

CRC

HANDBOOK SERIES
in
NUTRITION
and
FOOD

M. RECHCIGL, JR.

**SECTION G: DIETS,
CULTURE MEDIA, AND
FOOD SUPPLEMENTS
VOLUME I**

CRC

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in

Nutrition and Food

Miloslav Rechcigl, Jr., Editor-in-Chief

Nutrition Advisor and Director
Interregional Research Staff
Agency for International Development
U.S. Department of State

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CRC HANDBOOK SERIES IN NUTRITION AND FOOD

Miloslav Rechcigl, Jr.
Editor-in-Chief

SECTION OUTLINE

SECTION A: Nutrition and Food Science

Minimum of 1 volume projected.

Nomenclature, Nutrition Literature, Nutrition Societies, Foundations, and Historical Milestones in Nutrition.

SECTION B: The Living Organisms, Their Chemical Constitution, Feeding and Digestive System, and Ecological Aspects

Minimum of 3 volumes projected.

Taxonomy, Distribution of Organisms, Ecology – Symbiosis, Feeding and Digestive System, Chemical Constitution of Organisms, and Biological Productivity.

SECTION C: The Nutrients and Their Metabolism

Minimum of 1 volume projected.

Nutrients and Growth Regulators, Antinutrients and Antimetabolites, Naturally Occurring Food Toxicants, Regulatory Aspects of Nutrition, and Availability of Nutrients.

SECTION D: Nutritional Requirements

Minimum of 4 volumes projected.

Comparative Requirements of Organisms, Qualitative Requirements of Specific Organisms, Quantitative Requirements (Nutritional Standards), and Nutritional Requirements for Specific Processes and Functions: Animals, Microorganisms, Plants.

SECTION E: Nutritional Disorders

Minimum of 2 volumes projected.

Nutritional Disorders in Living Organisms, Effect of Specific Nutrient Deficiencies and Toxicities, and Nutritional Disorders in Specific Tissues.

SECTION F: Food Composition

Minimum of 1 volume projected.

Nutrient Content and Energy Value of Food, Factors Affecting Nutrient Composition of Food, and Utilization and Biological Value of Food.

SECTION G: Diets, Culture Media, and Food Supplements

Minimum of 4 volumes projected.

Diets, Culture Media, and Food and Feed Supplements.

SECTION H: The State of World Food and Nutrition

Minimum of 1 volume projected.

World Population, Natural and Food Resources, Food Production, Food Losses, World Food Usage and Consumption, Geographic Distribution of Nutritional Diseases, Nutritional Requirements – Current and Projected, Agricultural Inputs – Current and Projected, Food Aid, Food Marketing and Distribution, Socioeconomic, Cultural, and Psychological Factors Affecting Nutrition.

SECTION I: Food Safety, Food Processing, Food Preservation

Minimum of 1 volume projected.

Food Contamination, Food Spoilage, Food Wastes, Food Laws, and Nutrition Labeling.

SECTION J: Nutrition and Food Methodology

Minimum of 1 volume projected.

Assessment of Nutritional Status, and Measuring Nutritive Value of Food.

PUBLISHER'S PREFACE

In 1913, when the First Edition of the *Handbook of Chemistry and Physics* appeared, scientific progress, particularly in chemistry and physics, had produced an extensive literature but its utility was seriously handicapped because it was fragmented and unorganized. The simple but invaluable contribution of the *Handbook of Chemistry and Physics* was to provide a systematic compilation of the most useful and reliable scientific data within the covers of a single volume. Referred to as the "bible," the Handbook soon became a universal and essential reference source for the scientific community. The 57th Edition, published in the bicentennial year of 1976, represents more than 63 years of continuous service to millions of professional scientists and students throughout the world.

In the years following World War II, scientific information expanded at an explosive rate due to the tremendous growth of research facilities and sophisticated analytical instrumentation. The single-volume Handbook concept, although providing a high level of convenience, was not adequate for the reference requirements of many of the newer scientific disciplines. Due to the sheer quantity of useful and reliable data being generated, it was no longer feasible or desirable to select only that information which could be contained in a single volume and arbitrarily to reject the remainder. **Comprehensiveness** had become as essential as **convenience**.

