

# **NITRITE CURING OF MEAT**

## **THE N-NITROSAMINE PROBLEM AND NITRITE ALTERNATIVES**



*Ronald B. Pegg  
Fereidoon Shahidi*

# Nitrite Curing Of Meat The N Nitrosamine Problem And Nitrite Alternatives

**VM Jensen**

## **Nitrite Curing Of Meat The N Nitrosamine Problem And Nitrite Alternatives:**

**Nitrite Curing of Meat** Ronald B. Pegg, Fereidoon Shahidi, 2008-06-02 Meat has been treated for centuries with rock salt as a means of preservation. However, only one century has passed since the German researchers Polenske in 1891, Kissahl in 1899, and Lehmann in 1899 discovered that the active component in the curing process was nitrite. Soon after the role of nitrite as a meat curing agent was revealed, government regulators placed guidelines on the level of nitrite and nitrate permitted for use in cured meat formulations. In the late 1960s and early 1970s, the development of the so-called nitrite problem surfaced because of the detection of N-nitrosamines in processed meats. The industry was in an uproar, and the issue was of paramount interest to scientists and the public. A major technical advance in the analytical technique for N-nitrosamine detection was achieved when Thermo Electron of Waltham, Massachusetts, introduced the thermal energy analyzer (TEA). This unit allowed the screening of a large number of samples for nitrosamine with only a minimum preparation. The role of nitrite in revealing the desired and unique flavor of cured products, perhaps by suppressing the formation of lipid oxidation products, was another development in revealing other properties of nitrite. Above all, the antimicrobial role of nitrite together with salt had a major influence on the popularity of nitrite/nitrate in food preservation. This book provides a review of the desirable attributes which sodium nitrite confers to meat during processing, as well as drawbacks of nitrite usage, i.e., the presence of N-nitrosamines. In addition, solutions for the curing of meat without the use of nitrite are presented. An examination of a multicomponent nitrite-free curing system entailing the color, flavor, and microbial protection of such a system is given.

*Ingredients in Meat Products* Rodrigo Tarté, 2009-02-21 There is little doubt that today's food industry is faced with a rapidly changing market landscape. The obvious need to continue to provide consumers with nutritious, delectable, safe, and affordable food products which are also profitable for food manufacturers, as well as the ongoing challenge of ensuring the delivery of adequate nutrition to hundreds of millions of disadvantaged people around the world, appears at least as much as if not more than ever to be at odds with the challenges posed by soaring energy and food commodity prices, fast-paced changes in consumer demographics, habits, and preferences, and the continual need to stay ahead of current and emerging food safety issues. In addition to this, the present ubiquity in the industry of terms such as functional foods, nutraceuticals, low sodium, low fat, clean label, minimal processing, and natural to name a few, underscores yet a different dimension of the challenges faced by food processors today. On the other hand, however, the solutions of many of these challenges may concurrently present the food industry with unique and exciting opportunities. The processed meat industry, despite its long history and tradition, is certainly not exempt from having to face these modern challenges nor excluded from realizing the promises of the opportunities that may lie ahead.

**Nitrite and Nitrate in Human Health and Disease** Nathan S. Bryan, Joseph Loscalzo, 2017-01-31 This fully revised and updated new edition provides a comprehensive look at nitrite and nitrate and their effect on human health and disease. The first section describes the

