

## NUTRITION FOR VEGETARIAN EATING

### Why do athletes choose a vegetarian diet?

The main reasons for adopting vegetarian diets reported by the general population include cultural and religious beliefs, moral beliefs concerning animal rights, health benefits and environmental issues. For athletes, reasons are likely to be similar to those of the general population. However, some athletes may adopt a vegetarian or 'near-vegetarian' diet to meet increased carbohydrate requirements for training or to assist in weight management.

Some individuals, especially women, may switch to vegetarianism as a means of avoiding red meat and/or restricting energy intake to attain a lean body composition favoured in some sports such as distance running. Commonly, these athletes replace meat (red meat, chicken and fish) in their diet with bulky, high fibre foods or avoid eating red-meat, relying heavily on chicken and fish as protein staples. Failing to include suitable vegetarian meat alternatives in their daily meal plan, these athletes are at risk of inadequate dietary intakes to maintain health and support the demands of daily training. Occasionally, this may be a red flag for disordered eating and increase the risk for the female athlete triad. Because of this association, coaches and sports medicine professionals should be alert when an athlete becomes a vegetarian and should ensure that appropriate weight is maintained.

Interestingly, studies reporting on the suitability of vegetarian diets to support sports performance have included 'near vegetarian' athletes within the vegetarian cohort. In these studies, nutritional inadequacies identified are more likely to reflect athletes that display restrictive food behaviours than athletes who are following a well-chosen vegetarian diet.

### Categories of Vegetarian Eating

Many diets fall under the umbrella of vegetarian eating. The term vegetarian is used more broadly than its true definition, describing diets based exclusively on plant based foods to diets including some flesh foods. The table below outlines the different types of vegetarian diets that exist.

Type	Comments
Fruitarian	Diet consists of raw or dried fruits, nuts, seeds, honey and vegetable oil.
Macrobiotic	Excludes all animal foods, dairy products and eggs; uses only unprocessed, unrefined, "natural" and "organic" cereals, grains and condiments such as miso and seaweed.
Vegan	Excludes all animal foods, dairy products and eggs. In the purest sense, excludes all animal products including honey, gelatine, silk, wool, leather and animal derived food additives.
Lacto-vegetarian	Excludes all animal foods and eggs. Does however include milk and milk products.
Lacto-ovo-vegetarian	Excludes all animal foods, however includes milk, milk products and eggs.
"Quasi", "Pseudo", or Near-Vegetarian	Usually excludes red meat, however includes poultry, beef extracts and fats, fish, eggs and dairy products.

### **Will a vegetarian diet improve your exercise performance?**

Currently it is unclear as to whether a vegetarian diet will improve athletic performance. To date, studies have failed to examine the true benefit, if any, of a vegetarian diet on exercise performance. Studies have either controlled for the inherent differences seen between vegetarian diets and non-vegetarian diets, or have used populations that are not representative of well-trained athletes.

In theory, if a vegetarian diet was high in carbohydrate and met or exceeded recommendations for other nutrients and energy (kilojoules) then it would match the ideal or recommended diet for training and recovery, particularly for endurance athletes. As many studies typically report vegetarians consume a diet higher in carbohydrate than non-vegetarians, further research is required to determine the possible training and competition benefits of following such a diet.

### **Is a vegetarian diet suitable for athletes?**

Numerous studies have reported on the variety of health benefits associated with eating a vegetarian diet, but the question remains – is a vegetarian diet suitable for athletes? Generally speaking, vegetarian eating can support optimal sports performance. Studies have demonstrated that a well-chosen vegetarian diet contains adequate energy (kilojoules) and protein, is high in carbohydrate and low in fat – making it ideal for athletes striving to meet the dietary guidelines encouraged for sport.

It's worth noting that although a vegetarian diet can provide all essential nutrients to support intense daily training and competition, there are several dietary challenges faced by athletes following a vegetarian diet.

## **Can you eat enough energy (kilojoules) on a vegetarian diet?**

Vegetarian diets, if very high in fibre and bulk, are associated with low energy intakes because fibre satisfies hunger. Vegetarian athletes, particularly children and adolescents, may have difficulty meeting the daily energy requirements to support general growth along with the added demands of training. Legumes, whole grain cereals and grains, soybeans and many vegetables and fruits are high-fibre, relatively low-fat foods.

For the vegan athlete, incorporating energy dense foods such as nuts, tofu, tempeh, textured vegetable protein and commercially prepared meat analogues helps increase energy density of the diet. For lacto-ovo vegetarians, the addition of cheese, yoghurt and custard further removes bulk from the diet and makes it easier for athletes to maintain energy balance, particularly during periods of intense training or competition.

