

D.L.C. Lima, J.V. Coelho, A.J.G. Pereira, M.P. Silvestre and D.L. Nelson: Chemical and functional characterization of bovine blood globin obtained by the acidified acetone method. Pp. 99-108. acaju@uol.com.br

With a view to increasing the industrial use of bovine blood globin, the extraction of the globin fraction was achieved using the acidified acetone method. Spectrophotometric analysis of the globin and the extracted heme group was performed utilizing the Soret band. The influence of the type of final processing of the globins (freeze drying, gel) on the solubility, the emulsification capacity, the emulsifying activity index and the stability of the emulsion was studied at pH 5, 6 and 7. No behavioural differences between freeze-dried and gel globin forms were observed. The best performance for most of the functional properties was achieved at pH 5.0 for the globin obtained by this method.

Keywords: acidified acetone, bovine blood, globin, functional properties

E. Kovács, S. Siddiqui, Z. Kristóf, M. Tóth-Markus and E. Róth: Physiological and ultrastructural changes in ber (*Zizyphus Mauritiana* Lamk.) fruits during ripening. Pp. 109-118. etelka.kovacs@uni-corvinus.hu

Colour (L^* , a^* , b^* , h_0 , and chroma), B-galactosidase, polygalacturonase (PG) activity, pectin content, ultrastructure and volatile compounds were determined, in mature green and in yellow ber fruits (*Zizyphus mauritiana* Lamk. cv. Umran). The L^* did not, but a^* , b^* and h_0 significantly differed between mature green and yellow ber fruit. The pectin content and its solubilization (soluble pectin and neutral sugars), the activity of PG was higher in yellow ber fruits and in the outer part of fruits. Activity of B-galactosidase was higher in mature green ber fruits. The cell walls of mature green fruits were usually homogenous, the density of the middle lamellae decreased in yellow bers, and at the same time the structure of chloroplastids disintegrated. The aroma of yellow ber is characterized by the presence of even carbon number of ethyl esters from C4 to C14.

Keywords: ber (*Zizyphus mauritiana*), ripening, ultrastructure, pectin solubilization, B-galactosidase, polygalacturonase, volatile compounds

B. Özcelik, I. Orhan, M. Kartal and B. Konuklugil: In vitro testing of antiviral, antibacterial, antifungal effects and cytotoxicity of selected turkish phlomis species. Pp. 119-125. berrin@gazi.edu.tr, microberr@yahoo.com

The objective of this study was to examine antibacterial, antifungal and antiviral properties of selected Phlomis species (Lamiaceae) growing in Turkey. The petroleum ether and methanol extracts of the seven species, namely *P. armeniaca* Willd., *P. bourgaei* Boiss., *P. leucophracta* P.H. Davis & Hub.-Mor., *P. lunariifolia* Sibth. & Sm., *P. lycia* D. Don, *P. pungens* Willd. var. *pungens*, and *P. pungens* var. *hirta* Velen. were tested against *Escherichia coli*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Staphylococcus aureus*, *Bacillus subtilis*, and *Enterococcus faecalis* for their antibacterial activity using ampicillin and ofloxacin as references. Antifungal activity of the same extracts

was determined against *Candida albicans* using microdilution method with ketocanazole as reference. Both DNA virus Herpes simplex type-1 (HSV-1) and RNA virus Parainfluenza (PI-3) were employed for antiviral assessment of the *Phlomis* extracts using Madin-Darby Bovine Kidney and Vero cell lines in which acyclovir for HSV-1 and oseltamivir for PI-3 were employed as reference drugs. Although both the petroleum ether and methanol extracts seemed to exert similar antibacterial activity, the methanolic extracts were observed to be more active against *S. aureus* and *E. faecalis*. On the other hand, methanolic extract of *P. pungens* var. *pungens* possessed notable antiviral activity against both type of viruses.

