Optimizing performance on a vegetarian diet

We have seen recent rise in popularity for plant-based diets not only for the general population but also among athletes.

The decision to make the switch to vegetarianism, veganism or to simply incorporating more plant-based foods in your meals can be for a variety of reasons: an underlying health condition (i.e. heart disease, diabetes), ethical and/or environmental values, or because you watched a compelling documentary on Netflix. Whatever the reason, there are some important nutritional considerations to be aware of when limiting or restricting animal products from your diet.

**Energy Requirements**

Athletes with heavy training/competition loads, or those who are undergoing growth and development, may find it more difficult to meet their high energy demands when following a strict vegetarian or vegan diet. This is largely due to the high fibre content in plant-based foods (i.e., beans, nuts and seeds) resulting in an increased feeling of fullness and a slower digestion rate leading to a possible risk of gastrointestinal (GI) upset with training.

If energy needs are high, energy-dense, low-bulk foods are recommended for incorporation into meals and snacks. Here are some examples:

- Meat alternatives (i.e. veggie burgers/dogs), textured vegetable protein (TVP), tempeh, tofu, oils, nuts and nut butter
- Fruit juices, dried fruits, honey, jams
- Low-fat milk, cheese, yogurt (Lacto-ovo-vegetarian athletes)
- Protein/carbohydrate liquid meal supplement if GI upset with training is a common occurrence
Protein Requirements

Amino acids are the basic building blocks of protein. In total there are 20 amino acids, 9 of which are described as “essential”, meaning our body cannot make them in large enough quantities to support physical demands like periods of growth and recovery. The reduced absorption level of essential amino acids (EAAs) from plant-based protein sources can be a concern for the plant-based athlete. However, if the diet is balanced and well-planned, adequate protein for tissue repair and muscle protein synthesis is achievable.

Historically, recommendations were to combine complementary proteins (i.e. rice and beans) at each meal. The American Dietetic Association has since then de-bunked this belief and concluded that the consumption of a wide range of plant-based protein sources distributed throughout the day (0.3-0.4g protein/kg in 5-6 meals for adults) provides sufficient amounts of EAAs for muscle repair and building.

Particular attention should be placed on plant-based protein food(s) with higher levels of the EAAs leucine and lysine as they are important for building muscle and are much lower in concentration when compared to animal-based protein sources.

PLANT-BASED PROTEIN CHOICES HIGH IN LEUCINE AND LYSINE:
- Legumes: Black beans, Edamame, Chickpeas, Lentils (Soaking, fermentation, and germination are methods used to improve the digestibility of protein)
- Nuts/seeds: Almonds, cashews, chia seeds, pumpkin seeds
- Meat alternatives: tempeh, tofu
- Grains: Quinoa, Oatmeal, Seitan
Iron Requirements

Iron plays an important role in sport performance as it is involved in oxygen delivery to the working muscles during exercise which is critical for energy production⁴. If an athlete is iron deficient, they may also experience fatigue, an increased risk of infection and a lower training ability⁷.

Individuals who eat primarily plant-based are at an increased risk of iron deficiency due to the lower absorption rate of the type of iron found in plant (non-heme) versus animal (heme) products and inadequate intake of dietary iron⁸.

One strategy to increase intake and absorption of iron when following a plant-based diet is to include specific foods that are high in iron in combination with “enhancers” (foods that increase the absorption of iron); in doing so, you should also try to avoid “inhibitors” (foods that decrease the absorption of iron) at the same meal⁸.

Athletes, especially women, long-distance runners, adolescents, and vegetarians should be screened occasionally to assess and monitor iron status⁹. Always consult with your physician prior to taking iron supplements as individual assessments are required for a diagnosed deficiency.

FOODS THAT ARE HIGH IN IRON:
- Fortified cereals, rice, wheat and oats
- Molasses
- Lentils, kidney beans, chickpeas
- Tempeh
- Spinach, Swiss chard
- Soy milk

INHIBITORS:
- Tannins (i.e. tea and coffee)
- Calcium (i.e. milk, yogurt, cheese, calcium supplements)

ENHANCERS:
- Vitamin C (i.e. orange juice, strawberries broccoli, bell peppers, green leafy vegetables)

The Takeaway

Having the knowledge and skills to overcome the potential risks associated with plant-based diets such as inadequate energy and protein intake, and decreased iron absorption, is key to maintaining and optimizing athletic performance.

A plant-based diet not only provides an athlete with enough nutrients for fuel, training adaptations, and muscle repair and growth, but it can also introduce new foods and flavours, and reduce the risk of various chronic diseases⁴.

If you are new to a vegetarian or vegan diet and are unsure if or how to meet your daily training needs, a performance dietitian can help. Visit our Sports Nutrition page to learn more about our services.
REFERENCES:


