

## 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.

*npj Science of Food* (2023)7:64; <https://doi.org/10.1038/s41538-023-00240-z>

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>3</sup>. Jones et al

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# Sugar Substitutes And Enhancers

**Nicholas Pintauro**



## **Sugar Substitutes And Enhancers:**

*Sugar Substitutes and Enhancers* Nicholas Pintauro,1973      *Health and Sugar Substitutes* B. Guggenheim,1979-03-23

**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      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      Sugar Substitutes and Enhancers Roger Daniels,1973      Introduction to Clinical Nutrition, Third Edition 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 interrelationships of all nutrients and their roles in health maintenance and the prevention of various diseases Since the publication of the second edition of this book new discoveries have revolutionized the field of clinical nutrition This is true especially with respect to gene nutrient interaction epigenetic pathways that contribute to the activation and inactivation of

gene expression the relationship of nutrients to telomere length and health and personalized nutrition Highlighting these advances new and revised topics include Fiber antioxidants nutraceuticals alternative medicine and epidemiology DNA gene nutrient interaction epigenetics and telomeres Nutritional aspects of kidney disease diabetes and metabolic syndrome Personalized nutrition and personalized medicine Vegetarianism the Mediterranean diet and other popular dietary practices Obesity and cholesterol Designed as a textbook for students in conventional medicine osteopathy dentistry dietetics nursing pharmacy and public health the book focuses on the critical biochemical and physiological aspects of nutrients It includes clinical case studies to clarify topics at the end of most chapters and references to facilitate further study **CRC**

**Handbook of Food Additives, Second Edition** Thomas E. Furia, 1980-07-29 **Sugar Substitutes and Enhancers [by]**

**Roger Daniels** Nicholas Pintauro, 1973 *The Ultimate Guide To Sugars & Sweeteners* Alan Barclay, Philippa

Sandall, Claudia Shwider-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 **Food, Science, and**

**Technology** Richard E. Wallace, 1978 **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 5.0 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

**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 know ledge 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

**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

*Biotechnological Intervention in Production of Bioactive Compounds* Jyoti Devi, 2025-02-25 This book provides an overview of the state of our understanding regarding the biosynthesis of bioactive compounds from plant and microbial sources Additionally examples of how these compounds have been used in food agriculture and human health

are provided as well as the biotechnological approach for screening and characterizing bioactive compounds In the pharmaceuticals nutraceuticals and agrochemicals industries bioactive molecules are crucial to the production of high value products The discovery of bioactive chemicals from diverse sources has supported their use as medications functional food ingredients herbicides and insecticides due to their medicinal advantages nutritional importance and protective impacts in healthcare and agriculture The systematic investigation of biologically active products and the prospective biological activities of these bioactive compounds comprising their medical uses standardization quality control mode of action and possible biomolecular interactions are among the greatest sensational expansions in modern natural medication and healthcare This book is a useful resource for graduate and undergraduate biomedical chemistry and agriculture students who are interested in learning more about the possibilities of bioactive natural products This book is useful to researchers in a variety of scientific domains where natural products are important

**Flavor-Associated Applications in Health and Wellness Food Products** Xiaofen Du,Jun Yang,2024-03-23 Health and wellness foods snacks and beverages are of increasing importance to manufacturers as consumer interest in healthy lifestyles and the demand for healthier products and services continue to escalate Transparency of the supply chain traceability of the ingredients and processing methods and sustainability are the major concerns for modern consumers Incorporating new ingredients with traditional products is an important strategy for the food industry to reformulate healthier and value added foods with the heart of health and wellness food products being flavoring ingredients which deliver food and drink formats tasting just like the beloved original food products To meet the growth of health and wellness food products in the market new opportunities for flavor suppliers will include flavor raw materials and their applications in food products Flavor Associated Applications in Health and Wellness Food Products focuses on flavor and its application in health and wellness food products The first section comprehensively covers the role of flavor in health and wellness products while the second focuses on flavoring labels ingredient suitability and safety with specific case studies Further sections focus on sugar fat salt and alcohol reduction flavor solutions for plant based protein flavor perception and direct health benefits With no book on the current market focusing on health and wellness foods from a flavor perspective this work is a valuable single source for product developers manufacturers and researchers in need of a comprehensive summary of key recent developments regarding flavor associated applications in health and wellness food products

*Fig (Ficus carica): Production, Processing, and Properties* Mohamed Fawzy Ramadan,2023-02-20 This book creates a multidisciplinary forum of discussion on Ficus carica with particular emphasis on its horticulture post harvest marketability phytochemistry extraction protocols biochemistry nutritional value functionality health promoting properties ethnomedicinal applications technology and processing The impact of traditional and innovative processing on the recovery of high added value compounds from Ficus carica byproducts is extensively reported Also the text discusses the potential applications of Ficus carica in food cosmetics and pharmaceutical products Fig Ficus carica

Production Processing and Properties illustrates a diversity of developments in food science and horticultural research including Production processing chemistry and functional properties of Ficus carica Ficus carica phytochemicals and its health promoting effects Food non food and technological applications of Ficus carica Recent research focuses on studying the bioactive compounds and therapeutic traits and investigating the mode of action and toxicological impacts of medical plant extracts and bioactive phytochemicals Ficus carica is of significant importance due to its widespread food industrial and medicinal applications Although Ficus carica products are already commercially available in the international market it is hard to find a reference work covering the production processing chemistry and properties of Ficus carica This book will be the first publication focusing specifically on this important topic      *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      **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      *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

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