

# Practical tips for preparing healthy and delicious plant-based meals

It is not only what a diet excludes, but what it includes, that shapes health outcomes. This article is a practical guide for doctors to help them advise patients on nutrient-rich foods, which should form the basis of all types of plant-based diets. Of the recognised types of plant-based diets (Box 1), the most widely studied is the lacto-ovo-vegetarian diet.

## Key points about plant-based diets

- Plant-based diets focus on fruits, vegetables, legumes, nuts, seeds and grains. Some vegetarian diets also include eggs and dairy, and a few traditional (eg, Mediterranean and Asian) plant-based diets include limited amounts of meat and/or seafood.
- A varied and balanced plant-based diet can provide all of the nutrients needed for good health (Box 2).<sup>2</sup>
- Plant-based diets may provide health benefits compared with meat-centred diets, including reduced risks of developing chronic diseases such as obesity, heart disease, colorectal cancer and type 2 diabetes.<sup>1</sup>

### 1 Types of plant-based diets<sup>1</sup>

**Semi-vegetarian:** includes red meat, poultry and fish less than once a week.

**Pesco-vegetarian:** includes fish and seafood but no red meat or chicken.

**Lacto-ovo-vegetarian:** includes dairy foods, eggs, or both, but no red meat, poultry or seafood. This is the most common type of vegetarian diet.

**Vegan:** excludes all animal products including meat, poultry, seafood, eggs and dairy foods. Most vegans also won't use honey or other animal products. ◆

### 2 Sources of key nutrients in a vegetarian or vegan diet\*

Nutrient	Food source
Protein	Legumes, tofu, soy milk, tempeh, gluten, wholegrains (particularly amaranth and quinoa), nuts, seeds, eggs, milk, yoghurt
Iron <sup>†</sup>	Legumes/soybeans, wholegrains (particularly amaranth and quinoa), iron-fortified cereals, tofu, tempeh, dried fruit, nuts, seeds, green leafy vegetables
Zinc	Wholegrains, legumes, tofu, nuts, seeds, tempeh, eggs, milk, yoghurt
Calcium	Milk, yoghurt, cheese, calcium-fortified soy, rice or oat milk, calcium-set tofu, unhulled tahini, kale, Asian green vegetables, almonds
Vitamin B <sub>12</sub> <sup>‡</sup>	Milk, yoghurt, cheese, eggs, vitamin B <sub>12</sub> -fortified soy or rice milk, vitamin B <sub>12</sub> -fortified meat analogues (eg, some vegetarian sausages and burgers)
Omega-3 fats	Flaxseed oil, <sup>§</sup> linseeds/flaxseeds, <sup>§</sup> chia seeds, <sup>§</sup> walnuts, <sup>§</sup> soy foods, <sup>§</sup> omega-3 eggs and DHA-fortified foods (eg, breads, yoghurts, orange juice)
Vitamin D	Milk, eggs, vitamin D-fortified soy milk, vitamin D mushrooms

DHA = docosahexaenoic acid.

\* Amounts of each food required each day will vary for individuals depending on age and sex and, for women, whether they are pregnant or breastfeeding. Various health conditions or the use of certain medications may also affect requirements for particular nutrients. † Non-haem iron, the absorption of which is improved in the presence of vitamin C and inhibited by phytates and tannins. ‡ Mushrooms are not a reliable source as they provide only trace amounts. §  $\alpha$ -linolenic acid (ALA) is converted to the long-chain omega-3 fatty acids in the body; this conversion is improved with a diet low in omega-6 polyunsaturated fats and *trans* fats. ◆

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- Plant-based diets more closely match recommended dietary guidelines to eat plenty of fruits, vegetables, legumes and wholegrains, and to limit intakes of saturated fats and sugars.<sup>3</sup>
- A 2010 national Newspoll survey of 1200 adults indicated that 70% of Australians consume some plant-based meals in the belief that eating less meat and more plant foods improves overall health (Newspoll Research, Leaders in Nutrition, May 2010, commissioned by Sanitarium Health and Wellbeing).
- A vegetarian diet does not mean just cutting out meat. Careful planning, along with knowledge of practical ideas for using a variety of plant foods, is needed to ensure nutritional requirements are met, particularly for new vegetarians or those with special needs.
- Nutrients that may need more attention in a vegetarian diet include iron, zinc, calcium, vitamin B<sub>12</sub>, vitamin D and omega-3 fats. It may be beneficial to refer people to an Accredited Practising Dietitian experienced in vegetarian nutrition.
- Any dietary change can increase preparation time to begin with, but cooking plant-based meals need not be more time consuming after some training and regular practice.
- A minimally processed plant-based diet, with limited (if any) amounts of animal foods derived from animals lower down the food chain, provides environmental advantages over a Western-style meat-rich diet.<sup>4-6</sup>

## Common myths about vegetarian diets

### Myth: it is difficult to get enough protein on a vegetarian diet

Studies of Australian vegetarians have found that although their protein intakes are significantly lower than those of omnivores,<sup>7,8</sup> their intakes still easily meet recommended dietary intakes (RDIs) because most omnivores eat much more protein than is required. Most plant foods contain some protein, with the best sources

### 3 Glossary of protein-rich plant food

There are many protein-rich plant foods available, including whole foods such as legumes, traditional products like tofu, and faux meats, which can make transition to a plant-based diet easier and more convenient.