## **Protein – are vegetarian diets adequate?**

Although most vegetarian athletes meet or exceed recommendations for total protein intake, diets of vegetarians often provide less protein than those of non-vegetarians. Thus, some athletes may need to target protein rich vegetarian foods in order to meet the added demands of training and competition. Vegetable or plant proteins may be limiting in one or more essential amino acids (the building blocks of protein), so food sources need to be combined in such a way to ensure all amino acids are consumed. This is a particular issue for athletes who avoid all animal proteins such as milk and eggs (i.e. vegans). There is no requirement to include complementary proteins at each meal as long as a variety of protein sources are included throughout the day. Combining different types of plant foods allows low levels of amino acids in one food to be complemented by high levels of amino acids in the other (i.e. legumes and grains, or legumes and nuts/seeds).

Furthermore, as plant proteins are less well digested than animal proteins, vegetarian athletes are advised to consume approximately 10% more protein than current athlete protein recommendations. This is of particular concern for vegetarians with relatively low energy budgets. These athletes should pay extra attention in choosing nutrient rich foods and fluids in order to ensure protein intakes meet current recommendations. See our factsheet on protein requirements for athletes.

## **What about other nutrients?**

Recent revisions to population nutrient standards in both the USA and Canada have indicated that people consuming vegetarian diets have higher recommendations for zinc, iron and possibly calcium to adjust for the low bioavailability of these nutrients in vegetarian diets. For vegetarian athletes, this issue is complicated as the requirements for these nutrients are likely to be higher than population standards. Iron is of particular concern because plant sources of iron have low bioavailability compared with animal sources. Iron stores of vegetarians are generally lower than those reported for omnivores. Vegetarian athletes, especially women, may be at greater risk for developing iron deficiency or anaemia. Routine monitoring of iron status is recommended for vegetarian athletes, especially during periods of rapid growth (i.e., adolescence and pregnancy) or heavy training in extreme conditions (i.e. altitude).

Certain vitamins and minerals that are commonly found in animal based foods such as iron,

riboflavin, vitamin B12, calcium and zinc can be provided in adequate quantities provided suitable vegetarian meat alternatives are included. A key issue for athletes who are vegetarian or 'near-vegetarian' is to explore vegetarian alternatives to replace the nutrients normally provided by meat and other foods excluded from their daily intake.

### **Nutrition Tips for vegetarian athletes:**

- Be sure to eat a variety of food choices including protein-rich and carbohydrate-rich foods at each meal. Vegetarian sources of protein and minerals typically found in meat include lentils, dried beans and peas (ready-to-use products are available), tofu, tempeh, textured vegetable (or soy) protein, and ready-made nut, soy or wheat-derived meat analogues. Many supermarkets now provide vegetarian styles of mince, sausages or "luncheon meats".
- You may need help to experiment with vegetarian meat alternatives. Specialist vegetarian cookbooks can provide recipe ideas and special tips for cooking with legumes, soy and other vegetarian meat analogues. [Sanitarium Health Food Company](#) is the largest vegetarian company within Australia and New Zealand, and produce numerous nutrition resources including cookbooks, nutritional product analysis brochures and newsletters.
- If you have recently converted to a vegetarian diet, you may find that you lose weight that you didn't intend to lose. This is a common result when bulky, high-fibre foods such as beans and legumes are used as a replacement for meat, chicken and fish. Athletes in heavy training or undergoing growth spurts have very high energy requirements. It is sometimes difficult to eat enough when meals are based on bulky food requiring lots of chewing. In this situation, it is good to find compact, energy-dense vegetarian foods – for example commercially available meat analogues, textured vegetable protein, tempeh, tofu, nuts, and peanut or nut butter. For lacto-ovo-vegetarians, low-fat milk, reduced-fat cheese and other low-fat dairy products are also low in bulk and energy dense. Soy alternatives to these dairy products are available for vegan athletes.
- Be sure to include protein rich foods at meals, especially at the midday meal. Many lacto-ovo-vegetarians use cheese as a convenient meat alternative, whereas vegans may fail to use suitable protein alternatives altogether. As an athlete you may have limited time for meal preparation, particularly at lunch. Convenient meat alternatives for lunch include ready-prepared beans (eg. baked beans), nut and seed spreads, such as peanut butter, tahini and almond spread, eggs and ready-made vegetarian luncheon meats, derived from wheat gluten.
- If you use soy milk instead of cow's milk, be sure to choose a calcium fortified option. Read the nutrition analysis panel and choose a soy milk that contains at least 100mg of calcium per 100ml of fluid. If you don't drink cow's milk or a calcium fortified soy milk, other suitable non-dairy calcium-rich alternatives include tofu, soy yoghurts and soy custards. Breakfast cereals and low oxalate green vegetables such as broccoli, and bok choy also provide calcium, but it is important to have an everyday eating plan that provides at least 3 serves of calcium-rich foods. For most people, "milks", "yoghurts" and "cheeses" are the easiest foods to include in their eating plan.

