers are obtained and the working time is long enough. The concentration of CeO₂ particles was between 5-50g/L. Similar samples were made using the same concentration of Nd₂O₃ particles in bath solution. Many factors, like the nature of electrolyte and concentration of the dispersed phase in the electrolyte, methods of codeposition contributed to the obtaining of qualitative coatings. The embedded particle of dispersed phase in the copper matrix determines changes of surface coatings and also of their properties. Morphology is an important property of electrodeposited composite coatings and was studied by scanning electron microscopy (SEM) and EDAX analysis. The mechanical properties of the composite coatings were investigated. The Vickers microhardness was measured in cross section. The results are compared with copper coatings without oxide particles to understand the effects of dispersed phase on the properties of composite coatings. The obtained composite coatings properties are increased in comparison with the metal copper coatings.*

Key words: *electroless, composite coatings, electrolyte bath.*

IRON FORTIFICATION OF BREAD AND BAKED GOODS AS AGAINST NUTRITIONAL DEFICIENCIES OF POPULATION

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Abstract: *In Romania, according to the studies achieved by U.N.I.C.E.F., Health and Family Ministry, Institute of Mother and Child Care "Alfred Rusescu", about 50% of 2-year aged children and about 30% of those 5-year aged have ferriprive anaemia (determined by iron deficiency). Also, according to the same studies about 25% of pregnant women and about 32% of those who suckle, have iron deficiencies and ferriprive anaemia. In this paper some results of the performed researches on the achievement of bread and some baked goods fortified with iron (rolls with sun flower and sesame seeds and poppy sticks) are presented. As fortification agents, ferrous sulfate, ferrous lactate and ferrous gluconate, and the fortification levels were 20 mg Fe/kg flour, 40 mg Fe/kg flour, 60 mg Fe/kg flour, 80 mg Fe/kg flour were used. Taking into consideration the phytase role in phytates hydrolysis and increasing of iron bioavailability into human body, in bread and baked goods composition some standardised fungal phytase was added. Also, because the ascorbic acid is a promoter of the iron absorption into human body, it was used in composition of the achieved products. Bread and baked goods fortified with iron were analysed from sensorial, physico-chemical and microbiological point of views. The used fortification agents did not modify the product sensorial characteristics (appearance, colour, taste and smell), in comparison with control sample (bread and baked goods non-fortified with iron). The iron content of the achieved baked goods varied in the range 3.08 – 7.53 mg Fe/100g.*

Key words: *iron, content, bread, roll, poppy stick*

BIOGENIC AMINES CONTENT OF ROMANIAN MARKET MACKEREL

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Abstract. *In Romania we eat only imported mackerel (*Scomber scombrus*) because we do not have this kind of fish locally. In our paper we studied samples of frozen and smoked mackerel from Romanian market terms of biogenic amines content. The purpose was to find if the samples had low or high quantities of biogenic amines, because it is well known that amines such as: histamine and tyramine when exceeding some values are bad for human health, especially in scombroid fishes. Biogenic amines from mackerel samples were determined by HPLC (high pressure liquid chromatography) and the amines traced were: tryptamine, β -phenylethylamine, putrescine, cadaverine, histamine, serotonin, tyramine, spermine and spermidine. In frozen mackerel samples we detected small amounts of histamine, cadaverine, spermidine and putrescin. Only one sample of the frozen mackerel showed clearly the incipient state of spoilage. The biogenic amines from smoked mackerel samples were higher than those found in frozen mackerel. In smoked samples we have not detected serotonin, and only one sample had phenylethylamine. This sample also showed an incipient state of spoilage.*

Histamine and tyramine values were higher in smoked mackerel samples than in the frozen ones. The quantities found of those two amines in the analyzed samples do not cause health problems to people health.

Key words: *spoilage, fish meat, histamine, tyramine, scombroid poison, biogenic amines.*

QUANTITATIVE DETERMINATION OF POLYPHENOL COMPOUNDS FROM RAW EXTRACTS OF *ALLIUM*, *ALLIARA* AND *URTICA* GENUS. A COMPARATIVE STUDY

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Abstract: *Flavonoids are a large family of plant secondary metabolites, one of the largest groups of natural compounds known, principally recognized for their health-promoting properties in human diets. Most flavonoids outperform well-known antioxidants, such as ascorbate (vitamin C) and α -tocopherol (vitamin E), in vitro antioxidant assays because of their strong capacity to donate electrons or hydrogen atoms. Flavonoids have been demonstrated to accumulate with oxidative stress during abiotic and biotic environmental assaults. There are many foods that contain flavonoids and phenolic acids, besides these being dietary plants. This paper presents the spectroanalytical profile of the flavonoids and polyphenolic compounds from organs of Allium, Brassicaceae and Urticaceae genus raw hydroalcoholic extracts. The quantitative analysis of the examined chemical compounds showed that 70% ethanol solution was the best solvent used in order to obtain the highest polyphenolic content. The content of phenol compounds was determined colourimetrically with the Folin-Ciocalteu (FC) reagent and was expressed in gallic acid equivalents (GAE). The flavonoid contents was determined using a method based on the formation of complex flavonoid-aluminium and was expressed in quercetin equivalents (QE). The results show that the plants may be potent sources of natural antioxidants.*

Key words: *Allium ursinum, Alliaria petiolata, Urtica dioica, polyphenols, flavonoids*

