

Editorial

Plant-based diets for human health: A book review

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In an era where dietary choices are increasingly linked to long-term health outcomes and global wellness trends, *The Science of Plant-Based Diets in Human Health* emerges as a timely, meticulously researched, and structurally comprehensive guide that demystifies the complex relationship between plant-centric eating and human well-being. Comprising 17 thoughtfully organized chapters, this book moves beyond popular dietary fads to ground its analysis in peer-reviewed scientific research, clinical evidence, and nutritional biochemistry, making it an indispensable resource for nutritionists, healthcare professionals, researchers, and informed general readers seeking evidence-based insights into plant-based eating. Unlike many mainstream plant-based diet books that prioritize advocacy over science, this book strikes a rare balance between academic depth and accessible storytelling, systematically unpacking every facet of plant-based nutrition from foundational definitions to real-world health applications.

Key Words: plant-based diets, phytochemicals, vegetarian, non-communicable disease

INTRODUCTION

A plant-based diet consists mainly or exclusively of plant-derived foods, encompassing diverse dietary patterns that emphasize fiber-rich products such as vegetables, fruits, whole grains, legumes, nuts, and seeds. While small amounts of animal products may be included, the focus remains on maximizing plant intake. Over the past few decades, plant-based diets have gained significant popularity as individuals seek healthier lifestyle choices. Extensive research has consistently demonstrated that adopting a plant-based diet is associated with a notably lower risk of non-communicable diseases (NCDs), including cardiovascular, metabolic disorders and certain cancers.

This review aims to summarize and introduce the currently published book 'The Science of Plant-Based Diets and Human Health', edited by Duo Li, published by Royal Society of Chemistry (Figure 1).¹ It examines evidence-based research on plant-based dietary patterns, structures, key components, and their associations with NCDs. Additionally, it explores the potential underlying biological mechanisms through which these dietary patterns exert health-promoting effects, as well as how to prevent possible nutrient deficiencies.

STRUCTURAL COHERENCE AND CORE CONTENT FRAMEWORK

The book's 17-chapter structure (Table 1) is its greatest structural strength, designed to guide readers progressively from basic nutritional fundamentals to specialized, high-stakes health topics, creating a logical and easy-to-follow narrative arc. The opening chapters lay a critical

foundational groundwork, dedicating extensive space to the classification and components of plant-based diets: a section that addresses a common gap in popular nutrition literature. Rather than reducing plant-based eating to a single, one-size-fits-all lifestyle, the text meticulously categorizes different plant-based dietary patterns: from strict veganism and Su vegetarianism (such as Buddhism in China), raw veganism and fruitarianism, these four types of vegetarian diets not only exclude all animal products but also exclude allium vegetables such as onions, leeks, garlic, chives, and scallions.² Other claimed vegetarian dietary patterns include lacto-ovo vegetarianism, ovo-vegetarianism, lacto-vegetarianism, flexitarianism (semi-vegetarianism), pescatarian diets, and plant-forward diet plans, which prioritize plant-based foods while allowing minimal consumption of animal products.^{1,3}

Each category is paired with a detailed breakdown of key nutritional components, including macronutrients (plant-based proteins, complex carbohydrates, healthy unsaturated fats), micronutrients (vitamins like B12, D, iron, calcium, and zinc), dietary fiber, and bioactive compounds such as polyphenols, flavonoids, and phytochemicals.⁴

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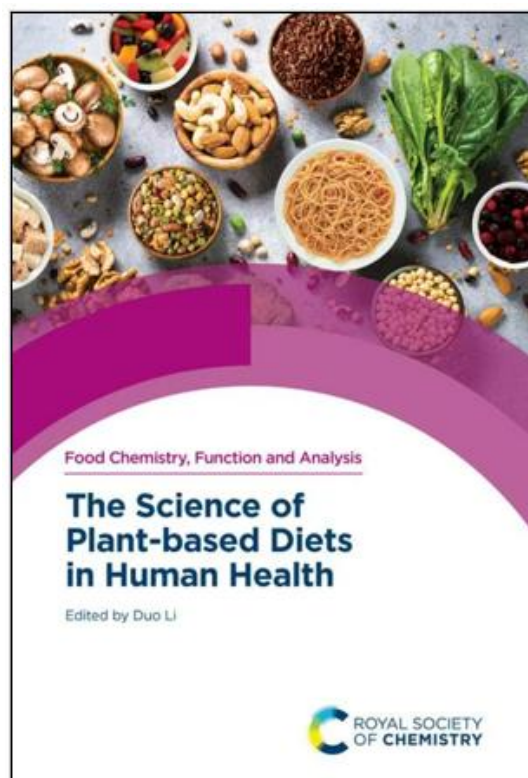


Figure 1. Book cover

The authors also tackle common nutritional concerns head-on, such as protein completeness, nutrient bioavailability, and potential deficiencies in restrictive plant-based diets, providing evidence-based strategies to mitigate these risks without sacrificing the diet's health benefits.

