

Peak Performance

Plant-Based Fuel for Endurance Athletes



As more elite and recreational athletes adopt plant-based diets, a common question emerges: *Can endurance performance be sustained—and even optimized—on plants alone?* The growing body of research, along with countless real-world success stories, offers a confident **yes**.

When properly planned, a whole-food, plant-based (WFPB) diet not only meets an athlete's nutritional needs but may also improve endurance, recovery, and overall wellness. This fact sheet explores how plant-powered nutrition can help endurance athletes of all levels train harder, recover faster, and thrive.

Meeting Nutrient Needs on a Plant-Based Diet

Endurance athletes face unique physiological demands. High-volume training places stress on muscles, immune function, and energy systems. Fortunately, a plant-based diet can meet—and often exceed—these demands by emphasizing nutrient-dense, whole-food sources of energy and recovery support.

Macronutrients

Carbohydrates

Carbohydrates are the body's preferred energy source during sustained aerobic activity. They fuel muscle contractions, preserve glycogen stores, and reduce fatigue, making them foundational for every endurance athlete. The most powerful part? Plants are the richest, most nutrient-dense source of these vital carbohydrates.

Yet, research shows many athletes underfuel with carbohydrates. One study found that nearly half of multisport endurance athletes consume inadequate carbohydrates, risking premature fatigue and underperformance (Masson & Lamarche, 2016). Encouragingly,

individuals transitioning to plant-based diets often increase their intake of beneficial, fiber-rich carbohydrates (Barnard et al, 2019).

Recommended Intakes according to the Academy of Nutrition and Dietetics (AND), Dietitians of Canada (DC), and the American College of Sports Medicine (ACSM):

- **5-7 g/kg body weight** for recreational athletes or low-intensity training (≤ 1 hr/day)
- **6-10 g/kg body weight** for moderate to high-intensity training (1-3 hours/day)
- Up to **12 g/kg body weight** for very high training loads (>4 -5 hours/day)

Plant Sources:

- Whole grains (brown rice, oats, quinoa) & whole-grain breads/pastas
- Starchy vegetables (sweet potatoes, squash)
- Legumes (lentils, beans, peas)
- Fruits (bananas, dates, berries, oranges)

Protein

Protein is critical for muscle repair, immune function, and adaptation to training. A wide array of research confirms that plant-based proteins, when consumed in adequate variety and quantity, can fully support athletic performance and recovery.

Although some individual plant proteins contain lower levels of one or more essential amino acids, all plant foods contain all nine essential amino acids. It is not necessary to consume all nine at each meal. By eating a diverse range of plant-based protein sources – such as legumes, whole grains, nuts, seeds, and soy – across the day, endurance athletes of all levels can easily meet their amino acid needs to support muscle maintenance and performance.

A review by Dmowska et al. (2024) highlights that endurance athletes following a well-planned plant-based diet can meet or exceed protein needs, with potential added benefits including reduced inflammation, improved cardiovascular markers, and favorable body composition.

Recommendations according to AND, DC, and ACSM:

- **0.8 grams protein x weight (kg)** = RDA (appropriate starting point for recreational athletes)
- **1.2 grams protein x weight (kg)** = lower range recommended for athletes
- **2.0 grams protein x weight (kg)** = upper range recommended for athletes

Plant Sources:

- Legumes (lentils, chickpeas, edamame, peas, and other beans)
- Quinoa

- Soy milk, tofu, tempeh
- Seeds (chia, flax, hemp, pumpkin)
- Whole nuts and nut butters

Below are multiple examples of plant-based meals/snacks and their corresponding protein content:

Snack or Meal	Protein (gm)
Peanut butter (2 Tbsp), hemp seed (2 Tbsp) on whole grain bread (2 slices)	24
Hummus (½ cup) and buckwheat crackers (20)	23
Quinoa (1 c) bowl with chickpeas (1 c) and broccoli	23
Buckwheat chia pancakes (four 4”) with almond butter (2 Tbsp) and berries	23
Mexican Bowl with brown rice (1 c), black beans (1 c), salsa (¼ c), avocado (1)	23
Whole grain tortilla wrap with lentils (1 c) and mixed veggies (carrots, spinach)	26
Oatmeal (1 c), soy milk (1 c), pecans (1.5 oz), hemp seeds (2 Tbsp), flax meal (2 Tbsp)	32
Tempeh Bolognese (4 oz tempeh, 1 c lentil pasta, 1 c pasta sauce)	38

Fats

Healthy fats support cellular health, hormone production, brain function, and endurance—functions that are important to casual and professional athletes alike. For endurance athletes, dietary fat provides sustained energy, especially during longer or lower-intensity sessions. WFPB diets provide ample essential fats through whole foods without the need for added oils.

