

Watermelon Performance Hub

Research Reference Summary

Prepared by: Umo Callins, MS, RD, CSSD, LD, CPT
Board-Certified Sports Dietitian & Fitness Coach
In partnership with the National Watermelon Promotion Board

This document provides a plain-language summary of the peer-reviewed research and authoritative sources cited throughout the Watermelon Performance Hub at watermelon.org/performance. Each summary describes the study design, key findings, and relevance to the hub content.

Intended for use by registered dietitians, sports nutritionists, coaches, athletic trainers, and other health professionals seeking to understand the evidence base behind the hub's nutrition messaging.

Hydration and General Nutrition

Reference 1 | Hydration

Water: How Much Should You Drink Every Day?

Mayo Clinic. (2022). Mayo Clinic Healthy Lifestyle: Nutrition and Healthy Eating. <https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/water/art-20044256>

This Mayo Clinic consumer health resource confirms that fluid intake comes from a combination of beverages and food sources. The source notes that approximately 20 percent of daily fluid intake comes from food, with the remainder from beverages. It supports the position that whole foods like watermelon contribute meaningfully to daily hydration needs.

Hub relevance: Cited on the hydration page and in Q1 of the Ask the Sports Dietitian section to support the claim that fluid from food counts toward daily hydration needs.

Reference 2 | Hydration

Fast Facts: Water Consumption

Centers for Disease Control and Prevention (CDC). Fast Facts: Water Consumption. <https://www.cdc.gov/nutrition/php/data-research/fast-facts-water-consumption.html>

The CDC confirms that total daily water intake includes water consumed from all beverages and food sources. This aligns with the hub's messaging that eating high-water foods like watermelon is a practical strategy for contributing to daily fluid needs, particularly for active individuals.

Hub relevance: Cited alongside the Mayo Clinic source to reinforce the food-as-fluid message throughout the hub and in Q1 of the Q&A section.

Reference 3 | Nutrition Data

FoodData Central — Watermelon, Raw (FDC ID: 2747675)

U.S. Department of Agriculture, Agricultural Research Service. FoodData Central. Watermelon, raw (FDC ID: 2747675). <https://fdc.nal.usda.gov/food-details/2747675/nutrients>

This is the primary USDA nutrient database entry for raw watermelon. Per 2-cup serving (280g), watermelon provides 85 calories, 21 grams of natural carbohydrates, 314mg of potassium, 23mg of vitamin C (25% Daily Value), 12.7mg of lycopene, and beta-carotene expressed as Vitamin A at 8% of the Daily Value. All nutrient claims in the hub are sourced from this entry and are cited throughout the copy deck, handouts, recipes, and Q&A section.

Hub relevance: *The anchor nutrition citation for the entire hub. Referenced across all seven pages and both practitioner handouts.*

Performance Nutrition and Fueling

Reference 4 | Performance Nutrition

Comparison of Watermelon and Carbohydrate Beverage on Exercise-Induced Alterations in Systemic Inflammation, Immune Dysfunction, and Plasma Antioxidant Capacity

Shanely, R.A., Nieman, D.C., et al. (2016). *Nutrients*, 8(8), 518. <https://doi.org/10.3390/nu8080518>

Study design: Randomized crossover study in recreational cyclists performing prolonged exercise (75 minutes at 75% VO₂max followed by 15 minutes at maximum effort). Participants consumed either watermelon juice or a carbohydrate beverage before and during exercise.

Key findings: Watermelon performed comparably to the carbohydrate beverage for maintaining blood glucose during exercise. Watermelon consumption was associated with reduced post-exercise markers of muscle damage and oxidative stress. The researchers concluded that watermelon juice can serve as a viable carbohydrate source during prolonged exercise, with the added benefit of naturally occurring antioxidant compounds.

Hub relevance: Cited on the performance nutrition page and in Q3 of the Q&A section to support the claim that watermelon can support carbohydrate and fluid needs during prolonged exercise comparably to standard carbohydrate beverages.

Reference 5 | Diet Quality

Watermelon Intake Is Associated with Increased Nutrient Intake and Higher Diet Quality in Adults and Children, NHANES 2003–2018

Fulgoni, K., & Fulgoni, V.L. III. (2022). *Nutrients*, 14(22), 4883. <https://doi.org/10.3390/nu14224883>

Study design: Cross-sectional analysis of NHANES data from 2003 to 2018. The study included over 35,000 adults and children and compared dietary quality and nutrient intake between watermelon consumers and non-consumers.

