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

HC 120695-399

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RE: Ashwagandha Root Found to Improve Fertility, Antioxidant and Hormone Levels, and Semen Quality in Infertile Men

Mahdi AA, Shukla KK, Ahmad MK, et al. *Withania somnifera* improves semen quality in stress-related male fertility. *Evid Based Complement Altern Med*. Sep 29, 2009. [Epub ahead of print] doi: 10.1093/ecam/nep138.

A clinical study has shown that ashwagandha (*Withania somnifera*) has beneficial effects on seminal quality, oxidative status, and reproductive hormone profiles.[1] Seminal oxidative stress is linked to male idiopathic infertility. In this study, researchers examine the protective effect of ashwagandha on semen quality in infertile male smokers and infertile men under psychological stress.

Ashwagandha roots were authenticated by a botanist at Shia P.G. College in Lucknow, India, and a voucher specimen was deposited (No. M-114, dated Dec. 19, 2006). The roots were shade-dried and ground into a fine powder. The study was conducted at the Chhatrapati Shahuji Maharaj Medical University in Lucknow, India from January 2006 to 2008. The control group included 60 aged-matched men who had normal semen profiles and serum cortisol levels, had previously initiated at least 1 pregnancy, and were not under psychological stress. The treatment group included 60 men with normal semen profiles (normozoospermic, NZ) and idiopathic male infertility divided into 3 subgroups: NZ men, NZ cigarette smokers, and NZ men under psychological stress (n=20 for each subgroup). The researchers assessed psychological stress levels using the State Anxiety Inventory in which the subjects are asked to rate their feelings on a 4-point scale with higher total scores indicating higher anxiety levels. The subjects provided semen samples following 3-4 days of abstinence at baseline and after 3 months of treatment, which were analyzed following the guidelines of the World Health Organization (WHO). Blood samples for biochemical analysis were also collected. The study group took 5 g of ashwagandha powder with skim milk once daily for 3 months. For 3 months after the treatment period, the researchers monitored the pregnancy outcomes of the subjects' partners whose extensive fertility tests had been normal.

At baseline, all 3 treatment subgroups had lower sperm concentrations than the placebo group (NZ: $P<0.05$; NZ stress: $P<0.01$; NZ smokers: $P<0.01$). All 3 study subgroups also had significantly higher semen liquefaction times compared to the placebo group at baseline (NZ: $P<0.05$; NZ stress: $P<0.01$; NZ smokers: $P<0.01$). The NZ smokers also had lower sperm

motility than the control group at baseline (P<0.05). There were no significant differences in semen volume between groups.

After treatment, sperm concentration increased compared to baseline values for all 3 treatment groups (NZ: +17%, P<0.01; NZ stress: +36%, P<0.01; NZ smokers: +20%, P<0.05). Sperm motility increased compared to baseline values in the 3 treatment groups (NZ: +9%, not significant; NZ stress: +13%, P<0.05; NZ smokers: +10%, P<0.05). Semen liquefaction time decreased significantly compared to baseline in the treatment groups (NZ: -19%, P<0.05; NZ stress: -34%, P<0.01; NZ smokers: -20%, P<0.05). The rates of pregnancy outcomes were 15% for NZ men and NZ men under stress and 10% for NZ smokers. Seminal plasma lipid peroxides (LPOs) were significantly increased in all treatment groups at baseline by 40-45%, when compared to the healthy control group (P<0.01 for all). Post-treatment seminal LPOs were significantly decreased compared to pre-treatment levels (NZ: -29%; NZ stress: -23%; NZ smokers: -27%; P<0.01 for all).

Seminal plasma superoxide dismutase (SOD) activity was significantly lower in all 3 treatment subgroups compared to the control group at baseline (P<0.01). Catalase activity was significantly lower in the NZ stress and NZ treatment subgroups compared to the control group at baseline (P<0.01 for both). After treatment, all 3 treatment groups experienced significant increases of 8-18% in SOD activity compared to baseline levels (P<0.01 for all), and the NZ stress treatment group showed a significant 11% increase in catalase activity (P<0.01). Treatment with ashwagandha also significantly increased seminal levels of glutathione and ascorbic acid in the NZ and NZ stress subjects (P<0.01 for both), as well as vitamin A and vitamin E in all 3 treatment subgroups (P<0.05 for all), compared to baseline values.

At baseline, the 3 treatment subgroups had significantly lower blood serum levels of testosterone and luteinizing hormone (LH) compared to the control group (P values not specified for any hormone changes). After treatment, all 3 treatment subgroups experienced significant increases in testosterone and LH levels compared to pre-treatment values. Prolactin and follicle stimulating (FSH) hormone levels were significantly increased in all 3 subgroups compared to the control group at baseline. Post-treatment FSH and prolactin levels decreased significantly compared to pre-treatment values in all 3 subgroups, with the exception of prolactin in the NZ stress treatment group. Cortisol levels measured at 8 am and 4 pm were significantly higher in the 3 treatment subgroups compared to the controls at baseline, except for the NZ treatment subgroup at 8 am. After treatment, all 3 subgroups experienced significant decreases in cortisol levels at 8 am and 4 pm compared to baseline values.

The authors conclude that ashwagandha improves seminal quality and oxidative status, decreases cortisol levels, and balances reproductive hormones in men with idiopathic male infertility, including smokers and men under psychological stress. They also write that the study "confirms the role of stress in male infertility." More research is needed to confirm the mechanism of action.

—Marissa Oppel-Sutter, MS

References

1.Oppel-Sutter M. Ashwagandha improves multiple parameters affecting infertile men. *HerbClip*. December 15, 2009 (No. 070692-390). Austin, TX: American Botanical Council. Review of *Withania somnifera* improves semen quality by regulating reproductive hormone levels and oxidative stress in seminal plasma of infertile males by Ahmad MK, Mahdi AA, Shukla KK, et al. *Fertil Steril*. Jun 5, 2009. [Epub ahead of print].

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