Keywords: *Phlomis*, Lamiaceae, antiviral, antimicrobial, cytotoxicity

R. Panghal, S. Jood, N. Khetarpaul and R. Goyal: Chemical characteristics and fatty acid composition of cooking oils and their blends. Pp. 126-129. ramjood@rediffmail.com

Palm oil as a rich source of carotene appears to be the only oil of vegetable origin which can serve as a potent source of vitamin A and monounsaturated fatty acids mainly oleic acid. Considering the nutritive value of crude palm oil this study was directed towards blending of CPO with other commonly used cooking vegetable oils to attain ideal fatty acid composition of SFA:MUFA:PUFA (1:2:1). Palm oil was blended with safflower oil and soybean oil in two different proportions i.e., CPO:safflower oil (65:35 and 70:30) and CPO:soybean oil (55:45 and 65:35). Chemical characteristics and fatty acid composition of crude palm oil and its blends were determined. Saponification value was highest in CPO and lowest in safflower oil. No peroxide value was detected in fresh oils. B-carotene content was 366.19 Bg/g in CPO and found absent in safflower and soybean oils. Fat acidity (mg KOH/g) was lowest (0.12) in CPO and highest (0.25) in safflower oil. The fatty acid composition of different oils revealed that palmitic acid was the predominant fatty acid (43.45%) in CPO followed by oleic (40.98%) and linoleic acids (14.67%). However, safflower and soybean oils contained the highest amount of linoleic acid (73.61, 54.22%) followed by oleic (18.23, 22.35%), palmitic (6.27, 11.09%) and stearic acids (1.87, 2.53%), respectively.

Key words: Palm oil, safflower oil, soybean oil, fatty acids, B-carotene, fat acidity

V. Ostrý, J. Ruprich And J. Skarkova: Glycoalkaloids in potato tubers: the effect of peeling and cooking in salted water. Pp. 130-135. ostry@chpr.szu.cz

The important glycoalkaloids in potatoes are α -solanine and α -chaconine. Their natural function is probably to serve as stress metabolites or phytoalexins for the protection of the potato when attacked by insects, fungi, etc. They contribute flavour to potatoes but at higher concentrations cause bitterness and are toxic to humans. α -Solanine and α -chaconine appear to have two main toxic actions, one on cell membranes and another one on acetylcholinesterase. Symptoms of α -solanine/ α -chaconine poisoning involve an acute gastrointestinal upset with diarrhea, vomiting and severe abdominal pain. An instrumental high-performance thin-layer chromatography (HPTLC) method was applied for the quantification of α -solanine and α -chaconine in peeled potato skin, raw potato pulp and cooked peeled potato tubers. The limit of quantification (LOQ) for α -solanine and α -chaconine was found to be 5.0 mg kg⁻¹ for each glycoalkaloid. In this study the factors of potential loss of α -solanine and α -chaconine in potato tubers during peeling (factor=0.8) and cooking into edible stage in salted water (factor=0.8) were examined. The combined loss factor of peeling and cooking for sum of both glycoalkaloids in potato tubers was 0.64. These

factors were practically used for the probabilistic exposure assessment of the intake of potato glycoalkaloids in the Czech Republic.

Keywords: potato tubers, glycoalkaloids, α -solanine, α -chaconine, HPTLC, peeling, cooking

J. Rutkowska and A. Żbikowska: Effects of fatty acid composition of liquid margarines on sensory quality of cakes. Pp. 136-148. jaroslawa_rutkowska@sggw.pl

The objective of this work was to determine the effects of fatty acid composition of liquid margarines (LM) on the sensory properties of sponge cakes and compare it with cakes containing solid margarines and butter. Fats were different in principal groups of fatty acid and were of the following composition: SFA (9.3-66.4) TFA (1.2-10.3), PUFA (1.9-53.9%). The taste and aroma of cakes scored lower with increasing content of unsaturated FA, especially PUFA and higher with increasing content of SFA and TFA combined. With respect to taste and aroma, cakes containing LM scored lower in comparison to cakes containing butter, while the texture of such cakes was rated as high as cakes containing butter. Approximately 34–65% of young consumers perceived such cakes as “like very much” and “like moderately”, however, 5% of consumers described them as “dislike a lot”. The results of this study indicate that liquid margarines could be recommended for cakes in large-scale manufacture. Regarding recommendations of reducing the intake of TFA in processed foods, it is justified to replace hydrogenated vegetable by liquid fats for manufacture of bakery products.

