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# Radionuclides in the Food Chain

J.H. Harley, G.D. Schmidt, and G. Silini  
Editors



Springer-Verlag

# Radionuclides In The Food Chain

**Richard Tykva, Dieter Berg**



## **Radionuclides In The Food Chain:**

**Radionuclides in the Food Chain** John H. Harley, Gail D. Schmidt, Giovanni Silini, 2012-12-06 The Symposium on Radionuclides in the Food Chain sponsored by the International Life Sciences Institute in association with the International Institute for Applied Systems Analysis was intended to bring together policymakers and other representatives of the food industry with radiation experts involved in measuring and assessing radioactivity in foodstuffs. The symposium was made timely by the problems arising from the nuclear reactor accident at Chernobyl in the USSR which brought out the lack of international agreement on guidance for responding to such radionuclide contamination of food and foodstuffs. The presentations by the radiation experts covered the sources of radionuclides, natural radioactivity, fallout from nuclear weapons tests, routine releases from nuclear facilities and various nuclear accidents. The speakers represented a broad distribution in both scientific disciplines and international geographic origin. They summarized the available data on measurements and indicated the current procedures for assessing radiation exposure. It was hoped that the food industry representatives would bring out the problems posed to industry and governments by the presence of radioactivity in food.

Radionuclides in the Food Chain Melvin W. Carter, 1988-01-01      **Principles and Methods of Toxicology, Fifth Edition** A. Wallace Hayes, 2007-09-25 Founded on the paradox that all things are poisons and the difference between poison and remedy is quantity, the determination of safe dosage forms the base and focus of modern toxicology. In order to make a sound determination there must be a working knowledge of the biologic mechanisms involved and of the methods employed to define these mechanisms. While the vastness of the field and the rapid accumulation of data may preclude the possibility of absorbing and retaining more than a fraction of the available information, a solid understanding of the underlying principles is essential. Extensively revised and updated with four new chapters and an expanded glossary, this fifth edition of the classic text *Principles and Methods of Toxicology* provides comprehensive coverage in a manageable and accessible format. New topics include toxicokinetics, plant and animal poisons, information resources, and non-animal testing alternatives. Emphasizing the cornerstones of toxicology, people, dose, matters, and things change, the book begins with a review of the history of toxicology and followed by an explanation of basic toxicological principles, agents that cause toxicity, target organ toxicity, and toxicological testing methods, including many of the test protocols required to meet regulatory needs worldwide. The book examines each method or procedure from the standpoint of technique and interpretation of data and discusses problems and pitfalls that may be associated with each. The addition of several new authors allow for a broader and more diverse treatment of the ever-changing and expanding field of toxicology. Maintaining the high quality information and organizational framework that made the previous editions so successful, *Principles and Methods of Toxicology, Fifth Edition* continues to be a valuable resource for the advanced practitioner as well as the new disciple of toxicology.      **Evaluation of Data on the Transfer of Radionuclides in the Food Chain** G. Desmet, J. Sennaeve, 1992      *Evaluation of data on the*

*transfer of radionuclides in the food chain* W. Steffens, M. Bilo, H. Maubert, Ph Drouet, H. Noordijk, K E van Bergeljk, M J. Frissel, J. Lembrechts, A D (Dave) Horrill, F R (Francis) Livens, V H (Val) Kennedy, B J (Brenda) Howard, N A (Nick) Beresford, C M. Vandecasteele, M van Hees, E. Fagniat, J. Vankerkom, C. Hurtgen, J. Colard, J-P. Culot, R W. Mayes, C S. Lamb, B T. Wilkins, E J. Bradley, M. Belli, U. Sansone, J. Hilton, C A. Mills, M vaz Carreiro, A de Bettencourt, M J. Madruga, D. Woodhead, K. Leonard, D. Swift, Commission of the European Communities, 1990

### **Radionuclides in the Environment** Clemens

Walther, Dharmendra K. Gupta, 2015-10-30 This book provides extensive and comprehensive information to researchers and academicians who are interested in radionuclide contamination its sources and environmental impact It is also useful for graduate and undergraduate students specializing in radioactive waste disposal and its impact on natural as well as manmade environments A number of sites are affected by large legacies of waste from the mining and processing of radioactive minerals Over recent decades several hundred radioactive isotopes radioisotopes of natural elements have been produced artificially including  $^{90}\text{Sr}$   $^{137}\text{Cs}$  and  $^{131}\text{I}$  Several other anthropogenic radioactive elements have also been produced in large quantities for example technetium neptunium plutonium and americium although plutonium does occur naturally in trace amounts in uranium ores The deposition of radionuclides on vegetation and soil as well as the uptake from polluted aquifers root uptake or irrigation are the initial point for their transfer into the terrestrial environment and into food chains There are two principal deposition processes for the removal of pollutants from the atmosphere dry deposition is the direct transfer through absorption of gases and particles by natural surfaces such as vegetation whereas showery or wet deposition is the transport of a substance from the atmosphere to the ground by snow hail or rain Once deposited on any vegetation radionuclides are removed from plants by the airstream and rain either through percolation or by cuticular scratch The increase in biomass during plant growth does not cause a loss of activity but it does lead to a decrease in activity concentration due to effective dilution There is also systemic transport translocation of radionuclides within the plant subsequent to foliar uptake leading the transfer of chemical components to other parts of the plant that have not been contaminated directly

