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Section

Food Process Engineering

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Section Information

This Section of the journal *Processes* focuses on all aspects of food processes, including on experimental, theoretical, and computational research in this area. The aim is to publish research that will enhance knowledge about chemical and biochemical reaction processes, mass transfer, separation, purification and fragmentation processes, heat transfer systems, mixing and fluid processes, integrated process design and scale-up, process modeling, optimization, simulation and control, all of which are topics that may be linked to food processes. Food quality aspects and energy saving in food processing are also of interest, as well as those related to the use of agro-food industry waste. All manuscripts submitted for publication under this section will undergo the high-quality peer review process of the *Processes* journal and, if accepted, will be published rapidly online.

Keywords: Cereal processing; Meat processing; Fruit and vegetable processing; Processes in beverage production; Thermal method of food preservation and processing; Sustainable food processing; Minimal food processing; Emerging food technologies; Food quality; Energy saving in food processing; Use of food waste; Minimally-processed food; Processed food and health.

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Featured Papers

DOI:10.3390/met12010122

Phytosterol, Tocopherol and Carotenoid Retention during Commercial Processing of *Brassica napus* (Canola) Oil

Authors: Clare L. Flakelar, Randy Adjonu, Gregory Doran, Julia A. Howitt, David J. Luckett and Paul D. Prenzler

Abstract: *Brassica napus* (canola) seed is a rich source of phytosterols, tocopherols and carotenoids, which all have recognized health benefits, although these are reduced or lost during crude oil refinement. Many studies are now outdated, so new research to monitor bioactive retention through current processing techniques is warranted. In this work, canola seed, in-process seed, and oil samples were collected from the major stages of five commercial canola oil processes. Analysis of phytosterols, tocopherols and carotenoids indicated seed pre-treatment enhanced bioactive concentrations in the crude oil. Although the bleaching step in each process eliminated all carotenoids, high concentrations of phytosterols and tocopherols remained in the refined oil across all processes, with losses notably lower than those found in previous reports. Moreover, crude oil samples from a two-stage cold pressing process showed greatly enriched concentrations of tocopherols (+122%), sterols (+140%) and carotenoids (+217%). The results show that modern Australian canola oil processing retains high phytosterol and tocopherol concentrations and warrants further investigation into bioactive enrichment strategies. Given the growing interest in health-enhanced foods, this study provides opportunities for nutrition and health-enhanced oil products and the potential for adding value in the edible oil industry.

DOI:10.3390/pr10010119

An Overview of Molecular Dynamics Simulation for Food Products and Processes

Authors: Andrea Smith, Xin Dong and Vijaya Raghavan

Abstract: Molecular dynamics (MD) simulation is a particularly useful technique in food processing. Normally, food processing techniques can be optimized to favor the creation of higher-quality, safer, more functional, and more nutritionally valuable food products. Modeling food processes through the application of MD simulations, namely, the Groningen Machine for Chemical Simulations (GROMACS) software package, is helpful in achieving a better understanding of the structural changes occurring at the molecular level to the biomolecules present in food products during processing. MD simulations can be applied to define the optimal processing conditions required for a given food product to achieve a desired function or state. This review presents the development history of MD simulations, provides an in-depth explanation of the concept and mechanisms employed through the running of a GROMACS simulation, and outlines certain recent applications of GROMACS MD simulations in the food industry for the modeling of proteins in food products, including peanuts, hazelnuts, cow's milk, soybeans, egg whites, PSE chicken breast, and kiwifruit.