Food	Description and additional information
Legumes	Dry beans, peas or lentils available in hundreds of varieties (eg, chickpeas, borlotti beans, black beans, puy lentils, lima beans). Many canned varieties are available from supermarkets.
Textured vegetable protein (TVP)	A good substitute for mince when making bolognese sauce, shepherd's pie or taco filling. Made from soy flour, TVP is dehydrated and resembles mince crumbles or chunks. It can be stored in the pantry for many months.
Tofu	This is available in different textures (silken, soft and firm) and can be cut to desired size. It is excellent for curries, stir fries, burgers, creamy dressings or dessert. Also known as bean curd, tofu is made by curdling soy milk.
Tempeh	This is a savoury fermented soybean cake that can be sliced or diced then grilled, baked or pan fried.
Gluten	Also known as seitan, gluten has a meaty texture and can be used in stir fries and casseroles or crumbed and cooked as schnitzel. It is available canned or fresh from Asian stores or can be made at home from gluten flour.
Convenience vegetable protein products	These are made from soy, nuts, gluten and grains. They are available canned, chilled, frozen or shelf-stable. Most are ready to heat and serve or can be used as ingredients in other dishes. Many have high levels of sodium, and so are not ideal for everyday use. ◆

being legumes, soy foods (including soy milk, tofu and tempeh), nuts and seeds. Grains and vegetables also provide protein. A glossary of protein-rich plant-based foods is provided in Box 3.

#### Myth: vegetarians need to combine proteins at meals

As most plant foods contain limited amounts of one or more essential amino acids it was once thought certain combinations had to be eaten at the same meal to ensure sufficient essential amino acids. Research has found that strict protein combining at each meal is unnecessary, provided energy intake is adequate and a variety of plant foods are eaten over the course of a day, including legumes, wholegrains, nuts and seeds, soy products and vegetables.<sup>9</sup> Soy protein is a complete protein as it has a Protein Digestibility-Corrected Amino Acid Score (PDCAAS) equivalent to that of eggwhite or dairy protein (casein).<sup>10</sup>

#### Myth: vegetarians need to take an iron supplement

Vegetarian diets can contain as much or more total (non-haem) iron as mixed diets; this iron comes primarily from wholegrain breads and cereals.<sup>11,12</sup> Iron deficiency anaemia is not more common among vegetarians, although their iron stores (serum ferritin levels) are often lower.<sup>7,12,13</sup> Some studies have found that lower iron stores are associated with reduced risk of chronic diseases (such as cardiovascular disease and type 2 diabetes), which may partly explain the lower risk of these diseases in vegetarians.<sup>14,15</sup>

#### Myth: dairy foods are the only good source of calcium.

Dairy products are not the only sources of calcium in the diet. Fortified soy, rice and oat milks, unhulled tahini, Asian greens, almonds and calcium-set tofu are good sources of bioavailable calcium in non-dairy diets.<sup>16,17</sup> Calcium needs can be met using plant foods as long as adequate amounts of these foods are consumed each day.

#### Myth: vegetarian diets are not suitable during pregnancy

Vegetarian diets can be planned to supply the required levels of nutrients during pregnancy. Research shows there are no significant health differences in babies born



to vegetarian mothers.<sup>18</sup> The higher fibre content and lower energy density of many vegetarian diets may offer significant advantages, including a reduced risk of excess weight gain.<sup>19</sup> Further, some studies suggest that a lower intake of meat and dairy products reduces the pesticide content of breast milk.<sup>20,21</sup>

#### Myth: vegetarian diets are not suitable for children

Vegetarian diets are appropriate for children of all ages.<sup>2</sup> The growth of vegetarian and vegan children is similar to that of non-vegetarian children if meals are planned well, according to the American Academy of Pediatrics<sup>22</sup> and American Dietetic Association.<sup>2</sup>

