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**File: ■ Ashwagandha (*Withania somnifera*, Solanaceae)
■ Ergogenic Aid
■ Muscle Strength and Recovery**

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RE: Ashwagandha Improves Muscle Strength and Recovery in Men Performing Resistance Training

Wankhede S, Langade D, Joshi K, Sinha SR, Bhattacharyya S. Examining the effect of *Withania somnifera* supplementation on muscle strength and recovery: a randomized controlled trial. *J Int Soc Sports Nutr*. November 25, 2015;12:43. doi: 10.1186/s12970-015-0104-9.

Ashwagandha (*Withania somnifera*, Solanaceae) root is an adaptogen, helping the body adapt to stress. Although it has been shown to have a wide range of beneficial effects, studies of ashwagandha as an ergogenic aid are lacking. The authors hypothesize that ashwagandha supplementation may enhance the physiological adaptation of the body in response to the stress of weight resistance training. Hence, the purpose of this 8-week, randomized, double-blind, placebo-controlled study was to evaluate the effects of ashwagandha on healthy men performing resistance training.

Healthy men (n = 57, aged 18-50 years) with little experience in resistance training were recruited at a gymnasium in Kolkata, India. Subjects were excluded if they were taking any medication or steroids to enhance physical performance; had weight loss of > 5 kg in the previous 3 months; had history of drug abuse, smoking > 10 cigarettes day, or consuming > 14 grams of alcohol/day; were hypersensitive to ashwagandha; had orthopedic injury or surgery within the previous 6 months; had participated in other clinical studies during the previous 3 months; or had any other condition which the investigators judged problematic. Subjects were instructed not to take anti-inflammatory agents, drink alcohol, or smoke tobacco (*Nicotiana tabacum*, Solanaceae) during the study.

Subjects received either placebo (starch) or 600 mg/day ashwagandha root extract (KSM-66®; Ixoreal Biomed; Los Angeles, California) for 8 weeks. The extract was produced using a water-based process and was standardized to contain 5% withanolides. During the 8-week study period, subjects participated in a structured resistance training program based on the publications of the National Strength and Conditioning Association (NSCA); Colorado Springs, Colorado. Subjects trained every other day (3x/week), exercising the major muscle groups in both the upper body and

lower body. During the first 2-week acclimatization phase, each exercise set consisted of 15 repetitions at a lower load to allow the subject's body and neurological system to adjust to the training. The subsequent 6 weeks of training consisted of varying numbers of higher-load repetitions.

The primary endpoints were upper body and lower body muscle strength. The secondary endpoints were muscle size, muscle recovery, serum testosterone level, and body fat percentage. Muscle size was measured at the arm, chest, and upper thigh. Creatine kinase levels were assessed as a measure of muscle recovery (reduction in exercise-induced muscle damage over time). Assessments were made 1-2 days after the first day of training, and 2 days after the end of the 8-week training period.

As expected, the resistance training resulted in improvements in all of the measured parameters in both groups. However, the ashwagandha group had a significantly greater increase in upper body ($P = 0.001$) and lower body ($P = 0.04$) strength compared with placebo; it also had significantly better muscle recovery ($P = 0.03$). Compared with placebo, the ashwagandha group had a significantly greater increase in the muscle size of the arm ($P = 0.01$) and chest ($P < 0.001$), but there was no significant difference in the size of the upper thigh. The ashwagandha group had a significantly greater increase in serum testosterone ($P = 0.004$) and a significantly greater decrease in body fat percentage ($P = 0.03$), compared to placebo. Ashwagandha was well tolerated, and there were no serious adverse effects.

The focal question of this study was whether ashwagandha supplementation would increase the adaptations to resistance training. At a P value of 0.05, the adaptations as measured by muscle strength, muscle size, testosterone level, and body fat percentage were found to be significantly greater with ashwagandha compared to placebo. The authors conclude that "ashwagandha supplementation is associated with significant increases in muscle mass and strength and suggests that ashwagandha supplementation may be useful in conjunction with a resistance training program." Acknowledged limitations were that only untrained subjects ≤ 50 years were included, the relatively small sample size, and short duration of the study. The authors recommend further studies evaluate the potential benefit of ashwagandha over longer periods of time and for different populations, including females and older adults of both genders.

—Heather S. Oliff, PhD

Referenced article can be accessed at <http://www.jissn.com/content/12/1/43>.

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