FOOD CHOICES

Nowadays, more and more people around the world choose to follow a vegetarian diet, and their reasons vary from personal beliefs to global concerns. The primary motivations for people avoiding meat may include concerns about animal welfare, health, and the environment.⁵

First of all, many people decide to be plant-based diet out of ethical considerations. They feel sorry for animals that suffer in factory farms and refuse to support cruel slaughter practices. They believe all living creatures have the right to live peacefully, and humans should not kill animals just for food.

Secondly, protecting the environment plays an important role in encouraging people to shift towards plant-based diets, especially with a high level of concern for climate change. Livestock farming produces large amounts of greenhouse gases, uses huge areas of land and wastes plenty of water. Cutting down meat consumption can reduce global warming, deforestation and pollution, which is good for our planet.⁶

Thirdly, health is a key reason. A balanced plant-based diet is rich in fibre, vitamins and antioxidants from vegetables, fruits, grains and beans. It can help lower the risk of heart disease, high blood pressure and obesity, making the body lighter and healthier.⁷

In addition, psychosocial and cultural factors have also contributed. Some people keep a vegetarian lifestyle because of religious or cultural traditions. Religions like Buddhism, Hinduism and Jainism advocate kindness to all lives, so their followers avoid eating meat. A small number of people also choose this diet simply because they dislike the taste of meat or prefer light plant-based food.⁷ Moreover, this book delves into the emotional, cognitive, sensory, and motivational components of people's choice to adopt a vegetarian diet. It examines what drives individuals to adopt this dietary approach, what helps them maintain it in the long term, and what may lead them to abandon it.⁵

In short, plant-based diet has become a meaningful way of life for many people today, whether from the perspective of animal welfare, health, nature, or personal beliefs.

PLANT-BASED DIETS AND SPECIAL POPULATIONS

Building on this foundational knowledge, the middle section of the book shifts focusses to plant-based diets and special populations, a highly relevant and often overlooked area in plant-based nutrition scholarship. The authors recognize that dietary needs vary drastically across different life stages and demographic groups, devoting dedicated chapters to children and adolescents, pregnant and lactating individuals,⁸ older adults,⁹ athletes,¹⁰ and individuals with specific genetic or physiological predispositions. For each group, the text analyzes the unique nutritional requirements, the potential benefits of tailored plant-based eating, and evidence-based guidelines for safe, sustainable adoption.

Table 1. List of chapters

Chapter	Title
1	Overview of plant-based diets
2	Nutrition profile of plant-based diets
3	Plant-based dietary patterns
4	Psychology of plant-based eating
5	Sustainable nourishment and livelihoods: Optimising plant-based food and health systems
6	The structure of plant-based diets and their relationship with health
7	Plant-based diets and infant development
8	Plant-based diets and the health of the elderly population
9	Metabolism of plant-based diets and their impact on gut microbiota
10	Effect of vegetarian diet on cardiovascular diseases
11	Effect of plant-based diets on body weight and metabolism
12	Plant-based diets and diabetes
13	Bioactive phytochemicals of plant-based diets for metabolic syndrome
14	Plant-based diets and cancer
15	Effect of plant-based diets on chronic kidney disease
16	Vegan diets for athletes
17	How to prevent certain nutrient deficiencies in a plant-based diet

This section avoids blanket recommendations, instead emphasizing individualized nutrition—for example, highlighting the need for enhanced iron and calcium intake for adolescent girls on plant-based diets, or optimized protein and calorie distribution for vegan athletes to support performance and recovery. By centering equity and inclusivity, the book dispels the myth that plant-based diets are only suitable for a narrow subset of the population, proving their adaptability across the human lifespan.

In short, evidence-based nutritional studies show that carefully planned plant-based diets, are suitable for people at all stages of life, including pregnancy, lactation, infancy, childhood, adolescence, and old age, as well as athletes. They can provide all the recommended nutrients in adequate amounts and lead to positive health outcomes.

