

a jejich aplikacím v biomedicině. V neposlední řadě je v knize diskutována reálnost teranostiky jako kombinace diagnostiky a terapie rakoviny. Několik kapitol se zabývá využitím zlatých nanočástic, a to nejen pro biologické zobrazování, ale např. také pro fototermální terapii.

V poslední části publikace je kapitola přinášející novinky v pokročilých aplikacích nejnovějších nanotechnologií pro molekulární zobrazování. Jsou diskutovány limity a budoucí výzvy těchto metod.

Velmi komplexní publikaci lze doporučit jak lékařským a vědeckým pracovníkům, tak studentům magisterských a postgraduálních programů.

Silvie Rimpelová

POLYSACHARIDY 2013 – DODATKY

DEVELOPMENT OF GROWTH MEDIUM SUITABLE FOR EXOPOLYSACCHARIDE PRODUCTION BY *BIFIBACTERIA ANIMALIS* SSP. *LACTIS*

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Complex media are commonly used in studies examining exopolysaccharide (EPS) production by *Bifidobacteria*. Quantification and structure analysis of EPS in complex medium can be complicated by interference due to EPS-equivalent (EPS-E) polymers contained in media components. This study outlines the development and validation of a broth medium suitable for EPS production by *B. animalis* ssp *lactis* free from EPS-E substances, and EPS isolation procedure.

NEW WAY OF PREPARATION OF PHOTOCROSSLINKABLE DERIVATIVES OF HYALURONIC ACID

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New derivatives from hyaluronic acid (HA) were prepared using new methodology by activation of carboxylic acid. Ester substituents, furyl or thienyl acryloyl, allow additional stabilization of material after cross-linking under UV. Mild reaction conditions without toxic reagents, simple up-scale and full biocompatibility make from these derivatives an optimal choice for cosmetic or medicinal applications, especially for nanofibers or thin film formation.

HYALURONAN BASED MATERIALS FOR BONE HEALING

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Hyaluronan (HA) is a naturally occurring glycosaminoglycan and one of the chief components of the extracellular matrix and therefore one of its promising applications is a hydrogel-based scaffolds for the field of tissue engineering. In this presentation we would like to present partial results obtained from development of material on the basis of HA hydrogels for bone healing and regeneration.

POLYSACCHARIDES FROM SEED-MUCILAGE OF HYPTIS SUAVEOLENS**ANDREA ČAVARKAPA***, RENATE LÖPPERT, SIRIPORN OKONOGLI, WERNER PRAZNIK, FRANK M. UNGER, and HELMUT VIERNSTEIN*Department of Pharmaceutical Technology and Biopharmaceutics, University of Vienna, Vienna, Austria
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Mucilage isolated from seeds of *Hyptis suaveolens* is normally very viscous, almost tasteless and odorless. The extracted alkali soluble mucilage was separated into acidic and neutral fractions, which occur in the ratio of ca. 1:1.

In order to determine their molecular weight and monosaccharide composition, they were analysed by Size Exclusion Chromatography and after hydrolysis with trifluoroacetic acid by Thin Layer Chromatography.

Further structural investigations of the both polysaccharides such as methylation analysis, NMR, HPLC are still required.