- For the Vegan: Vitamin B12 deficiency is a concern for strict vegan athletes. Dairy foods and eggs provide sufficient vitamin B12 for athletes following a lacto-ovo-vegetarian diet. Vegan athletes should include a known source of vitamin B12 such as fortified soy milks or consider Vitamin B12 supplementation.
- For the Vegan: Dietary intake of riboflavin may be limited for vegan athletes, particularly those who avoid consuming soy milk and soy milk products. Rich sources of riboflavin for the vegan athlete include fortified breakfast cereals, grains, textured vegetable protein, soy milks, soy yoghurts, soy custards, soy cheeses and yeast extract spreads such as Marmite™ and Vegemite™.
- There are two forms of iron in the diet – haem iron which is found in animal derived foods such as red meat, chicken, liver and eggs, and non-haem iron found in breakfast cereals, bread, legumes, textured vegetable protein, nuts and green leafy vegetables. Haem iron is well absorbed by the body (15-35%) whereas non-haem iron is more poorly absorbed (2-8%). As many athletes have increased requirements for iron and non-haem iron sources are more poorly absorbed by the body compared with haem iron sources, it is important for vegetarian athletes to be aware of iron rich foods and factors that inhibit or enhance iron absorption.
- The best sources of iron in a vegetarian diet include breakfast cereals (especially those commercially fortified with iron – check the nutrition information panel), bread, textured vegetable protein, legumes, dried beans, gluten-based vegetarian meat analogues, nuts, dried fruits and green leafy vegetables. Including a rich source of vitamin C with meals such as orange juice or salad will enhance the absorption of non-haem iron from these meals. Be sure to avoid drinking tea and coffee with meals or adding unprocessed bran to meals as this will decrease the absorption of non-haem iron from meals.

Reliable vegetarian web sites include:

- The [International Vegetarian Union](#) has a comprehensive web site providing web site addresses for the various vegetarian societies throughout the world.
- The [Vegetarian Resource Group](#)
- The [Vegan Society](#), based in the United Kingdom

### **Vegetarian Cooking Tips:**

- Many traditional meat dishes can be easily converted into a vegetarian dish. Mince is easily replaced in recipes by using either brown or green lentils or textured vegetable protein. Replacing mince in a lasagne with textured vegetable protein or brown lentils provides a suitable alternative to meat.
- Tofu is a great substitute for chicken in most recipes. Although some people complain that tofu is bland and tasteless, there are many seasoned options on the market. You can also season tofu yourself, prior to cooking. Spray a pan with an oil spray, add garlic, ginger, soy sauce and sweet chilli sauce. Add the tofu, turning frequently and cook until browned.

- Tofu can also be marinated or coated in spices. Once you have cut the tofu into 1cm slabs, marinate in plum sauce, soy sauce and garlic. This is absolutely delicious when barbequed and served on a crusty bread roll with salad.
- Don't be deterred by recipes using beef or chicken stock - vegetable stock is a suitable alternative. There are numerous ready-made vegetable stocks and vegetable stock cubes available in a variety of flavours.
- When using textured vegetable protein in a wet dish such as pasta sauce, don't rehydrate it before use. To cut down on preparation time, simply add it straight to the recipe. You will need to add additional fluid to the recipe as the textured vegetable protein will absorb fluid.
- Nutmeat is a great substitute for beef in a stir-fry. Simply slice the nutmeat and then cut into cubes. As this is a ready prepared meat alternative it requires minimal cooking and should be added at the end of cooking.
- Canned lentils, kidney beans and three bean mixes are nutritious options that are great to use in cooking. If you have the time to soak them, dried lentils and beans are a cheaper option. If you decide to soak lentils or beans, make a double batch and freeze half. They will keep for up to three months. Canned options are more expensive however definitely decrease the recipe preparation time. They are found in the canned vegetable aisle in most supermarkets.
- The health food section of most supermarkets often provides an excellent array of vegetarian food options. Also check the fridge section for tofu, vegetarian sausages and luncheon slices.

*Written by AIS Sports Nutrition, last updated August 2009. © Australian Sports Commission.*