Use and application of gelatin as potential biodegradable packaging materials for food products

The manufacture and potential application of biodegradable films for food application has gained increased interest as alternatives to conventional food packaging polymers due to the sustainable nature associated with their availability, broad and abundant source range, compostability, environmentally-friendly image, compatibility with foodstuffs and food application, etc. Gelatin is one such material and is a unique and popularly used hydrocolloid by the food industry today due to its inherent characteristics, thereby potentially offering a wide range of further and unique industrial applications. Gelatin from different sources have different physical and chemical properties as they contain different amino acid contents which are responsible for the varying characteristics observed upon utilization in food systems and when being utilized more specifically, in the manufacture of films. Packaging films can be successfully produced from all gelatin sources and the behaviour and characteristics of gelatin-based films can be altered through the incorporation of other food ingredients to produce composite films possessing enhanced physical and mechanical properties. This review will present the current situation with respect to gelatin usage as a packaging source material and the challenges that remain in order to move the manufacture of gelatin-based films nearer to commercial reality [Z.A. Nur Hanani*, Y.H. Roos and J.P. Kerry (Department of Food Technology, Faculty of Food Science & Technology, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia), International Journal of Biological Macromolecules, 2014, 71, 94-102].

Recovery of carotenoids from tomato processing by-products – A REVIEW

Industrial tomato processing generates large amount of low-value by-products, primarily used as livestock feed or disposed of; however, being a rich source of natural carotenoids, tomato waste can be used to produce high value-added products for food, cosmetics, or pharmaceutical applications. The objective of this review is to summarize and give an overview of the extraction methods available for the recovery of carotenoids and, especially, lycopene from tomato processing by-products. Organic solvent extraction techniques are presented and the effect of extraction conditions on carotenoids recovery is evaluated. In particular, the use of Ultrasound Assisted (UAE), Microwave Assisted (MAE), Enzyme-Assisted (EAE) and Extraction at High Pressure (HPE) for the recovery of carotenoids is assessed. Also, this review examines the efficiency of Supercritical Fluid Extraction (SFE) and in particular the effect of process parameters on carotenoid recovery from industrial tomato waste [I.F. Strati* and V. Oreopoulou (Laboratory of Food Chemistry & Technology, School of Chemical Engineering, National Technical University of Athens, 15780 Athens, Greece), Food Research International, 2014, 65 C, 311-321].

Changes in chlorophylls, chlorophyll degradation products and lutein in pistachio kernels (Pistacia vera L.) during roasting

Bright green pistachio kernels are desirable in the food industry and degradation of color is often associated with a loss in quality. Chlorophylls (a and b) and lutein are the major pigments in raw pistachios. The heat treatment of chlorophyll-containing foods results in color alteration, due to the conversion of chlorophylls (bright green color) to pheophytins and pyropheophytins (yellow-brown olive color). In
this study, changes in the concentration of chlorophylls, chlorophyll degradation products and lutein in pistachios were monitored during oven roasting. An efficient, high performance liquid chromatography method with photodiode-array detection (HPLC-PDA) was developed to separate and quantitate these pigments in pistachios. Extractable chlorophylls \(a\) and \(b\) were higher in pistachio kernels roasted for 5 and 10 min than in the raw kernels. The most drastic losses were observed with pheophytins \(a\) and \(b\), which both decreased by approximately 85% after 60 min of roasting. Pyropheophytins \(a\) and \(b\) increased significantly during roasting and were 10–12 fold higher in the pistachios roasted for 60 min than in the raw pistachios. Extractable lutein concentration increased by 37% after 5 min, but did not change significantly with longer roasting times. Initial increases in chlorophylls \(a\) and \(b\) and lutein were likely due to enhanced extractability with roasting. Color measurements of the pistachios corresponded with changes in concentration of chlorophyll pigments observed at the later roasting times. Interestingly, pyrochlorophylls \(a\) and \(b\) were detected in pistachios as confirmed by mass spectrometry. There are no prior reports of these compounds being detected in pistachios. It is hypothesized that the conditions of pistachio roasting favor the formation of pyrochlorophylls. Color changes observed after oven roasting significantly affect quality and value perceptions of pistachios [Gloria Pumilia, Morgan J. Cichon, Jessica L. Cooperstone, Daniele Giuffrida, Giacomo Dugo and Steven J. Schwartz*(Department of Food Science & Technology, The Ohio State University, 2015 Fyffe Ct., 110 Parker Food Science & Technology Building, Columbus, OH 43210, USA), Food Research International, 2014, 65 B, 193-198].

