

Handbook of Dietary Fiber. Edited by Susan Sungsoo Choo and Mark L. Dreher. New York: Marcel Dekker Inc. 2001. £158/€255. ISBN 0-8247-8960-1

Do not be put off by the title of this book. Here are 868 pages comprising forty-five very well referenced chapters about the polysaccharides that we might find in our diet, their diverse range of physical properties, functional uses and even some physiological effects that we should not ignore. But first, we should dispose of the idea that fibre is definable, measurable in its entirety or, most importantly, offers protection against a range of chronic diseases. Although we are told early on that there are five food-labelling health claims allowed for fibre in the USA, a cursory glance at these immediately tells us that these claims relate to foods or groups of foods. That is the context to keep in mind when reading the first twelve chapters, which are about fibre and health. A healthy diet comprises one low in fat and high in fruits, vegetables and wholegrain cereals. End of story – well not quite.

In Chapter 2, Marlett, who has worked in this area for many years, states that: 'Fiber is the grandparent of the current wave of interest in functional foods and food components' and that to prevent cardiovascular disease other components of the diet are equally important. Both of these concepts are important dimensions to the fibre story, namely, that fibre is the progenitor of much of today's interest in dietary carbohydrate and that fibre is only one component of our diet, which in turn is only one aspect of our lifestyle that contributes to health. Unpicking these complex interactions is not easy.

Equally significant, early in the book Slavin remarks that there are few reliable values for the fibre contents of foods in the literature and thus any epidemiological relationships described are difficult to interpret. It is a pity that not all of the other authors have not taken this on board. In a long chapter on breast cancer, Cho of the Kellogg Company and co-editor of the book with Dreher from Mead Johnson Nutritionals tries to make a case for fibre being protective despite only one out of ten prospective studies showing such an effect and both the World Cancer Research Fund and the UK Department of Health having described any links as either just 'possible' or 'inconsistent'. There seems to be special pleading both here and in Cho's later chapters on the health effects of bran and psyllium. That aside, the summaries of fibre and prostatic disease and diabetes both take a more realistic view: 'Nutritional therapy for type 2 diabetes need not focus particular attention on the dietary fiber content of the diet beyond that recommended for the general population'.

Getting more towards the essence of this book, Bird and Topping, reviewing resistant starch, separate complex carbohydrates into clearly defined groups including NSP and various fractions of starch. Suddenly it is possible to start putting fibre in its proper context as one of many classes of dietary carbohydrate that can be measured and which has overlapping physical and physiological properties. The relationship between chemistry and digestion is well drawn and the section dealing with the failure of resistant starch to protect against colorectal cancer in animal models is balanced and fair.

A recurring theme throughout the book is the division of fibre and other dietary polysaccharides into soluble and insoluble. The notion that this categorisation relates to supposed health effects of foods is false and the ammunition to dispose of it is well described in the book. For example, we learn that depending on methodology, mainly the pH at which extractions are done, the soluble fraction of dietary fibre can be anything from 15 to 50% of the total fibre in a food. Oakenfull, in describing the physico-chemical properties of fibre, says that: 'solubility is a vague concept and in this context not well defined'. He also points out that the properties of the material one might want to call fibre change as it passes through the gut. This is not to say that solubility is not a useful functional yardstick for polysaccharides, but we have not reached that part of the book yet.

An unusual chapter on carcinogen adsorption by cell wall material by Ferguson includes some new results and is followed by two on the effects of fibre and mineral absorption. This latter is not a problem but the fibre fraternity seem unduly sensitive about it. Harland rightly says that it is difficult to predict mineral bioavailability for mixed diets. This must be especially true for individual foods in the diet.

After physico-chemical properties comes a section entitled 'Chemistry and analysis'. Mercifully there is no chapter on fibre analysis. Instead the book really starts to justify itself with an update by Selvendran on plant cell wall chemistry. There is an excellent technical review of HPLC techniques for dietary carbohydrate by Henshall in which Englyst's and Garleb's methodologies are offered as an 'attractive alternative to GLC'. A chapter by Saura-Calixto and Bravo on polyphenols, whilst somewhat tangential to the main theme of the book, is nevertheless a very useful summary of their chemistry. Here, we learn that there are over 8000 known structures with diverse properties. These are measured as insoluble dietary fibre in some methods, but this fact is a diversion from their real interest in nutrition. Best of all in this section is a comprehensive, informative and critical review of lignin by Mongeau. It includes the most seminal table in the whole book in which the fibre and lignin content of a wide range of foods is given. The footnote references more than twenty-five different methods, an apt riposte to anyone who thinks they can define or measure dietary fibre. Despite the problems with lignin methodology that Mongeau describes, we learn that intakes are 1.6–2.0 g/d and that it is important in ruminant animal nutrition.

The real core of this book is the section on functional uses and ingredients especially chapters 23 (food uses) and 26–37. These latter all follow a similar pattern and describe the production, composition, physical and chemical properties, health effects and food applications of fibre sources, e.g. oat fibre, barley, rice bran, pectin, food polysaccharides, guar, alginate, gum arabic, gellan and curdlan. Skip the health stuff, it is mostly about lipids and glycaemic response and, as such, the effects are reported with suitable circumspection. Otherwise this section contains a mine of information with detailed data on everything from geography of production to gel formation. We learn that gum arabic is so called because of the port of origin

in Arabia from which it was originally exported and curdlan, an unbranched β -1,3 glucan of bacterial origin, gets its name because it curdles in hot water. Ellis' chapter on guar is a model of clarity and breadth. The word fibre hardly appears, but a degree in food technology would help the reader to get the best out of it.

The book finishes with eight chapters where the authors make a brave attempt to set down intakes of dietary fibre. Given all that has gone before, it is clear that such a task is impossible and the authors mostly acknowledge the difficulty of obtaining reliable data. Nevertheless, there are useful, and some new, data on food intakes in children and in Spain, Israel, China, Poland, Chile, Mexico and Brazil.

The book contains three chapters on non-digestible oligosaccharides. They are somewhat out of place in a book entitled '*Handbook of Dietary Fiber*' but richly deserve a place in any consideration of dietary carbohydrate. The ability of some oligosaccharides to selectively stimulate growth of large bowel bifidobacteria and lactobacilli (prebiotic effects) is one of the most remarkable discoveries about dietary carbohydrate in recent years. Together with the possibility that some oligosaccharides

may increase Ca absorption and even effect immune function, this creates a broader dimension for our understanding of carbohydrates.

This book should be entitled '*Dietary Polysaccharides*'. It is essential reading for food technologists and anyone working in the food industry. In this context, fibre has found a place. Here we have a book about food ingredients. Not something that will prevent the world's diseases, but various groups of carbohydrates with diverse physical, chemical and functional properties. If you want to learn about a particular polysaccharides, then this is the place to start. As for fibre, let us give it due respect. It did lead us into something of great importance to nutrition. The previously neglected dietary carbohydrates. We know from this book that they can be described and measured successfully. The FAO report of dietary carbohydrates provides a framework for their classification. Maybe now we can get some joined up epidemiology and physiology that will start to tell us their role in health.

John Cummings

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