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File: ■ Red Ginseng (*Panax ginseng*)
■ Allergic Rhinitis

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RE: Therapeutic Effects of Fermented Red Ginseng on Allergic Rhinitis Symptoms

Jung J-W, Kang H-R, Ji G-E, et al. Therapeutic effects of fermented red ginseng in allergic rhinitis: a randomized, double-blind, placebo-controlled study. *Allergy Asthma Immunol Res*. April 2011;3(2):103-110.

"Red" ginseng (*Panax ginseng*) is produced by steaming raw ginseng root, which generates the caramel-colored end product after drying, while "white" ginseng is usually peeled or scraped raw main root, which is then either sun-dried or oven-dried without further processing. Steaming ginseng leads to transformation of some original ginsenosides, mainly by partial deglycosylation, resulting in enhancement of biological activity. (Editor's Note: This process has…**not** been found to increase the content of…ginsenosides.) The authors of the paper summarized here stated that, "Fermented red ginseng has been treated with microorganisms and enzymes that *enhance the saponin content of the red ginseng* for maximum efficacy." They meant to say that: Red ginseng is treated with microorganisms and enzymes to produce "fermented" red ginseng, which has further enhanced biological activity, as evidenced by the protective effect of lipopolysaccharide (LPS)-inflammation in RAW 264.7 cells.

Ginsenoside Rh1, produced from metabolic biotransformation of protopanaxatriol ginsenosides, has been reported to be anti-allergenic and anti-inflammatory.[1] The authors cite a previous study showing that fermented red ginseng worked better in suppressing allergy-related inflammation than non-fermented red ginseng.[2] In this randomized, double-blind, placebo-controlled study, the authors evaluate the therapeutic effects of fermented red ginseng against the symptoms of allergic rhinitis.

Patients included in this study were between 18-55 years old suffering from at least 2 of the 4 major allergic rhinitis symptoms of itching, sneezing, runny nose, or congestion for the past 2 years. Included patients also had positive skin prick tests for more than 1 perennial allergen such as house dust mites, fungi, cockroaches, and animal hair. Patients already taking medication for allergic symptoms or having taken antihistamines or H2-blockers within 2 weeks prior to the study were excluded. Those suffering from asthma, hypertension, diabetes, or who were pregnant or planning on becoming pregnant within 3 months of the study were also excluded. Lastly, the authors did not include patients with abnormal blood test results.

The experimental material was a capsule of 250 mg of dried, fermented red ginseng powder provided by Bifido Inc., Hongcheon, Korea. The powder per gram was characterized as containing 236.7 mg of crude saponin, 2.3 mg of Rb2, 0.01 mg of Rb3, 0.6 mg of Rc, 9.5 mg of Rd, 0.5 mg of Re, 0.6 mg of Rg1, 8.2 mg of Rg2, 27.7 mg of Rg3, 12.1 mg of Rh1, and 3.1 mg of Rh2 ginsenosides, with 61.0 mg of compound K. Placebo capsules containing starch were the same size and shape as the experimental capsules. The dosage regimen was 3 capsules twice daily for 4 weeks.

Patients were randomly placed in either the experimental or control groups and received either the fermented red ginseng or placebo, respectively. The authors administered a Rhinitis Quality of Life (RQoL) survey before and after the 4-week study. This survey assessed quality of life with a 5-point scale of 28 subjects related to allergic rhinitis including practical problems, sleep, nasal symptoms, non-nose/non-eye symptoms, activity state, emotional state, and eye symptoms. In addition, a daily total nasal symptom score (TNSS) addressed the 4 symptoms of itching, sneezing, runny nose, and congestion using a 4-point scale ranging from 0 to 3, with 0 being no symptoms and 3 being severe symptoms. Symptom duration during each day was also measured using a range from 0 for none to 3 for symptoms lasting more than 2 hours. A skin prick test was also conducted before and after the study measuring 14 allergens including the perennial allergens of house dust mites, fungi, cockroaches, animal hair, and the seasonal allergens of trees, grass, and weeds. Patients were also monitored for adverse effects.