### **Man-Made and Natural Radioactivity in Environmental Pollution and Radiochronology**

Richard Tykva, Dieter Berg, 2004-01-31 The goal of this book is to examine the complex state of radioactivity in the environment and to understand the interplay of its two principal sources man made and natural The text examines human contributions to release of radionuclides with an eye to future reductions and assesses natural occurrences in an evaluation of baseline radioactivity

### Behavior of Radionuclides in the Environment II Alexei Konoplev, Kenji Kato, Stepan N.

Kalmykov, 2020-05-19 This is Volume II in a three volume set on the Behavior of Radionuclides in the Environment focusing on Chernobyl Now so many years after the Chernobyl accident new data is emerging and important new findings are being made The book reviews major research achievements concerning the behavior of Chernobyl derived radionuclides including their air transport and resuspension mobility and bioavailability in the soil water environment vertical and lateral migration

in soils and sediments soil to plant and soil to animal transfer and water to aqueous biota transfer The long term dynamics of radionuclides in aquatic ecosystems are also discussed in particular the heavily contaminated cooling pond of the Chernobyl Nuclear Power Plant which is in the process of being decommissioned Lessons learned from long term research on the environmental behavior of radionuclides can help us understand the pathways of environmental contamination which in turn will allow us to improve methods for modeling and predicting the long term effects of pollution This book features a wealth of original data and findings many of which have never been published before or were not available internationally The contributing authors are experts from Ukraine Russia and Belarus with more than 30 years of experience investigating Chernobyl derived radionuclides in the environment The content presented here can help to predict the evolution of environmental contamination following a nuclear accident and specifically the Fukushima Dai ichi nuclear power plant accident

*Radionuclide Contamination and Remediation Through Plants* Dharmendra Kumar Gupta, Clemens Walther, 2014-07-14 This book focuses on the mechanistic microscopic understanding of radionuclide uptake by plants in contaminated soils and potential use of phytoremediation The key features concern radionuclide toxicity in plants how the radioactive materials are absorbed by plants and how the plants cope with the toxic responses The respective chapters examine soil classification natural plant selection speciation of actinides kinetic modeling and case studies on cesium uptake after radiation accidents Radionuclide contaminants pose serious problems for biological systems due to their chemical toxicity and radiological effects The processes by which radionuclides can be incorporated into vegetation can either originate from activity interception by external plant surfaces either directly from the atmosphere or from resuspended material or through uptake of radionuclides via the root system Subsequent transfer of toxic elements to the human food chain is a concrete danger Therefore the molecular mechanisms and genetic basis of transport into and within plants needs to be understood for two reasons The effectiveness of radionuclide uptake into crop plants so called transfer coefficient is a prerequisite for the calculation of dose due to the food path On the other hand efficient radionuclide transfer into plants can be made use of for decontamination of land so called phytoremediation the direct use of living green plants for in situ removal of pollutants from the environment or to reduce their concentrations to harmless levels

**Inventory of Federal Energy-related Environment and Safety Research for ...**, 1978 **Inventory of Federal Energy-related Environment and Safety Research for FY 1977** United States. Department of Energy. Environmental Impacts Division, 1978

**A History of Radioecology** Patrick C. Kangas, 2022-12-26 This book presents a history of radioecology from World War II through to the critical years of the Cold War finishing with a discussion of recent developments and future implications for the field Drawing on a vast array of primary sources the book reviews synthesizes and discusses the implications of the ecological research supported by the Atomic Energy Commission AEC of the United States government from World War II to the early 1970s This was a critical period in the history of ecology characterized by a transition from

the older largely descriptive studies of communities of plants and animals to the modern form of the science involving functional studies of energy flow and mineral cycling in ecosystems This transition was in large part due to the development of radioecology which was a by product of the Cold War and the need to understand and predict the consequences of a nuclear war that was planned but has never occurred The book draws on important case studies such as the Pacific Proving Grounds the Nevada Test Site El Verde in Puerto Rico the Brookhaven National Laboratory and recent events such as the nuclear disasters at Chernobyl and Fukushima By revisiting studies and archived information from the Cold War era this book offers lessons from the history of radioecology to provide background and perspective for understanding possible present day impacts from issues of radiation risks associated with nuclear power generation and waste disposal Post Cold War developments in radioecology will be also reviewed and contrasted with the AEC supported ecology research for further perspectives This book will be of great interest to students and scholars of radioecology environmental pollution environmental technology bioscience and environmental history