By the late 1960's, it was apparent that the solution to the problem was the development of the multi-volume Handbook. This answer arose out of necessity during the editorial processing of the *Handbook of Environmental Control*. A hybrid discipline or, to be more precise, an interdisciplinary field such as Environmental Science could be logically structured into major subject areas. This permitted individual volumes to be developed for each major subject. The individual volumes, published either simultaneously or by some predetermined sequence, collectively became a multi-volume Handbook series.

The logic of this new approach was irrefutable and the concept was promptly accepted by both the scientist and science librarian. It became the format of a growing number of CRC Handbook Series in fields such as Materials Science, Laboratory Animal Science, and Marine Science.

Within a few years, however, it was clear that even the multi-volume Handbook concept was not sufficient. It was necessary to create an information structure more compatible with the dynamic character of scientific information, and flexible enough to accommodate continuous but unpredictable growth, regardless of quantity or direction. This became the objective of a "third generation" Handbook concept.

This latest concept utilizes each major subject within an information field as a "Section" rather than the equivalent of a single volume. Each Section, therefore, may include as many volumes as the quantity and quality of available information will justify. The structure achieves permanent flexibility because it can, in effect, expand "vertically" and "horizontally." Any section can continue to grow (vertically) in number of volumes, and new sections can be added (horizontally) as and when required by the information field itself. A key innovation which makes this massive and complex information base almost as convenient to use as a single-volume Handbook is the utilization of computer technology to produce up-dated, cumulative index volumes.

The *Handbook Series in Nutrition and Food* is a notable example of the “sectionalized, multi-volume Handbook series.” Currently underway are additional information programs based on the same organizational design. These include information fields such as Energy and Agricultural Science which are of critical importance not only to scientific progress but to the advancement of the total quality of life.

We are confident that the “third generation” CRC Handbook comprises a worthy contribution to both information science and the scientific community. We are equally certain that it does not represent the ultimate reference source. We predict that the most dramatic progress in the management of scientific information remains to be achieved.

B. J. Starkoff
President
CRC Press, Inc.

PREFACE

CRC HANDBOOK SERIES IN NUTRITION AND FOOD

Nutrition means different things to different people, and no other field of endeavor crosses the boundaries of so many different disciplines and abounds with such diverse dimensions. The growth of the field of nutrition, particularly in the last two decades, has been phenomenal, the nutritional data being scattered literally in thousands and thousands of not always accessible periodicals and monographs, many of which, furthermore, are not normally identified with nutrition.

To remedy this situation, we have undertaken an ambitious and monumental task of assembling in one publication all the critical data relevant in the field of nutrition.

The *CRC Handbook Series in Nutrition and Food* is intended to serve as a ready reference source of current information on experimental and applied human, animal, microbial, and plant nutrition presented in concise tabular, graphical, or narrative form and indexed for ease of use. It is hoped that this projected open-ended multivolume set will become for the nutritionist what the *CRC Handbook of Chemistry and Physics* has become for the chemist and physicist.

Apart from supplying specific data, the comprehensive, interdisciplinary, and comparative nature of the *CRC Handbook Series in Nutrition and Food* will provide the user with an easy overview of the state of the art, pinpointing the gaps in nutritional knowledge and providing a basis for further research. In addition, the *Handbook* will enable the researcher to analyze the data in various living systems for commonality or basic differences. On the other hand, an applied scientist or technician will be afforded the opportunity of evaluating a given problem and its solutions from the broadest possible point of view, including the aspects of agronomy, crop science, animal husbandry, aquaculture and fisheries, veterinary medicine, clinical medicine, pathology, parasitology, toxicology, pharmacology, therapeutics, dietetics, food science and technology, physiology, zoology, botany, biochemistry, developmental and cell biology, microbiology, sanitation, pest control, economics, marketing, sociology, anthropology, natural resources, ecology, environmental science, population, law, politics, nutritional and food methodology, and others.

To make more facile use of the *Handbook*, the publication has been divided into sections of one or more volumes each. In this manner the particular sections of the *Handbook* can be continuously updated by publishing additional volumes of new data as they become available.

The Editor wishes to thank the numerous contributors, many of whom have undertaken their assignment in pioneering spirit, and the Advisory Board members for their continuous counsel and cooperation. Last but not least, he wishes to express his sincere appreciation to the members of the CRC editorial and production staffs, particularly President Bernard J. Starkoff, Mr. Gerald A. Becker, Mrs. Kathryn H. Harter, Mrs. Karen G. Ketchaver, and Mr. Paul R. Gottehrer, for their encouragement and support.

