OILS/FATS (incl. Edible oils, Butter) NPARR 2(1), 2011-068, Freshwater algae as potential source of polyunsaturated fatty acids: Review

Polyunsaturated fatty acids form an elite class of food constituents that exhibit large spectrum of crucial functions in biological systems. Investigations over the past two decades have revealed their roles and those of their eicosanoid metabolites, and have highlighted their homeostatic functions in mammals. A growing interest in the nutritional and pharmaceutical importance of polyunsaturated fatty acids (PUFAs) has created an increasing demand for purified PUFAs. As the traditional sources are inadequate for fulfilling this demand, alternative sources are being sought. Algae are a great source of highly valuable products and they are considered as potential alternative for the large scale production of PUFAs. Various investigations have been actively carried out for screening of potential microalgal strains and development of feasible culture techniques for the commercial production of these vital compounds. In this review, we provide the combined information from various reports on freshwater algae as source of important PUFAs. This review recommends the freshwater algae over marine algae as an uncontaminated source of PUFAs [Rahul A. Bhosale and B. B. Chaugule (Institute of Bioinformatics and Biotechnology, University of Pune, India), International Journal of Algae, 2010, 12(4), 335-356]

NPARR 2(1), 2011-069, Extraction of canola seed (Brassica napus) oil using compressed propane and supercritical carbon dioxide

This study aimed to investigate the extraction of canola seed (Brassica napus) oil using supercritical carbon dioxide and compressed propane as solvents. The extractions were performed in a laboratory scale unit at temperatures and pressures of 40, 50 and 60 °C and 20, 22.5 and 25 MPa for carbon dioxide and 30, 45 and 60 °C and 8, 10 and 12 MPa for propane extractions, respectively. The results indicated that pressure and temperature were important variables for the CO₂ extraction, while temperature is the most important variable for the extraction yield with propane. The extraction with propane was much faster than that with carbon dioxide. The characteristics of the extracted oil, that is, the oxidative stability determined by DSC and the chemical profile of fatty acids determined by gas chromatography, were similar for the two solvents. The overall extraction curves were well described by the Sovová model [Márcia Mantovani Pedersssetti, Fernando Palú, Edson Antonio da Silva*, Jurandir Hillmann Rohling, Lúcio Cardozo-Filho and Cláudio Dariva (Universidade Estadual do Oeste do Paraná, UNIOESTE, Rua da Faculdade, 645, 85903-000 Toledo, Paraná, Brazil), Journal of Food Engineering, 2011, 102(2), 189-196].

NPARR 2(1), 2011-070, Nanofiltration process for the nutritional enrichment and refining of rice bran oil

Crude rice bran is a natural source of γ oryzanol, a nutritionally valuable phytochemical with antioxidant properties. In the present paper the refining and γ oryzanol enrichment of rice bran oil was investigated through solvent extraction optimization and nanofiltration processing. Several solvent resistant nanofiltration membranes were screened and successfully applied in a two step membrane cascade with fluxes between 39 and 53 L m⁻² h⁻¹. A first membrane stage operation provided the separation between glycerides and γ oryzanol, promoting the oil enrichment in this phytochemical. In the second membrane stage the oil could be refined to acceptable consumption levels (FFA<0.20 wt.%) and its γ oryzanol content was further enhanced. Overall, the integrated process provided a RBO γ oryzanol enrichment from 0.95 to 4.1 wt.% in oil, which corresponded to more than a two fold increase in the oil’s antioxidant capacity. These results demonstrate the potential of organic solvent nanofiltration as a technology to enrich and refine oil based products [I. Sereewatthanawut, I.I.R. Baptista, A.T. Boam, A. Hodgson and A.G. Livingston*(Dept of Chemical Engineering and Chemical Technology, Imperial College London, Exhibition Road, London SW7 2AZ, United Kingdom), Journal of Food Engineering, 2011, 102(1), 16-24].

NPARR 2(1), 2011-071, Characteristics, chemical composition and utilisation of Albizia julibrissin seed oil
The physicochemical characteristics, fatty acid and triacylglycerol compositions, DSC profile and UV/vis spectrum of oil extracted from *Albizia julibrissin* seeds were determined in this study. The oil content and the moisture of the seeds were 10.50\% and 1.56\%. The free fatty acid, the peroxide value, the p-anisidine value, the saponification value, the iodine value were 2.54\%, 6.61 mequiv. O$_2$/kg of oil, 1.98, 190.63 (mg KOH/g) and 111.33 (g/100g of oil), respectively. The specific extinction coefficients $K_{232}$, $K_{268}$ were 7.55 and 0.96, respectively. Linoleic acid (C$_{18:2}$; 58.58\%), palmitic acid (C$_{16}$, 13.86\%) and oleic acid (C$_{18:1}$, 10.47\%) were the dominant fatty acids in the *A. julibrissin* seed oil. LLL (36.87\%), OLL (21.62\%), PLL (16.69\%) and PLO + SLL (8.59\%) were the abundant triacylglycerol representing $>83\%$ of the seed oil (L: linoleic, O: oleic, P: palmitic, S: stearic). The DSC melting curves reveal that: melting point = $-14.70^\circ$ C and melting enthalpy = 54.34 J/g. *A. julibrissin* seed oil showed some absorbance in the UV-B and UV-C ranges. The results of the present analytical study show that *A. julibrissin* is a promising oilseed crop, which can be used for making soap, hair shampoo and UV protectors. Furthermore, the high level of unsaturated fatty acids makes it desirable in terms of nutrition [I. Nehdi*(King Saud University, College of Science, Chemistry Department, Riyadh 1145, Saudi Arabia), *Industrial Crops and Products*, 2011, 33(1), 30-34].

**NPARR 2(1), 2011-072, Utilisation of red palm olein in formulating functional chocolate spread**

Novel functional chocolate spreads were formulated by replacing butter fat in conventional chocolate spread by red palm olein at 20\%, 40\%, 60\%, 80\% and 100\% levels. Sensory evaluation revealed that chocolate spread made from 20\% red palm olein (RPOL) and 80\% butter fat was accepted as the conventional chocolate spread (100\% butter fat). Hence, the former two chocolate spreads were selected for further study. Samples were stored at room temperature and fridge for 6 months and monitored for their physical properties, fat stability, fatty acid composition and natural antioxidants.

The data revealed that the replacement of butter fat in functional chocolate spread led to a significant increment in tocopherols and tocotrienols (3.7 folds) and carotenes (19.8 folds), as compared to the control. The functional chocolate spreads could be stored at room temperature for 6 months without any deteriorative effects on their quality [Nesma N.M. El-Hadad, Mohammed M. Youssef*, Mohammed H. Abd El-Aal and Hani H. Abou-Gharbia (Food Science and Technology Department, Faculty of Agriculture, Alexandria University, 21545 El-Shatby, Alexandria, Egypt), *Food Chemistry*, 2011, 124(1), 285-290].