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File: ■ Ashwagandha (*Withania somnifera*)
■ Male Infertility

HC 101337-490

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RE: Beneficial Effects of Ashwagandha in the Treatment of Male Infertility

Gupta A, Mahdi AA, Shukla KK, et al. Efficacy of *Withania somnifera* on seminal plasma metabolites of infertile males: a proton NMR study at 800 MHz. *J Ethnopharmacol*. 2013;149(1):208-214.

Infertility affects 10-15% of couples worldwide.[1] A highly regarded tonic and adaptogen, in traditional East Indian systems of medicine ashwagandha (*Withania somnifera*) roots are also used to treat impotence and infertility. There is some experimental evidence that ashwagandha root improves semen quality and decreases spermatorrhea by regulating reproductive hormone levels and oxidative stress.[2,3] This study evaluated the effects of ashwagandha on seminal plasma metabolites, enzymes, and hormones in infertile men by using high-resolution proton nuclear magnetic resonance (NMR) spectroscopy.

Ashwagandha root contains withanosides, essential and non-essential fatty acids, amino acids, sterols, catecholamines, aromatic alcohols and acids, gamma-aminobutyric acid, and glycerol. The roots for this study (obtained from Central Council for Research in Unani Medicine; New Delhi, India) were dried and ground to a fine powder.

One hundred and eighty male subjects aged 22 to 45 years were recruited from the infertility clinic at King George's Medical University, Departments of Urology and Obstetrics & Gynecology in Lucknow, India, and subdivided into the following 3 groups:

- Normozoospermic (NZ; n=60) men who had a normal semen profile (>20 x 10^6 spermatozoa/mL, >40% motility, and >40% normal morphology) and infertility of unknown etiology
- Oligozoospermic (OZ; n=60) men who had a sperm concentration <20 x 10^6/mL, >40% motility, and >40% normal morphology
- Asthenozoospermic (AZ; n=60) men who had a sperm concentration >20 x 10^6/mL, but <40% motility, and >40% normal morphology

An additional 50 men who were age-matched and healthy (>20 x 10^6/mL, >40% motility, and >40% normal morphology) served as controls (CZ; n=50).

The subjects in the NZ, OZ, and AZ groups were prescribed ashwagandha root powder (5 g daily taken orally with milk in a single dose) for 3 months. Semen and blood samples were collected at baseline and after 3 months of treatment.

Seminal plasma samples were analyzed using proton NMR spectroscopy to determine concentrations of the metabolites lactate, alanine, glutamate, glutamine, citrate, lysine, choline, glycerophosphocholine (GPC), glycine, tyrosine, histidine, phenylalanine, and uridine. Sperm concentration, motility, lipid peroxide (LPO), enzyme, and hormone levels were also measured.

The concentrations of lysine, choline, glutamine, glycine, tyrosine, and uridine did not change significantly in any group post-treatment. Compared with baseline values, alanine, glutamate, citrate, GPC, and histidine increased significantly in the NZ, OZ, and AZ groups after 3 months of treatment, while phenylalanine concentrations decreased. Sperm concentration, motility, and LPO levels also improved significantly in these groups compared with baseline values.

According to the authors, this is the first study to analyze metabolite concentrations, as well as levels of the enzymes alanine aminotransferase, aspartate aminotransferase, lactate dehydrogenase (LDH), and isocitrate dehydrogenase, in the seminal plasma of infertile males in an attempt to elucidate the physiological effects of ashwagandha. Enzyme levels increased significantly in all groups of infertile subjects post-treatment compared with baseline, except for LDH in the NZ group.

Compared with baseline, there was a significant increase in luteinizing hormone and testosterone in all groups post-treatment. Follicle-stimulating hormone and prolactin levels decreased in all 3 groups of infertile subjects.

The authors explain, "Aberrations of endogenous metabolites, enzymatic activities, and hormone levels commonly precede the onset of infertility." An important finding in this study is that oral intake of ashwagandha for 3 months by infertile men resulted in substantial enhancement of seminal plasma metabolic profiles and improvements in enzymatic, hormonal, and clinical parameters (sperm concentration, motility, and LPO). The authors conclude that ashwagandha "can be used as an alternative empirical therapy for the treatment and clinical management of male infertility."

—Shari Henson

References

[1]Callister LC. Global infertility: are we caring yet? *MCN Am J Matern Child Nurs*. 2010;35(3):174.

[2]Mahdi AA, Shukla KK, Ahmad MK, et al. *Withania somnifera* improves semen quality in stress-related male fertility. *Evid Based Complement Alternat Med*. 2011;2011:576962. doi: 10.1093/ecam/nep138.

[3]Ahmad MK, Mahdi AA, Shukla KK, et al. *Withania somnifera* improves semen quality by regulating reproductive hormone levels and oxidative stress in seminal plasma of infertile males. *Fertil Steril*. 2010;94(3):989-996.

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