Book reviews


I find this book to be very comprehensive and informative. It has taken in the practical sides with proper theoretical references. The pictorial illustrations are good.

The chapters are pertinent to the snack food industry. This is an excellent reference book for food science and food engineering programs at the university level.

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This volume on protein-based films and coatings provides a comprehensive overview of the products, design, process technology, and applications of biopolymer-derived films and coatings. Expert contributors provide thorough reviews of related interdisciplinary research, design, and applications. It discusses the most up-to-date and detailed information available on high-volume plant and animal protein-based biopolymer edible and inedible films and coatings.

The volume contains 26 chapters with detailed information on the topic and ample references. In most cases, the chapters provide concise and comprehensive information including chemical, physical, and application properties. Both widely commercialized and envisioned applications are discussed, including hard and soft capsules, collagen casings, and microcapsules.

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The world of nutrition research currently is undergoing a paradigm shift from an avoidance perspective to one of inclusion. In other words, the field’s hottest topics are now no longer those that focus on which foods to consume less of, which will cause cancer or a heart attack, or which will damage your developing baby. Rather, the hottest topics in nutrition research today are those showing the benefits of components found in our food supply and directing dietary recommendations toward foods with health benefits to prevent heart attacks or cancer or enhance the growth of a developing baby.

Similarly, dietary guidelines are being considered that do not simply focus on avoiding a nutrient deficiency but instead focus on optimizing intake of nutrients for improved health and performance. Thus, many compounds (most of which are found in plants) have received tremendous interest from researchers and the public alike. These compounds have been categorized generally as “phyto” or “plant” chemicals. Although the field of phytochemicals provides vast opportunity for researchers and the food industry, questions remain about these compounds. These include:

- Where/how are these phytochemicals found?
- How are they extracted and used, or do they appear in foods naturally?
- How are they delivered in foods and at what levels?
- What is the evidence that their consumption results in health benefits?

In response to this shift in the focus of nutrition research and to these important questions, CRC Press has published Phytochemicals in Nutrition and Health. This 12-chapter review includes discussions of the botanical origins of phytochemicals through to their clinical use in therapy, providing a comprehensive review of the most notable phytochemicals being researched today. A selection of the topics reviewed includes phytochemicals in berries, wine, soy, oilseeds, and other plants, as well as bioengineering and pharmacokinetics.

Most chapters provide a depth of information, often including the botanical derivation of the substance, the history of the nutrient (as an intrinsic component of its parent food) in traditional usages, and anecdotal associations between the food/nutrient and health benefits in animal and human research trials. Other chapters provide more of a taxonomy of the various phytochemicals found in a specific food or food categories, or consider a question that encompasses a broader range of phytochemicals. Each chapter, however, presents data that are cutting edge and thorough and that are easily read.

I would recommend this book for researchers, educators, and dietitians interested in functional foods and preventive health. Others involved in food formulation and product development in the food industry would also benefit from having this book on their reference shelf.

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Extracts & Distillates

Detection of adulteration of oils


Fourier transform infrared spectroscopy was used to detect the adulteration of hazelnut oil with different oils and to detect
the adulteration of extra virgin olive oil with hazelnut oil. Oil spectra were collected with an FT-IR instrument equipped with a ZnSe-ATR accessory and an MCTA detector. Discriminant analysis and partial least squares analysis were used to analyze the data. The detection level for sunflower seed oil adulteration of hazelnut oil was 2%. Adulteration of virgin olive oil with hazelnut oil could be detected at levels of 25% and higher.

Gas chromatographic identification of fatty acids

The proposed method for gas chromatographic identification of fatty acids in complex mixtures is based on a mathematical approach using regression curves obtained by plotting the relative retention times of fatty acid methyl esters (FAME) analyzed in isothermal and gradient temperature conditions. Use of the method permitted the identification in human milk of 64 fatty acids, including branched-chain acids and other fatty acids for which reference standards were not readily available. Confirmation of most of the components was made by mass spectrometry. The relative residuals and the relative differences between estimated and measured relative retention times of individual FAME varied from 0.03 to 3.15% and from 0.0 to 2.9%, respectively.

TAG structure of animal tallow

Triacylglycerol (TAG) compositions were obtained by reversed-phase high-performance liquid chromatography (RP-HPLC) coupled with atmospheric pressure chemical ionization mass spectrometry (APCI-MS) of lard and mutton tallow fractions under consideration for food formulation products. Comparison of the data was made with fatty acid composition analysis of the TAG made by gas chromatography. The average absolute errors with respect to TAG quantification and identification were less than 1%. Concentrations of TAG species with various unsaturated (U) and saturated (S) fatty acids as UUU, UUS, USS, and SSS can be determined accurately from RP-HPLC/APCI-MS of the actual TAG species.