biochemical analysis of nitrite and nitrate and its role in human physiology The book then shifts to sources of human exposure of nitrite and nitrate including environmental and dietary Finally the last section discusses nitric oxide based therapeutics and how nitrite and nitrate biochemistry can be safely harnessed to improve human health Each chapter provides a balanced evidence based view and heavily cites the most recent published literature They follow a strict chapter format which includes keywords key points a conclusion highlighting major findings and extensive references The second edition contains new chapters on nitrite and nitrate in age medicine nitrite and nitrate as a treatment for hypertension and nitrite and nitrate in exercise performance Additionally the editors have expanded the biochemistry section to include chapters on nitrate reducing oral bacteria nitrite mediated S Nitrosation epigenetics and the regulation of nitric oxide and nitrite control of mitochondrial function Nitrate and Nitrite in Human Health and Disease 2e will be of interest to health professionals nutritionists dieticians biomedical scientists and food scientists *Handbook of Molecular Gastronomy* Christophe Lavelle, Herve This, Alan L. Kelly, Roisin Burke, 2021-06-08 *Handbook of Molecular Gastronomy Scientific Foundations and Culinary Applications* presents a unique overview of molecular gastronomy the scientific discipline dedicated to the study of phenomena that occur during the preparation and consumption of dishes It deals with the chemistry biology and physics of food preparation along with the physiology of food consumption As such it represents the first attempt at a comprehensive reference in molecular gastronomy along with a practical guide through selected examples to molecular cuisine and the more recent applications named note by note cuisine While several books already exist for a general audience either addressing food science in general in a light way and or dealing with modern cooking techniques and recipes no book exists so far that encompasses the whole molecular gastronomy field providing a strong interdisciplinary background in the physics biology and chemistry of food and food preparation along with good discussions on creativity and the art of cooking Features Gives A Z coverage to the underlying science physics chemistry and biology and technology as well as all the key cooking issues ingredients tools and methods Encompasses the science and practice of molecular gastronomy in the most accessible and up to date reference available Contains a final section with unique recipes by famous chefs The book is organized in three parts The first and main part is about the scientific discipline of molecular and physical gastronomy it is organized as an encyclopedia with entries in alphabetical order gathering the contributions of more than 100 authors all leading scientists in food sciences providing a broad overview of the most recent research in molecular gastronomy The second part addresses educational applications of molecular gastronomy from primary schools to universities The third part provides some innovative recipes by chefs from various parts of the world The authors have made a particular pedagogical effort in proposing several educational levels from elementary introduction to deep scientific formalism in order to satisfy the broadest possible audience scientists and non scientists This new resource should be very useful to food scientists and chefs as well as food and culinary science students and all lay people interested in gastronomy *Advanced Technologies For*

Meat Processing Leo M.L. Nollet,Fidel Toldra,2006-03-21 In recent years the meat industry has incorporated important technological advances that to this point have not been addressed in a single source Comprehensive and authoritative Advanced Technologies for Meat Processing presents developments concerning the quality analysis and processing of meat and meat products Co Edited by Fidel Toldra Recipient of the 2010 Distinguished Research Award from the American Meat Science Association Featuring contributions from a panel of international experts the book details technologies used in the meat processing chain It describes important processing methodologies such as gene technology automation irradiation hot boning high pressure vacuum salting enzymes starters and bacteriocins The book begins by exploring various production systems that include the use of modern biotechnology automation in slaughterhouses and rapid non destructive on line detection systems It proceeds to describe different new technologies such as decontamination high pressure processing and fat reduction The book then examines functional meat compounds such as peptides and antioxidants and the processing of nitrate free products and dry cured meat products It also discusses bacteriocins that fight against meat borne pathogens and the latest developments in bacterial starters for improved flavor in fermented meats It concludes with a discussion of packaging systems of the final products

*Food and Cancer Prevention* Keith W. Waldron,I T Johnson,G R

Fenwick,1993-01-01 Food and cancer prevention Chemical and biological aspects is the first book to be published on this subject and represents the current state of the art It is interdisciplinary in scope and provides researchers from around the world with the opportunity to bring themselves up to date in this vital area Food and cancer prevention Chemical and biological aspects covers a topic which is attracting considerable attention and aims to promote constructive collaboration among clinicians toxicologists nutritionists food scientists epidemiologists and plant scientists worldwide It is an essential reading for anyone involved in research in to this subject and will also be of interest to government departments with a view to legislation and food manufacturers producing functional novel or health foods

**Federal Register** ,1986-06-16

Advanced Technologies for Meat Processing Fidel Toldrá,Leo M. L. Nollet,2017-10-10 As with the first edition the main goal of Advanced Technologies for Meat Processing is to provide the reader with recent developments in new advanced technologies for the full meat processing chain This book is written by distinguished international contributors with recognized expertise and excellent reputations and brings together all the advances in a wide and varied number of technologies that are applied in different stages of meat processing This second edition contains 21 chapters combining updated and revised versions of several chapters with entirely new chapters that deal with new online monitoring techniques like hyperspectral imaging and Raman spectroscopy the use of nanotechnology for sensor devices or new packaging materials and the application of omics technologies like nutrigenomics and proteomics for meat quality and nutrition The book starts with the control and traceability of genetically modified farm animals followed by four chapters reporting the use of online non destructive monitoring techniques like hyperspectral imaging and Raman spectroscopy real time PCR for

pathogens detection and nanotechnology based sensors Then five chapters describe different advanced technologies for meat decontamination such as irradiation hydrostatic and hydrodynamic pressure processing other non thermal technologies and the reduction in contaminants generation Nutrigenomics in animal nutrition and production is the object of a chapter that is followed by five chapters dealing with nutritional related issues like bioactive peptides functional meats fat and salt reduction processing of nitrite free products and the use of proteomics for the improved processing of dry cured meats The last four chapters are reporting the latest developments in bacteriocins against meat borne pathogens the functionality of bacterial starters modified atmosphere packaging and the use of new nanotechnology based materials for intelligent and edible packaging    The Health Effects of Nitrate, Nitrite, and N-nitroso Compounds Assembly of Life Sciences (U.S.). Committee on Nitrite and Alternative Curing Agents in Food,1981