We invite comments and criticism regarding format and selection of subject matter, as well as specific suggestions for new data (and additional contributors) which might be included in subsequent editions. We should also appreciate it if the readers would bring to the attention of the Editor any errors or omissions that might appear in the publication.

Miloslav Rechcigl, Jr.
Editor-in-Chief
October 1976

PREFACE
SECTION G: DIETS, CULTURE MEDIA, FOOD SUPPLEMENTS

This section, projected into several volumes, furnishes information relating to food habits and dietary regimens of various types of animals including livestock and laboratory and zoo animals as well as animals living in the wild. Data are furnished on the natural and semipurified and purified diets, listing individual ingredients, their concentrations and their sources. In the case of natural ingredients or mixtures, chemical composition is also given, if known.

The first volume contains information on diets and food habits of mammals. The subsequent volume will cover comparable data on other vertebrates and the invertebrates. A special volume will be devoted to media used for cultivation of microorganisms and plants, while another subsection will be concerned with culture media for cells, tissues, organs, and embryos.

Miloslav Rechcigl, Jr.
Editor
January 1977

MILOSLAV REHCIGL, JR., EDITOR

Miloslav Rechcigl, Jr. is Nutrition Advisor and Director of the Interregional Research Staff in the Agency for International Development, U.S. Department of State.

He has a B.S. in Biochemistry (1954), a Master of Nutritional Science degree (1955), and a Ph.D. in nutrition, biochemistry, and physiology (1958), all from Cornell University. He was formerly a Research Biochemist in the National Cancer Institute, National Institutes of Health and subsequently served as Special Assistant for Nutrition and Health in the Health Services and Mental Health Administration, U.S. Department of Health, Education, and Welfare.

Dr. Rechcigl is a member of some 30 scientific and professional societies, including being a Fellow of the American Association for the Advancement of Science, Fellow of the Washington Academy of Sciences, Fellow of the American Institute of Chemists, and Fellow of the International College of Applied Nutrition. He holds membership in the Cosmos Club, the Honorary Society of Phi Kappa Pi, and the Society of Sigma Xi, and is recipient of numerous honors, including an honorary membership certificate from the International Social Science Honor Society Delta Tau Kappa. In 1969, he was a delegate to the White House Conference on Food, Nutrition, and Health and in the last two years served as President of the District of Columbia Institute of Chemists and a Councilor of the American Institute of Chemists.

His bibliography extends over 100 publications, including contributions to books, articles in periodicals, and monographs in the fields of nutrition, biochemistry, physiology, pathology, enzymology, and molecular biology. Most recently he authored and edited *World Food Problem: A Selective Bibliography of Reviews* (CRC Press, 1975), *Man, Food, and Nutrition: Strategies and Technological Measures for Alleviating the World Food Problem* (CRC Press, 1973), *Food, Nutrition and Health: A Multidisciplinary Treatise Addressed to the Major Nutrition Problems from a World Wide Perspective* (Karger, 1973), following his earlier pioneering treatise on *Enzyme Synthesis and Degradation in Mammalian Systems* (Karger, 1971), and that on *Microbodies and Related Particles. Morphology, Biochemistry and Physiology* (Academic Press, 1969). Dr. Rechcigl also has initiated and edits a new series on Comparative Animal Nutrition and is Associated Editor of *Nutrition Reports International*.

ADVISORY BOARD MEMBERS
SECTION G: DIETS, CULTURE MEDIA, FOOD SUPPLEMENTS
VOLUME I

E. J. W. Barrington

Department of Zoology
University of Nottingham
University Park
Nottingham, England

Charles A. Black

Department of Agronomy
Iowa State University of Science and
Technology
Ames, Iowa

Ricardo Bressani

Division of Agricultural and
Food Chemistry
Institute of Nutrition of Central America
and Panama (INCAP)
Guatemala City, Guatemala

Sir David Cuthbertson

Department of Biochemistry
University of Glasgow Royal Infirmary
Glasgow, Scotland

William J. Darby

The Nutrition Foundation, Inc.
489 Fifth Avenue
New York, New York

Emanuel Epstein

Department of Soils and Plant Nutrition
University of California, Davis
Davis, California

Leon Golberg

Chemical Industry Institute of Toxicology
Research Triangle Park, North Carolina

Earl O. Heady

Center for Agricultural and Rural
Development
Iowa State University of Science and
Technology
Ames, Iowa

