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Review Article

Benefits of Ashwagandha Supplementation on Strength and Endurance Exercise: A Narrative Review

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Abstract

Ashwagandha is an adaptogen that has various immunomodulatory, anti-stress, anxiolytic, antioxidant, cardioprotective, anti-inflammatory, antitumor, neuroprotective, and revitalizing properties. Ashwagandha supplementation improves muscle strength and coordination and cardiorespiratory endurance. The objective of this review is to verify the efficacy of Ashwagandha supplementation in carrying out strength and endurance exercise. Ashwagandha intake was analyzed in both strength and endurance exercise. In conclusion, comment that the intake of Ashwagandha has beneficial effects for carrying out strength exercise, favoring greater performance on the improvement of muscular strength as well as in endurance exercise, favoring greater performance at the level of cardiorespiratory endurance as an increase in VO2 max.

Keywords: athletes, training, VO_2 max, muscle, sport.

Introduction

Ashwagandha is an herb known as Indian ginseng and is found in the semi-arid region of India that provides numerous health benefits and is recognized as a medicinal plant by the World Health Organization (WHO). Ashwagandha is an adaptogen that has various properties (Figure 1): immunomodulatory, anti-stress, anxiolytic, antioxidant, cardioprotective, anti-inflammatory, antitumor, neuroprotective, and revitalizing [1].

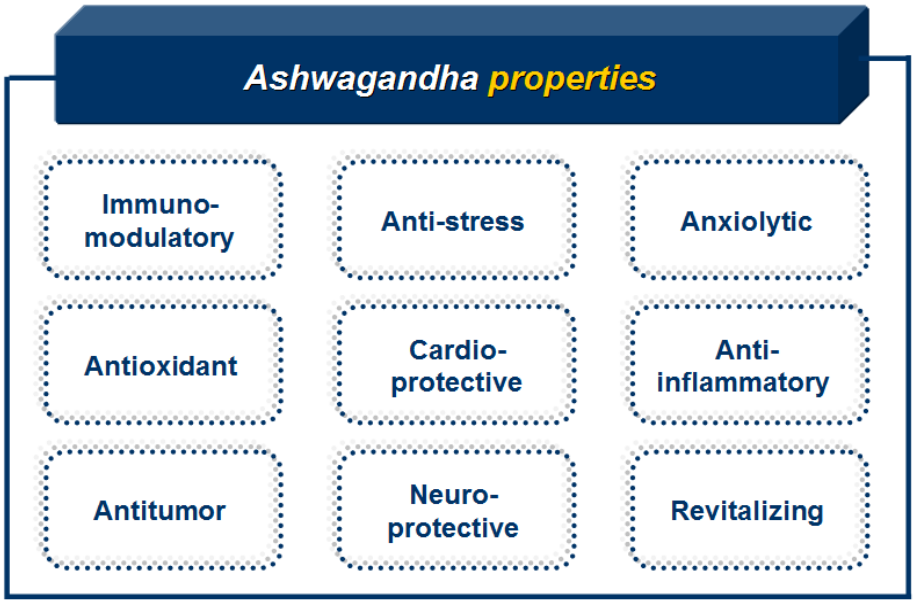

Figure 1. Properties of Ashwagandha.

The biologically active chemical components of Ashwagandha are alkaloids such as ashwagandhine, cuscohygrine, anahygrine, tropine, etc.; steroidal compounds such as withaferin A, with anolides, withasomniferin, with asomidienone, with asomniferols, withanone, etc.; saponins and a variety of amino acids such as aspartic acid, proline, tyrosine, alanine, glycine, glutamic acid, cystine, tryptophan and a high amount of iron [2].

Ashwagandha is used as a component in numerous food supplement formulations for: improvement of musculoskeletal conditions, improvement of general health and longevity, and disease prevention [3]. Ashwagandha is an adaptogen that increases the body's ability to resist the damaging effects of stress and restore normal physiological functioning [4].

Studies in normal healthy adults have shown that Ashwagandha supplementation improves muscular strength and coordination, and cardiorespiratory endurance. Ashwagandha intake decreases cortisol levels and increases testosterone levels, reduces blood urea nitrogen levels, lactic acid, corticosterone, and dopamine receptors in the brain in response to stress [5]

Through endurance training, VO2 max can be improved through a series of adaptations that occur in cardiac muscle tissue, blood volume, and oxygen-carrying capacity. When these adaptations occur, as they do in endurance athletes, they can lead to doing a greater amount of work for a longer time. Ashwagandha contains flavonoids, alkaloids, and antioxidants such as superoxide dismutase, catalase, and glutathione peroxidase that may help athletes achieve greater adaptability [6].

The objective of this review is to verify the efficacy of Ashwagandha supplementation in carrying out strength and endurance exercise.

Material and Methods

A descriptive review study has been carried out with the aim of answering the following research question: What beneficial effects does Ashwagandha supplementation have on strength and endurance exercise?

For this, a search was carried out in databases such as Pubmed and Google Scholar in January 2023. In order to find the largest number of articles possible, the following keywords were used: Ashwagandha, exercise, sport, endurance, strength, athletes.

