CRC
HANDBOOK OF

Dietary Fiber in Human Nutrition

2nd Edition

Edited by
GENE A. SPILLER

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DEDICATION

To Hugh Trowell (1904–1989), who with Dennis Burkitt pioneered a new understanding of the role of plant fibers in human health. He has been to me a teacher of science, medicine, and humility. He should be remembered not only as a pioneer in medicine, but for his selfless and total dedication to the prevention of disease and human suffering.

PREFACE TO THE FIRST EDITION

The *CRC Handbook of Dietary Fiber in Human Nutrition* is proof of the amazing growth in the study of dietary fiber during the 1970s and 1980s. When I first edited a book on dietary fiber, *Fiber in Human Nutrition,* in the mid-1970s, I was happy to find at least a few good investigators who could contribute chapters to it. It would have been impossible to find a large number of scientists that could have made a major contribution to that early book.

However, as work was beginning on this Handbook in 1982 and I was presenting the design at the Symposium on Fiber in Human and Animal Nutrition in New Zealand that year, not only was I able to find all the 50-plus authors I needed, but I had the sad task of omitting some outstanding names.

Interest in what used to be the disregarded cinderella nutrient of the early 20th century has grown at a rate greater than almost any other nutrient. The plant cell wall and the gums and mucilages had found their well-deserved niche in nutrition and medicine.

Even though few people still believe that dietary fiber has not found the *ultimate* proof that makes it a required nutrient, the momentum is with the ones who have found valid uses for it in high fiber foods in treating diseases such as type II diabetes. The momentum is also with the epidemiologists who have found correlations with lower incidence of colorectal cancer, the ones that have found in high fiber foods one of the best ways to prevent excessive fat and food intake. It is a list that can go on and on.

Has the ultimate study on the long range effects of dietary fiber been published? Of course not. It is probably impossible to carry out the ultimate study on the correlation of nutrition to chronic diseases under present conditions: we must accept the pieces of evidence derived from good epidemiology, from controlled human studies and, of course, animal studies. The lifetimes of many of us would be needed to satisfy the purists who hope for the ultimate study, in this or any other field in which we deal with the lifetime of a human being.

There is more to complicate things: dietary fiber polymers are quite elusive, unlike vitamins that can be isolated or synthesized readily. Some of these polymers may change when torn apart from their complex structure in the cell wall. Thus, when we attempt to extract them, too often we isolate something quite different from the original material, perhaps useful, but most certainly different. This bothers many scientists who would like to use the pure form of nutrients for their investigations. There is more: dietary fiber is so interactive that other components of the diet probably vary its effect on humans. All this makes dietary fiber research so challenging and so difficult!

This book is proof that there are many dedicated scientists and clinicians that have given their best efforts to dietary fiber. There are many who could not be included here, as there is a point in an effort of this kind at which the editor must sadly stop asking for contributions and recognize that the book must be a finite number of pages. I owe a very special thanks to all the authors in this book, for after all it is their book.

The book presents a large volume of data. The reader is directed to the Table of Contents which illustrates the design of the book, a design that was conceived to make it as easy as possible to find the needed data. Chemistry, analytical methodologies, physiological and biochemical aspects, clinical and epidemiological studies, and consumption patterns are covered extensively. Tables with the dietary fiber content of various foods analyzed by different methods are given at the end of the book.

Gene A. Spiller
Los Altos, California
February 1985

PREFACE TO THE SECOND EDITION

Dietary fiber research has seen a great deal of progress since the first edition of this Handbook. This new edition is revised and updated by individual authors and, with the exception of a few chapters, such as the Southgate and the crude fiber analytical methods, that are unchanged, new material is added. Some new authors and chapters have been added, including the new method of analysis by Englyst and Hudson (Chapter 3.3) and Bosello, Armellini, and Zamboni's chapter on fiber consumption in Italy. Hugh Trowell passed away in 1989; his chapter has been left untouched. A major addition in the second edition is the inclusion of more extensive tables of data on dietary fiber in foods. They are prepared by various authors to give the reader a chance to compare data from different sources or methods.

This new edition should give researchers, physicians, nutritionists, and other health professionals a useful and ready source of information, as a handbook should. Again, as in the first edition, we could not ask all the experts in this field to contribute, so we decided to stay with the original authors as much as possible. We hope that our efforts will make this work valuable to everyone interested in this topic.

Gene A. Spiller
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THE EDITOR

Gene Alan Spiller, D.Sc., Ph.D. is the director of the Health Research and Studies Center and of the SPHERA Foundation in Los Altos, California. He is the editor of many nutrition-related books.

Dr. Spiller received his doctorate in chemistry from the University of Milan (Italy) in 1949, and a Master's degree (1968) and a Ph.D. (1972) from the University of California at Berkeley. He did additional studies at the Stanford University School of Medicine at Stanford, California from 1980 to 1983.

In the 1970s, he was in charge of the Nutritional Physiology Section of Syntex Research in Palo Alto, California, where he did extensive human and animal research on dietary fiber. He continued his work on fiber in the 1980s, first as an independent consultant and later as the director of the Health Research and Studies Center in Los Altos, California. Many human clinical studies, reviews, and other publications were results of this work. In addition to his research and writings on dietary fiber, Dr. Spiller has carried out clinical studies on the effect of complex whole foods high in fiber and other beneficial nutrients such as monounsaturated fats.

In the early days of dietary fiber research in nutrition and medicine (1970s), Dr. Spiller was responsible for one of the first multiauthor books on this topic when he edited *Fiber in Human Nutrition* (Plenum Press, 1975) which was followed by two other multiauthor books on the same topic, *Topics in Dietary Fiber Research* (1978) and *Medical Aspects of Dietary Fiber* (1980) both published by Plenum Press. In 1986 he edited the first edition of this Handbook. His latest multiauthor nutrition-medical book is *The Mediterranean Diets in Health and Disease* (Van Nostrand, 1991).

In addition, Dr.Spiller has been a lecturer in nutrition in the San Francisco Bay Area at Mills College and Foothill College.

He has a special interest in lesser known nutritional factors that may be beneficial to human health even though not essential to life, especially factors that are present in plant foods and that may work together with dietary fiber in the prevention of degenerative diseases. He continues human studies on dietary fiber, including the investigation of differences between high fiber diets and fiber concentrates.

Dr. Spiller has been responsible for organizing international workshops on dietary fiber, such as the International Nutrition Congress in Brazil in 1978 and in Brighton (U.K.) in 1985, and he has chaired many symposia and sessions on this topic.

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