Dorothy Hollingsworth

The British Nutrition Foundation
Alembic House
93 Albert Embankment
London, England

B. Connor Johnson

Department of Biochemistry and Molecular
Biology
The University of Oklahoma Science
Center
Oklahoma City, Oklahoma

O. L. Kline

American Institute of Nutrition
9650 Rockville Pike
Bethesda, Maryland

Gilbert A. Leveille

Department of Food Science and Human
Nutrition
Michigan State University
East Lansing, Michigan

Margaret Mead

The American Museum of Natural History
Central Park West at 79th Street
New York, New York

Emil M. Mrak

University of California, Davis
University House
Davis, California

Anthony H. Rose

School of Biological Sciences
University of Bath
Claverton Down
Bath, England

Howerde E. Sauberlich

Department of Nutrition
Letterman Army Institute of Research
Presidio
San Francisco, California

ADVISORY BOARD MEMBERS
SECTION G: DIETS, CULTURE MEDIA, FOOD SUPPLEMENTS
VOLUME I

Nevin S. Scrimshaw

Department of Nutrition and Food Science
Massachusetts Institute of Technology
Cambridge, Massachusetts

E. M. Widdowson

Department of Investigative Medicine
University of Cambridge
Downing Street
Cambridge, England

Charity Waymouth

The Jackson Laboratory
Bar Harbor, Maine

CONTRIBUTORS
SECTION G: DIETS, CULTURE MEDIA, FOOD SUPPLEMENTS
VOLUME I

John T. Abrams

Department of Clinical Veterinary Medicine
University of Cambridge
Madingley Road
Cambridge, England

Michael Aleksziuk

The Boreal Institute for Northern Studies
University of Alberta
Edmonton, Alberta, Canada

M. H. Beaver

Lobund Laboratory
Department of Microbiology
University of Notre Dame
Notre Dame, Indiana

A. T. Bergerud

Department of Biology
University of Victoria
Victoria, British Columbia, Canada

Lytle H. Blankenship

Agricultural Research and Extension Center
Texas Agricultural Experiments Station
The Texas A & M University System
Uvalde, Texas

Diane L. Bray

Department of Nutritional Sciences
University of California, Berkeley
Berkeley, California

George M. Briggs

Department of Nutritional Sciences
University of California, Berkeley
Berkeley, California

S. T. Chou

Ralston Purina Company
Purina Research Farm
Gray Summit, Missouri

Larry R. Collins

National Zoological Park
Conservation and Research Center
Front Royal, Virginia

G. L. Dryden

Biology Department
Slippery Rock State College
Slippery Rock, Pennsylvania

N. Fairall

Provincial Administration of the Cape of
Good Hope
Department of Nature Conservation
Cape Town, Republic of South Africa

Saul Fernandez-Baca

Facultad de Medicina, Veterinaria, y
Zootecnia
U.N.A.M.
Mexico

David Ford

MRC Laboratory Animals Centre
Medical Research Council Laboratories
Woodmansterne Road, Carshalton
Surrey, England

James L. Gobble

Department of Dairy and Animal Science
College of Agriculture
The Pennsylvania State University
University Park, Pennsylvania

Eduardo González-Jiménez

Universidad Central de Venezuela
Facultad de Agronomía
Instituto Producción Animal
Maracay, Venezuela

Martyn L. Gorman

Department of Zoology
University of Aberdeen
Aberdeen, Scotland

CONTRIBUTORS
SECTION G: DIETS, CULTURE MEDIA, FOOD SUPPLEMENTS
VOLUME I

D. G. Govaert

Lobund Laboratory
Department of Microbiology
University of Notre Dame
Notre Dame, Indiana

P. Haberey

Institut de Physiologie
Faculte de Medecine
Université Louis Pasteur de Strasbourg
Strasbourg Cedex, France

Anthony J. Hall-Martin

Mountain Zebra National Park
Cradock, Republic of South
Africa

John Hammond, Jr.