Keywords: fatty acid composition, liquid margarines, sponge cakes, sensory attributes consumer preference Szedljak,

I. Szedljak, K. Szántai-Kőhegyi and J. Kosáry: Study of tobacco plant as a possible nutritive protein source. Pp. 149-156. judit.kosary@uni-corvinus.hu

The changes in the activity of enzyme polyphenol oxidase, the concentration of total soluble phenolic compounds and soluble protein content in different tobacco cultivars (Virginia and Burley) during cultivation, then in a combined curing model system were studied. The latter was a special combination of air-curing and flue-curing methods followed by a long fermentation period to optimize the treatment of tobacco plants used both as protein sources and starting materials in tobacco industry. The results suggest that a cultivation period of 13-14 weeks could be better for tobacco plants as protein sources, however, for starting materials for industrial use 16-17 weeks are optimal. It was found a four-week curing period could be the best for two tobacco cultivars (Virginia and Burley) in the case of using them both as protein sources and starting materials in tobacco industry.

Keywords: protein source, soluble protein content, polyphenol oxidase, total phenol content, tobacco cultivation and curing

Gy. Virág, T. Tóth, J. Schmidt, E. Zsédely and Cs. Eiben: Effect of dietary vegetable oil combined with vitamin e supplementation and gender on the ph and colour of rabbit meat and dissected fat. Pp. 157-166. virag@katki.hu

Often less than optimal PUFA content of human diet have started the research aimed to

increase its quantity in meats. Including linseed and sunflower oil in rabbit feed effectively improves rabbit meat lipid composition, but its altered sensitivity to oxidative reactions could result in colour change. The effect of vegetable oil content of the diet and vitamin E supplementation was studied on the colour of rabbit loin and thigh meats and dissected fat. Meat lightness, redness, yellowness, hue and chromacity were measured with Minolta chromameter on samples cooled to 5 °C for 24 h. Including sunflower (2%) and linseed (2%) oil in rabbit diet changed the colour of the dissected fat making it lighter (L^* 76.96 v. 73.79), more yellowish (b^* 13.34 v. 11.41) and intense (C^* 14.49 v. 12.35) coloured compared to the control diet without vegetable oils. To the effect of the vitamin E supplementation of vegetable oil containing feed redness of the thigh decreased (a^* 4.41 v 5.44) and hue increased (h° 58.63 v. 49.76). The source of vitamin E supplement influenced only the colour of loin: natural vitamin E increased lightness (L^* 53.03 v. 49.62), yellowness (3.86 v. 3.04) and chromacity (3.96 v. 3.25) while synthetic vitamin E did not. The changes of loin, thigh and fat colour observed in this study may be utilized in making the product more desirable to the consumer.

Keywords: rabbit, meat, fat, colour, gender, vitamin E, diet, linseed, sunflower

V. Mrkic, I. Radojci Redovnikovic, S. Mazor Jolic, K. Delonga and V. Dragovic-Uzelac: Effect of drying conditions on indole glucosinolate level in broccoli. Pp. 167-174.
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Broccoli is interesting as raw vegetable for domestic use and as well as dehydrated powder due to content of numerous biologically active compounds – phytochemicals. We examined the influence of blanching and drying air temperature and velocity on glucosinolate composition and content under conditions which are usually applied in industrial processing of broccoli. Broccoli blanching prior to drying caused a significant decrease in the glucosinolate content, which additionally decreased during the drying process. Drying at 50 °C and 60 °C with air velocity of 2.25 m s⁻¹ was the most favourable in most of the cases.