**NPARR, 6(1 & 2), 2015-36 Chemical and functional properties of the different by-products of artichoke (Cynara scolymus L.) from industrial canning processing**

In this study, the basic chemical composition and functional properties of six by-product fractions collected from different steps of artichoke industrial processing were evaluated. Fractions differed in thermal treatment, the bract position in the artichoke head and the cutting size. Contents of moisture, ash, protein, fat, dietary fibre, inulin, total phenolics, total flavonoids, caffeoyl derivatives and flavones were analysed. Antioxidant activity values were also determined. All assessed artichoke by-product fractions contained high-dietary fibre (53.6–67.0%) and low fat (2.5–3.7%). Artichoke by-product fractions contained high levels of inulin, especially in the boiled inner bracts (30%). Total phenolic and flavonoid contents and antioxidant activity (153–729 \(\mu\)mol gallic acid equivalents, 6.9–19.2 \(\mu\)mol quercetin equivalents and 85-234 \(\mu\)mol ascorbic acid equivalents per gram of dry matter, respectively) varied widely with the bract positions in the artichoke head and the thermal treatments. The more interesting fractions for use as functional ingredients were those situated closer to the artichoke heart and thermally treated [Domingo Ruiz-Cano Francisca Pérez-Llamas*, María José Frutos, Marino B. Arnao, Cristóbal Espinosa, José Ángel López-Jiménez, Julián Castillo, Salvador ZamoraFrancisca Pérez-Llamas (Physiology Department, University of Murcia, Campus Espinardo, 30100 Murcia, Spain), Food Chemistry, 2014, 160, 134-140].

**NPARR, 6(1 & 2), 2015-37 Aflatoxins in dates and dates products**

A total of 153 samples of dates and dates products (date cookies, date cake and date halva) from Punjab and Khyber Pakhtunkhwa, Pakistan were evaluated for aflatoxins (AFs) using HPLC equipped with fluorescence detection. Thirty eight out of 96 samples (39.6%) of different date varieties and 18 out of 57 (31.6%) samples of date products contained AFs. The total mean level of AFs ranged between 2.90 to 4.96 \(\mu\)g/kg and 2.76 to 4.80 \(\mu\)g/kg in dates and dates products, respectively. About 16 and 20 samples of dates were found above the permissible level for AFB\(_1\) and total AFs, respectively.
(i.e. 2 µg/kg, 4 µg/kg). Furthermore, two samples of date’s cookies and one sample of date cake were found above the level of AFB\(_1\) and total AFs and three and five samples of date halva were found above the recommended limit for AFB\(_1\) and total AFs, respectively. The high occurrence of AFs may cause health hazards and limit exports [Shahzad Zafar Iqbal*, Muhammad Rafique Asi and, S. Jinap (Food Safety Research Center (FOSREC), Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia), Food Control, 2014, 43, 163-166].

NPARR, 6(1 & 2), 2015-38 Influence of fresh date palm co-products on the ripening of a paprika added dry-cured sausage model system

Date palm co-products are a source of bioactive compounds that could be used as a new ingredient for the meat industry. An intermediate food product (IFP) from date palm co-products (5%) was incorporated into a paprika added dry-cured sausage (PADS) model system and was analysed for physicochemical parameters, lipid oxidation and sensory attributes during ripening. Addition of 5% IFP yielded a product with physicochemical properties similar to the traditional one. Instrumental colour differences were found, but were not detected visually by panellists, who also evaluated positively the sensory properties of the PADS with IFP. Therefore, the IFP from date palm co-products could be used as a natural ingredient in the formulation of PADS [Ana María Martín-Sánchez, Gelmy Ciro-Gómez, José Vilella-Esplá, Jamel Ben-Abda, José Ángel Pérez-Álvarez* and Estrella Sayas-Barberá (IPOA Research Group, Grupo 1-UMH Grupo REVIV, Generalitat Valenciana, AgroFood Technology Department, Orihuela Polytechnical High School, Miguel Hernández University, Ctra. Beniel, Km 3.2, E-03312 Orihuela, Alicante, Spain), Meat Science, 2014, 97(2), 130-136].

NPARR, 6(1 & 2), 2015-39 Foeniculum vulgare Mill. as natural conservation enhancer and health promoter by incorporation in cottage cheese

Food industry is focused on the development of novel functional foods containing health promoting natural ingredients, avoiding the potential harm of synthetic food additives. In the present work, the antioxidant and antimicrobial potential of Foeniculum vulgare Mill. (fennel) decoction (phenolic-enriched extract) was evaluated; after chemical characterization of the extract by HPLC-DAD-ESI/MS, it was used as natural ingredient in cottage cheese samples for two purposes: increase shelf life and bring bioactive properties. The incorporation of fennel-based ingredients did not alter significantly the nutritional characteristics of control cottage cheese (without fennel-based ingredients), but avoided the increase in yellowness (after 7 days of storage), and the decrease in lactose content (after 14 days of storage) observed in control samples. Control samples after 14 days of storage, were the only ones showing signs of degradation. Furthermore, the incorporation of the fennel decoction improved the antioxidant properties of cottage cheese, up to 14 days of storage. Overall, fennel decoction can be used as a natural conservation enhancer in cottage cheese, while bringing antioxidant properties to the final product [Cristina Caleja, Lillian Barros, Amilcar L. Antonio, Ana Ciric, Marina Soković, M. Beatriz P.P. Oliveira, Celestino Santos-Buelga, Isabel C.F.R. Ferreira* (Mountain Research Centre (CIMO), ESA, Polytechnic Institute of Bragança, Campus de Santa Apolónia, 1172, 5301-855 Bragança, Portugal), Journal of Functional Foods, 2015, 12, 428-438].