

VEGETARIAN AND VEGAN DIETS FOR ATHLETES



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OVERVIEW

- Vegetarian/Vegan Diets Defined
- Potential Benefits
- Nutrient Considerations for Athletes
- Practical Applications



VEGETARIAN & VEGAN DIETS DEFINED

TYPES OF VEGETARIAN DIETS

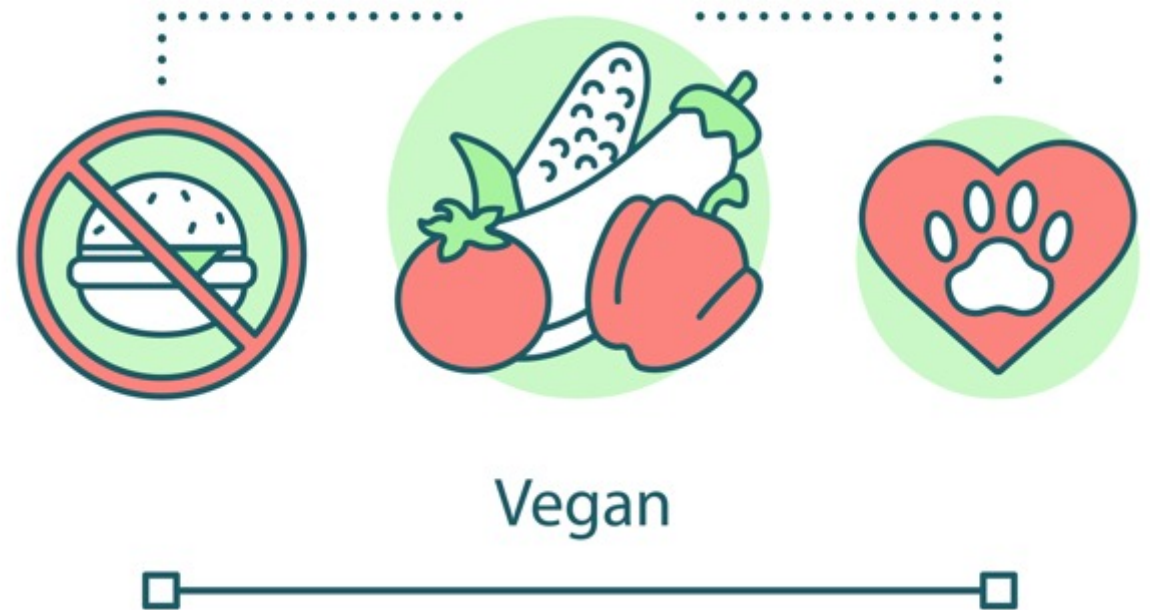
Vegan (strict vegetarian)	Excludes all animal products including dairy and eggs; may exclude honey
Vegetarian	Avoids all flesh foods; may or may not consume eggs or dairy products
Lacto-vegetarian	Includes milk or other dairy products but not eggs or other animal foods
Ovo-vegetarian	Includes eggs but not dairy products
Lacto-ovo-vegetarian	Includes eggs and dairy products



REASONS FOR VEGETARIAN & VEGAN DIETS

Athletes elect to follow a vegan/vegetarian diet for a variety of reasons, including:

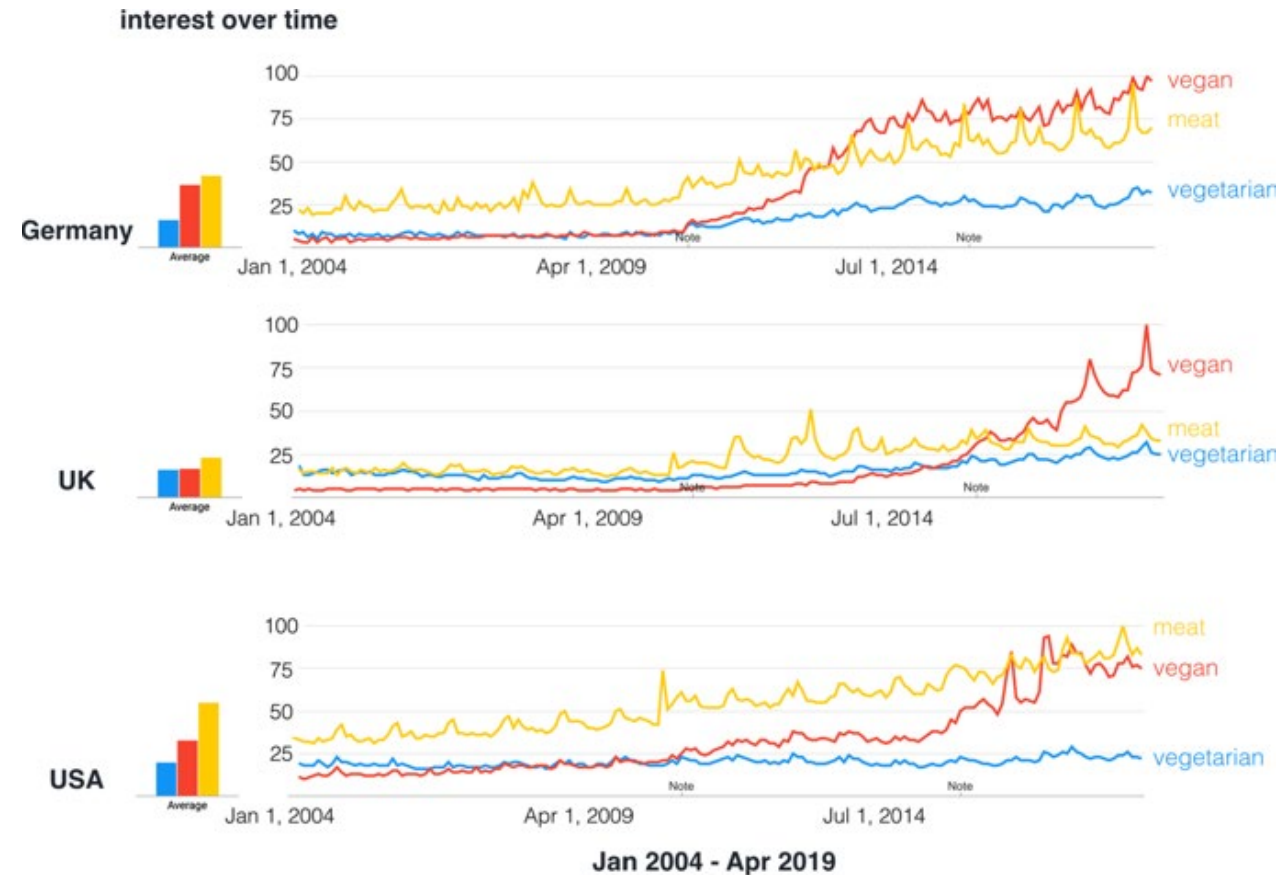
- Health
- Environmental
- Ethical
- Philosophical
- Religious/Spiritual



VEGETARIAN/VEGAN TRENDS

- Nationwide polls in the U.S. suggest that **~3.3% of adults are vegetarian or vegan**
- **~46% of all vegetarians in the U.S. are estimated to be vegan**
- Among athletes, a survey from the 2010 Commonwealth games found that **8% of international athletes reported eating vegetarian diets, with 1% being vegan**

Google Trends Search for search term hits for “vegan”, “vegetarian” and “meat” in Germany, the USA, and the UK from 2004-2019 (Medawar et al., 2019)





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**POTENTIAL
BENEFITS**

POTENTIAL BENEFITS



Vegetarian/vegan diets associated with a ↓ risk of:

- Obesity
- Hypertension
- Cardiovascular disease
- Type 2 diabetes
- Cancer mortality

healthline

Elite Athletes Are Going Vegan. Will It Help You?



Kendrick James Farris at the weightlifting event at the Rio 2016 Olympic Games. Getty Images

Akers, W. (2019). Elite Athletes Are Going Vegan. Will It Help You?. *Healthline*

It has been hypothesized that vegetarian diets improve athletic performance due to higher consumption of:



Carbohydrate



Antioxidants/Phytonutrients

However, there is little research evidence to confirm these claims.

DIETARY ESSENTIALS FOR PERFORMANCE

To help ensure optimal performance, vegetarian/vegan athletes must consume:

1. Adequate energy; and
2. Foods rich in essential nutrients that are less abundant in vegetarian foods (or are not as well absorbed from plant compared to animal sources).





NUTRIENT CONSIDERATIONS FOR ATHLETES

CARBOHYDRATE

- Overall, the carbohydrate needs of vegetarian/vegan athletes do not differ from non-vegetarians.
- Recommended daily intake: 5-10 g/kg/day for most athletes performing moderate to high-intensity exercise of ~1-3 h/day.