**Nuclear Science Abstracts** ,1976 *Energy Research Abstracts* ,1984

**Marine Radioactivity** ,2004-09-17 This book on Marine Radioactivity sets out to cover most of the aspects of marine radioactivity which have been the focus of scientific study in recent decades The authors and their reviews divide into topic areas which have defined the field over its history They cover the suite of natural radioisotopes which have been present in the oceans since their formation and quantitatively dominate the inventory of radioactivity in the oceans Also addressed are the suite of artificial radionuclides introduced to the oceans as a consequence of the use of the atom for development of nuclear energy nuclear weapons and various applications of nuclear science The major source of these continues to derive from the global fallout of atmospheric tests of nuclear weapons in the 1950s and 1960s but also includes both planned and accidental releases of radioactivity from both civilian and military nuclear technology The other division of the major study direction depends on whether the objective is to use the radionuclides as powerful tools to study oceanic processes to describe and understand the ocean distribution of the various natural or artificial radionuclides or to assess the different radionuclides impact on and pathways to man or marine organisms The oceans cover 70% of the Earth s surface and thus contains a corresponding large share of the Earth s radioactivity Marine Radioactivity covers topics of recent scientific study in this young field It examines both natural radioactivity radioactivity naturally present in oceans since their formation and artificial radioactivity radioactivity introduced by man and use of atomic and nuclear energy with regard to possible effects on the global environment

**Atomic Energy Research** U.S. Atomic Energy Commission. Division of Plans and Reports,1970

*Food Safety* J. P. Felix D'Mello,2003 Food safety is a concern for scientists policy makers and consumers especially as food poisoning outbreaks are becoming more common and as particular concerns arise over genetically modified foods This book covers recent developments in the chemistry biochemistry and physiological effects of toxicants that might have an impact on human health and welfare

**Neutronics of Advanced Nuclear Systems** Yican

Wu,2019-03-19 This book provides a systematic and comprehensive introduction to the neutronics of advanced nuclear systems covering all key aspects from the fundamental theories and methodologies to a wide range of advanced nuclear system designs and experiments It is the first ever book focusing on the neutronics of advanced nuclear systems in the world Compared with traditional nuclear systems advanced nuclear systems are characterized by more complex geometry and nuclear physics and pose new challenges in terms of neutronics Based on the achievements and experiences of the author and his team over the past few decades the book focuses on the neutronics characteristics of advanced nuclear systems and introduces novel neutron transport methodologies for complex systems high fidelity calculation software for nuclear design and safety evaluation and high intensity neutron source and technologies for neutronics experiments At the same time it describes the development of various neutronics designs for advanced nuclear systems including neutronics design for ITER CLEAR and FDS series reactors The book not only summarizes the progress and achievements of the author s research work but also highlights the latest advances and investigates the forefront of the field and the road ahead **Environmental**

**Health Perspectives** ,1999 Impacts of Emerging Contaminants and Their Ecotoxicological Consequences Xuchun Qiu,Yuji Oshima,Kun Chen,Yohei Shimasaki,Yanhong Shi,2025-08-13 Emerging contaminants such as pharmaceuticals and personal care products PPCPs nanomaterials trace metals pesticides and microplastic are important factors that constrain productivity individual health reproduction and the ecosystem development of aquatic species The increasing number and diversity of emerging contaminants have shown multiple impacts on biological systems biodiversity and ecosystem functions which may finally lead to significant changes in populations and communities in aquatic environments In recent years many emerging pollutants in natural ecosystems have attracted widespread attention with the advances in detection and monitoring technologies Furthermore the adverse effects of emerging environmental pollutants particularly those that occur at environmentally relevant concentrations may appear only when they co occur with another stressor but knowledge about these impacts on aquatic species is still limited Thus more studies on the effects of those emerging environmental contaminants on aquatic organisms are critical to better assess their risk

## Unveiling the Energy of Verbal Art: An Emotional Sojourn through **Radionuclides In The Food Chain**

In some sort of inundated with screens and the cacophony of immediate transmission, the profound energy and psychological resonance of verbal art usually fade in to obscurity, eclipsed by the regular onslaught of sound and distractions. Yet, nestled within the musical pages of **Radionuclides In The Food Chain**, a charming perform of fictional splendor that impulses with fresh feelings, lies an wonderful journey waiting to be embarked upon. Penned by a virtuoso wordsmith, this enchanting opus courses readers on an emotional odyssey, gently exposing the latent possible and profound affect embedded within the elaborate internet of language. Within the heart-wrenching expanse with this evocative analysis, we shall embark upon an introspective exploration of the book is main subjects, dissect its fascinating publishing design, and immerse ourselves in the indelible impression it leaves upon the depths of readers souls.

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web classification mammal iucn status endangered lifespan in wild 80 90 years weight more than 130 000kg body size 30m long diet carnivore habitat ocean range 1 the largest animals to have ever lived on earth blue whales can grow to over 30m long and weigh more than 130 000kg that s longer than three buses and heavier than three lorries

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