Abstract

Performance effects of vegan and vegetarian diets

There are compelling reasons to eat more plant–based food: climate change, land and water use, animal welfare, and health. Yet numerous myths and pieces of misinformation persist regarding the nutritional needs of athletes specifically. What does the science actually say?

A common concern is that athletes cannot obtain sufficient protein on a plant–based diet. Plant proteins are often cited as inferior—lacking certain amino acids or containing anti–nutrients that reduce protein absorption. Each claim contains a grain of truth, but all can be readily addressed:

- Muscle growth stimulus: It is true that when suboptimal amounts of protein are provided, animal proteins generally stimulate greater muscle protein synthesis. However, when total protein intake is increased, these differences disappear and a comparable ceiling for muscle protein synthesis is reached.
- Essential amino acids: Plant–based proteins do not lack essential amino acids; they contain all of them, though sometimes in suboptimal proportions. This is easily overcome by combining complementary plant–based protein sources. Traditional cuisines worldwide have long used such combinations: soy and rice in Asia, maize and beans in Mexico, hummus and bread in the Middle East.
- Anti–nutrients: Anti–nutrients do play a role, but their impact diminishes when sufficient total protein is consumed. Processing methods like sprouting and fermenting reduce anti–nutrient levels. Additionally, plant–based protein powders typically contain substantially fewer anti–nutrients than whole plant foods.

Acute studies show that when 30 grams of combined plant–based protein sources are provided, muscle protein synthesis is similar to that of animal–based proteins.

A higher proportion of plant foods in the diet may positively affect several physiological domains:

- Reduced inflammation

- Improved antioxidant status
- Enhanced blood flow (nitrate–rich foods)
- Higher carbohydrate availability
- Increased fibre and improved gut health

Beta–alanine and creatine are specific performance nutrients that vegetarians and vegans typically consume in lower amounts. Importantly, these are not optimised in typical omnivorous diets either. For athletes competing in sports where ergogenic benefits are relevant, supplementation is warranted—regardless of dietary pattern.

Training studies and cross–sectional studies generally show comparable performance outcomes between plant–based and omnivorous diets. In aerobic performance, there may even be a slight benefit associated with higher plant intake.

A well–planned plant–based diet, with appropriate supplementation where needed, can fully support elite athletic performance. There is no clear evidence that adding animal–based products to a well–planned plant–based diet provides additional performance or health benefits.