PLANT-BASED DIETS AND NON-COMMUNICABLE DISEASES

The final, and arguably most impactful, section of the book delves into the critical link between plant-based diets and NCDs, the leading cause of global mortality and morbidity. Drawing on decades of epidemiological studies, clinical trials, and meta-analyses, the authors explore how plant-based dietary patterns prevent, manage, and even reverse some of the most prevalent NCDs, including cardiovascular disease,¹¹ body weight and metabolism,¹² type 2 diabetes,¹³ metabolic syndrome,¹⁴ certain cancers (such as colorectal and breast cancer)¹⁵ and chronic kidney disease.¹⁶

The effective targets of plant-based diets for the benefits of NCDs and risk factors include maintaining and correcting the gut microbiome, anti-inflammatory and antioxidant effects, and so on.¹⁷

The effective targets of plant-based diets for mitigating NCDs and their risk factors encompass several key mechanisms, including the modulation of the gut microbiome, anti-inflammatory effects, and antioxidant properties. Each disease-specific chapter explores these protective biological mechanisms in detail: For instance, soluble fiber and polyunsaturated fatty acids in plant-based diets contribute to lowering serum triglycerides, total cholesterol, and low-density lipoprotein cholesterol levels. The

high potassium content in fruits and vegetables plays a role in regulating blood pressure.¹¹ Whole plant foods are characterized by a low glycemic index, which helps stabilize blood sugar,¹² maintain body weight,¹³ and support metabolic functions.¹⁴ In addition, the anti-inflammatory and antioxidant phytochemicals in plant-based diets are associated with reduced risks of NCDs such as cancer, cardiovascular disorders, obesity and diabetes. Furthermore, some nutrients or phytochemicals exert beneficial effects on NCDs and their risk factors by modulating the expression of enzymes or proteins in specific pathways within the body, as described and discussed in the relevant chapters.

Importantly, the text avoids sensationalism; it acknowledges the limitations of current research, notes confounding variables in dietary studies, and distinguishes between whole-food plant-based diets (rich in whole grains, legumes, fruits, and vegetables) and processed plant-based diets (high in refined sugars, fried foods, and plant-based junk foods) that offer minimal health benefits.

In short, the authors conducted systematic review of the effects of plant-based diets on NCDs and their risk factors, based on evidence from meta-analyses, epidemiological and case-control studies, as well as randomized controlled trials. The evidence indicates that a plant-based diet has beneficial effects on NCDs, which result from the nutrients and phytochemicals in plant-based diets acting through various potential mechanisms.

HOW CAN STRICT VEGETARIANS CHOOSE THEIR FOOD TO PREVENT CERTAIN NUTRIENT DEFICIENCIES?

The last chapter discusses how strict vegetarians can choose their food to prevent deficiencies in certain nutrients.¹⁸ Strict vegetarians, or vegans, can prevent common nutrient deficiencies through intentional food choices, focusing on nutrients most likely to be lacking in a purely plant-based diet such as calcium, iodine, iron, zinc, selenium, vitamin D, and especially vitamin B12 and omega-3 polyunsaturated fatty acid (n-3 PUFA).

Key nutrients of concern include vitamin B12 and n-3 PUFA. Vitamin B12 is an essential nutrient, and its active intake is non-negotiable. Reliable levels cannot be found in any plant-based food. Regularly consume fermented foods containing vitamin B12, such as fermented black beans, broad beans, tofu, soy yogurt, and some fermented vegetables, and regularly undergo vitamin B12 blood tests. If necessary, supplements can be taken.¹⁸

The n-3 PUFA C20:5n-3 and C22:6n-3 are crucial for brain and heart health. But these two fatty acids do not exist in plant-based foods. The human body cannot effectively convert plant-based C18:3n-3 into C20:5n-3 and C22:6n-3. Therefore, for the vegetarian, especially the vegan population, it is important to increase the intake of foods rich in C18:3n-3, such as flaxseed, perilla seeds, chia seeds, hemp seeds, walnuts, and their oils. Some microalgae contain LC n-3 PUFA, such as *Nannochloropsis* sp. containing C20:5n-3 and *Isochrysis* sp. containing C22:6n-3, and their oil is a great source of C20:5n-3 and C22:6n-3 for the vegetarians, especially for vegans.¹⁸

