



PLANT-BASED DIETS

A move away from processed meat towards plant-based foods is growing in popularity. The number of vegans in Great Britain quadrupled between 2014 and 2019, with vegans making up 1.16% of the population in 2019.¹⁰ This article reports on the nutritional considerations of plant-based diets.



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Plant-based diets are defined by the low frequency consumption of animal food and by consuming mostly or solely foods that come from plants. These include fruit, vegetables, grains, pulses, legumes, nuts and meat substitutes such as soy and new novel food products with a focus on healthy wholefoods, rather than processed foods. The drive towards a more plant-based diet is fuelled by a combination of health, environmental, economic, religious and ethical reasons.

Consumers understand and use the term 'plant-based' diet in different ways, from complete avoidance of animal and animal-related products to the occasional consumption of meat, fish, or dairy products. Similarly, consideration should be given to the type, quality and frequency of plant foods consumed, the

degree of over processing and what else is eaten in the diet.

CARDIOVASCULAR AND OTHER BENEFITS

Numerous studies have found plant-based diets are associated with lower risk of cardiovascular outcomes and improved lipid profile.¹ Randomised clinical trials have demonstrated that replacing red meat with nuts, legumes, and other plant-based protein foods reduces levels of total and low-density lipoprotein cholesterol.²

The low saturated fat and high unsaturated fat contents of a healthful plant-based diet may lower CVD risk by improving the blood lipid profile and also through its potential anti-inflammatory effects. Replacing saturated fats with polyunsaturated and monounsaturated fats may also enhance insulin sensitivity

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Table 1: Examples of plant-based diets

Lacto-vegetarians	Eat dairy foods but exclude eggs, meat, poultry and seafood.
Ovo-vegetarians	Include eggs but avoid all other animal foods, including dairy.
Lacto-ovo-vegetarians	Eat dairy foods and eggs but not meat, poultry or seafood.
Semi-vegetarians (or flexitarians)	Occasionally eat meat or poultry.
Pescetarians	Eat fish and/or shellfish.
Vegans	Don't eat any animal products at all, including honey, dairy and eggs. Many shop-bought ready-made products may contain animal ingredients, so the labels of all manufactured products need to be read carefully.

and prevent Type 2 diabetes, possibly through altering cell membrane fatty acid composition and, thus, cell membrane function, moderating gene expression and enzyme activity and mediating the inflammatory response.

Plant foods, such as wholegrains, fruits, vegetables, vegetable oils, nuts, tea, coffee, and cocoa, are also rich in polyphenols, flavonoids, lignans, phenolic acids and stilbenes, which are natural bioactive compounds produced by plants as secondary metabolites. Their antioxidant capacity protects against oxidative stress. Polyphenols might also contribute to improved cardiovascular health through their roles in inhibiting platelet aggregation, reducing vascular inflammation and improving lipid profile.

A healthful plant-based diet is also rich in other antioxidant nutrients such as vitamins C and E, beta-carotene and potassium, which has been shown to reduce blood pressure and lower stroke risk through its beneficial effects on endothelial function and vascular homeostasis. Also, magnesium found in plant-based foods has been associated with improved cardio-metabolic outcomes due to its effects on glucose metabolism and insulin sensitivity and its anti-inflammatory, vasodilatory and anti-arrhythmic properties.

The gut microbiome – the complex community of microorganisms that reside in the human gut – metabolises otherwise indigestible dietary substrates to potentially influence the cardiovascular health of the human host. Plant-based diets differ from animal-based diets with respect to many other microbe-dependent metabolic pathways, including increased metabolism of fibre and polyphenols and decreased metabolism of bile acids and amino acids, which could mediate their inverse associations with cardiovascular end points.

Research suggests that people who eat primarily plant-based diets tend to have a lower body mass index (BMI) and lower rates of obesity, diabetes and heart disease than those who eat meat.³ Plant-based diets (especially vegan diets) may also help people prevent or manage diabetes by improving insulin sensitivity and reducing insulin resistance.⁴ The risk of diverticular disease too, has been found to be lower in vegetarians (31%) and even lower in vegans (72%) when compared to meat eaters.⁵

Another benefit is that people following plant-based diets and consuming a wide variety of fruits, vegetables and pulses are generally likely to find it easier to meet their five-a-day target and eat a diet high in fibre and complex carbohydrates. They are also likely to have good intakes of the vitamins and minerals present in fruit and vegetables, including folate, vitamin C and potassium, all of which are important for good health.

SUSTAINABLE EATING

In the UK, it is estimated that well-planned completely plant-based, or vegan, diets need just one third of the fertile land, fresh water and energy of the typical British meat-and-dairy-based diet. With meat and dairy being the leading contributor to greenhouse emissions, reducing animal-based foods and choosing a wide range of plant foods can be beneficial to the planet and our health.⁶ There is growing concern that industrial meat production can contaminate natural resources, including rivers, streams, and drinking water and that the raising of livestock can lead to the loss of forests and other land that both provide valuable carbon sinks.

NUTRITIONAL CONSIDERATIONS

Plant-based may not always mean 'healthy', particularly when it comes to processed and packaged foods. Technically, products such as refined sugar, white flour and certain vegetable fats can all be labelled 'plant-based' as they are vegetarian, but this does not mean that they should make up the bulk of a healthy diet. Also, if plant-based diets are not well planned, this may lead to a deficiency in the intake of some nutrients.