**Present Knowledge in Food Safety** Michael E. Knowles, Lucia

Anelich,Alan Boobis,Bert Popping,2022-10-08 Present Knowledge in Food Safety A Risk Based Approach Through the Food Chain presents approaches for exposure led risk assessment and the management of changes in the chemical pathogenic microbiological and physical radioactivity contamination of food at all key stages of production from farm to consumption This single volume resource introduces scientific advances at all stages of the production to improve reliability predictability and relevance of food safety assessments for the protection of public health This book is aimed at a diverse audience including graduate and post graduate students in food science toxicology microbiology medicine public health and related fields The book's reach also includes government agencies industrial scientists and policymakers involved in food risk analysis Includes new technologies such as nanotechnology genetic modification and cloning Provides information on advances in pathogen risk assessment through novel and real time molecular biological techniques biomarkers resistance measurement and cell to cell communication in the gut Covers the role of the microbiome and the use of surrogates especially for viruses    Special Publication ,1980    **Turkish journal of veterinary & animal sciences** ,2007

*Encyclopedia of Meat Sciences* Carrick Devine,M. Dikeman,2014-07-22 The Encyclopedia of Meat Sciences Second Edition Three Volume Set prepared by an international team of experts is a reference work that covers all important aspects of meat science from stable to table Its topics range from muscle physiology biochemistry including post mortem biochemistry and processing procedures to the processes of tenderization and flavor development various processed meat products animal production microbiology and food safety and carcass composition It also considers animal welfare animal genetics genomics consumer issues ethnic meat products nutrition the history of each species cooking procedures human health and nutrition and waste management Fully up to date this important reference work provides an invaluable source of information for both researchers and professional food scientists It appeals to all those wanting a one stop guide to the meat sciences More than 200 articles covering all areas of meat sciences Substantially revised and updated since the previous edition was published in 2004 Full color throughout    Encyclopedia of Food and Health ,2015-08-26 Approx 3876 pages

Approx 3876 pages *Journal of Food Protection* ,1985 **Determination of Some Carcinogenic Contaminants in Food** Sergei Yurchenko,2006 **Chemistry of Novel Foods** Arthur M. Spanier,1997 **Alternatives to the Current Use of Nitrite in Foods** Assembly of Life Sciences (U.S.). Committee on Nitrite and Alternative Curing Agents in Food,1982 Abstract A 2 part study on the health effects of nitrite and related compounds nitrate N nitroso compounds was performed by the US National Research Council Committee on Nitrite and Alternative Curing Agents in Food The purpose of the study was to review the research status and future prospects for developing feasible alternatives to nitrite use as a food preservative The most promising alternative to nitrite use in bacon is the use of alpha tocopherol 500 mg kg in combination with ascorbate 550 mg kg and sodium nitrite 120 mg kg which significantly reduces nitrosamines formation Mutagenicity tests and possible animal toxicity tests should be conducted on this combination The effect of the combination of ascorbate and tocopherol on nitrite s anti botulinal activity in bacon and other cured meat products also should be tested Irradiation with without nitrite appears to be effective against C botulinum in several cured meat products but further work is needed Other potential nitrite alternatives requiring further evaluation include lactic acid bacteria sodium hypophosphite fumarate esters and potassium sorbate plus low 40 80 mg kg nitrite wz **Highlights of Agricultural Research in Ontario** ,1987

**Food Technology in Australia** ,1988

The Top Books of the Year Nitrite Curing Of Meat The N Nitrosamine Problem And Nitrite Alternatives The year 2023 has witnessed a noteworthy surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of popular books, exploring the captivating narratives that have enthralled audiences this year. The Must-Read : Colleen Hoovers "It Ends with Us" This poignant tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover skillfully weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can prevail. Nitrite Curing Of Meat The N Nitrosamine Problem And Nitrite Alternatives : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This captivating historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids absorbing storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic : Delia Owens "Where the Crawdads Sing" This mesmerizing coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens weaves a tale of resilience, survival, and the transformative power of nature, entrancing readers with its evocative prose and mesmerizing setting. These top-selling novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of captivating stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a masterful and thrilling novel that will keep you speculating until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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