Recommendations according to AND, DC, and ACSM:

- **0.5-1.5 g/kg** body weight **or**
- About **20%** of total energy intake

Plant Sources:

- Avocados
- Nuts (walnuts, almonds, pistachios)
- Seeds (chia, flax, hemp)
- Olives

***Note:** Because many plant-based foods are low in calorie density, endurance athletes may need larger portion sizes or more frequent meals to meet energy demands.*

Key Micronutrients

Endurance training increases the demand for several vitamins and minerals. A mindful WFPB diet can provide these through whole, unprocessed plant foods—with strategic use of fortified foods or supplementation when necessary.

Iron

Iron is crucial for endurance performance, as it carries oxygen to working muscles and plays a role in energy production and immune function. Plant-based sources include lentils, chickpeas, tofu, quinoa, pumpkin seeds, fortified cereals, and spinach. Absorption can be enhanced by pairing iron-rich foods with good sources of vitamin C (citrus fruits, bell peppers, broccoli).

Calcium

Aside from bone health, calcium is important for muscle contraction and nerve signaling. Great sources include fortified plant milks, fortified juices, tofu (made with calcium sulfate), leafy greens (kale, bok choy), and almonds.

Vitamin D

Vitamin D regulates calcium absorption, bone metabolism, and immune health, and is involved in many other processes in the body. It can be difficult to achieve adequate vitamin D status through sunlight alone, depending on location and time of year. Supplementation can be a great option, but dietary sources are still available with fortified foods (plant milks, cereals) and mushrooms (if exposed to UV light).

Vitamin B12

Vitamin B12 plays a vital role in nerve and brain function, red blood cell production, and DNA synthesis—all critical for sustaining energy, endurance, and mental focus during athletic performance. Although B12 is made by bacteria (not plants or animals), it is typically found in animal-based foods due to bacterial synthesis in their digestive tracts. For those following a plant-based diet, B12 is available only through fortified foods (such as plant milks, breakfast cereals, and nutritional yeast) or supplements. Because deficiency can impair performance and recovery, athletes should be proactive in supplementing.

Omega-3 Fatty Acids

These essential fatty acids, known as ALA, EPA, and DHA, reduce inflammation, support cardiovascular and brain health, and aid in recovery. Flaxseeds, chia seeds, walnuts, and hemp seeds are great plant-based sources of omega-3 fatty acids. Algae-based EPA/DHA supplements can provide additional support if needed.

Zinc

Zinc is essential for immune health, tissue repair, and muscle recovery, making it especially important for athletes undergoing intense training. It also supports enzyme function and helps reduce inflammation. Plant-based sources of zinc include pumpkin seeds, oats, legumes, tofu, and whole grains.

Iodine

Iodine is essential for producing thyroid hormones, which regulate metabolism, energy levels, and body temperature—all critical for endurance performance and recovery. For those on a plant-based diet, iodine is primarily found in iodized salt, seaweed (such as nori, dulse, and wakame), and some fortified foods. If your diet doesn't usually contain these, an iodine supplement may be worth considering.

Performance Benefits of a Plant-Based Diet

A well-planned whole food, plant-based (WFPB) diet offers more than just adequate nutrition—it provides a distinct advantage for endurance athletes. Packed with nutrient-dense foods that support heart health, energy production, muscle recovery, and metabolic efficiency, plant-based diets can enhance performance across all stages of training and competition.

Cardiovascular Efficiency

A well-planned plant-based diet supports optimal heart and vascular function, a cornerstone of athletic performance. Naturally low in saturated fat and rich in fiber, antioxidants, and phytonutrients, plant-based diets help lower blood pressure, reduce arterial plaque formation, and improve cholesterol profiles. These changes translate to enhanced cardiovascular efficiency, allowing the heart to pump blood more effectively and deliver oxygen and nutrients to working muscles with less strain.

Enhanced circulation means better endurance, faster recovery, and improved thermoregulation during prolonged or high-intensity exercise. Additionally, many plant foods support nitric oxide production—a key molecule that promotes vasodilation, or widening of blood vessels, to further increase blood flow and oxygen delivery. Foods like beets, arugula, spinach, Swiss chard, and citrus fruits are especially powerful in boosting nitric oxide levels, offering a natural and legal performance edge for endurance athletes.

The result? Improved stamina, endurance, and recovery—without the cardiovascular risks associated with high-fat, animal-based diets.

Energy Levels and Endurance

Whole, carbohydrate-rich plant foods are the primary fuel source for endurance athletes. Foods like fruits, vegetables, legumes, and whole grains help maintain steady energy and optimize glycogen stores, the body's preferred energy reserve for prolonged activity. Unlike processed carbohydrates that spike and crash blood sugar, these fiber-rich options promote stable glucose levels, reducing the risk of mid-workout energy slumps.

By fueling with complex, nutrient-dense carbohydrates, plant-based athletes benefit from long-lasting stamina, improved recovery, and better performance over time—making whole-food an ideal choice for sustained training and competition.

Enhancing Recovery with a Plant-Based Diet

Recovery is just as important as training when it comes to building endurance, avoiding injury, and improving performance. A whole food, plant-based (WFPB) diet supports faster, more effective recovery by reducing inflammation, supporting restful sleep, and fueling tissue repair.

Reducing Inflammation

Intense exercise creates oxidative stress and inflammation, which can slow recovery if not properly managed. Plant-based diets are naturally rich in antioxidants and phytonutrients, which help fight inflammation and protect cells.

Eating a variety of colorful fruits and vegetables—like berries, leafy greens, turmeric, beets, and green tea—can speed up muscle recovery, reduce soreness, and support immune function.

Supporting Restorative Sleep

Sleep is essential for muscle repair, hormone regulation, and mental clarity. Research suggests that diets high in fiber and complex carbohydrates and low in saturated fat—like a plant-based diet—may improve sleep quality and duration.

Foods such as bananas, oats, almonds, leafy greens, and tart cherries contain natural compounds like magnesium, tryptophan, and melatonin, which help promote relaxation and restful sleep. By fueling your body with nutrient-dense, plant-based foods, you can recover more quickly between workouts and reduce the risk of overtraining and injury—helping you stay consistent, strong, and ready for the next session.

Conclusion

A WFPB diet is more than just fuel—it's a strategy for thriving. For endurance athletes, it offers a powerful combination of performance, recovery, and long-term health benefits that are grounded in both science and real-world results. From enhancing cardiovascular efficiency and sustaining energy to accelerating recovery and supporting a healthy body composition, plant-powered nutrition checks every box.

Whether you're chasing a personal best or simply aiming to feel stronger and more energized day to day, adopting a plant-based lifestyle can help you go farther—fueled by foods that nourish, restore, and elevate every system in the body. The science is clear. The stories are compelling. Now, the next step is yours. Give your body the edge it deserves—power it with plants.

Sample Meal Plan For Plant-Based Athletes

[Let the Plant-Based Games Begin!](#)

Developed in collaboration with the International Olympic Committee's Office of Sustainability, Let the Plant-Based Games Begin is a comprehensive Playbook created by Switch4Good and co-authored by Dr. Scott Stoll, former Olympian and co-founder of The Plantrician Project. Designed for athletes, coaches, dietitians, and physicians, the Playbook offers science-backed strategies to help optimize performance, recovery, and long-term health through plant-based nutrition.

Whether you're training for your first 10K or coaching elite athletes, the ***Let the Plant-Based Games Begin Playbook*** provides a powerful toolkit to fuel your journey.

[Download the Playbook](#) and start building your personalized plant-based performance plan.

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