VALIDATION OF AN ENZYMATIC METHOD FOR NITRATES DETERMINATION FROM VEGETABLE PRODUCTS

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Abstract: *Nitrates and nitrites are natural components of soil, derived from mineralization of nitrogenous organic substances of vegetable and animal origin. Plants absorb nitrogen from soil, mainly as nitrates or ammonium forms. This paper presents the results of researches carried out to validate an enzymatic method for nitrates determination in vegetable products. Within this method, the nitrate is reduced by the reduced nicotinamide adenine dinucleotide phosphate (NADPH) to nitrite, in the presence of nitrate-reductase (NR). In the case of the enzymatic method for nitrates determination in vegetable products, the calibration curve achieved with 9 standard levels of nitrate ions (with three rehearsals for each one), in the range of concentrations 6 mg/L – 30 mg/L, beginning from origin and the linearity coefficient (r^2), is 0.9999. For 10 vegetable samples grown in open field (egg plants, bell peppers, green peppers and onion) the average nitrate concentration of vegetable species varied in the range 27.91 mg NO₃⁻/kg – 82.85 mg NO₃⁻/kg, and repeatability was in the range 1.33 mg NO₃⁻/kg – 1.50 mg NO₃⁻/kg. The determination of nitrates in a cabbage sample, by three analysts, led to an average nitrate concentration of 107.42 mg NO₃⁻/kg, relative standard deviation RSD(R), and the determined concentration is 0.81 %, and reproducibility is 2.45 mg NO₃⁻/kg. The detection limit is 0.15 mg/L and quantification limit is 0.30 mg/L. In the case of onion sample grown in open field, the nitrates concentration was 55.5 mg NO₃⁻/kg, and uncertainty was 0.68 mg NO₃⁻/kg.*

Key words: *linearity, repeatability, reproducibility, limit of detection, limit of quantification*

THE INFLUENCE OF SOME FACTORS ON SUNFLOWER SEEDS LIPASE ACTIVITY

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Abstract: *This work focused on the sunflower seeds lipase activity on its own substratum (sunflower oil), as well as on other substratum, belonging to 7 plant species (pumpkin, soy bean, sesame, almond, maize, walnut and peanut), at various temperatures and pH values.*

The experiment materials have been represented by dried sunflower seeds (SMC =10%), used as enzyme (lipase) source, and refined oils from 7 plant seeds above mentioned – as substratum for enzymes.

The lipase activity was determined at 20°C and 40°C as well as at 3 pH values (5.5; 7.4 and 9.5). The method principle has consisted in titrating fatty acids (released from oils by enzymes, at a certain time interval) with a solution of KOH.

At 20°C, the highest enzyme activities were registered at pH 5.5 (on soy bean and walnut oils) and the lower ones were at pH 9.5 (on sesame and almond oils) and at pH 7.4 (on sunflower and soy bean oils).

At 40°C the highest enzyme activities were also registered at pH 5.5 (on peanut, soy bean and sunflower oils) and the lower ones were at pH 9.5 (on sunflower, pumpkin, soy bean, maize and walnut oils) and at pH 7.4 (on sesame, almond and peanut oils).

The comparative analyse of the sunflower seeds lipase activity on various substratum has pointed out that, both at 20°C and at 40°C, the highest values were registered at pH 5.5, and the lowest ones at pH 9.5.

Key words: *lipase, substratum, pH, oil.*

STUDIES ON PLANT BIOMASS IN VARIOUS STAGES OF DEGRADATION

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Abstract. *Lignocellulosic residues from wood, grass, agricultural, forestry wastes and municipal solid wastes are particularly abundant in nature and have a potential for bioconversion. Due to their abundance and renewability, there has been a great deal of interest in utilizing this biomass for the production and recovery of many value-added products. Accumulation of lignocellulosic materials in large quantities in places where agricultural residues present a disposal problem results not only in deterioration of the environment but also in loss of potentially valuable material that can be used in paper manufacture, biomass fuel production, composting, human and animal feed among others. Several novel markets for lignocellulosic residues have been identified recently. The use of fungi in low cost bioremediation projects might be attractive given their lignocelluloses hydrolysis enzyme machinery.*

This paper presents the evolution of the lignocelluloses degradation from vegetal residues (sawdust, rose leaves, rushes leaves and corn leaves) during five months, in aerobic and anaerobic conditions. The degradation process gives small molecules like polyphenols. We used Folin-Cicâlțeu method for evaluation of lignine amount that is transformed in corresponding polyphenols. It was observed a growth of transformed amount along this period. Therefore, we can conclude that the lignocellulosic degradation occurred. This increase in degradability could have important implications in the evaluation of the composting process.

Key words: *lignocelluloses, biodegradation, polyphenol.*

INTENSE LIGHT PULSES EFFECT ON FUNGAL BURDEN OF MUSTARD AND BLACK PEPPER

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Abstract: Mustard seeds and black pepper berries were used as test materials in an experiment that aimed to put the basis of a decontamination procedure for spices and condiments using a non-thermal minimal processing method based on Intense Light Pulses. The method wants to be a better solution to actual decontamination procedures of spices, food ingredients that have to fulfill the safety requirements regarding fungal burden and mycotoxin content. The need for the development of innovative technologies for the production of high quality spices is widely recognized by different authorities involved in food safety. The tests were performed on an installation prototype consisting of a vibratory sieve (800 rpm) and IFP 800 flash lamp discharging in Xenon gas. Different energetic densities (0.170 J/cm², 0.783 J/cm² and 1.393 J/cm²) and different pulse regimes (10·10⁻³ s, 20·10⁻³ s and 30·10⁻³ s) were used in order to establish the most suitable regime for fungal decontamination. The experimental results showed that it is possible to obtain 100% fungal decontamination of mustard seeds by setting appropriate regimes that take into consideration the initial fungal burden, the seeds quantity per sieve squared centimeter, the energetic density and the pulse regime. For black pepper berries, contamination was significantly reduced (1.7 log), but total fungal decontamination was not achieved. Comparatively to mustard seeds, black pepper berries display a similar roughness but a different undulation, the last one being the potential responsible for mould spores protection against light pulses.