For the selection of articles, inclusion criteria were used such as: articles published in any country, articles published in English, articles on Ashwagandha supplementation; The exclusion criteria were established: articles with supplementation other than Ashwagandha, articles that do not refer to the performance of strength and endurance exercise.

Results

Ashwagandha Supplementation on Strength Exercise

In a study conducted by Wankhede et al [5] in 57 male subjects aged between 18 and 50 years not experienced in strength training for 8 weeks where the Experimental Group (EG) ingested 300 mg of root extract of Ashwagandha and the Control Group (CG) ingested 300 mg of starch 2 times a day and did strength training with leg, chest, back, arm and shoulder exercises 4 days/week. The results showed that in the GE there was a greater increase in both strength and muscle mass with respect to the GC.

Ziegenfuss et al. [7] conducted a randomized, double-blind study in physically active men aged 18-45, where the EG ingested 500 mg of Ashwagandha root and the CG ingested 500 mg of placebo for 12 weeks. performing during this period a training of 10-12 strength exercises of the main muscle groups by performing 3 series of 12-15 repetitions during the first weeks and 4 to 6 series of 8 repetitions in the last weeks. The study authors concluded that taking 500 mg/day of Ashwagandha in combination with a progressive intensity strength program improves upper and lower body muscle strength.

In a study carried out with 42 mice [8] aged between 12 and 14 months whose objective was to evaluate the intake of

Ashwagandha and some dietary interventions to combat muscle weakness in aged rats. The study sample was divided into several groups with different dietary interventions such as: 500 mg/kg of body weight (BW) of Ashwagandha extract, 1.5 g/kg of BW of soybean + 1g/kg of BW of quinoa, 500 mg/kg of BW of Ashwagandha extract + 1.5 g /kg of soybean + 1g/kg of quinoa and 1g/kg of BW of whey protein hydrolysed. They undertook a 60-day strength program of 15-minute swimming in a pool with 5- to 15-gram weights strapped to their abdomens. The nutritional interventions that performed best in terms of decreased muscle loss and increased skeletal muscle strengthening were Ashwagandha and Ashwagandha with protein.

Malik et al. [9] conducted a study on 48 hockey players whose objective was to assess the effect of Ashwagandha intake on the strength and stability of the core muscles. The EG ingested Ashwagandha 500 mg twice a day for 8 weeks, while the CG ingested starch capsules. The study authors concluded that taking Ashwagandha improved both the strength and stability of the core muscles.

Ashwagandha Supplementation on Endurance Exercise

In a study carried out by Tiwari [10], the efficacy of the intake of an extract of Ashwagandha was evaluated in 50 healthy athletes, the GE performed the intake of 300 mg of Ashwagandha 2 times a day for 8 weeks. Efficacy was assessed using the Recovery-Stress Questionnaire for Athletes (RESTQ), Total Quality Recovery Scores (TQR), and Daily Analysis of Life Demands for Athletes (DALDA). The results obtained in the questionnaires showed that the GE athletes were the ones that showed the best results in the questionnaires with respect to the GC, so the researchers concluded that the intake of Ashwagandha improves cardiorespiratory endurance and quality of life.

Choudhary et al. [11] conducted a study with male and female athletes aged between 20 and 45 years. The EG ingested a 300 mg capsule of Ashwagandha extract twice a day for 12 weeks, while the GC did the same but with sucrose capsules. Cardiorespiratory endurance was assessed by performing the 20 m Shuttle Run Test and quality of life was assessed with The World Health Organization Quality of Life (WHO QOL) questionnaire. The researchers' findings suggest that Ashwagandha improves cardiorespiratory endurance and improves quality of life in healthy athletes.

In a study carried out with 40 elite cyclists [6] whose objective was to know the effect of Ashwagandha on aerobic capacity. The GE ingested 500 mg of aqueous Ashwagandha roots twice a day for 8 weeks, while the CG received the same intake but with starch. Subjects performed before and after the Ashwagandha intake period an incremental treadmill exercise test following the Bruce protocol in which subjects were asked to exhaustion. The results showed that Ashwagandha improves cardiorespiratory endurance.

Sukumar et al. [12] conducted a study evaluating the efficacy of Ashwagandha in improving cardiorespiratory endurance in 108 healthy subjects. The GE made an intake for 60 days of 12 g of Ashwagandha Choorna + 200 ml of milk while the GC made the intake of 200 ml of milk. The Rockport fitness walking test was performed before the start and at the end of the intervention. The results obtained showed that oral administration of Ashwagandha with milk improved VO2 max and increased hemoglobin in healthy subjects, thereby improving cardiorespiratory endurance.

Conclusions and Future Directions

As conclusions of this review, it is highlighted that the intake of Ashwagandha has beneficial effects for both strength and endurance exercise. In the case of resistance exercise, the intake of Ashwagandha caused a greater increase in both strength and muscle mass, while in the case of endurance exercise, the intake of Ashwagandha improved VO2 max, cardiorespiratory endurance and the quality of life. The number of studies carried out with Ashwagandha is very scarce in the scientific literature, so more studies are needed on the effects of Ashwagandha on speed exercise performance, exercise duration, as well as at different exercise intensities.

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