

## COMMENT OPEN



# Sugar substitutes and taste enhancers need more science, sensitivity- and allergy-guided labeling

D. A. Steindler <sup>1</sup>

There is new attention to food safety resulting from the second White House Conference on Hunger, Nutrition, and Health, as well as new advisories from the World Health Organization calling for more research on sugar substitutes because of possible cancer risks. Together they point to a need for rethinking how we study sugar substitutes and taste enhancers as potentially contributing to adverse health changes. In addition to the need for more research on sweeteners and taste enhancers, including the use of sensitive bioassays, and epidemiological and human clinical trial studies, there should be a call for better truth in labeling, especially including single names for such dietary elements that would afford easier recognition and potential avoidance by those with sensitivities and allergies.

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On the heels of the second, some 50 years after the first, “White House Conference on Hunger, Nutrition and Health”, along with the “Biden-Harris Administration National Strategy on Hunger, Nutrition and Health”, food safety is an important area of focus. The World Health Organization cancer agency’s recent advisory on the artificial sweetener, aspartame, and its potential cancer risk, in addition to their new guideline on not using non-sugar sweeteners for body weight control, all together signal a need to revisit how to best study sugar substitutes and other food additives for their potential negative physiological actions as their presence grows in our food supply. This also follows two studies of the NutriNet-Santé population-based cohort that have linked both “artificial sweeteners” as well as “sugar consumption” itself with potentially elevated cancer risks<sup>1,2</sup>. Two more recent studies on aspartame<sup>3</sup> and erythritol<sup>4</sup> have brought additional interest in food safety and better product labeling of sweeteners (with most of the field and practitioners recognizing the availability of these sugar substitutes as being needed for those with certain health issues including obesity, diabetes, and heart disease) and flavor enhancers. Of course, sugar itself is contraindicated for these health issues, and should also be studied in all of the paradigms and models discussed here, but like sugar, enhancing the umami taste with additives can also lead to obesity, metabolic syndrome, and brain, e.g., hypothalamic, inflammation which has been described as, “...mediated by nucleotide degradation and uric acid generation...”.<sup>5</sup> The 1969 White House Conference on Food, Nutrition, and Health was organized by Dr. Jean Mayer, for whom the previous institution of food and nutrition science where I was privileged to work was named. Professor Mayer also studied a controversial, umami taste-enhancing food additive, monosodium glutamate (“MSG”), in animal models<sup>6</sup>, and it is still controversial today. Kanarek et al.’s<sup>7</sup> findings on deficits in caloric restriction and juvenile-onset obesity, along with Mayer’s advocacy and similar reports from other groups, ultimately led to baby food manufacturers suspending MSG use after Congressional Hearings questioned its safety. A conclusion will be reached here that more research and thoughtful product labeling will help the cause of food safety in general, as new consumables and warnings are

introduced. In a constantly changing landscape from both new product introductions and new research findings, an open mind is warranted when it comes to supporting or challenging regulation.

There are many critical questions with both the Jones et al.<sup>8</sup> and Witkowski et al.<sup>4</sup> studies, but together they provide a powerful impetus for industry and government to come together to help remove stigma over debate of adverse health effects of food additives. This is needed in the meantime until we have better modeling and studying of the distinct human omics, including metabolomics, of food sensitivities within a heterogeneous population offering better stratification of at-risk populations with sensitivities and allergies. This ultimately will lead to easier scrutiny of substances that can trigger adverse health events in certain susceptible individuals who now rely almost totally on truth in labeling, or more accurately, sensitivity- and allergy-guided labeling (since current labeling usually does include names for food components that are truthful, but because of the pervasive use of pseudonyms for many of these additives, it is not obvious or clear enough for easy recognition of any food component that may be undesirable for those with health issues, allergies or sensitivities). All of us are at risk for unrecognized dietary elements that could contribute to potentially serious allergies and sensitivities<sup>9</sup>. Building on the needed use of highly sensitive models and bioassays, and comparisons with carefully run patient studies to determine the actions of dietary components, this Comment hopes to expand the awareness of the significance of studies like these that aim to uncover pathophysiological changes from the consumption of certain food additives. This issue has now been brought to light again from the findings in these new studies on the dietary consumption of artificial sweeteners, aspartame, and erythritol<sup>3,4</sup>, and raises concern again about the safety of additives in our food supply, with potentially adverse health effects that range from neurological to cardiovascular changes. Of considerable concern, the aspartame study reported a transgenerational passage of molecular and physiological changes in the amygdala of a robust animal model, that led to altered neurotransmission and changes in behavior including anxiety in descendants of users<sup>10</sup>. Jones et al