Keywords: blanching, broccoli, drying conditions, glucosinolates, HPLC

M. Novák-Hajós, J. Szamos, M. Gasztonyi and †Gy. Hajós: Characterization of 2-propanol soluble seed proteins in mutant soybean (glycine max [L.] Merr) lines. Pp. 175-179.
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Seed protein pattern of control and M10 mutant soybean (Glycine max [L.] Merr) lines in defatted and non-defatted raw flour was studied after 60% 2-propanol extraction, SDS-PAGE separation, colloidal staining and densitometric evaluation to detect a new variant of the protein KTI and/or BBI, furthermore to find new protein(s) of low molecular weight. Electrophoretic separation of defatted and non-defatted control soybean samples showed the same protein patterns. On the densitograms of mutant lines quantitative and qualitative differences could be observed. Defatted raw soy samples reflected more differences in the number of peaks than non-defatted ones. Beside soy trypsin inhibitors, several more soy proteins of low molecular weight are dissolved. KA mutant line 9 has a unique 2-propanol soluble protein pattern, and a new protein band of $R_f=0.37$ compared to the control line. 60% 2-propanol soluble soybean seed proteins are suitable for cultivar identification and characterization, furthermore to distinguish soybean lines of the same origin.

Keywords: mutant soybean lines, seed proteins, KTI, BBI, 2-propanol extraction, SDS-PAGE

A.-Lambert-Meretei, E. Szendrei, M. Nogula-Nagy and A. Fekete: Methods to evaluate the effects of bread improver additive on bread crumb texture properties. Pp. 180-191.

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The aim of the work was to develop a method to evaluate the effect of bread improver dosage on bread crumb texture. Standard breads were prepared to get different crumb structures when bread improver was added to the flour in a concentrate of 0.2%, 0.4% and 0.6%. The additive used in the experiments contains lecithin, ascorbic acid and alpha-amylase. Rheological tests and image analysis were performed to predict the effect of the additive. Hardness, chewiness, gumminess, cohesiveness and springiness were determined by rheological method. The rheological properties neither separately nor combined were able to discriminate the different bread crumb groups. Image processing method was developed to determine the ratio of dark to light area of the images taken of the bread slices. It was concluded that both rheological and visual parameters should be taken into account to characterize bread crumb texture.

Keywords: bread crumb texture, rheological properties, texture profile analysis, image analysis, ratio of dark/light area

A. Del Caro, A.F. Cacciotto, P.A.M. Fenu and A. Piga: Polyphenols, colour and antioxidant activity changes in four Italian red wines during storage. Pp. 192-210.

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The evolution, during one year of storage, of the antioxidant activity, phenolic compounds and colour of four red wines, obtained from two different Sardinian important cultivars (Cannonau and Cagnulari) and kept in stainless steel tanks or in bottle, was evaluated. Two samples were subjected to the microoxygenation process, with one of these derived from a late grape harvest. Wines stored in stainless steel tanks showed a decrease in phenolic content and antioxidant activity, while the bottled wine did not show significant variations. The different degree of microoxygenation caused some significant differences with regard to the decrease in phenolic compounds during the storage, being lower in the sample microoxygenated for a longer time and with more oxygen. Correlation coefficients between anthocyanins and antioxidant activity were high for all the samples analysed. Regarding the colour, percent of blue showed a significant increase in microoxygenated wines. PCA, applied to the data set of phenolic compounds showed that Cannonau wine is different from Cagnulari samples, because of the higher content of cinnamic acids. Cagnulari bottled wine differed from the two Cagnulari stored in steel tanks, in particular for the anthocyanins content, confirming the reducing activity of the bottle.