Key words: moulds, decontamination, mustard, black pepper, intense light pulses

LINGOCELLULOSICS:
THE QUALITY EVALUATION OF THE SERVICES PROVIDED BY
PRESIDENT RESTAURANT FROM MANGALIA BY ANALYZING
CUSTOMER'S SATISFACTION REGARDING THE WAITER TAKING
ORDER

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Abstract. *Services features make assessment of their quality and have certain characteristics. The quality of services and hence the satisfaction degree of consumers' needs are determined by qualifications, competence, discipline of serving personnel, but also by the organizing capacity of the sector. For consumers the serving time is a quality aspect of live, an element that indicates the satisfaction degree of consumers' needs. To assess the satisfaction degree of President restaurant customers regarding the takeover command by waiters a specific quality management tool has been used which allows comparison of trial results with requirements set out above and identification of the extent to which the process produces good results including the point where there are deviations to the limits set by requirements. After having selected the process to be analyzed and its variables respectively, the time (in minutes) needed to take order we proceeded to collect relevant data during the period 1 to 2 May 2010, when 54 observations were made. The scheduled requirement was a making order to be achieved within no more than 10 minutes from a list-menu presentation. The results showed a relatively large number of observations that have not met the target. Measures are necessary to reorganize the serving activity in order to reduce the waiter's taking order time so that they fall within specified limits.*

Key words: *taking order time, customer's satisfaction, histogram, services quality*

THE EFFICACY OF PLANT STANOLS / STEROLS IN ENSURING THE HEART HEALTH

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Abstract. *In all civilized countries the first cause of mortality and morbidity is a cardiovascular disease. Cardiovascular diseases are a group of degenerative diseases of the heart and blood circulatory system including heart disease, peripheral artery disease and stroke. To reduce LDL-cholesterol level two significant areas of functional foods development are based on the one hand on plant sterols and stanol esters use and respectively, on the other hand on soy proteins use. More recent studies have shown plant sterols and stanols (hydrogenated derivatives of sterols) capacity to reduce LDL-cholesterol in certain conditions. Recent technological advances have provided plant sterols and respectively stanols extractions and esterification opportunity and then those solubilizing in a matrix of fatty food becomes possible so easily to their incorporation in food at effective levels. Dobrogea Group with Raisio Finland introduced on the Romanian market first bread with added plant stanols esters showing that after only 14 days of regular consumption of this product the level of serum cholesterol was reduces.*

Key words: *functional food, plant sterols, heart, heart, LDL-cholesterol, Benecol product*

THE IMPACT OF STORAGE TEMPERATURES AND DURATION ON SUCROSE CONTENT OF SUGARBEET

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Abstract. *After being harvested, sugar beet is stored until industrial processing. The storage conditions affect the quality of beet getting into production. During the storage date, there can be noticed several sucrose content changes due to the sugar beet metabolism. These sugar beet metabolic processes are influenced by a number of factors. Besides the original quality of sugar beet and harvesting conditions, the temperature and storage duration influence the evolution of sugar beet's sucrose content. The main objectives of this study are to characterize the sucrose loss caused by storage processes by analyzing the relationship between storage duration and temperature on the one hand, and the sucrose content of sugar beet, on the other hand. Sugar beet was stored at the temperature levels of 2, 6, 10, 15 and 20 ° C, afterwards being determined the sucrose content after storage periods of 5, 10, 20, 30, 40, 50 and 60 days. The sucrose determination was made through ICUMSA Method GS6. The information was statistically processed using Excel in Microsoft Office XP, in order to find the values of correlation coefficients (r) between storage time and temperature and variation of sucrose content of the analyzed beet.*

The results obtained show that sucrose loss during storage is irregular variation in time and moderately influenced by the temperature storage level of sugar beets.

Key words: *storage date, sucrose, sugar beet*

THE IMPACT OF STORAGE TEMPERATURE AND DURATION ON REDUCING SUGARS CONTENT OF THE SUGARBEET

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Abstract. *The quality of the sugar beet influences directly its sugar yielding. Besides the original quality and harvesting conditions, storage conditions influence significantly the technological quality of sugar beet. An important indicator in terms of technological quality of sugar beet is the reducing sucrose content. In the production processes reducing sugars are some of the most important sources of pigments found in juices and syrups. The objectives of this study are to determine the sugar beet quality variation during storage, on the one hand statistically analyzing the relationship between duration and storage temperature, and change the content of reducing substances on the other hand. Sugar beet was stored at the temperature levels of 2, 6, 10, 15 and 20 ° C, in order to determine the reducing sucrose content after storage periods of 5, 10, 20, 30, 40, 50 and 60 days. Determination of reducing sugars was done using ICUMSA Method GS 2/9 –6. The information obtained was statistically processed using Excel in Microsoft Office XP in order to find values of correlation coefficients (r) between storage time and temperature and variations of reducing sucrose content of the sugar beet analyzed. The analysis results show that there is an irregular variation in time of reducing sugars content during storage, with a moderate influence due to the temperature level of the sugar beet storage.*