Common Carb Sources for Vegetarian Athletes

- Grain products
- Fruits
- Juices
- Starchy vegetables
- Sports products (beverages, gels, bars)





- Protein requirements vary according to training level and activity type, ranging from 1.2-2.0 g/kg/day.
- Vegan athletes should consume a variety of plant-based protein sources to help ensure adequate intake of protein and essential amino acids*.

**Adequate intake may be easier for lacto-ovo vegetarians.*



Lacto-Ovo Vegetarian Protein Sources

- Milk
- Yogurt
- Cheeses
- Cottage cheese
- Eggs

- Fat intake should be in accordance with public health guidelines.
- Vegetarian diets are typically rich in omega-6 fatty acids; therefore, athletes may benefit from omega-3 rich foods.



Plant-based Sources of Fat

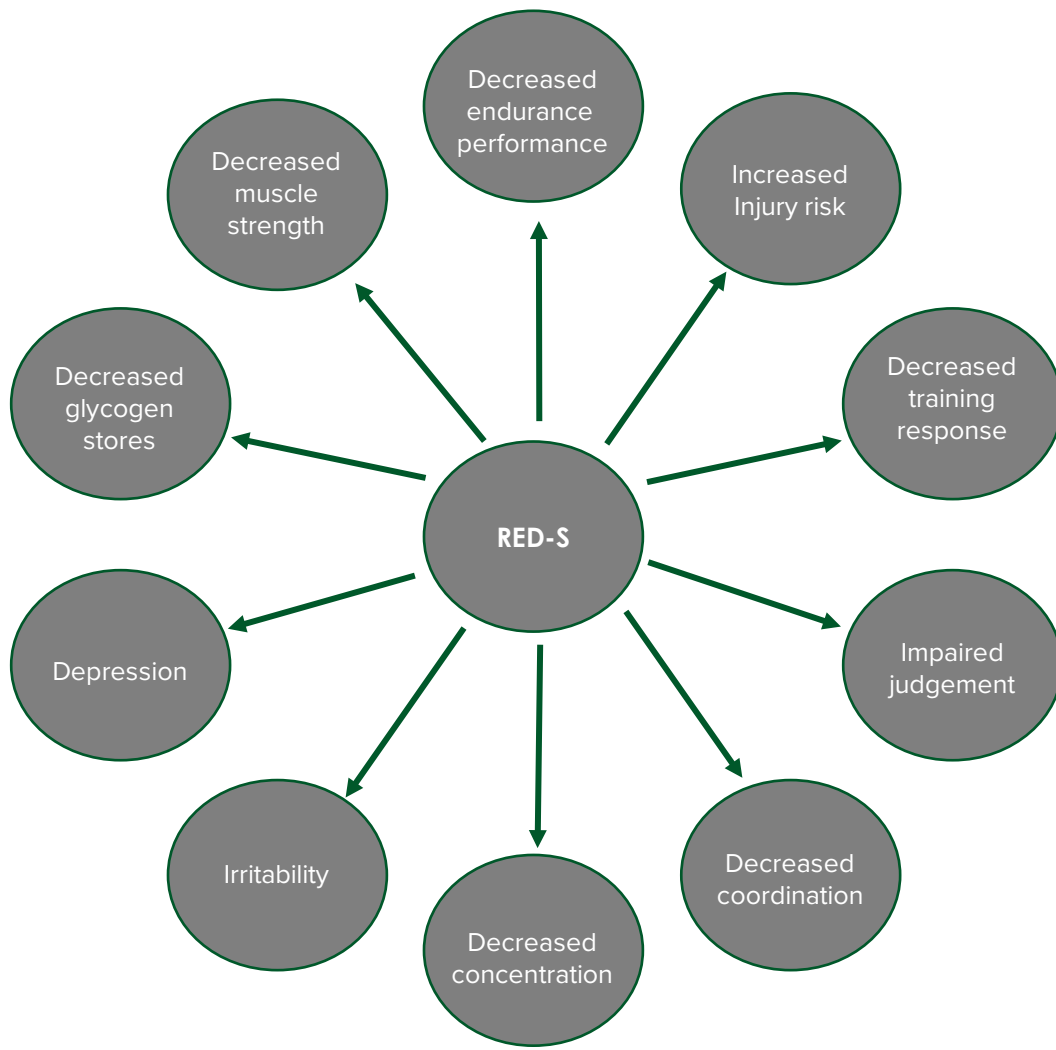
- Nuts (almonds, walnuts, peanuts, etc.)
- Avocados
- Oils (olive, canola, sesame, etc.)
- Flax seed
- Chia seed
- Hemp seed



MICRONUTRIENTS



- Athletes should pay attention to certain nutrients found less abundantly in plant-based foods, including:
 - Iron, zinc, calcium, vitamin D, iodine, vit. B-12, and riboflavin
- If necessary, consumption of fortified foods or supplementation should be considered.



