

PREFACE

The class of oligosaccharides possessing biological activities is important to human health. The awareness and the adequacy of the diet are necessary to ensure that all the benefits of these bioactive carbohydrates are present. Oligosaccharides present unique physicochemical and biological properties that can be exploited commercially for specific applications in foods, cosmetics and pharmacology. Advances in technology used in the production of these carbohydrate oligomers are necessary for their development and inclusion, as functional products in foods (nutriceuticals), or for therapeutic applications as medicinals. Oligosaccharides can be produced through a number of different methods (physical, chemical and enzymatic catalysed reactions) from their parent polysaccharides or glycoconjugates, as well as through specific chemical synthesis and enzyme-catalysed transglycosylation reactions. More recently, solid-phase synthesis has allowed the synthesis of complex carbohydrate sugar chains at scaled-up levels of preparation. The use of enzymes in preference to physical and chemical processes in obtaining oligosaccharides has become an attractive approach through the advent of biomolecular protein engineering technology. This has resulted in new *mutant* enzymes as biocatalysts for the synthesis of complex oligosaccharides. This book presents an overview on different pathways leading to the production of bioactive oligosaccharides for biotechnological applications. Mostly, these carbohydrate oligomers constitute a nutritional source of “*fiber*” (prebiotic) that is beneficial to bacterial growth in the lower distal part of the human intestinal tract promoting health, and general well-being. Oligosaccharides, like some of their polysaccharide counterparts, can induce innate immune responses, and this unique property has led to potential applications for their commercialization as immunoceuticals.