Initially, 66 patients were enrolled in the study with 7 dropping out before completion. Overall, 59 patients completed the study with 30 in the experimental group and 29 in the control group. At baseline, there were no significant differences in positive reactions to allergens, TNSS, or RQoL between experimental and control groups. Throughout the study, both the experimental and control groups significantly improved in the itchy nose, runny nose, and sneezing TNSS and duration scores from baseline to control ($P<0.05$); however, the nasal congestion TNSS of the experimental group significantly improved at weeks 2, 3, and 4 ($P<0.05$) while the control group did not. Also, the experimental group's duration TNSS for nasal congestion improved at weeks 1, 2, 3, and 4 of treatment ($P<0.05$), while the control group's score did not significantly change until week 4 ($P<0.05$). The endpoint TNSS and duration scores were not significantly different between the experimental and control groups (1.16 ± 0.55 vs. 1.46 ± 0.75 and 1.22 ± 0.54 vs. 1.42 ± 0.76, respectively).

The experimental group significantly improved in the RQoL activity and emotional state categories while the control group did not ($P<0.05$); however, in all other RQoL categories, both groups significantly improved ($P<0.05$), and there were no significant differences between the experimental and control groups' RQoL at the end of the study (9.38 ± 2.45 vs. 10.14 ± 3.34, respectively). Also, the experimental group had significantly reduced skin discoloration in response to 8 tested perennial allergens while the control group showed no change ($P<0.05$). Lastly, the authors observed a significant increase in the allergy-associated antibody immunoglobulin E (IgE) levels in the control group between baseline and endpoint (507.38 ± 45.67 U/ml vs. 522.34 ± 50.75 U/ml, $P=0.025$). No significant increase was seen in the experimental group.

Mild hepatic dysfunction was reported from 3 patients, with 1 in the experimental group and 2 in the control group. The patient in the experimental group had elevated levels of

alanine aminotransferase (ALT), a liver enzyme used to detect liver problems, but showed normal levels after 2 weeks. The other patients had increased levels of ALT and bilirubin; however, no other adverse effects were reported.

The authors conclude that the positive results observed with the nasal congestion TNSS in the experimental group indicate fermented red ginseng as a possible substitute for antihistamine use. The authors argue that conventional medication for nasal decongestion such as decongestants and steroids may be ineffective and even harmful if used over a long period of time. The data presented in this study support the use of fermented red ginseng, along with liver function monitoring, for this allergy symptom as it is more effective than the placebo in this study. One notable aspect was the parallel improvement of TNSS and RQoL in both the experimental and placebo groups throughout the study. This suggests that overall, with the exception of nasal congestion, fermented red ginseng was not more effective in treating allergic rhinitis symptoms than the placebo.

A serious issue with this study is the lack of any details about the preparation and fermentation of the red ginseng; also informative would be a comparison of the ginsenoside profiles of red ginseng and the fermented red ginseng product. (Editor's Note: The authors address a timely and important avenue of research into the potential impacts of fermented foods and herbal medicine; however, without specifics on the microbes used and the fermentation process, it is hard to make any definitive assessment about the bioactivity observed. As microbes' effects on medicinal plants are only starting to be a focus of investigation, studies such as the one presented here will become increasingly paramount.)

—Amy C. Keller, PhD

References

[1]Park E-K, Choo M-K, Han MJ, Kim D-H. Ginsenoside Rh1 possesses antiallergic and anti-inflammatory activities. *Int Arch Allergy Immunol*. February 2004;133(2):113-120.

[2]Hyun MS, Hur JM, Shin YS, Song BJ, Mun YJ, Woo WH. Comparison study of white ginseng, red ginseng, and fermented red ginseng on the protective effect of LPS-induced inflammation in RAW 264.7 cells. *J Appl Biol Chem*. March 2009;52(1):21-27.