Avoiding Low Energy Availability

- Some evidence suggests relative energy deficiency in sport (RED-S) may be more common in vegetarian athletes.
- This may be due to consumption of low energy-dense, high-fiber plant foods coupled with high training demands.
- Adequate energy intake should be emphasized for these athletes.

Performance consequences of RED-S

Mountjoy M, et al. Br J Sports Med 2014;48:491–497. doi:10.1136/bjsports-2014-093502



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PRACTICAL APPLICATIONS

TIPS TO HELP GUIDE ATHLETES

1. Athletes should be encouraged to eat a diet that contains a variety of plant foods, including whole and enriched grain products, fruits, vegetables, protein-rich plant foods, and (if desired) dairy products and eggs.
2. Properly educate vegetarian/vegan athletes on sources of both macro- and micronutrients that fit their personal preferences and values.
3. Ensure the athlete is not practicing a vegetarian/vegan diet in order to mask an eating disorder, as this is a serious mental illness that can impair health and athletic performance.

VEGETARIAN SOURCES OF KEY NUTRIENTS

Protein	Functional and structural components of the body; in athletes serves as trigger and source for muscle protein synthesis	Milk, yogurt, cottage cheese, cheese, eggs, beans, peas, lentils, edamame, tempeh, tofu, soy products (veggie burgers, dogs, other meat analogues), nuts, seeds, nut butters (including peanut), soymilk and other plant-based "milks". Other sources: starchy vegetables, grains including breads, rice, quinoa, oatmeal.
Healthy Fats	Energy source; aids in absorption of fat-soluble vitamins	Nuts, seeds, nut butters, avocado, olives, olive oil, flax seed, coconut, granola and muesli cereals, plant based oils including canola, grape seed, hazelnut, sesame seed, pumpkin seed and hemp oils.
Omega-3 Fatty Acids	Modulation of inflammatory process	Walnuts, flax, chia, camelina and hemp seed, and canola, walnut, flax and hemp oils.
Iron	Component of hemoglobin and myoglobin and as part of cytochromes and enzymes in energy-yielding pathways	Beans, peas, lentils, edamame, nuts, seeds, most vegetables, whole & fortified grains including breads, rice, quinoa, breakfast cereal. Absorption enhanced by consuming with source of vitamin C: citrus fruits, berries, melon, peppers, tomatoes, broccoli, kale, potatoes.
Zinc	Component of many enzymes including those involved in energy metabolism, protein synthesis and immune function	Beans, peas, lentils, edamame, nuts, seeds, most vegetables, whole & fortified grains including breads, rice, quinoa, breakfast cereal, hard cheeses.



VEGETARIAN SOURCES OF KEY NUTRIENTS

Calcium	Growth, nerve conduction, maintenance and repair of bone tissue, regulation of muscle contraction and normal blood clotting	<p>Excellent bioavailability (> 50%): Chinese/Napa cabbage, bok choy, collards, kale, okra, turnip greens, texturized vegetable proteins, black strap molasses.</p> <p>Average bioavailability (~30%): Milk, yogurt, cheese, calcium-set tofu, fortified orange juice (with calcium citrate malate).</p> <p>Lower bioavailability: fortified soymilk, most nuts, seeds legumes, fortified orange juice (with tricalcium phosphate/calcium lactate).</p>
Vitamin D	Calcium absorption, bone health, skeletal muscle function, immune function, inflammatory modulation	<p>Fatty fish, eggs from hens fed vitamin D or exposed to sunlight, vitamin D-fortified breakfast cereals, margarine, fruit juice and plant-based "milks."</p> <p>Exposure of the arms, torso and legs, two to three a week, at close to solar noon for 25 to 50% of the time it would take to develop a mild sunburn.</p>
Iodine	Functions as part of thyroid hormone, which is a key regulator of metabolism and heart rate	Iodized salt, fish, seafood, seaweed, dairy products and some commercial-breads. The iodine content of most foods is low and affected by soil content, irrigation and fertilizers.
Vitamin B12	Important for energy production	Redstar™ nutritional yeast, soymilk & plant-based "milks," breakfast cereals and B-12 fortified meat analogs (veggie burgers, veggie dogs, etc.).
Riboflavin	Coenzyme for numerous oxidation- reduction reactions in several metabolic pathways and in energy production	Milk and milk-based drinks, bread products and fortified cereals; small amounts found in most plant foods.