Immobilization of lipase
Agarose, alginate, and chitosan were evaluated for the immobilization by entrapment of Candida rugosa lipase in terms of enzyme loading, leaching, and activity. Agarose beads exhibited undesirable swelling in the leaching and activity medium. Alginate or chitosan beads were prepared by ionic gelation using calcium chloride or sodium tripolyphosphate, respectively, as the cross-linking agent in the gelling solution. Alginate beads were found to leach substantially more enzyme than did chitosan beads. Entrapment efficiencies were comparable for different levels of both chitosan and alginate (43–50%). The higher lipase activity determined with chitosan beads compared with that of alginate beads was attributed to lower possible polymer–enzyme interaction. The conclusion was that chitosan is a polymer worthy of pursuit for the immobilization of lipase.

**Detection of 4-HNE**


A gas chromatographic–mass spectrometric method suitable for clinical requirements has been developed for the detection of 4-hydroxynonenal (4-HNE). A satisfactory internal standard is 4-hydroxybenzaldehyde. Minimal sample size is 50 μL of plasma. Samples with 4-HNE concentrations close to physiological levels were found to be stable over 22 months when stored at −80°C. 4-HNE is a major aldehydic product of lipid peroxidation in the tissues, and its measurement is a useful indicator for oxidative stress in vivo.

**Study of free radicals**


The radical species formed during horseradish peroxidase/H2O2-initiated low-density lipoprotein (LDL) oxidation was studied using direct electron paramagnetic resonance (EPR) spectroscopy and spin trapping techniques. Evidence was obtained for the formation of the α-tocopheroxyl radical and for a protein radical(s) assigned to a tyrosyl radical(s) of apolipoprotein B-100. Results support the hypothesis that radicals are initiators of the oxidative process and show that their formation is an early event in peroxidase-mediated oxidation. Resveratrol, a red wine polyphenolic antioxidant, could accelerate α-tocopherol consumption, conjugated diene formation, and the decay kinetics of LDL-centered radicals.

**Regulation of vitamin E status**


A metabolic pathway for tissue tocopherol has been found to involve cytochrome P450-mediated α-hydroxylation of the tocopherol phytol side chain followed by the stepwise removal of two- or three-carbon moieties, ultimately yielding the 3′-carboxybenzoxamic acid metabolite for excretion in the urine. All key intermediates of γ-tocopherol metabolism by this pathway have been identified in hepatocyte cultures using gas chromatography–mass spectrometry. Tocopherol α-hydroxylase showed similar binding affinities but markedly higher catalytic activities for γ-tocopherol than α-tocopherol, suggesting a pathway that would allow physiological retention of α-tocopherol and elimination of γ-tocopherol. Dietary sesamin can produce elevated tocopherol levels and potently inhibits tocopherol α-hydroxylase, suggesting a functionally significant means of regulating vitamin E status.

**Inhibition of stearoyl-CoA desaturase activity**


Treatment of human breast cancer cells with the cis-9,trans-11 and trans-10,cis-12 conjugated linoleic acid (CLA) isomers did not suppress stearoyl-CoA desaturase (SCD) mRNA in two different lines. Both CLA isomers significantly decreased SCD protein levels and SCD activity in one of the lines. In the MDA-MB-231 cells the cis-9,trans-11 and trans-10,cis-12 CLA isomers regulate human SCD by reducing SCD protein levels, whereas in MCF-7 cells both isomers show a direct inhibitory effect on SCD enzyme activity. SCD is regarded as a key enzyme in fatty acid and fat metabolism in the body.

**Regulation of COX-2 Enzyme**


Cyclooxygenase (COX)-2 mRNA and protein levels and prostaglandin (PG) E2 production in normal endometrial stromal cells (ESC) were significantly increased in malignant endometrial epithelial cell conditioned medium (MECM). COX-2 mRNA stability was increased significantly in MECM. PGE2 was one of the major factors in MECM responsible for up-regulating COX-2 expression in ESC. Malignant endometrial epithelial cells secrete PGE2 that induces COX-2 expression in ESC in a paracrine fashion through activation of transcription.
and stabilization of COX-2 mRNA. A link between cancer of the uterus and the COX-2 enzyme is proposed, suggesting that blockage of the enzyme might provide treatment for uterine cancer in combination with other therapies.

**Elevated palmitate of soybeans**


Attempts have been made to develop soybean cultivars with 400 g/kg palmitate in the seed oil that would have agronomic and seed traits comparable to cultivars with less palmitate. Comparisons were made in replicated tests at three locations in Iowa between 27 random lines with ca. 400 g/kg palmitate (400P lines) and 27 lines with ca. 260 g/kg (260P lines). Mean seed yields adjusted for plant density by co-variate analysis averaged 814 g/kg less for the 400P lines than the 260P lines. The 400P lines had smaller seed size, greater protein, and lower oil contents accompanied by lower oleate and linoleate levels than the 260P lines. It was considered unlikely that soybean cultivars with 400 g/kg palmitate could be developed with seed yield and oil content comparable to cultivars with less palmitate using the available mutant alleles.

**New books**