School of Agriculture
University of Cambridge
Cambridge, England

J. S. Ichhponani

Department of Animal Science
Punjab Agricultural University
Ludhiana, India

A. Sydney Johnson

Institute of Natural Resources
University of Georgia
Athens, Georgia

R. M. Jordan

Department of Animal Science
University of Minnesota
St. Paul, Minnesota

George R. Kerr

Department of Nutrition
School of Public Health
Harvard University
Boston, Massachusetts

Thomas A. Leege

Idaho Fish and Game Department
Kamiah, Idaho

Lim Boo Liat

Medical Ecology Division
Institute for Medical Research
Kuala Lumpur, Malaysia

Jack R. Luick

Institute of Arctic Biology
University of Alaska
Fairbanks, Alaska

Rex E. Marsh

Agricultural Experiment Station
Wildlife and Fisheries Biology
College of Agricultural and Environmental
Sciences
University of California, Davis
Davis, California

J. K. Matsushima

Department of Animal Sciences
Colorado State University
Fort Collins, Colorado

Dennis A. Meritt, Jr.

Lincoln Park Zoological Gardens
Chicago, Illinois

R. P. Millar

Provincial Administration of the Cape of
Good Hope
Department of Nature Conservation
Cape Town, Republic of South
Africa

Julius G. Nagy

Department of Fishery and Wildlife
Biology
Colorado State University
Fort Collins, Colorado

Jack R. Nelson

Department of Forestry and Range
Management
Washington State University
Pullman, Washington

CONTRIBUTORS
SECTION G: DIETS, CULTURE MEDIA, FOOD SUPPLEMENTS
VOLUME I

John J. Rasweiler IV

Department of Anatomy
College of Physicians and Surgeons of
Columbia University
New York, New York

Ronald T. Reuther

Philadelphia Zoological Garden
Philadelphia, Pennsylvania

Pilar S. Reyes

Department of Nutritional Sciences
University of California, Berkeley
Berkeley, California

Sam H. Ridgway

Biomedical Group
Undersea Sciences Department
Naval Undersea Center
San Diego, California

Charles C. Schwartz

Natural Resource Ecology Laboratory
Colorado State University
Fort Collins, Colorado

Patricia P. Scott

Interdepartmental Division of Cell Studies
Royal Free Hospital School of Medicine
University of London
London, England

Terry A. Schulz

School of Veterinary Medicine
University of California, Davis
Davis, California

Ann U. Shump

The Museum
Michigan State University
East Lansing, Michigan

G. S. Sidhu

Commonwealth Scientific and Industrial
Research Organization
Division of Animal Production – Ian Clunies
Ross Animal Research Laboratory –
Prospect
Blacktown, New South Wales,
Australia

J. D. Skinner

Mammal Research Institute
Department of Zoology
University of Pretoria
Pretoria, Republic of South Africa

Lyle K. Sowls

Arizona Cooperative Wildlife Research Unit
University of Arizona
Tucson, Arizona

Richard R. Tenaza

Department of Biological Sciences
University of the Pacific
Stockton, California

Jack W. Thomas

U.S. Department of Agriculture
Forest Service
Pacific Northwest Forest and Range
Experiment Station
Range and Wildlife Habitat Laboratory
LaGrande, Oregon

J. H. Topps

Division of Agricultural Chemistry
and Biochemistry
School of Agriculture, Aberdeen
Aberdeen, Scotland

D. E. Ullrey

Department of Animal Husbandry
Michigan State University
East Lansing, Michigan

CONTRIBUTORS
SECTION G: DIETS, CULTURE MEDIA, FOOD SUPPLEMENTS
VOLUME I

Don Van Dyke

Biomedical Group
Undersea Sciences Department
Naval Undersea Center
San Diego, California

Elver H. Voth

Department of Biology
George Fox College
Newberg, Oregon

A. Lorin Ward

U.S. Department of Agriculture
Forest Service
Rocky Mountain Forest and Range
Experiment Station
Laramie, Wyoming

Barbara J. Weir

Journal of Reproduction and Fertility
Editorial Office
Cambridge, England

William C. Weir

Department of Nutrition
Agricultural Experiment Station
College of Agricultural and Environmental
Sciences
University of California, Davis
Davis, California

John O. Whitaker, Jr.

Department of Life Sciences
Indiana State University
Terre Haute, Indiana

Bernard S. Wostmann

Lobund Laboratory
Department of Microbiology
University of Notre Dame
Notre Dame, Indiana

E. Young

Division of Veterinary Services
Kruger National Park
Republic of South Africa

To my inspiring teachers at Cornell: Harold H. Williams, John K. Loosli, Richard H. Barnes, the late Clive M. McCay, and the late Leonard A. Maynard.

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