Key findings: Watermelon consumers had significantly higher Healthy Eating Index scores compared to non-consumers. Consumers also had greater intake of potassium, magnesium, and vitamins A and C, and lower intake of added sugar and saturated fat. The study concluded that watermelon consumption is associated with improved overall diet quality and nutrient adequacy across age groups.

Hub relevance: Cited on the professionals page and in the Fueling Plate handout to support the claim that people who eat watermelon regularly have higher overall diet quality.

Recovery and Exercise

Reference 6 | Recovery and Antioxidants

Effects of Watermelon Juice on VO₂max and Antioxidant Capacity in Elite Taekwondo Athletes

AghabeigiAmin, et al. (2025). *Sport Sciences for Health*, 21, 923–929. <https://doi.org/10.1007/s11332-025-01329-6>

Study design: Controlled study examining the effects of watermelon juice supplementation on aerobic capacity (VO₂max) and plasma antioxidant markers in elite taekwondo athletes during a structured training period.

Key findings: Athletes who consumed watermelon juice showed improvements in VO₂max and significantly higher plasma antioxidant capacity compared to the control group. The researchers attributed the antioxidant effects to naturally occurring compounds in watermelon including lycopene and vitamin C. The findings support the role of watermelon's antioxidant content in supporting exercise adaptation in trained athletes.

Hub relevance: Cited on the recovery page and in the Hydration and Recovery Chart handout to support the antioxidant compound messaging around exercise recovery.

Reference 7 | Recovery and Muscle

The Effects of Watermelon Juice on Muscle Hypertrophy, Exercise Performance, and Muscle Soreness in Non-Athlete Men Undergoing Endurance Training

Norouzzadeh, M., et al. (2025). *Food Science & Nutrition*, 13(10). <https://doi.org/10.1002/fsn3.71070>

Study design: Randomized controlled trial in non-athlete men undergoing a structured endurance training program. Participants consumed watermelon juice or a placebo alongside their training protocol over the study period.

Key findings: Participants who consumed watermelon juice showed greater improvements in exercise performance and reported reduced muscle soreness compared to the control group. The study also found favorable changes in body composition markers including muscle hypertrophy. The researchers concluded that watermelon juice may support exercise performance and recovery in individuals undergoing endurance training.

Hub relevance: Cited on the recovery page and in both practitioner handouts to support the post-workout recovery messaging and the connection between watermelon consumption and reduced muscle soreness.

Antioxidants and Lycopene

Reference 8 | Antioxidant Nutrients

FoodData Central — Watermelon, Raw: Lycopene, Vitamin C, and Beta-Carotene

U.S. Department of Agriculture, Agricultural Research Service. FoodData Central. Watermelon, raw (FDC ID: 2747675). <https://fdc.nal.usda.gov/food-details/2747675/nutrients>

This entry from USDA FoodData Central provides the specific antioxidant nutrient values used throughout the hub. Per 2-cup serving (280g): lycopene 12.7mg, vitamin C 23mg (25% Daily Value), and beta-carotene expressed as Vitamin A at 8% Daily Value. These are naturally occurring antioxidant compounds in watermelon with no added ingredients.

Hub relevance: Cited specifically for antioxidant figures in Q3 and Q9 of the Q&A section and in the Recovery and Professionals pages.

Reference 9 | Lycopene Superiority

Lycopene: A Carotenoid with Protective Health Effects

Tlili, I., et al. (2020). NJAS - Wageningen Journal of Life Sciences. PMC7698065. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7698065/>

This peer-reviewed paper examines lycopene as a naturally occurring carotenoid with antioxidant properties. The paper notes that watermelon is among the richest whole-food sources of lycopene available, containing higher concentrations than most other commonly consumed fresh fruits and vegetables. Lycopene is a fat-soluble antioxidant compound associated with protection against oxidative stress, which is relevant in the context of exercise-induced oxidative damage.

Hub relevance: Cited in Q3 of the Q&A section to support the claim that watermelon contains 12.7mg of lycopene per 2-cup serving, the highest of any fresh fruit or vegetable.

Watermelon Seed Nutrition

Reference 10 | Seed Nutrition

FoodData Central — Seeds, Watermelon Seed Kernels, Dried (FDC ID: 169407)

U.S. Department of Agriculture, Agricultural Research Service. FoodData Central. Seeds, watermelon seed kernels, dried (FDC ID: 169407 / NDB 12174, SR Legacy dataset). <https://fdc.nal.usda.gov/food-details/169407/nutrients>

This USDA FoodData Central entry provides nutrient data for dried watermelon seed kernels. Per one-ounce serving: approximately 8 grams of plant-based protein, 146mg of magnesium (approximately 35% Daily Value), 2.9mg of zinc (26% Daily Value), and 2mg of iron (11% Daily Value). These figures are from the SR Legacy dataset (NDB 12174) which represents the inner kernel of the watermelon seed, not the outer black shell.