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COMPLEMENTARY PROTEINS FOR VEGAN ATHLETES

Below is a list of options combining multiple plant protein sources to help improve delivery of essential amino acids.

- Whole Wheat Chips + Black Bean & Corn Salsa
- Brown Rice + Green Peas + Corn
- Black Beans + Spinach + Whole Wheat Pita Pocket
- Peanut Butter + Whole Wheat Toast or Bagel
- Whole Wheat Pasta + Tomato Sauce + Peas + Chopped Spinach
- Trail Mix: Dried Fruit + Nuts + Sunflower Seeds
- Raw Veggies + Hummus Dip + Whole Wheat Pita
- Oatmeal Crackers + Dried Fruit + Slivered Almonds
- Veggie Burger + Whole Wheat Bun

What is an example of a nutritious breakfast for a vegetarian athlete?

Lacto-Ovo Vegetarian & Vegan Diet



	Lacto-Ovo Vegetarian	Vegan
Breakfast 2 ounce Grains 2 ounce Proteins ½ cups Vegetables 1 cup Fruit ½ cup Dairy/Eq	2 slices Whole Wheat Toast Butter & 1 Tbsp Fruit Preserves 2 Scrambled Eggs ½ cup Peppers & Spinach 1 cup Orange Juice Latte made with ½ cup Milk	2 Slice Whole Wheat Toast Margarine & 1 Tbsp Fruit Preserves ½ cup Scrambled Tofu ½ cup Peppers & Spinach 1 cup Calcium-Fortified Orange Juice Latte made with ½ cup Soymilk
Lunch 2 ounce Grains 2 ounce Proteins 1 cup Vegetables 1 cup Fruit ½ cup Dairy/Eq	2 slices Sourdough Bread 2 cups Minestrone Soup (made with 1/4 cup garbanzo beans, ¼ cup kidney beans, 1 cup mixed vegetables & olive oil) topped with ½ ounce Parmesan Cheese Large Apple	2 slices Sourdough Bread 2 cups Minestrone Soup (made with 1/4 cup garbanzo beans, ¼ cup kidney beans ¾ cup mixed vegetables/ ¾ cup vale & olive oil) Large Apple

	Lacto-Ovo Vegetarian	Vegan
Snack 2 ounce Grains 1 ounce Proteins ½ cup Dairy/Eq	½ Large (2 oz) Whole Grain Bagel 1 Tablespoon Peanut Butter 1 cup Milk	½ Large (2 oz) Whole Grain Bagel 1 Tablespoon Peanut Butter 1 cup Soymilk
Dinner 4 ounce Grains 2 ounce Protein 2 ½ cups Vegetables	4 Lentil Tacos (made with lentils, tomato sauce, canned tomatoes, onion, celery and canola oil on soft corn tortillas served with lettuce, jicama, fresh tomato, avocado and salsa)	4 Lentil Tacos (made with lentils, tomato sauce, canned tomatoes, onion celery and canola oil on soft corn tortillas served with lettuce, jicama, fresh tomato, avocado and salsa)
Snack 1 cup Dairy/Eq	1 cup Yogurt ½ cup Berries or sliced Peaches	1 cup Rice Yogurt ½ cup Berries or sliced Peaches
Exercise Associated Snacks	Fluid replacement beverage, sports gels, sports bars, etc.	Fluid replacement beverage, sports gels, sports bars, etc.

KEY TAKEAWAYS

- ✓ With proper planning, vegetarian and vegan athletes are able to meet their energy/nutrient needs on a diet that contains a variety of foods.
- ✓ Depending upon food preferences, eating patterns, and training load, the diet of some athletes may contain suboptimal amounts of certain nutrients (e.g. total energy, protein, omega-3 fatty acids, calcium, vitamin D, iron, zinc, riboflavin, and vitamin B-12).
- ✓ In such cases, athletes can generally improve nutrient status through careful selection of foods containing the nutrient(s) they lack and a supplemental source when appropriate.
- ✓ There is currently limited evidence that vegetarian/vegan diets are better than omnivorous diets for improving athletic performance.



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