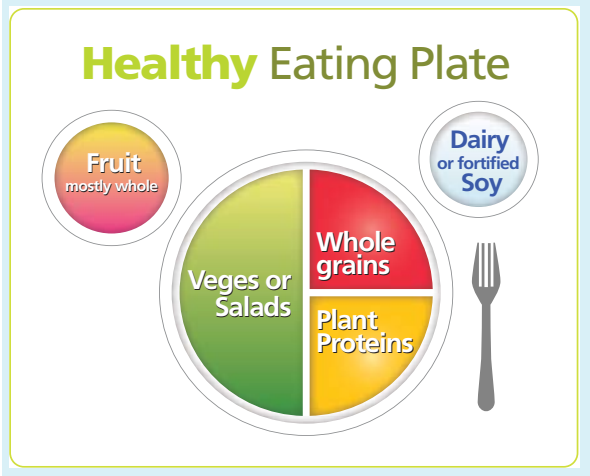
### Meal planning

As for all healthy diets, meal planning for plant-based diets should focus on incorporating a wide variety of minimally processed foods from each of the main food groups to ensure a plentiful supply of nutrients and phytonutrients.

The Healthy Eating Plate device (Box 4) has been created as a visual guide for planning plant-based meals at home.

**Vegetables and/or salads:** these should include vegetables of a variety of colours, and should fill half of a main meal plate.

#### 4 The Healthy Eating Plate device



**Wholegrains:** these are preferred over refined grain foods (eg, brown rice instead of white rice), and can occupy about a quarter of a main meal plate. When choosing grain foods, choose those with a low glycaemic index (GI). Low GI carbohydrates help to regulate blood glucose and insulin levels, lower the levels of low-density lipoproteins and triglycerides and raise the high-density lipoprotein level, and can assist with weight management.<sup>23-25</sup>

**Plant proteins:** from sources such as legumes, nuts, seeds, soy products or vegetarian convenience products should occupy about a quarter of a main meal plate. Semi-vegetarians may sometimes substitute fish, poultry or red meat.

**Dairy or calcium-fortified soy, rice or oat products:** these may be liquids or solids, and consumed as a side dish or integrated into the contents of a main meal plate. Lower fat varieties are preferable. The lower protein content of rice and oat beverages may not be suitable for infants and young children.

**Fruit:** this is best eaten whole with the skin (rather than juiced), and consumed as a dessert or snack.

While it is desirable to plan to include all of these components in each meal, different cooking styles and cuisines may determine the composition of a meal and whether the recommended balance of nutrients is eaten at each meal or spread over the meals for the day.

Easy meal ideas for main plates and snacks are provided in Box 5, and Healthy Eating Plate images for main courses are shown in Box 6.

#### Shopping tips

- When choosing alternatives to dairy foods (eg, soy or rice milk), look for products enriched with calcium and vitamin B<sub>12</sub>.
- Tofu, tempeh, Quorn (meat-free, soy-free products based on high-quality mycoprotein), textured vegetable protein, canned and frozen or chilled convenience products (eg, Sanitarium Vegie Delights, Fry's Vegetarian foods and Syndian Natural Food Products) are available in most supermarkets.
- Many varieties of legumes and wholegrains are available in Asian, Indian and health food shops.

#### 5 Some delicious plant-based meal and snack ideas

##### Breakfast ideas

- Bircher muesli with yoghurt and berries
- Soy and linseed bread with almond spread
- Fruit salad with low-fat yoghurt and a sprinkle of natural muesli
- Toasted rye sourdough with ricotta, fresh tomato and oregano
- Smooth polenta porridge with soy milk
- Baked beans on wholegrain English muffins
- Homemade carrot, rosemary and zucchini muffins with chia seeds
- Millet with macadamia nuts, currants and low-fat milk

##### Lunch ideas

- Vietnamese rice paper rolls filled with vegetables, tofu and fresh herbs
- Vegetable frittata with mixed green leaves
- Falafel roll with hummus, tabouli, tomato and lettuce
- Mixed bean and pasta salad with lemon
- Homemade mini pizzas with Mediterranean vegetables
- Wholegrain egg and lettuce sandwich
- Lentil burger with baby spinach, tomato, beetroot and caramelised onion
- Jacket potato with spicy bean mix, coleslaw and fresh avocado topping

##### Dinner ideas

- Vegetable stir fry with tempeh, hokkien noodles and satay sauce
- Spaghetti with red wine and cinnamon bolognese sauce (made with textured vegetable protein)
- Three-bean dhal with steamed brown rice and minted cucumber raita
- Spinach and ricotta cannelloni with fresh cabbage, carrot and shallot salad
- Lentil shepherd's pie with tossed salad
- BBQ tofu and vegetable kebabs with wild rice salad and wasabi dressing
- Moroccan chickpea and vegetable tajine with quinoa
- Crumbed gluten (seitan) schnitzel with cauliflower mash, pumpkin and broccolini with almonds

##### Snack ideas

- Fresh fruit in season
- Low-fat dairy or calcium-fortified soy yoghurt
- Handful of almonds or cashews
- Few dried figs or prunes
- Milo made with low fat milk
- Fresh cob of corn or popcorn
- Roasted soy nuts or chic nuts (roasted chickpeas)
- Wholemeal pita pocket with hummus and cherry tomatoes
- Berry and banana soy smoothie with ground linseeds/flaxseeds
- Sweet potato in its jacket

- Vegetarian cheese, dairy-free margarine/chocolate or frozen convenience meals may sound healthy, but many can hide excess kilojoules, fat, sugar or salt.