Key words: *sugar beet, sucrose, the temperature level*

THE REMOVAL OF CR (VI) FROM AQUEOUS SOLUTIONS BY PVC-BASED POLYMER INCLUSION MEMBRANE

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Abstract. *Over the last years, special attention has been given to the environmental contamination with heavy metals because of their high toxicity resulting in various diseases and their non- biodegradability. Among various methods of heavy metal removal, recently, many scientists showed an increasing attention in using liquid membranes in the separation processes with high implications in green chemistry. In this work there were prepared novel polymer inclusion membranes (PIM) containing a PVC polymer matrix. Extraction and facilitated transport of Cr (VI) ions from model solutions simulating waste liquid matrices were studied using the prepared PIMs. The influence of several parameters, such as the membrane composition, the pH and the phase's composition was investigated in order to estimate their impact on the metal ions transport process. The obtained results prove that our membrane possesses good transport properties and good reliability confirmed by experiments under established optimal conditions. The kinetic parameters such as the transport fluxes and the permeability of the optimal membrane were calculated from the experimental data and used to explain the transport mechanism. The obtained data make it possible to identify suitable conditions for using the developed membrane in applications at a larger scale in environmental protection.*

Key words: *polymer inclusion membrane; PVC; carrier; Cr (VI).*

NOVEL POLYMER INCLUSION MEMBRANE APPLIED IN HEAVY METAL EFFICIENT SEPARATION

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Abstract. *Heavy metal removal from industrial wastewaters is a problem of great significance nowadays because of the uncontrolled spread of these substances in the environment. Among the environmental- friendly technologies, the polymer inclusion membranes (PIMs) involving ion- exchange agents as carriers is a very promising techniques. In this work we studied the transport process of Pb (II) ions through newly prepared PVC- based PIM.*

In order to optimize the membrane transport process for high selective Pb(II) recovery, the parameters affecting the transport process were evaluated: pH and the phases composition, membrane composition, metal ion initial concentration and other metal ions influence (selectivity study).

The work provides also a detailed characterization of the newly prepared membrane and an investigation over the reusability of the optimal membrane. The simplicity, stability, high selectivity and low operation costs of the prepared PIM highlights an alternative to conventional solvent extraction methods.

Key words: *Heavy metal removal, industrial wastewaters, transport process*

SOLID PHASE EXTRACTION OF HEAVY METALS FROM AQUEOUS SOLUTIONS

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Abstract. *Among the conventional techniques commonly used for heavy metal removal from wastewaters, the adsorptions process is preferred for the highly selective separation and concentration of trace metal. In this work, novel PVC based composites were prepared and used for comparative study on the removal of toxic metal ions like Pb^{2+} and Cu^{2+} from aqueous matrices. The influence of the main parameters controlling the adsorption process such as: the ion- exchange agent concentration in the composite, the pH of the metal ion solution, the initial concentrations of the metal ions and the other metal ion presence was studied. The adsorption kinetics of Pb^{2+} and Cu^{2+} from aqueous solutions had been investigated. The correlation coefficient (R^2) was used to determine the best fitting kinetic model. The obtained data allowed optimizing the adsorption process for effective removal of the above mentioned heavy metal ions. FTIR spectroscopy, DSC analysis and SEM microscopy investigation were used to characterize the obtained composites.*

Key words: *the adsorptions process, : the ion- exchange agent concentration, the pH of the metal ion solution*

**ADSORPTION OF HEAVY METALS FROM
AQUEOUS SOLUTIONS ON COMPOSITES CONTAINING
ALIQUAT 336 AS EXTRACTIVE AGENT**

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Abstract. *Nowadays, heavy metals are widely used in various industrial applications, which will mainly increase their concentrations in water and soil. Because of the health hazards associated with exposure to chromium (VI) and Zn (II) for human and animal bodies, their removal from wastewaters is a problem of great significance. Newly prepared PVC and cellulose based composites containing Aliquat 336 as extractive agent was used for the toxic heavy metal ions adsorption from aqueous matrices. The factors influencing the adsorption capacity of the composites were investigated, i.e. the extracting agent concentration, the contact time, the pH value of the metal ions solutions and the initial metal ion concentrations in the aqueous solutions. The kinetics of the metal ion adsorption on the obtained composite was analyzed by three different kinetic models: the pseudo- first order, the pseudo- second order and the intra-particle diffusion model. This study leads to identification of the kinetics models and the adsorption isotherm which best describes the experimental behaviour.*

Key words: *adsorption capacity, kinetics of the metal ion adsorption, kinetics models*

**RESEARCH CONCERNING THE INFLUENCE OF
HEAT TREATMENTS ON PHYSICO – MECHANICAL AND
TEXTURAL CHARACTERISTICS OF PEARS**

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Abstract. *The objective of this research was to investigate how the texture of pears (*Pyrus communis* L) is affected during heat treatment. The following parameter varied: temperature $t = 70\div 100$ °C and time $\tau = 5\div 20$ minutes. During heat treatment pears were immersed into sugar syrup (two variants of sucrose source were used – granulated sugar and brown sugar). We analyzed several physico-mechanical properties (moisture, fruit dimensions, aspect ratio, geometric mean diameter, sphericity, surface area, fruit mass, fruit volume, fruit density, bulk density, density ratio, porosity).*

The structure of heat treated pears was examined by fluorescence and phase contrast combination microscopy and texture was measured by a penetrometer type Fruit Texture Analysis (FTA). The average fruit mass ranged from 190.36 to 289.85 g. The bulk density, porosity and fruit hardness determined as 365.84 - 543.12 kg/m³; 45.67 - 66.57% and 9.87 - 13.74 N/mm between samples. A better firmness and a higher temperature in the center of the sample were observed for brown sugar syrup treated pears.

Key words: *sugar syrup, blanching, microstructure, fruit quality, firmness.*

MONITORING DAIRY PRODUCTS CONTAMINATION WITH RADIONUCLIDES AND HEAVY METALS

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Abstract. *Pollution represents one of the major problems of humanity and it can cause ecological damage that could affect both environment and human health.*

The present paper studied the evaluation of milk and dairy products contamination with radionuclides and heavy metals in Bacau district area. The samples were provided by different farms and milk processing factories.