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# Sugar Substitutes And Enhancers

**Roger Daniels**



## **Sugar Substitutes And Enhancers:**

*Sugar Substitutes and Enhancers* Nicholas Pintauro, 1973

## **Sweeteners and Sugar Alternatives in Food**

**Technology** Kay O'Donnell, Malcolm Kearsley, 2012-07-13 This book provides a comprehensive and accessible source of information on all types of sweeteners and functional ingredients enabling manufacturers to produce low sugar versions of all types of foods that not only taste and perform as well as sugar based products but also offer consumer benefits such as calorie reduction dental health benefits digestive health benefits and improvements in long term disease risk through strategies such as dietary glycaemic control Now in a revised and updated new edition which contains seven new chapters part I of this volume addresses relevant digestive and dental health issues as well as nutritional considerations Part II covers non nutritive high potency sweeteners and in addition to established sweeteners includes information to meet the growing interest in naturally occurring sweeteners Part III deals with the bulk sweeteners which have now been used in foods for over 20 years and are well established both in food products and in the minds of consumers In addition to the traditional polyol bulk sweeteners newer products such as isomaltulose are discussed These are seen to offer many of the advantages of polyols for example regarding dental health and low glycaemic response without the laxative side effects if consumed in large quantity Part IV provides information on the sweeteners which do not fit into the above groups but which nevertheless may offer interesting sweetening opportunities to the product developer Finally Part V examines bulking agents and multifunctional ingredients which can be beneficially used in combination with all types of sweeteners and sugars

**Health and Sugar Substitutes** B. Guggenheim, 1979-03-23

*Sugar Substitutes and Enhancers* Roger Daniels, 1973

*Introduction to Clinical Nutrition* Vishwanath Sardesai, 2011-10-11 Dietary factors have been implicated in at least four of the ten leading causes of death in the U S heart disease cancer diabetes and stroke Nevertheless physicians frequently receive inadequate training in nutrition to properly counsel their patients *Introduction to Clinical Nutrition* Third Edition discusses the physiologic and metabolic

## **CRC Handbook of Food Additives, Second Edition** Thomas E.

Furia, 1980-07-29

*Alternative Sweeteners, Third Edition, Revised and Expanded* Lyn O'Brien-Nabors, 2001-06-08 A survey

of the extensive field of sucrose alternatives detailing scientific information technical applications and regulatory ratings for a wide array of sweeteners It highlights the change in status of saccharin the increased use of polyols and the possibilities provided by the availability of a variety of alternative sweeteners and their uses in combination This third edition contains new chapters on neotame tagatose trehalose erythritol and aspartame acesulfame salt  
*Sugar Substitutes and Enhancers* [by] Roger Daniels Nicholas Pintauro, 1973