Hub relevance: Cited in Q7 of the Q&A section as the primary source for watermelon seed kernel nutrition data.

Reference 11 | Seed Nutrition Corroboration

Watermelon Nutritional Composition with a Focus on L-Citrulline and Its Cardioprotective Health Effects: A Narrative Review

Tili, I., et al. (2025). *Nutrients*, 17(20), 3221. <https://pmc.ncbi.nlm.nih.gov/articles/PMC12566930/>

This 2025 narrative review published in *Nutrients* examines the full nutritional composition of watermelon including its flesh, rind, and seeds. The review reports protein content in watermelon seeds ranging from 25.2 to 35.6 percent, magnesium at 500 to 532mg per 100g, iron at 7.08 to 7.28mg per 100g, and zinc at 10.13 to 10.24mg per 100g. These ranges are consistent with the USDA SR Legacy data cited as Reference 10, providing current peer-reviewed corroboration that the 1984 USDA dataset remains accurate against independent modern research.

Hub relevance: Cited alongside Reference 10 in Q7 of the Q&A section to demonstrate that the USDA seed nutrition data is consistent with current peer-reviewed literature.

Reference 12 | Seed Composition

Nutritional Composition and Bioactive Potential of Watermelon Seeds: A Pathway to Sustainable Food and Health Innovation

Ogunlakin, G.O., et al. (2025). *Sustainable Food Technology*, 3, 375–395. <https://pubs.rsc.org/en/content/articlehtml/2025/fb/d4fb00335g>

This peer-reviewed review published in *Sustainable Food Technology* provides a comprehensive analysis of watermelon seed nutritional composition and bioactive compounds. The paper reports protein, magnesium, zinc, and iron values consistent with the USDA FoodData Central data, and discusses the functional food potential of watermelon seeds as an underutilized nutrient-dense ingredient. The review supports watermelon seeds as a practical source of plant-based protein and key minerals for active individuals.

Hub relevance: Cited in Q7 of the Q&A section as additional peer-reviewed corroboration of the watermelon seed nutrition figures.

Digestibility and Cell Wall Research

Reference 13 | Seed Digestibility

Plant Cell Walls: Impact on Nutrient Bioaccessibility and Digestibility

Holland, C., et al. (2020). *Foods*, 9(2), 201. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7074226/>

This peer-reviewed paper published in *Foods* examines how plant cell wall composition affects the digestibility and bioaccessibility of nutrients. The paper establishes that hard outer seed coats, composed primarily of cellulose and lignin, resist enzymatic digestion in the human gastrointestinal tract. As a result, seeds consumed whole with their outer coat intact pass through the digestive system largely undigested, limiting nutrient absorption from the inner kernel.

Hub relevance: *Cited in Q7 of the Q&A section to support the recommendation that watermelon seeds are best consumed roasted or as dried kernels rather than whole, as the outer coat resists digestion and limits nutrient access.*

Watermelon Selection and Availability

Reference 14 | Selection Guide

How to Choose a Watermelon

National Watermelon Promotion Board. *How to Choose a Watermelon*. <https://www.watermelon.org/the-slice/how-to-choose-a-watermelon/>

This resource from the National Watermelon Promotion Board provides consumer guidance on selecting a ripe watermelon. Key indicators include the field spot, the creamy yellow patch on the underside where the watermelon rested on the ground during growth. A deep yellow field spot indicates the watermelon ripened on the vine. Additional indicators include weight relative to size, a dull rather than shiny surface, and vibrant deep red flesh in pre-cut watermelon. The resource also confirms year-round availability of watermelon at most grocery stores.

Hub relevance: *Cited in Q8 of the Q&A section to support the watermelon selection guidance provided.*

A Note on USDA Compliance

All content in the Watermelon Performance Hub has been developed in accordance with USDA commodity board communication guidelines. Nutrient claims are based on USDA FoodData Central data and are expressed using approved language. Structure-function claims have been carefully reviewed and either removed or softened to align with USDA guidelines. Any questions regarding the evidence base or approved language should be directed to Umo Callins, MS, RD, CSSD, LD, CPT.

Watermelon Performance Hub | Research Reference Summary | Umo Callins, MS, RD, CSSD, LD, CPT | National Watermelon Promotion Board