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RECEIVED 28 March 2025
ACCEPTED 01 April 2025
PUBLISHED 14 April 2025

CITATION
Tian B and Shen XL (2025) Editorial: Food and nutrition for athletics: redefining the role and application. *Front. Nutr.* 12:1602040. doi: 10.3389/fnut.2025.1602040

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Editorial: Food and nutrition for athletics: redefining the role and application

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KEYWORDS

athletic performance, macronutrients, carbohydrate, protein, bioactive plant compounds

Editorial on the Research Topic

Food and nutrition for athletics: redefining the role and application

Food and nutrition play a vital role in athletes' health and performance, making it a timeless topic. Of course, this also applies to the general population. This Research Topic focuses on two main aspects: the impact of macronutrients on athletic performance and the effects of bioactive plant compounds on exercise performance.

Bagheri et al. reported that variations in muscle strength, power adaptation, and endurance after 16 weeks of either concurrent or resistance training with varying high-protein intakes were not linked to changes in lean mass among resistance-trained young males. Through meta-analysis, Zhao et al. concluded that protein intake offers modest benefits to athletes, especially in improving endurance. Subgroup analysis indicates that protein intake boosts muscle glycogen levels and that combining protein with carbohydrates is more effective for endurance athletes than consuming high protein alone. Kuhlman et al. reported that male collegiate gymnasts may have a high prevalence of low energy availability, primarily due to insufficient relative energy and carbohydrate intake. Ritson et al. observed a drug-free bodybuilder following evidence-based nutrition strategies over 18 weeks of low energy availability, resistance training, and a high-protein diet to attain extreme leanness, providing insights into the fluctuations of free triiodothyronine and total testosterone. Kripp et al. reported that in active and healthy individuals, a low-carbohydrate, high-fat diet negatively impacts individual blood lipid profiles compared to carbohydrate-rich diets. Noakes and Prins analyzed and highlighted the potential limitations of the exogenous carbohydrate ingestion prediction model for achieving a sub-2 h marathon, as proposed by Lukasiewicz et al. (1). Zhang et al. discovered that in free-living conditions, athletes' body composition is influenced by habitual water intake rather than hydration status.

Ikeda et al. found that kaempferol, a flavonoid found in edible plants, enhances sleep quality and may contribute to long-term improvements in quality of life, including physical activity, as demonstrated in a double-blind, placebo-controlled, crossover trial. Guo and Rezaei reviewed the effects of ashwagandha (*Withania somnifera*), an herbal plant from the Solanaceae family, highlighting its ability to enhance antioxidant response, alleviate stress-related conditions such as depression, anxiety, and insomnia, and improve

physical performance in sports such as maximum oxygen consumption, treadmill time to exhaustion, metabolic equivalents, and more. Wang et al. explored strategies to enhance the bioavailability of *Rhodiola rosea*, finding that its nano-dosage form significantly improves anti-exercise fatigue effects in rats, particularly when combined with aerobic exercise, compared to the normal form.

The Research Topic covered in this issue are limited. In the future, researchers can conduct in-depth studies on various areas such as the specific nutritional requirements of different types of sports (2), the effects and mechanisms of precise formulations on specific athletic performance (3), the potential toxicity and underlying mechanisms of long-term supplementation of certain nutrients (4), and the impact and mechanisms of specific nutrients on injury prevention or rehabilitation in athletes.

Author contributions

BT: Funding acquisition, Writing – original draft, Conceptualization. XS: Writing – review & editing, Funding acquisition, Conceptualization.

Funding

The author(s) declare that financial support was received for the research and/or publication of this article. This work was financially supported by the National Natural Science Foundation of China (82060598), the Scientific Research Program of Guizhou

Provincial Department of Education (QJJ[2023]019), the Science & Technology Program of Guizhou Province (QKHPTRC-CXTD[2022]014), the Excellent Youth Talents of Zunyi Medical University (17zy-006), Zhejiang Provincial Key Research and Development Program (2022C04036 and 2023C02040), the Cooperative Project Fund of the Zhejiang University of Technology and Zhejiang Institute of Modern TCM and Natural Medicine Co., Ltd. (KYY-HX-20211132 and KYY-HX-20240244), China Postdoctoral Science Foundation funded project (2022M712846), Sichuan Provincial Key Research and Development Program (2024YFHZ0179), and Shaoxing City Science and Technology Special Project to Strengthen Agriculture (2024A12002).

Conflict of interest

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References

1. Lukaszewicz CJ, Vandiver KJ, Albert ED, Kirby BS, Jacobs RA. Assessing exogenous carbohydrate intake needed to optimize human endurance performance across sex: insights from modeling runners pursuing a sub-2-h marathon. *J Appl Physiol.* (2024) 136:158–76. doi: 10.1152/jappphysiol.00521.2023
2. Cannataro R, Straface N, Cione E. Nutritional supplements in combat sports: what we know and what we do. *Hum Nutr Metab.* (2022) 29:200155. doi: 10.1016/j.hnm.2022.200155
3. Duttagupta S, Krishna Roy N, Dey G. Efficacy of amino acids in sports nutrition- review of clinical evidences. *Food Res Int.* (2024) 187:114311. doi: 10.1016/j.foodres.2024.114311
4. Yfanti C, Deli CK, Georgakouli K, Fatouros I, Jamurtas AZ. Sport nutrition, redox homeostasis and toxicity in sport performance. *Curr Opin Toxicol.* (2019) 13:45–67. doi: 10.1016/j.cotox.2019.01.003