## **Sweeteners and Sugar Alternatives in Food Technology** Helen

Mitchell, 2008-04-15 Sugar replacement in food and beverage manufacture no longer has just an economic benefit The use of ingredients to improve the nutritional status of a food product is now one of the major driving forces in new product development It is therefore important as options for sugar replacement continue to increase that expert knowledge and

information in this area is readily available. Sweeteners and Sugar Alternatives in Food Technology provides the information required for sweetening and functional solutions enabling manufacturers to produce processed foods that not only taste and perform as well as sugar based products but also offer consumer benefits such as calorie reduction, dental health benefits, digestive health benefits and improvements in long-term disease risk through strategies such as dietary glycaemic control. Part I of this comprehensive book addresses these health and nutritional considerations. Part II covers non-nutritive high intensity sweeteners providing insights into blending opportunities for qualitative and quantitative sweetness improvement as well as exhaustive application opportunities. Part III deals with reduced calorie bulk sweeteners which offer bulk with fewer calories than sugar and includes both the commercially successful polyols as well as tagatose, an emerging functional bulk sweetener. Part IV looks at the less well established sweeteners that do not conform in all respects to what may be considered to be standard sweetening properties. Finally, Part V examines bulking agents and multifunctional ingredients. Summary tables at the end of each section provide valuable concentrated data on each of the sweeteners covered. The book is directed at food scientists and technologists as well as ingredients suppliers.

**Alternative Sweeteners** Lyn O'Brien-Nabors, 2016-04-19 The fourth edition of *Alternative Sweeteners* follows the same formula as the previous three books by discussing each sweetener in terms of its characteristics. Qualities covered include means of production, physical characteristics, utility and relative sweetness compared to sucrose. Technical qualities covered include admixture potential, application, availability, shelf life, transport, metabolism, carcinogenicity and other toxicity evaluation data. A new chapter on the sweetener Advantame has been added and new contributors have updated information throughout the book. Also new is a section on how stevia sweeteners have been examined and deemed safe by the Joint FAO/WHO Expert Committee on Food Additives and the US FDA.

**FUNDAMENTALS OF ENVIRONMENTAL CHEMISTRY** Dr. Babita M Sakdeo, 2017-02-14 Environmental Chemistry is now a fully developed, viable and exciting branch of science. It is the application of chemical principles to the maintenance and enhancement of environmental quality, the biggest challenge facing mankind today. Scientist, professional and individuals need to have some knowledge of environmental chemistry if they want to make a meaningful contribution to the improvement of environment. For this chemistry has a special role to play as it helps in understanding the environmental changes logically and scientifically.

*Alternative Sweet and Supersweet Principles* Ram Snehi Dwivedi, 2022-09-24 This book compiles the latest information on different kinds of natural plant based super sweeteners. A book on alternative natural super sweeteners is extremely timely and useful especially in light of the decreasing cultivable area, ever increasing demand for sucrose and the well identified ills of sugar consumption. Every year more than 50 million people die due to diabetes and diabetes associated diseases like cardiovascular, kidney disorder, liver cancer etc. This book describes the use of non-saccharide super sweet principles to counter such maladies. The readers will get an in-depth understanding of different kinds of sweeteners, molecular basis of sweetness, their general classification, plant source with photo plates etc. The chapters

explain different kinds of super sweet principles This book emphasizes on the propagation cultivation and conservation of NSSS plants NSSSP and extraction of super sweet principles and granting of generally recognised as safe GRAS certificate to sweeteners The concluding chapter describes the eco physiological difference between saccharide super sweet and non saccharide sweet plants The book also describes commercial production of selected potential Natural Super Sweeteners This book will be of great interest to researchers extension workers as well as postgraduate students in Food science nutrition ayurveda plant physiology Unani naturopathy biochemistry and plant breeding It would also be of interest to industry stakeholders in sweetener industry and alternative sweetener manufactures **Food, Science, and Technology** Richard E.