Ten samples of raw milk were analyzed for radionuclides (Cs134, Cs 137) content and ten samples of dairy products were analyzed for heavy metals (Pb, Cd, Hg) content. For raw milk samples the content in Cs134, Cs 137 were analyzed by Low-Resolution Gamma-Ray Spectrometry. For dairy products samples: different types of cheese, yogurt, butter milk, kefir, the content in Pb, Cd, Hg, were analyzed by Atomic Absorption Spectrophotometry.

The analysis results led to these conclusions: the values obtained after determination of Cs134, Cs 137 content in the ten raw milk samples are within the maximum allowable limits; for the dairy products samples after determination of Pb, Cd, Hg content, we have found out that a single sample, buttermilk, registered a slight exceeding of the maximum permissible limit for Pb.

Key words: *dairy products, food safety, radionuclides contamination, heavy metals contamination, quality assessment*

EFFECTS OF A2 PHOSPHOLIPASE ON DOUGH RHEOLOGICAL PROPERTIES AND BREAD CHARACTERISTICS

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Abstract. *Flour lipids, although representing 2% of the flour mass, play an important technological role because they interact with proteins and starch in the dough, influencing the rheological properties of the dough, the bread quality and its freshness.*

The properties of lipids and particularly of phospholipids are given by the structural and functional particularities of the molecules. It is considered that phospholipids are amphipathic substances because there is no polarity in the core of the molecule, and because the extremities have opposite poles.

This paper presents the experimental results regarding the effects of exogenous phospholipase (A2) used in different quantities on the rheological properties of the dough and bread quality. The rheological properties of the flours were made on Mixolab, as well as using a Chopin Alveograph and the effect upon the bread quality was determined by baking tests. The results obtained on mixolab indicate an increase of dough stability, a clear reduction of C1 value and a greater difference of the points C5-C4 with the addition of A2 phospholipase. From the alveographic point of view it was noticed an increase of dough strength along with a higher phospholipase A2 content. From the technological point of view, the best results have been obtained for a dose of 3000 U/100 kg flour added to the flour.

Key words: *phospholipase, Mixolab, Alveograph, baking test*

THE PRESENT STATE OF RESEARCHES REGARDING ELECTROPLATING PROBLEMS

(Review)

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Abstract. *During the last years researches regarding galvanic electroplating problematic had an accelerated development due to environment protection reasons, because more of the present technologies will have to be changed by new ones of minor environmental impact. For example, in machine building industry, heavy metals (as cadmium) are replaced by new materials with superior properties and non-toxic. Alloys and composite materials are a convenient alternative.*

One of the greatly developed galvanic-technique branches is represented by functional electroplating under very hard working conditions. Human activity is extended in all places of the planet, so metals have to work under very corrosive conditions.

Decorative electroplating represents another branch in quick development. There are new and unexpected uses for electroplating materials. For example deposits of silk nickel have a silky aspect, a uniform appearance, corrosion resistance etc.

Galvanic electroplatings with nickel are used for fabrication of smaller and smaller mechanical micro-components. To control the quality of these micro-components is necessary to understand the relations between variables of the process and resulting properties. The influence of additives is intensively studied because these ones permit to obtain high quality deposits.

Key words: *Galvanic electroplatings, nickel layers electrodeposited, nickel electroplating mechanism, nickel electro crystallization, nucleation, growth and structure, cyclic voltammetry, EIS*

HIGHLIGHTING GENETIC PROGRESS IN IMPROVING WINTER RYE

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Abstract. *This paper highlights the contribution of winter rye culture, initially by testing and identifying the most suitable local populations and foreign varieties, and subsequently through the creation, introduction and widespread in the production of varieties Gloria, Orizont, Ergo and Suceveana, obtained from A.R.D.S. Suceava.*

During the stage 1951-1955, certain local landraces and the cultivar Petkus registered an average yield of 1300 kg/ha, and during period 1970-1975 the average yield of the cultivars Danae and Dankovskie Zlote grows at the 3160 kg/ha.

The cultivars Danae, Dankovskie Zlote and Ianoși during the period 1976-1985 registered an average yield of 4207 kg/ha, and during 1986-1995 the cultivars Gloria, Ergo and Orizont which were created at the A.R.D.S. of Suceava had an average yield of 4980 kg/ha.

The cultivar Suceveana was cultivated during 1996-2005, with an average yield of 5075 kg/ha. The superiority of the four cultivars: Gloria, Orizont, Ergo and Suceveana from the point of view of productivity and yield stability, was statistically demonstrated by the distribution of correlations and variance of productions in comparison with the standard cultivars from the above periods.

The superior values of the quality traits recommend the utilization of the rye cultivars which were created both for bread making feature and for fodder users.

Key words: *cultivars, breeding, yield, quality, resistance.*

PREDICTING THE ORGANOLEPTIC QUALITY OF SOME ROMANIAN BEER FROM PHYSICAL-CHEMICAL DATA USING MULTIVARIATE ANALYSIS

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Abstract: *Two categories of lager blonde beer produced in Romania, of which twelve samples are common blonde beer type and eight samples are superior blonde beer type were studied to determine their quality through physical-chemical (apparent extract, original extract, alcohol concentration, pH, turbidity, viscosity, colour, acidity, bitterness value) and sensorial (appearance, colour, odour, taste, gas release, foam stability) characteristics. Beer characteristics measurements were examined by multivariate data analysis, using principal component analysis (PCA). The analysis of the principal components sheds light on the correlations between the variables as well as on the differences between the analyzed samples. The values of correlation coefficients indicate important direct statistical relations between the variables taste and alcohol concentration for all the 20 samples of beer analyzed. For the samples from the category common blond beer type, the values of correlation coefficients show that there are reverse statistical connections between the bitterness value and the characteristics used in the sensorial analysis ($p \geq 0.05$). For this type of beer, Skol was mostly appreciated, while for the superior blond beer category Ursus Premium was considered the best, both types of beer being regarded as very good beer quality according to the sensorial evaluation methodology described by SR 13355-1:1997.*

