were the least contaminated. Based on an AOAC Method, another ELISA kit not detecting barley was a simple tool to roughly estimate the nature of the gluten contamination, which was later confirmed by Real Time PCR for barley. About one third of the 23 faulty cereal foods appeared to be contaminated with barley but wheat would be the main contaminant in most samples.

O-80

Psychophysical markers for crispness and influence of phase behavior and structure. H. DOGAN (1), J. L. Kokini (1). (1) Rutgers University.

Crispness is the most significant and commercially important texture descriptor for cellular foods. In this study we aimed to understand the physical basis of crispness, through elucidation of the role of structure and phase behavior of the food polymer matrix. Corn extrudates were used as model solid food foams. Extrudates of a wide range of cellular characteristics were produced by varying the extrusion parameters in the ranges of 120–200°C barrel temperature; 15–25% feed moisture content, and 200 rpm screw speed using a single screw laboratory extruder (Brabender Instruments Inc.). Cross-sectional images of extrudates were analyzed using image analysis techniques to measure average cell size and cell size distribution, cell density, cell wall thickness and cell wall thickness-to cell radius ratio (t/R). Bulk and solid densities of extrudates were measured using volumetric displacement techniques. Differential scanning calorimetry was used to determine glass transition temperatures (Tg). Uniaxial compression was used for textural characterization. Jaggedness of the resulting force deformation curves was quantified using three techniques: Fractal analysis, ratio of linear distances and the average number of peaks (Np). Accurate mechanical methods were developed to count the peaks and relate them to sensory crispness. Np was found to be a good predictor for sensory crispness scores generated using psychophysical models (R^2 = 0.71). Constitutive models were developed to relate phase behavior and structure of cellular foods to Np. The effect of cellularity and phase behavior on Np was investigated by non-linear regression between Np and t/R and Aw. Np decreased exponentially both with an increase in t/R and water activity level (R^2 = 0.95). This parameter further varied systematically with phase change in extrudates characterized with the use of T-Tg.

O-81

Oat phenolics: Purification and structural elucidation of new avenanthramides from oat kernels. F. COLLINS (1), N. Fillion (1). (1) Agriculture and Agrifood Canada.

Recent interest in the role of bioactive phenolic constituents in oats has necessitated an in-depth evaluation of both their structure in planta and their physicochemical properties. Avenanthramides represent a unique component of the readily bioavailable phenolic components of oats with antiatherogenic activity. An in-depth evaluation of the major and minor components of the total soluble avenanthramide complement of oats was undertaken using novel preparative-scale group separation column chromatography, 2-D HPLC mapping and mass spectrometry to reveal a complex mixture of about 35 different avenanthramides. Group separation of the avenanthramides was carried out on aqueous ethanolic extracts of whole groats using Octyl-Sepharose CL-4B to remove interfering polar lipids. The avenanthramide fraction was then purified by batch column chromatography on Sephadex LH-20 in aqueous ethanol. In addition to the known avenanthramides containing a 5-hydroxyanthranilic acid moiety, new avenanthramides with 4-hydroxy-, 4,5-dihydroxy- and 4-methoxy-5-hydroxy-anthranilic acid moieties were found. A number of new avenanthramides containing avenalumic, 3-hydroxyavenalumic and 3-methoxyavenalumic acids were also detected. The structures and physico-chemical properties of the individual components, methods of synthesis, and biosynthetic pathways proposed for these natural products, as well as potential impact on human health will be presented.

O-82

Acoustic emission, fracture behaviour and morphology of dry cellular crispy foods. T. VAN VLIET (1), H. Luyten (1), W. Lichtendonk (1). (1) Wageningen Centre for Food Sciences, Wageningen, The Netherlands.

For many food products their crispy character is an important sensory characteristic. It is generally accepted that it is related to the fracture behaviour of the food. It requires multiple brittle fractures accompanied by acoustic emission and relatively low work of mastication. These demands set clear requirements to a product both at molecular and mesoscopic scale. The main process acting at molecular scale is the required brittle fracture accompanied by acoustic emission. This means crack growth speeds of about 300 – 400 m s^{-1}. This high speed in combination with the need for multiple fracture events and a low work of mastication sets clear requirements on the morphology of the product regarding optimum beam and pore sizes. Fracture behaviour and sound emission of toasted rusk rolls and biscuits were measured at a data sampling rate of 65000 data points per second, allowing registering the fracture of individual beams or lamellae forming the cellular structure of the crispy food. From measured properties like the occurrence of sound, the sound energy, the duration of single sound events, the minimum time interval between sound events to be heard as separate events by humans and from the required size of the force drops on fracture of a beam or lamellae it was possible to calculate morphological constraints for the cellular structure of the crispy foods. During the presentation we will present data for the minimum and maximum sizes of the pores and of the sizes of the solid material elements surrounding them for a typical dry crispy product. These sizes were found to be of the order of 50–500 micrometer.

O-83

Functional properties of modified wheat proteins and their applications for encapsulating oils. L. DAY (1), M. Xu (2), L. Sanguansri (1). (1) Food Science Australia, Werribee, VIC, Australia; (2) Institute of Land and Food Resources, Gilbert Chandler Campus, University of Melbourne, Werribee, VIC, Australia.

Wheat gluten is a valuable source of plant protein. While the insoluble nature of gluten is a desirable attribute in traditional applications of this protein in bread and baked products, its insolubility in water limits its usefulness in many other applications. Wheat gluten in modified forms (following modification by enzymes, chemicals and/or physical treatments) has attracted much attention in recent years.