When following a plant-based diet, there are some key nutrients to focus on to avoid deficiency, as certain nutrients are not found very easily, or at all, in plant foods. These may need to be sourced from fortified foods such as fortified plant milks, spreads and cereals.

Vitamin B12: Most people get vitamin B12 by eating animal products. The only reliable plant sources of vitamin B12 are fortified foods (some breakfast cereals, yeast extracts, soya yoghurts and non-dairy milks.) and supplements.

Recommend eating fortified foods at least twice a day, aiming for 3mcg of vitamin B12 a day, or take a supplement, 10mcg daily or at least 2000mcg weekly.

Iron has lower bioavailability in plants than meat. Plant sources of iron include dried fruits, wholegrains, nuts, green leafy vegetables, seeds and pulses. Combine citrus and other vitamin C sources with plant-based sources of iron to increase absorption.

Protein: Some people may have concerns about getting enough protein from a plant-based diet. However, there is a wide variety of plant-based sources of protein, including beans, lentils, chickpeas, seeds, nuts and nut butters (eg, peanut butter) and tofu. Eggs, and dairy are also good sources (if appropriate). Meat substitutes such as vegetarian burgers, soya sausages and other meat alternatives can be useful for those adapting to a plant-based diet and can provide a source of protein. However, as with any processed foods, these can often be high in salt and fat, so should be used in moderation. These products may contain animal ingredients such as eggs, milk derivatives and honey, so careful label reading is necessary if following a vegan diet.

Omega-3 fatty acids: These are commonly found in oily fish. However, if not eating fish, plant sources of omega-3 include walnuts, flax (linseed), hemp seeds, chia seeds and soya beans. Oils such as hemp, rapeseed and flaxseed oil provide essential omega-3 fats. Research shows, however, that the body is slow at converting omega-3 ALA to the more active EPA and DHA molecules, so supplements should be considered. A range of plant-based omega-3 supplements is available.

Calcium: Whilst the calcium intake for vegetarians is similar to that of meat eaters, the intake of calcium by vegans is much lower.⁷ Fortified plant-based milk alternatives, dried fruit, figs, nuts such as almonds, leafy green vegetables, red kidney beans, sesame seeds, tahini and tofu, are all good choices.

Vitamin D: Plant-based sources of vitamin D include sun-exposed mushrooms and fortified

foods such as vegetable spreads, breakfast cereals and plant-based dairy alternatives. Since it's difficult to get enough vitamin D from food alone, everyone should consider taking a daily supplement of 10mcg/day during the autumn and winter months. Some vitamin D supplements are not suitable for vegans. Vitamin D2 and lichen-derived vitamin D3 are suitable.

Iodine: The main sources of iodine in our diet are dairy products and fish, so vegetarian and vegan diets may be deficient. Some plant-based drinks, such as soya, oat and rice, may be fortified with iodine, so it is wise to check labels. The iodine content of plant foods also depends on the iodine content of the soil, which is variable. Foods grown closer to the ocean tend to be higher in iodine. The iodine content of seaweed, for example, is variable and sometimes too high. Guidance is not to consume sea vegetables more than once a week.⁸

Zinc: Phytates found in plant foods, such as wholegrains and beans, reduce zinc absorption. Good sources of zinc-containing foods include fermented soya such as tempeh and miso, beans (soak dried beans then rinse before cooking to increase zinc absorption), wholegrains, nuts, seeds and some fortified breakfast cereals.

Selenium: Concerns have been raised about the selenium status of non-meat eaters, as the consumption of red meat is a major determinant of serum selenium.⁹ Plant sources of this mineral include grains, seeds and nuts. Just three Brazil nuts daily will provide you with half your daily requirement of selenium.

MEAT SUBSTITUTES

Plant-based meat alternatives (PBMA) have entered the market designed to mimic the taste and experience of eating meat. These are aimed to appeal to a broader consumer base than the relatively smaller vegan or vegetarian demographic, which had traditionally been the target of animal product alternatives. PBMA, however, need further investigation for their health benefits and carbon footprint.

Another line of products on the horizon is laboratory-grown (or cultured) meat, poultry and fish, which uses cell-based technologies

to culture and grow cells from animals, producing animal products without raising and slaughtering the animal.

SUMMARY

Eating a diet higher in plant foods and lower in animal products can have many health benefits, including a lower risk of heart

disease and diabetes and encouraging weight management. Plant-based diets are seen to be environmentally sustainable too. Following a plant-based or vegan diet may challenge some micronutrients (iron, zinc, vitamin B12, calcium and omega-3s) and complete protein sources, making careful consideration and planning a requirement.

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Internet resources: [Vegan Society \(UK\) www.vegansociety.org](http://www.vegansociety.org)



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Questions relating to: *Plant-based diets*

Type your answers below, download and save or print for your records, or print and complete by hand.

Q.1 How are plant-based diets defined?

A

Q.2 Explain how plant-based diets can benefit cardiovascular health.

A

Q.3 What is the difference between a lacto-vegetarian and a lacto-ovo vegetarian?

A

Q.4 What are the antioxidant benefits of plant-based diets?

A

Q.5 Describe how plant-based diets contribute to sustainable eating.

A

Q.6 When can plant-based diets become unhealthy?

A

Q.7 Explain how protein deficiency may be a concern for some people considering a plant-based diet.

A

Q.8 What advice can be given regarding iodine deficiency in these diets?

A

Please type additional notes here . . .