Key words: *Principal Component Analysis, physical-chemical parameters, sensory property, lager blonde beer*

INFLUENCE OF TOTAL SOLUBLE CONTENT, STARTER CULTURE AND TIME PERIOD ON RHEOLOGICAL BEHAVIOUR OF CULTURED BUTTERMILK

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Abstract: Casein gels are part of the dairy products, hard or soft products, as cheese and yogurt, cultured buttermilk, and their rheological behaviour can be measured by various instrumental techniques. For this study we used three types of milk (7.5%, 10%, and 12.5% respectively TSS) and starter culture (*Lactococcus lactis* subsp. *lactis* and *Lactococcus lactis* subsp. *cremoris*) in different concentrations (2 g/100 l, 3 g/100 l, 4 g/100 l). The rheological properties of the cultured buttermilk obtained from milk were investigated by a Brookfield RV Pro II+ viscometer at different shear rates, during the time period keeping (from the 1st day – the obtaining day, till the 20th day – the last day when the product is good for human consumption). The samples with the highest TSS (total soluble content) present the highest viscosity, while the samples with 7.5% TSS content present the smallest viscosity. During the rheological tests, the samples with 3 g/100 l starter culture presented the best rheological properties (the samples had the highest viscosity), while the samples with 4 g/100 l had the smallest viscosity due to the proteolysis generated by the starter culture activity. The flow index behaviour was influenced more by the TSS content rather than by the starter culture dose. It can be seen that the change in the apparent viscosity was not linear with solids concentration, where a 5% (from 7.5% to 12.5%) increase in the solids concentration led to triplicate in the apparent viscosity.

Key words: viscometer, shear stress, shear rate, flow index

THE INFLUENCE OF LIQUEFACTION TEMPERATURE UPON RHEOLOGICAL PROPERTIES OF CORN STARCHY MASHES

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Abstract: *In this paper we studied the effect of liquefaction temperature of corn starchy mashes upon their rheological properties. For the study we made two types of corn grind starchy mashes respectively one of fine grind with particles of <0.5 mm and one of rougher grind with particles of > 0.5 mm. The enzymatic package used at obtaining the two types of starchy mashes comprises three enzyme types respectively the Spezyme (liquefaction enzyme), Stargen 001 (α -amylase and amiloglucosydase for the starch hydrolysis) and Fermgen (protease). For the two types of starchy mashes different liquefaction temperatures of 40°C, 50°C, 60°C and 70°C have been tested. The rheological properties of starchy mashes have been analyzed by the viscometer Brookfield RV Pro II+ during they were obtained in two phases: before and after the starchy mashes liquefaction. From the study made we observed that the mashes obtained from fine corn grind at the liquefaction temperature of 60°C is more efficient and more reduced viscosity being obtained in comparison with the other liquefaction temperature of 40°C, 50°C and 70°C. For the mashes obtained from rough corn grind we noticed the fact that the liquefaction temperature of 50°C is more efficient and more reduced viscosity being obtained in comparison with the other liquefaction temperatures of 40°C, 60°C and 70°C.*

Key words: *viscosity, enzyme, fine grind, rougher grind.*

RESEARCH ON THE DESCRIPTION OF DIFFUSION PHENOMENON USING MATHEMATICAL MODELLING METHODS

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Abstract. *The aim of this paper is to present a series of theoretical research carried out in order to determine the diffusion coefficients when some metallic materials made from potentially dangerous chemical elements get into contact with varied food products.*

The idea this approach is based on derives from the fact over the last decades at world level other similar experiments and studies on the use of mathematical modelling methods have also been made. The latter ones had in view to determine the rate of mass transfer in metallic materials meant to get into contact with food products.

The first part of the paper describes in broad lines the diffusion phenomenon, starting from the possible mass transfer that takes place in the immediate nearness to the contact surface between the metallic material and food product.

Further on, the research is focused on mathematical interpretation of Fick's second law (diffusion law) being known that in most cases the mass transfer complies with Fick's diffusion laws. We defined notions referring to the main characteristics of diffusion phenomenon, making a mathematical description of the relationships between these ones, all this having in view the possibility of modelling such phenomenon.

The last part of the paper presents the conclusions that may be drawn from the use of mathematical modelling methods to characterize the diffusion process, its use being considered an additional instrument for classical methods and a process that will be made step by step in future.

Key words: *migration, diffusion coefficients, concentration, mathematical model.*

TERMINOLOGICAL NEOLOGISMS IN SCIENTIFIC STYLE

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Abstract. *The present analysis sets out from the fact that Romanian papers meant to English influence on Romanian language have not paid enough attention to loans' semantics, though this assimilation aspect concerns too lexicology, lexicography and normative linguistics.*

The problems of neologisms' meaning of English origin has been mainly dealt with so far from the normative point of view, from the social psychology's and communication strategies', translator's or the dictionary authors' one.