EVALUATION OF THE BAKING QUALITY OF WHEAT FLOUR MIXTURES WITH VALUABLE GENOTYPES**ONDŘEJ JIRSA^a**, KATEŘINA VACULOVÁ^a, PETR MARTINEK^a, ZDENĚK STEHNO^b, and IVANA LAKNEROVÁ^c*^a Agrotest fyto, s.r.o., Havlíčkova 2787/121, 767 01 Kroměříž, ^b Crop Research Institute, Drnovská 507, 161 06 Praha, ^c Food Research Institute Prague, Radiová 7, 108 32 Praha, Czech Republic
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The aim of the work was to evaluate the baking quality of wheat flour mixtures with valuable genotypes. These mixtures were developed especially with regard to increasing nutritional value of common wheat products. The enhancing of nutritional value of final bread product was dependent on the amount and composition of particular milling fractions of used valuable genotypes. Common retail smooth flour of standard quality and flour from winter wheat cultivar Citrus (yellow endosperm with beta-carotenoides) were used as a main components for mixture preparation. Supplemental components included whole meals of winter wheat cv. Skorpion (blue aleuron), emmer wheat (cvs. Tapioszele and Rudico) and hullless spring barley (cv. AF Lucius, breeding line KM 1057). Mixing characteristic of blends showed generally longer dough development time and dough stability. No of the blends had obviously sticky dough. Bread made from some blends resulted in rather dense crumb (especially with barley), while some other ones resulted in rather sparse crumb.

This work was financially supported by the Ministry of Agriculture of the Czech Republic (Q191B095 and RO0211).

STARCH AT SYNCHROTRON**SERGE PEREZ***Centre de Recherches sur les Macromolécules Végétales, CNRS, Grenoble, France
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Recent developments in methods and instrumentation, using X-ray synchrotron radiations, have contributed to major advances in our understanding of the fine structure of amylose and amylopectin. The structure of the starch granule slowly unravels with new insight into key structural features. The presentation will review and distinguish between those structural features that have received widespread acceptance and those that are still under debate, with the ambition of being educational and to provide stimulation for further fundamental investigation into the starch granule as a macromolecular assembly.

IDENTIFICATION OF POLYSACCHARIDES IN MEDICAMENTS AND FOOD SUPPLEMENTS**JAN PRAVDA**, ANDRIY SYNYTSYA, ROMAN BLEHA, and JANA ČOPÍKOVÁ*Department of Carbohydrates and Cereals, ICT Prague, Technická 5, 166 28 Praha 6, Czech Republic
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Polysaccharides are often part of medicaments and food supplements and perform many different functions in them. Presence of declared polysaccharides can be found by infrared spectroscopy quite simply. On the other hand, previous work has shown problem for some samples, where interference in MIR region did not allow identification of polysaccharides. The aim of this presentation is to find the reliable purifying procedure of medicaments and food supplements and then to identify declared polysaccharides by infrared spectroscopy.

Financial Support from Specific University Research (MSMT No. 20/2013).

IN SITU CROSSLINKABLE VERY LOW MOLECULAR WEIGHT CONJUGATE OF HYALURONIC ACID AND TYRAMINE

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Hyaluronan-tyramine conjugates (HA-TA) are promising materials for application in biomedicine. HA-TA is capable to undergo horseradish peroxidase (HRP) mediated crosslink reaction which leads to hydrogel formation. Recently our group developed new type of HA-TA derivative where tyramine moiety is to the polymer backbone attached via suitable aliphatic linker (HA-LIN-TA). Very low Mw (40 kDa) of this conjugate allows preparation of low viscose solutions with broad range of polymer contain (0,5–15 % (w/w)). Presence of aliphatic linker increases efficacy of crosslink reaction. In result despite of low Mw of conjugate crosslink reaction is sufficiently effective for hydrogel formation.

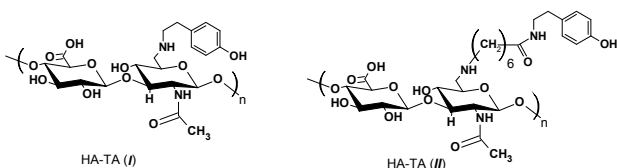


Fig. 1. Structures of compered conjugates of hyaluronic acid and tyramine

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FIBER FROM HYDROFOBIZED HYALURONIC ACID DERIVATE

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The poster summarizes results from a hydrophobized hyaluronan (HHA) fiber formation. Mechanical properties of a native HA fibers are unsatisfactory especially in wet

conditions, therefore it is advantageous to perform a chemical hydrophobization by using palmitoyl side chains. HHA fibers show unique physical-chemical, mechanical and biological characteristics. Furthermore, HHA fibers are strong enough to be textile processable.