Keywords: stainless steel tanks, bottle, microoxygenation, storage, colour, phenols

M.F. Pardo, M.A. Bruno, C. Sequeiros, S.A. Trejo, L.M.I. López, N.O. Caffini and C.L. NATALUCCI: New plant endopeptidases with potential application in cheesemaking. Pp. 211-221. caffini@biol.unlp.edu.ar

Results are given on the milk clotting properties and casein hydrolytic behaviour of partially purified extracts of four new cysteine plant endopeptidases: balansain, hieronymain, asclepain f, and philibertain g. Milk coagulation behaviour was different for the assayed proteases: balansain and hieronymain showed a similar performance, whereas asclepain f exhibited the lowest clotting activity; philibertain g exhibited the highest one when was previously incubated with cysteine. According to the relative ratio of clotting activity to proteolytic activity, balansain, philibertain g and hieronymain appear as possible vegetable rennets. Casein hydrolysates were produced with each enzyme and the hydrolysis pattern was analysed by tricine SDS-PAGE. The α S2- and α S1-casein fractions, associated with cheese texture, showed different degradation patterns: higher degradation kinetics was obtained for philibertain g, followed by balansain and hieronymain, whereas asclepain f showed the lowest activity. The β -casein fraction, related to bitterness, showed similar initial degradation kinetics for balansain and asclepain f; degradation was faster in the case of philibertain g and slower for hieronymain. In the case of the B-casein fraction, involved in milk clotting, the most remarkable behaviour was that of hieronymain, as this casein fraction was quickly degraded by the protease.

Keywords: plant endopeptidases, casein hydrolysates, electrophoresis, asclepain f, balansain, hieronymain, philibertain g.

Sipos, P. S. Agachi, X. M. Meyer and P. Strehaiano: Batch fermentation process: modelling and direct sensitivity analysis. Pp. 222-233. anca.sipos@ulbsibiu.ro

Based on a nonlinear model, this article realizes an investigation of dynamic behaviour of a batch fermentation process using direct sensitivity analysis (DSA). The used nonlinear mathematical model has a good qualitative and quantitative description of the alcoholic fermentation process. This model has been discussed and validated by authors in other studies. The DSA of dynamic model was used to calculate the matrix of the sensitivity functions in order to determine the influence of the small deviations of initial state, control inputs, and parameters from the ideal nominal values on the state trajectory and system output in time. Process optimization and advanced control strategies can be developed based on this work.

Keywords: batch fermentation, nonlinear mathematical model, process simulation, direct sensitivity analysis

U. Krupa and M. Soral-Śmietana: Bean seed protein digestibility affected by pressure and microwave cooking. Pp. 234-238. Urszula.Krupa@pan.olsztyn.pl

The aim of the study was to compare the effect of pressure and microwave cooking on the in vitro protein digestibility of bean seeds (*Phaseolus vulgaris*). The results of the in vitro digestibility ascertained the improvement of protein digestibility affected by pressure-cooking of seeds. The digestibility of proteins of microwave-cooked bean seeds was lower. The electrophoretic SDS-PAGE separation patterns of bean proteins hydrolysed with trypsin indicated a significant influence of both treatments on the proteins examined. Degradation of proteins was apparent, however the dominant fraction of 47-41 kDa remained intact, which confirms its resistance to digestion.

Keywords: bean seeds; proteins digestibility; SDS-PAGE; pressure cooking; microwave

cooking.

M.D. Croitoru, I. Fülöp, M. Kincses Ajtay, Gy. Dudutz, O. Crăciun and M.T. Dogaru:
Glutamate determination in foodstuffs with a very simple hplc-uv method. Pp. 239-247.
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To date, monosodium glutamate is the most used flavour enhancing food additive. Because high levels of glutamate are toxic to brain concerns appeared regarding the safe use of glutamate and there is a 10 g kg⁻¹ concentration limit in foodstuff. A simple HPLC-UV method, based on a derivatization procedure with o-phthaldialdehyde, was developed for determination of glutamate in meat products, soup bases and vegetable concentrates. Even if our method is less sensitive than the HPLC-fluorescence ones widely available, it is able to measure amounts at least 200 times smaller than the maximum allowed one, has good reproducibility (CV under 2% for intraday and under 3% for interday determinations), linearity and accuracy. Less expensive HPLC systems are required and the formed derivative is very stable (at least 1 week), good separation is obtained with the less expensive 5 µm particle C18 columns and methanol as organic phase.

Keywords: glutamate, HPLC, o-phthaldialdehyde, foodstuffs