The very fast rhythm of enrichment of the Romanian vocabulary over the last decade and the abundance of loans from English perceived frequently as a polluting factor, threatening the Romanian language identity, might be considered as possible explanations for the absence of some of these loans from the Romanian dictionaries. Taken into consideration the impossibility of presenting herein an exhaustive inventory of the new meanings that have come up lately, we focused on the study of the main directions of meaning dynamics of some English loans as they occur in some specific fields. Therefore, we selected a corpus of scientific texts from the food industry field. The research is predominantly a descriptive one, having in view to signal and explain to some extent the terms' new meanings from a double perspective semantically and functionally as well. The aim is not to make distinctions on the etymological nature (direct loan/ by filiations/ Anglicism/ americanism) or according to the criteria regarding the assimilation degree (proper loans /xenisms), but to highlight how these loans effectively function within the specialized language of scientific style.

Key words: *semantics, assimilation, loan, meaning dynamics*

APPLICATIONS OF DEFINITE LINEAR FUNCTIONS IN THE AREA OF CHEMICAL REACTIONS FOR SUBSTANCES WITH GIVEN PROPERTIES

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Abstract. *Chemical Physics, correlating the concepts and methods in Physics and Chemistry, using in all aspects a quantitative way of approaching problems, depends on a mathematical basis sufficiently well developed, which comprises most of the chapters in modern Mathematics: differential and integral calculus, differential geometry, calculus of variations, many chapters from functional analysis, complex variable functional theory, Mathematical statistics, etc., among these chapters being also present the finite linear analysis, for which there has been a growing interest recently. Using some linear algebra methods, we can calculate complex system equilibriums with many component parts (such as equilibrium composition), chemical and physical properties of different types of substances; we can solve stationary kinetics problems or accurately process a large number of experimental data, etc. For example, for some of the alkanes in the homologous series, we can find out the one containing, under specific circumstances, extreme values, such as: formation enthalpy ΔH_f , molar volume V and isobar potential ΔG_f , or, for hydrocarbons with less than 12 carbon atoms, we can make a mixture with maximum heat content, on condition that the enthalpies of the component parts and the average molar volume are provided, and the saturated vapour pressure does not go beyond a predetermined value.*

Key words: *vectors, formation enthalpy, molar volume, isobar potential, linear programming*

STATISTICS INDICATORS USED IN TOURISM DEMAND ANALYSIS

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Abstract. *The objective of this paper is to investigate the role of websites in order to determine the internet impacts on tourist demand. For the persons implied in tourism industry, the key factors that influence tourism demand are very important, in order to understand trends in the tourism market, and create competitive advantages for tourism industry. Along with the growth in demand for tourism in Romania over the past two decades, an increasing interest in tourism research has been noticed. Statistics indicators for volume indices of hotels offered to population regarding arrivals in the main establishments of tourist reception with functions of tourist accommodation (hotels, motels, inns, tourist villas, tourist chalets, tourist boarding houses, agro-tourist boarding houses, campings, school and pre-school camps, tourist halting places, bungalows, tourist houselet-type units) are studied in Romania for the period of time 2007 - 2010. On the other hand, the inter-relationships between tourism demand and number of accessed sites have been discussed. The vast majority of accommodation spaces developed a presence on the Internet. Tourists' age and education influence their level of interest in tourism websites. Also, international tourists had the greatest interest in tourism websites. Tourism demand modeling relies on statistically data in terms of estimation.*

Key words: *website evaluation, number of accessed sites, tourist, estimation*

THE INFLUENCE OF MODERN PRODUCTION SYSTEMS „COOK-SERVE”, „COOK-CHILL”, „COOK-FREEZE” ON THE ACTUAL PRESERVATION OF NUTRIENTS IN THE CATERING PRODUCTS

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Abstract. *Introduced relatively recently among consumer needs of modern man, measured as an indicator of quality of life, catering product fully deserves its importance in the rational nutrition. Nutritional quality is one of the most important valences of total quality catering products, depending on a number of complex physico-chemical, which can be optimized and modelled. This study sought to determine hydro soluble vitamin content of two types of catering products: cooked fish (which has the composition of salmon fillet, carp fillets and vegetables) and minced meat (which has the composition of pork and beef) processed in different ways (cook-serve, cook-chill, cook-freeze). Catering processing modes, and heat treatments (conventional or microwave) have a major influence on the contents of water soluble vitamins (thiamine, riboflavin, nicotinamide).*

Key words: *catering products, cook-serve, cook-chill, cook-freeze, water-soluble vitamins, thiamine, riboflavin, niacin.*

THE POSSIBILITIES OF THE USE OF WASTES RESULTED FROM THE INDUSTRIAL PROCESSING OF POTATOES

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Abstract. The paper presents the technologies of the processing of potatoes and the possibilities of use of the biological mud, resulted from the industrial processing of potatoes.

Key words: *processing of potatoes, biological mud, wastes*

THE INFLUENCE OF MODERN SYSTEMS USED IN CATERING PRODUCTION UPON REAL AND APPARENT RETENTION OF Ca²⁺ and Fe²⁺ IONS

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Abstract. *This study followed the evolution of Ca²⁺ and Fe²⁺ ions in two types of catering products: fish (which has in its composition salmon fillet, carp fillet and vegetables) and meat minced (which has in the composition pork and beef) processed in different ways (cook-serve, cook-chill, cook-freeze). The results indicate that Ca²⁺ and Fe²⁺ ions are stable during culinary processing. Conventional and microwave heat treatments have much smaller effect on the calcium content.*

Key words: *catering products, calcium ions, iron ions, cook-serve, cook-chill, cook-freeze.*

WAYS OF OPTIMIZING THE NUTRITIONAL VALUE OF DIETETIC PASTRY PRODUCTS

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Abstract. *A balanced nutrition means a diet which contains necessary nutrients in proper proportions for our body's health. The general concern for the development of functional foods has led to reconsidering the use of dietary fibres in food production and thus researches on their physiological role for human organism had been initiated. The purpose of this paper was to find some ways to improve the nutritional value of a dietetic pastry product based on sweeteners. For accomplishing this, the water used in preparing the fibre-rich product was replaced by carrot juice. Thus, a general improvement of the nutritive value could be noticed, but with a slight growth of the energetic value of the final product, a growth that was determined also by the use of some caloric sweeteners.*