#### Seven cooking tips

1. Enrol in a cooking class to improve your culinary skills and increase dietary variety.
2. Plan meals that you know you can easily prepare for several days of each week to help you avoid buying takeaway meals.
3. Stock your pantry with a flexible range of ingredients, with an emphasis on whole foods to make it easy to prepare a



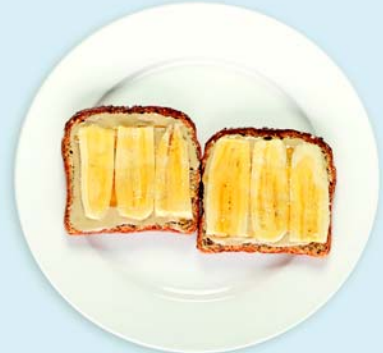
6 Healthy Eating Plate images for main courses



Multigrain chia seed porridge topped with walnuts, dried white figs and berries



Vege sausages with grilled tomato, avocado, caramelised onions and café-style grainy toast



Soy and linseed bread with tahini, sliced banana and honey drizzle



Bruschetta piled with black-eyed bean, lemon and shallot salad



Kumara, red lentil and dill soup served with sourdough seeded bread



Quinoa salad with black beans, shaved fennel, orange slices and mint



Barley risotto with porcini mushrooms, pine nuts and sage and dressed rocket salad



Yellow split-pea curry with Persian lime, red and wholegrain rice combo and yoghurt cucumber salad



Roasted vegetables on wholegrain couscous with Moroccan dressing, pepita seeds and fetta

meal (eg, wholegrain spaghetti, canned brown lentils and a tomato-based pasta sauce for spaghetti bolognese).

4. Invest in a pressure cooker to cook legumes and wholegrains quickly, or a slow cooker to cook them overnight on low heat.
5. Freeze portion-sized quantities of homemade leftover soups, stews and curries for easy lunches.
6. Shell your own walnuts (these are rich in  $\alpha$ -linolenic acid, making them highly prone to oxidation on exposure to oxygen) and store nuts and seeds in the fridge or freezer to extend shelf life.

7. Choose cooking oils that have high levels of omega-9 (eg, extra virgin olive oil, macadamia oil) or omega-3 (eg, canola oil) fatty acids. Do not heat flaxseed oil or chia oil (because they have a very high omega-3 fatty acid content making them highly prone to oxidation), and store in the fridge.

### Supplements

It is not necessary for people to take supplements routinely just because they follow a plant-based diet. However,

## 7 Resources

- Free images of the Healthy Eating Plate device and sample plant-based food plates developed by the first author can be downloaded in full colour and high-resolution for educational purposes ([www.sueradd.com/resources/healthyeatingplate.html](http://www.sueradd.com/resources/healthyeatingplate.html)).
- For one-on-one dietary advice, find an Accredited Practising Dietitian with expertise in vegetarian nutrition ([www.daa.asn.au](http://www.daa.asn.au)).
- Nutrition information, recipes, cooking classes and forums can be found at the Australian Vegetarian Society ([www.veg-soc.org](http://www.veg-soc.org)).
- Sanitarium Health & Wellbeing Australia website ([www.sanitarium.com.au](http://www.sanitarium.com.au)) provides an abundance of free vegetarian recipes and other practical information. ◆

depending on dietary restrictions, health, and stage of life, certain supplements may be beneficial. For example, those eating a vegan or low-dairy diet should ensure a sufficient intake of foods fortified with vitamin B<sub>12</sub> or take a supplement that provides at least the RDI of vitamin B<sub>12</sub>. Patients beginning a plant-based diet should see their doctor or an Accredited Practising Dietitian for further advice on their individual supplement needs. In some cases, high doses of supplements may be harmful.

## Conclusion

There are many health benefits from eating a plant-based diet, but, as with any eating plan, it is important that it is well planned to ensure that nutritional needs are met. In this article, we provide a basic guide to preparing healthy plant-based meals that incorporate key nutrients. It is intended as a starting point, as individual needs will vary. An Accredited Practising Dietitian can help develop an eating plan specific to individual needs.

This practical paper is intended for use in patient education and may be reproduced for this purpose. Additional resources are shown in Box 7. For further details on the scientific evidence behind these recommendations please see the other articles in this supplement.

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