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File: ■ Rooibos Tea (*Aspalathus linearis*)
■ Antioxidant Capacity
■ Total Radical-trapping Antioxidant Potential (TRAP)

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RE: Rooibos Tea Consumption Acutely Increases Plasma Antioxidant Capacity in Healthy Subjects

Villano D, Pecorari M, Testa M, et al. Unfermented and fermented rooibos teas (*Aspalathus linearis*) increase plasma total antioxidant capacity in healthy humans. *Food Chem*. 2010;123(3):679-683.

Pre-clinical studies have shown that rooibos (*Aspalathus linearis*) tea possesses antioxidant effects.[1] This antioxidant activity has been primarily attributed to polyphenolic constituents that include the unusual compounds aspalathin and nothofagin, as well as caffeic acid, protocatechuic acid, quercetin, rutin, isoquercitrin, and others.[1] Fermentation of rooibos tea oxidizes many of these polyphenolic compounds. This randomized, placebo-controlled, crossover, clinical study was the first to assess the antioxidant capacity of both fermented and unfermented rooibos tea in healthy human subjects.

Beverage Partners Worldwide (Zurich, Switzerland) provided 500 mL bottles of fermented and unfermented rooibos teas containing 1.5 g/L rooibos extract powder for the study. The authors recruited 15 healthy nonsmokers who did not take medications or antioxidant supplements. For 2 days prior to the study, the subjects followed a low-antioxidant diet that excluded fresh fruits and vegetables, tea, coffee, and wine. The subjects kept dietary records to ensure that they did not consume high-antioxidant foods and beverages. The subjects were randomized into 3 groups (randomization method not stated): group A received 500 mL water (control), group B received 500 mL fermented rooibos tea, and group C received 500 mL unfermented rooibos tea. Venous blood samples were collected 0, 0.5, 1, 2, and 5 hours after the subjects drank the tea. Following 2-week wash-out periods, the subjects were crossed over to the other treatments until all patients had received all treatments. The researchers measured the total antioxidant capacity (TAC) of the subjects' plasma and the teas using the total radical-trapping antioxidant potential (TRAP) assay. In addition, they measured the subjects' levels of plasma glucose, total cholesterol, triglycerides, and urate.

The in vitro results showed that unfermented rooibos tea has a 28% higher TAC than fermented rooibos tea (unfermented: 5.23 ± 0.80 mmol/L; fermented: 4.07 ± 0.29

mmol/L). The authors comment that both fermented and unfermented rooibos teas "possess a lower chain-breaking antioxidant potential than do green and black teas [*Camellia sinensis*] but higher than commercially available instant tea."

There were no significant changes in the subjects' plasma triglyceride, uric acid, or total cholesterol levels. Their plasma glucose levels increased significantly compared to baseline 30 minutes after drinking the fermented and unfermented rooibos teas (fermented: +32.0%, $P<0.001$; unfermented: +21.6%, $P<0.001$), but not water. The authors do not provide information about product formulation, but this increase could be due to sweetener added to the teas. Water did not affect the subjects' plasma TRAP values. Plasma TRAP values increased compared to baseline 30 minutes after the subjects drank the fermented rooibos tea (+4.8%), and the increase was statistically significant 1 hour post-ingestion (+6.6%, $P<0.05$ compared to baseline and control). The subjects' plasma TRAP values increased 30 minutes after drinking the unfermented rooibos tea (+1.7%), and the difference was statistically significantly higher than the control 1 hour (+2.9%, $P<0.01$) and 2 hours post-ingestion (+2.7%, $P<0.05$). Although still significantly higher than baseline values, the subjects' plasma TRAP values started to decline at 2 hours post-ingestion (+4.9%, $P<0.05$ compared to baseline). The subjects' plasma TRAP values returned to baseline levels 5 hours after ingestion. The authors failed to mention the presence or absence of adverse side effects. No withdrawals from the study were reported.

This is the first clinical study to show that rooibos tea acutely increases plasma antioxidant levels in human subjects. It is interesting to note that, while the unfermented rooibos tea showed a greater antioxidant capacity compared to the fermented tea in vitro, the in vivo results show that fermented tea has greater effect on plasma TRAP values compared to the unfermented rooibos tea. This raises questions about bioavailability. Further clinical studies to confirm these results and to examine the effect of chronic rooibos tea consumption on antioxidant status are warranted.

—Marissa Oppel-Sutter, MS

Reference

1. Milot B. Comprehensive review of rooibos. *HerbClip*. February 27, 2004 (No. 100331-251). Austin, TX: American Botanical Council. Review of Rooibos tea: research into antioxidant and antimutagenic properties by Erickson L. *HerbalGram*. 2003;59:34-45.

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