Key words: *diet, fibres, nutritive value, sweetener.*

**RESEARCH ON THE INACTIVATION OF ALKALINE PHOSPHATASE
AND NATURAL MICROBIAL FLORA FROM
COW'S MILK UNDER ELECTRIC FIELDS ACTION**

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Abstract. *The aim of this study was to compare the efficiency of the electric field at different intensities and heat pasteurization regarding the alkaline phosphatase activity and natural microbial flora viability from raw skim milk. Different electric field intensities and different thermal conditions, respectively 15⁰ and 60⁰ C in skimmed raw milk samples were applied. Another two samples of skimmed raw milk were heat treated applying two known methods of pasteurization: LTLT (63⁰C/30 min) and HTST (72⁰ C / 15 sec). Alkaline phosphatase activity and the total microflora in milk treated in the electric field and heat-treated milk for a period of time between 0 and 7 days were examined. The Potențiostat - Bio-Logic Galvanostat SP150 (France) device was used and Square Wave Voltammetry method was applied. LTLT and HTST pasteurization has been achieved under laboratory conditions, the samples were heat treated in glass containers and then cooled in ice water and kept at 4-6⁰ C for seven days. The results we obtained confirmed that the combined effect of electric field intensity and temperature led to the inactivation of alkaline phosphatase and total microflora in skimmed raw milk. The need for retaining heat-sensitive nutrient and sensory properties of milk has resulted in the application of alternative technologies. This study suggests that using electrical fields under mild temperature conditions can provide milk with adequate safety and shelf life.*

Key words: *alkaline phosphatase, natural microbial flora, raw milk, electric fields, LTLT, HTST, Square Wave Voltammetry*

STUDY REGARDING THE BEHAVIOUR OF *BACILLUS CEREUS* IN MILK UNDER ELECTRIC FIELDS ACTION

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Abstract. *Psychrotrophic Bacillus cereus is a limiting factor for the shelf-life of pasteurized milk. The effects of electric fields treatments at room temperature on Bacillus cereus vegetative cells inoculated in sterile skim milk were investigated. This treatment could be an alternative to traditional thermal processes since it is capable of destroying micro-organisms. Research has been focused on evaluating the effects of electric field treatments on Bacillus cereus cells, and the effectiveness of this non thermal technique has been demonstrated. Sterile milk samples were inoculated with suspension of Bacillus cereus cells in proportion of 10^2 UFC/ml. The electrochemical behaviour of Bacillus cereus cells was evaluated through Square Wave Voltammetry using a Potentiostat-Galvanostat Bio-Logic SP150 inoculated with Bacillus cereus. The samples were treated with electric fields using a POTENTIOSTAT – GALVANOSTAT BIO – LOGIC SP150 (FRANCE) instrument. The working method used was Square Wave Voltammetry. The electric wave was applied for periods between 40 and 200 seconds. Treated samples were stored under refrigeration conditions for a period of 6 days and microbiologically analyzed by inoculation on MYP Agar medium after 2, 4 and 6 days. Parallel determinations were made on suspension of Bacillus cereus cells in deionized water. The electric field antibacterial ability depends on its electric parameters and the physicochemical properties of the suspending medium. The results show that Bacillus cells behaviour is different and it depends on the number of electrical pulses and the conductivity of the suspending medium. Higher cell lethality was obtained by increasing the duration of electrical wave.*

Key words: *Bacillus cereus, Electric Fields Treatments, Sterile Skim Milk, Square Wave Voltammetry*

VEGETAL BIOACTIVE SUBSTANCES AND THEIR ROLE IN FUNCTIONAL ALIMENTATION

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Abstract. *From the relationship between diet and diseases has emerged the concept of „functional alimentation” and therefore a new discipline developed: „the science of functional alimentation”. A balanced diet is a primary concern of major interest in providing and maintaining health and a good functioning of the human body. A series of scientific research has shown that a controlled diet can regulate body functions thus participating in maintaining health and homeostasis, necessary to reduce the risk of many chronic diseases. In the last decades, nutrition as a science has progressed in terms of understanding the physiological and genetic mechanisms through which diet and individual food components affect health. It is a paradox that nutrition is essential in maintaining life and can also be a cause of many chronic diseases. Functional alimentation as a science tries to: identify the interactions between the presence and the absence of a component (macronutrient, micronutrient) and certain specific functions of the body; understand the action mechanisms involved in treating various diseases. The role of plant bioactive substances in the fruits of *Rosa canina* for the human body. In the chemical content of the fruits (*Cynosbati fructus*) predominates vitamin C (ascorbic acid and dehydroascorbic acid) in quantities of 0.5 - 2%, 50 times higher than in lemons, 80 – 100 times more than in cherries, sour cherries and mandarins and 200 times more than in apples. Provitamin A is recommended in vitamin deficiencies, hypo vitamin deficiencies and as general energizing especially for children, the elderly, and persons with tuberculosis. Vitamins B1, B2, K, P and PP - *Cynosbati fructus* fruit preparations are good arterial and venous vasodilator and represent effective remedies against capillary fragility, because of the content rich in flavonoids and vitamin PP. The *Rosa Canina* seeds contain high amounts of tocopherol and are effectively used in cases of palpitations, bleeding and chronic colitis. Seed tinctures are also recommended for nervous instability, anxiety, constant fear, restlessness at night.*

Key words: *health, natural food ingredients, health maintaining, functional balance*