Wallace,1978 **Food Quality And Standards - Volume II** Radomir Lasztity,2009-04-14 Food Quality and Standards is a component of Encyclopedia of Food and Agricultural Sciences Engineering and Technology Resources in the global Encyclopedia of Life Support Systems EOLSS which is an integrated compendium of twenty one Encyclopedias The Theme on Food Quality and Standards is so organized that it starts first the necessity of food quality control and food legislation and standards is explained and focuses on problems of food safety and connection between adequate nutrition and health This is continued with food safety aspects which are strongly connected with good agricultural practice GAP and good manufacturing practice GMP and also prevention of food borne diseases The system and organization of food quality control at government production and private consumer level is treated Methods of quality control and trends of their development are also briefly discussed Quality requirements of main groups of food with special aspects of functional foods foods for children and specific dietary purposes are overviewed Finally some international institutions involved in this work are presented For readers interested in specific details of this theme an overview is given about microbiology of foods including industrial use of microorganisms in food production and food borne pathogens and food chemistry focused on nutrients and some biologically active minor food constituents These three volumes are aimed at the following five major target audiences University and College students Educators Professional practitioners Research personnel and Policy analysts managers and decision makers and NGOs **Encyclopedia of Food & Color Additives** George A. Burdock,2014-07-29 THE FIRST

SOURCE TO CONTAIN COMPLETE PROFILES OF 2 500 FOOD ADDITIVES AND INGREDIENTS This 3 volume set provides all the answers to technical legal and regulatory questions in clear nontechnical language Information once scattered among the Code of Federal Regulations CFR other government and technical publications or only available thr *Low Calorie and Special Dietary Foods* B.K. Dwivedi,2018-01-18 This book is based on the papers presented at the Symposium on Low Calorie and Special Dietary Foods at the annual meeting of the Institute of Food Technologies in Anaheim California on June 8 1976

*The Ultimate Guide To Sugars & Sweeteners* Alan Barclay,Philippa Sandall,Claudia Shwide-Slavin,2014-12-16 The very first compendium of the sweet substances we typically eat and what happens once they re in our body New York Journal of Books Today supermarkets and natural food stores feature a bewildering variety of sugars and alternative sweeteners The

deluge of conflicting information doesn't help. If choosing a sweetener leaves you scratching your head, this handy guide will answer all of your questions, even the ones you didn't know to ask. Which sweeteners perform well in baking? Will the kids notice if I sub in stevia? What's the best pick if I'm watching my waistline, blood sugar, or environmental impact? Are any of them really superfoods or toxic? Perfect for foodies, bakers, carb counters, parents, chefs, and clinicians, this delightfully readable book features more than 180 alphabetical entries on natural and artificial sweeteners, including the usual suspects: table sugar, honey, the controversial aspartame, high fructose corn syrup, the hyped coconut sugar, monk fruit sweetener, and the unfamiliar Chinese rock sugar, isomaltulose. You'll also find myth-busting Q&As, intriguing trivia, side-by-side comparisons of how sweeteners perform in classic baked goods, and info on food additive regulations, dental health, the glycemic index, and more. Your sweet tooth is in for a real education. An honest, comprehensive book based on facts for those who want to see the meeting of history, science, and common sense. It covers every sweetener you have heard of, plus many you may never encounter. One of the few books that put sugar and sweetness in context so you can make a wise judgment. Glenn Cardwell, author of *Gold Medal Nutrition*. **The Code of Federal Regulations of the United States of America**, 2002. The Code of Federal Regulations is the codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government. **Code of Federal Regulations**, 1996. **Encyclopedia of Food Chemistry**, 2018-11-22. Encyclopedia of Food Chemistry Three Volume Set is the ideal primer for food scientists, researchers, students, and young professionals who want to acquaint themselves with food chemistry. Well organized, clearly written, and abundantly referenced, the book provides a foundation for readers to understand the principles, concepts, and techniques used in food chemistry applications. Articles are written by international experts and cover a wide range of topics, including food chemistry, food components, and their interactions, properties, flavor, aroma, texture, the structure of food, functional foods, processing, storage, nanoparticles for food use, antioxidants, the Maillard and Strecker reactions, process-derived contaminants, and the detection of economically motivated food adulteration. The encyclopedia will provide readers with an introduction to specific topics within the wider context of food chemistry, as well as helping them identify the links between the various sub-topics. Offers readers a comprehensive understanding of food chemistry and the various connections between the sub-topics. Provides an authoritative introduction for non-specialists and readers from undergraduate levels and upwards. Meticulously organized with articles structured logically based on the various elements of food chemistry.

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