EFFECT OF *Fusarium* INFECTION ON THE CONTENT OF SELECTED POLYSACCHARIDES IN BARLEY GRAIN

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Infection of stands by fungi of the genus *Fusarium* leads to a decrease in yield and quality of barley grain due to the presence of mycotoxins, their toxic secondary metabolites. A set of 29 cultivars and genetic resources of spring barley, grown at two locations (Kroměříž, Žabčice) in 2011–2012 in an experiment with natural infection and inoculation with *F. culmorum*, was used to study the relationship between a level of infection and the content of selected polysaccharides (starch, fibre, beta-glucans). The results revealed that the inoculation was a significant factor of variability for beta-glucans only, the content of which reduced due to an increased infection pressure. Contents of examined trichothecenes and zearalenones in grain ranged from the limit of quantification (LOQ) to 22210 $\mu\text{g kg}^{-1}$ (DON – deoxynivalenol; cv. Ricardo, inoculated variant) and were affected by both year and location. Significant negative correlations between DON-3G (deoxynivalenol-3-glucoside), DON and beta-glucan content in grain detected in groups of cultivars with covered grain, standard starch or 2-row spike were not confirmed in sets with opposite characters, *i.e.* naked caryopses, waxy starch or 6-row spikes. The results of the study correspond with the data that the differences in the level of *Fusarium* infection and mycotoxin accumulation in individual barley materials are influenced by morphological and vegetative specificities determined by the genotype rather than by differences in the content of basic components of grain.

**CLINICAL TRIALS OF β -GLUCAN:
NEW BEGINNING****VACLAV VETVICKA**

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Since glucan therapy has achieved great success in preclinical animal models, many efforts have been made to determine their therapeutic efficacy in humans. Currently, at least 20 clinical trials are running, including cancer therapy. Some of the trials are under way in the Czech Republic. Although data from most of these trials have not been released, published data suggest strong effects on immune system and cancer growth.

ISOLATION AND EVALUATION OF CHOLESTEROL LOWERING FRACTIONS FROM FRUITING BODIES OF MUSHROOMS *Pleurotus ostreatus* AND *Lentinula edodes*

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Fruiting bodies of edible mushrooms are known as a plentiful source of various bioactive compounds including proteins, phenolics, triterpenes and polysaccharides¹. These compounds, i.e. cell wall polysaccharides (β -glucans, chitins)², the main sterol (ergosterol)³, etc. are responsible of antioxidant, antimicrobial, immunomodulatory and other biological activities supporting human health. Apparently, hypocholesterolemic activity of mushrooms is reached by two different ways: (a) impairing the cholesterol absorption during digestion process or (b)

blocking cholesterol synthesis pathway. Several fungal species are able to inhibit 3-hydroxy-3-methyl-glutaryl CoA reductase (HMGCR), a key enzyme of cholesterol metabolism⁴.

This work is focused on a suitable isolation procedure to fractionate fruiting body matrix from *Pleurotus ostreatus* and *Lentinula edodes* and obtain fractions with HMGCR inhibition properties. HMGCoA reductase inhibition was successfully maintained in the *P. ostreatus* dialyzed fractions, but some problems in the enzyme assay connected with interferences were found for the fractions from *L. edodes*. FTIR spectroscopy was applied to evaluate the general composition and purity of the obtained fractions. In order to purify these fractions and thus understand the chemical nature of the inhibitor, several washing procedures were applied. The combination of used preparative methods (extraction, dialysis and washing with aqueous ethanol) was effective to remove phenolics and small molecules and thus purify remainder proteins. Several ratios of carbohydrates vs. proteins vs. phenolics were found depending on the dialysis fraction and the washing step. Mannitol was identified as one of the main low molecular fruiting body component of *L. edodes*, but not of *P. ostreatus* that is in agreement with previous studies^{5,6}.

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