Astragalus membranaceus (Huangqi) Supplementation in Sports Training: A Systematic Review

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The aim of this systematic review is to study the effects of *Astragalus membranaceus* (Huangqi) supplementation for sports activity and physical performance. PubMed, EMBASE, Web of Science, Cochrane Library, and Google Scholar were systematically searched for relevant studies from inception up until October 2023. Eleven clinical studies were considered eligible for inclusion (six of them involved the administration of Huangqi alone, while, in the remaining trials, this herb was supplemented in combination with other remedies). On average, the number of study participants ranged from 8 to 120, and the sports activities practiced by the subjects included martial arts, mountain hiking, basketball, rowing, running, aerobic exercises, and strength training. When a dried extract was used, Astragalus was taken at a daily dose of 1 to 4 g for several weeks. Huangqi supplementation was associated with improvements in aerobic performance, oxidative status, reticulocytes percentage, and response to acclimatization, without a specific effect on the athletes' strength. Better post-exercise immune functions were also observed, especially with regard to NK cell activity, IL-2 levels, CD4+/CD8+ ratio, and lymphocyte turnover. No adverse effects were described. In conclusion, Astragalus supplementation has the potential to decrease fatigue, enhance aerobic performance, and mitigate post-exercise immune suppression in athletes. It is advisable to conduct additional research on the subject to enhance the robustness of the existing evidence through larger-scale controlled trials.

Keywords: Astragalus membranaceus ; Huangqi ; dietary supplementation ; sports medicine ; review

Introduction

Background

Astragalus membranaceus, commonly known as Huangqi, milkvetch, or Astragalus, is a well-regarded medicinal plant with a rich history in Traditional Chinese Medicine and other traditional healing systems (this plant is native to the northern and eastern regions of China, as well as Mongolia) [1]. For over two millennia, the dried root of *Astragalus membranaceus*, originally recorded in Shennong Bencao Jing (Shennong's Classic of Materia Medica, 200–300 AD), has been a widely favored herbal remedy in China, cherished for its health-enhancing properties; in contemporary Chinese medicine, it finds application in Fu zheng therapy, serving as an immune stimulant, and it is esteemed for its capacity to fortify the body's fundamental vitality encompassing the immune system, metabolic processes, respiratory functions, and waste elimination [2]. Astragalus is a perennial herb of the Fabaceae family, typically growing to a height of 60 to 150 cm, and it is characterized by its upright, hairy stems; pinnately compound leaves; and clusters of small, yellow flowers [3]. The roots of this plant (*Radix astragali*) are the most commonly used part in traditional medicine and are harvested for their medicinal properties, as they are known to possess immunomodulatory, anti-inflammatory, adaptogenic, and antioxidant properties [4][5]. For this reason, Astragalus supplementation has gained interest in sports medicine due to its potential to enhance athletic performance and support the overall well-being of athletes, for example by potentially boosting physical performance, expediting post-activity recovery and preventing the exercise-induced immunodepression in endurance sports [6]. However, to the best of our knowledge, no previous study has systematically synthesized the existing evidence concerning the impact of *Astragalus membranaceus* supplementation on the augmentation of sports activities.

Research Objectives

The primary objective of this systematic review is to thoroughly investigate the potential benefits associated with the supplementation of *Astragalus membranaceus* in the context of sports activity and physical performance. In this examination, we aim to discern the specific effects of *Astragalus membranaceus* supplementation on various aspects of sports performance, including endurance, strength, recovery, and overall physiological adaptations. By critically reviewing

a diverse range of studies, we seek to provide an evidence-based understanding of the potential mechanisms through which *Astragalus membranaceus* may influence athletic performance.

References

1. Fu, J.; Wang, Z.; Huang, L.; Zheng, S.; Wang, D.; Chen, S.; Zhang, H.; Yang, S. Review of the Botanical Characteristics, Phytochemistry, and Pharmacology of Astragalus Membranaceus (Huangqi). Phytother. Res. 2014, 28, 1275–1283.
2. Shahrajabian, M.H.; Sun, W.; Cheng, Q. A Review of Astragalus Species as Foodstuffs, Dietary Supplements, a Traditional Chinese Medicine and a Part of Modern Pharmaceutical Science. Appl. Ecol. Environ. Res. 2019, 17, 13371–13382.
3. Wang, P.; Wang, Z.; Zhang, Z.; Cao, H.; Kong, L.; Ma, W.; Ren, W. A Review of the Botany, Phytochemistry, Traditional Uses, Pharmacology, Toxicology, and Quality Control of the. Front. Pharmacol. 2023, 14, 1242318.
4. Durazzo, A.; Nazhand, A.; Lucarini, M.; Silva, A.M.; Souto, S.B.; Guerra, F.; Severino, P.; Zaccardelli, M.; Souto, E.B.; Santini, A. Astragalus (Astragalus Membranaceus Bunge): Botanical, Geographical, and Historical Aspects to Pharmaceutical Components and Beneficial Role. Rend. Lincei Sci. Fis. Nat. 2021, 32, 625–642.
5. Sheik, A.; Kim, K.; Varaprasad, G.L.; Lee, H.; Kim, S.; Kim, E.; Shin, J.-Y.; Oh, S.Y.; Huh, Y.S. The Anti-Cancerous Activity of Adaptogenic Herb Astragalus Membranaceus. Phytomedicine 2021, 91, 153698.
6. Yu, Z.; Wang, W.; Yang, K.; Gou, J.; Jiang, Y.; Yu, Z. Sports and Chinese Herbal Medicine. Pharmacol. Res.—Mod. Chin. Med. 2023, 9, 100290.