

Natural Food Flavors and Colorants

Mathew Attokaran



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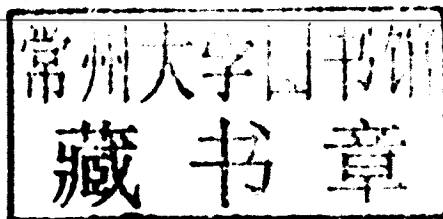
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Preface

Ever since man started adding crushed roots, fruits, and leaves to food with a view to improving its organoleptic appeal, the search for more and more diverse flavors had continued. In addition, consumers want their food to be pleasing to the eye. It was soon found that some plant materials gave a good color to the food. One of the distinctive features of humans that differentiates us from other animals is our innovative approach to improve the quality of our food. This enabled the production of such plant material in ground, crushed, distilled, and extracted forms so as to obtain the flavor and color in a convenient and effective form, to be used as an excellent natural additive.

With the development of modern chemistry, synthetic chemical molecules capable of producing delicious flavors and attractive colors started emerging. But as man became more and more conscious of his own physiology and the interference of external molecules, leading to allergy, toxicity, and carcinogenicity, he took a decisive step back to natural substances. After all, the human body is a biological engine and compatibility with bio-derived materials is only natural.

A recent survey (Food Technology, IFT, 2010, April) of the top 10 food trends reports that blending foods and drinks with naturally rich nutrients to be the second most popular trend, and avoidance of chemical additives and artificial colors as the fifth most important trend that Americans seek now.

It was Ernest Guenther who pioneered the production of a six-volume treatise, *The Essential Oils*, which covers the largest group of natural aroma and flavor materials used in food. Even after 60 years, the volumes are widely consulted by food scientists and technologists. Brian M. Lawrence continued the great tradition of reviews in the form of "Progress in Essential Oils," which appears in the journal *Perfumer and Flavorist*. While the aroma-contributing natural flavors of essential oils are well treated, the same cannot be said regarding nonvolatile natural flavors.

There are many books on spices, but only a few deal with the chemical constituents that are referred to in this book. For spices and other materials, the compilation by Albert Y. Leung and Steven Foster, *Encyclopedia of Common Natural Ingredients*, is indeed a very valuable one. There are some good books and reviews on food colors. Nevertheless, the author believes that there is room for a book that includes all the available natural food flavors and colorants with adequate coverage of plant products, tips on extraction procedures, the chemistry of active principles, guidance on analytical methods, and links to regulatory bodies. This book is designed to assist people associated with food science, technology, and industry to realize the newfound dream

of consumers for a return to natural substances that can be added to food to improve its appeal.

Almost all the products dealt with in this book may indeed be familiar to ordinary people. However, their scientific significance, methods of production, and recognition in food laws are matters that laypeople will not be fully conversant with and will be a great help to students, researchers, and those in the industry.

The book is divided into three parts. Part I deals with matters connected with analysis, general properties, and techniques. Part II describes the various natural flavors and colorants that are available. Part III covers the future prospects that can be pursued by research workers and manufacturers.

Mathew Attokaran

Acknowledgments

This book has been the fulfillment of one of my cherished dreams. In making available this publication, it is my humble wish that it will serve food scientists, technologists, and industrialists the world over, to move toward flavors and colors of natural origin, a trend that is preferred by today's consumers. However, this effort of mine would never have seen the light of day had it not been for the benevolent and generous support and encouragement I received from C.J. George, Managing Director of Plant Lipids Limited, a natural flavor and color producing company that is in the forefront of technical excellence and quality management.

Furthermore, I wish to express my indebtedness to all staff members of Plant Lipids for their excellent cooperation throughout this effort. In particular, may I express my gratitude to C.P. Benny, K.V. George, Thomas Mathew, and Binu V. Paul for useful discussions; John Nechupadom for his keen interest; Neelu Thomas for making the figures; Moby Paul for assistance in word processing; and the scientific staff for helpful hints. I must also acknowledge Professor Madhukar Rao for his valuable advice on the usage of language.

I will be failing in my duty if I do not express my gratitude to Salim Pushpanath for the beautiful photographs. (All photographs copyright © Salim Pushpanath.)

I am indeed grateful to the authorities of the Food Chemical Codex (FCC) for allowing me to quote the relevant descriptions of physical specifications of about 40 natural ingredients, most of which are essential oils. They are reprinted with permission, the United States Pharmacopeial Convention, copyright 2009, all rights reserved.

Last but not least, I thank the Institute of Food Technologists, USA, for the encouragement and acceptance of my proposal for publication.

Mathew Attokaran

About the Author

Mathew Attokaran (formerly A.G. Mathew) was born in Kerala State in India. He has taken his MSc. in Oils, Fats, and Aromatics and Ph.D. in Food Chemistry. He has carried out research in Food Science and Technology for over 28 years in the Central Food Technology Research Institute, Mysore and Regional Research Laboratory (CSIR), Trivandrum, before moving to the industry. He has guided Ph.D. students and published over 200 scientific papers.

Many of his research findings have been successfully developed into viable technologies, which have been effectively utilized by the industry. His team developed the highly successful two-stage process for making spice oleoresin.

Twice he has been the leader of the Indian Delegation for the International Standards Organization (ISO) Committee meetings on Spices and Condiments held in Hungary (1983) and in France (1986). He was the President of Essential Oils Association of India for two terms. He has widely traveled in the United States, Europe, and Asia for visits to research and industry centers as well as for participation in international conferences. He has completed Short-term Missions in three United Nations agencies: the Food and Agricultural Organization of the United Nations, Rome; the United Nations' Industrial Development Organization, Vienna; and the International Trade Centre, of the UN and WTO, Geneva.

He is happily married and lives with his wife in Cochin, where he continues to work as the Technical Director of Plant Lipids Limited. He has two daughters and five grandchildren. Dr. Attokaran can be reached at info@plantlipids.com.

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Part I

General

Introduction

Before we discuss various flavors and colorants, many general aspects will have to be understood. There are several eminent organizations, which on a regular basis, review methods of determination, specifications, and safety assessments of these. This part deals with techniques and general characteristics of certain classes of flavors and colors that are necessary for a better understanding of the food technology related to these ingredients.

Various chapters cover subjects related to analysis, techniques in extraction, and modifications necessary for application in foods. General characteristics of some important classes of products like spices, essential oils, flavors, and colors have also been given some emphasis so as to help researchers, manufacturers, and formulators of food.

