



Book reviews

Functional Molecular Gels (RSC Soft Matter Series No. 1), B. Escuder, J.F. Miravet (Eds.). Royal Society of Chemistry, Cambridge, UK (2014). xi + 319 pp., £149.99, ISBN: 978-1-84973-665-7

There is considerable interest in molecular gels, defined as gels formed by low-molecular weight compounds, due to their potential use in many diverse areas, such as in biomedical and materials science applications. The challenges involve the design of functional molecular gelation agents (gelators) that confer specific function(s) to the resultant supramolecular material, and can result in the emergence of new supramolecular properties as a direct consequence of the self-assembly process.

This volume, comprising eight chapters, details the latest research on molecular gels from the fundamentals of their formation to their uses in a broad range of applications. The volume begins with two chapters that deal with the key concepts of designing molecular gelators and techniques for the characterisation of molecular gels, followed by two chapters that discuss different stimuli-responsive systems, namely those responsive to physical and chemical stimuli, and those responsive to enzymes.

The remainder of the volume (four chapters) then focus upon particular areas of application. The first of these covers molecular recognition, reactivity and catalysis, whilst the second deals with biomedical applications. Specific topics in this chapter include the use of molecular gels for extracellular matrix (ECM) mimics, drug delivery, tissue engineering and regenerative medicine, and for three-dimensional cell cultures. The penultimate chapter discusses the optic and electronic applications of molecular gels, covering aerogels and xerogels, isotropic and anisotropic gels, birefringence, liquid-crystalline gels, fluorescent gels and electrical conductors. The final chapter details the use of molecular gels as templates for nanostructured materials, such as inorganic nanomaterials, metal nanoparticles, carbon nanotubes and graphene-based gel-nanocomposites.

In conclusion, this informative volume, written by active researchers, provides an insight into the possibilities that molecular gels offer for those both new to, and already established in, such diverse and rapidly expanding application areas.

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Available online 15 March 2014

<http://dx.doi.org/10.1016/j.carbpol.2014.02.066>

Biotechnology in Agriculture and Food Processing – Opportunities and Challenges, Parmjit S. Panesar, Satwinder S. Marwaha (Eds.). CRC Press/Taylor & Francis, Boca Raton, FL, USA (2014). (xvi+621 pp., £127.00, ISBN: 978-1-4398-8836-0)

Agriculture and food processing are integrated disciplines and biotechnology has played a significant role in both areas for many years. Biotechnological processes have helped to boost the yield of agricultural crops and have also assisted in the generation of novel varieties. Such activities are an essential part of the ongoing battle to overcome worldwide problems of hunger and malnutrition faced by an ever-increasing population. Biotechnological techniques in food processing are beneficial with respect to improvement of existing processes and development of new processes and products.

This volume is divided into four parts, the first of which explains the fundamental concepts of the role of biotechnology and genomics in agriculture and food processing. The second part focuses upon specific applications of biotechnology in agriculture, covering plant cell and tissue culture techniques and genetic transformation for crop improvement, and the production of biofertilisers and biopesticides. The third part details biotechnological aspects in food processing, covering the production of fermented foods, functional foods, polysaccharides, sweeteners, biocolours, bioflavours, the use of enzymes in food processing, and GM foods. Carbohydrate-based prebiotics covered include lactosucrose, isomalto-, xylo-, gluco-, fructo-, galacto- and soybean oligosaccharides, inulin and resistant starch. Polysaccharides of interest include xanthan, gellan, hyaluronic acid, xylinan, dextran, scleroglucan and schizophyllan. The final part examines management of crop residues and agro-industry by-products, specifically dealing with mushroom production and value addition to wastes and residues. Wastes from the fruit and vegetable, dairy processing, sugar, brewing, wine, distillery, meat and poultry processing, seafood, coffee, and olive oil, industries are included, along with information on the production of single-cell proteins, baker's yeast, a wide range of organic acids, biofuels, enzymes, polysaccharides, pigments, flavours, surfactants, bacteriocins, vitamins, amino acids and antibiotics.