In short, a healthy plant-based diet, like all dietary patterns, hinges on the inclusion of a diverse range of foods. No single food can provide all the essential nutrients that the body requires. Nevertheless, with careful consideration and strategic planning, it is entirely possible to create a balanced and nutrient-rich plant-based diet. Particular attention should be paid to stricter vegetarian groups, such as vegans, as improperly designed diets in these populations may lead to deficiencies in key nutrients, including protein, iron, zinc, vitamin D, calcium, iodine, selenium, especially vitamins B12 and n-3 PUFAs. As a result, it is crucial for vegetarians, especially vegans, to meticulously plan their meals to prevent nutrient gaps. This chapter delves into the most common plant-based sources of essential nutrients for vegetarian populations and offers guidance on avoiding specific nutrient deficiencies through thoughtful dietary planning.

SCIENTIFIC RIGOR AND ACCESSIBILITY

What sets this book apart from other nutrition texts is its unwavering commitment to scientific rigor without sacrificing readability. The authors, presumably a team of nutrition scientists, dietitians, and public health researchers, cite a vast body of peer-reviewed literature, including landmark studies from the World Health Organization, the Academy of Nutrition and Dietetics, and long-term cohort studies like the Adventist Health Study^{19,20} and the EPIC (European Prospective Investigation into Cancer and Nutrition) study.²¹⁻²³ Every claim is backed by empirical data, and the text includes clear explanations of statistical terms, study designs, and scientific concepts, making complex nutritional science accessible to readers without advanced scientific training. Graphs, tables, and summary boxes are strategically placed throughout the chapters to distill key findings, while real-world case studies and patient anecdotes add a human element to the scientific data, helping readers connect abstract research to tangible health outcomes.

The book also addresses common misconceptions and criticisms of plant-based diets with fairness and objectivity. It engages with counterarguments related to nutrient deficiencies, cultural food traditions, and the practical

challenges of adopting a plant-based diet in a food environment dominated by animal products, offering pragmatic solutions rather than ideological rhetoric. This balanced approach makes the book credible to skeptical readers, including healthcare providers who may have previously viewed plant-based diets as restrictive or nutritionally inadequate.

The systematic review approach adopted in this book not only integrates current knowledge, but also identifies the focus of future research in the key field of nutrition science. This book innovatively combines nutritional epidemiology with molecular biology evidence to gain a deeper understanding of the health benefits of plant-based diets, providing valuable insights for public health policies and dietary guidelines.

STRENGTHS AND AREAS FOR FURTHER EXPLORATION

The book's primary strengths lie in its comprehensive scope, scientific accuracy, and practical applicability. Its 17-chapter structure ensures no critical aspect of plant-based nutrition is overlooked, and its focus on special populations and NCDs fills a significant gap in existing literature. Additionally, the text transcends individual health to briefly touch on the environmental and public health implications of plant-based diets—linking reduced animal product consumption to lower greenhouse gas emissions, decreased land and water use, and reduced strain on healthcare systems—adding a broader societal context to its analysis.

One minor area for potential enhancement is a more extensive exploration of cultural and culinary adaptations of plant-based diets across global communities. While the book focuses heavily on Western nutritional research, a deeper dive into traditional plant-based diets from regions like the Mediterranean, Asia, Africa, and Latin America could further illustrate the cultural sustainability and diversity of plant-centric eating. Additionally, more actionable, day-to-day dietary guidelines and sample meal plans (paired with the scientific rationale) would make the book even more valuable for readers looking to translate research into practice.

CONCLUSION

The Science of Plant-Based Diets in Human Health is a landmark contribution to the field of nutritional science, offering a definitive, evidence-based examination of plant-based eating that is both academically rigorous and deeply practical. Its 17-chapter framework, covering diet classification, special populations, and NCDs, provides a holistic understanding of why and how plant-based diets support human health, making it essential reading for anyone working in healthcare, nutrition, or public health, as well as individuals seeking to make informed, science-based dietary choices. In a world grappling with rising rates of NCDs and misinformation about nutrition, this book stands as a reliable, balanced, and urgently needed resource. It demonstrates that a plant-based diet is not just a lifestyle trend, but a scientifically validated foundation for long-term health and well-being. Whether used as a textbook for students, a reference for clinicians, or a guide for conscious eaters, this book sets a new standard

for nutrition literature, bridging the gap between scientific research and real-world health impact.

CONFLICT OF INTEREST AND FUNDING DISCLOSURES

No competing interests are reported.

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