



HerbClip™

Mariann Garner-Wizard
David Levine

Shari Henson
Heather S Oliff, PhD

Amy Keller, PhD
Risa Schulman, PhD

Executive Editor – Mark Blumenthal

Managing Editor – Lori Glenn

Consulting Editors – Dennis Awang, PhD, Thomas Brendler, Francis Brinker, ND, Mark Dreher,
Steven Foster, Risa Schulman, PhD

Assistant Editor – Tamarind Reaves

AMERICAN
BOTANICAL
COUNCIL

**File: ■ Black Tea (*Camellia sinensis*)
■ Cardiovascular Disease**

HC 021236-448

Date: May 15, 2012

RE: Black Tea Intake Improves Lipid Profile and Antioxidant Status

Bahorun T, Luximon-Ramma A, Neergheen-Bhujun VS, et al. The effect of black tea on risk factors of cardiovascular disease in a normal population. *Prev Med.* 2011; [epub ahead of print]. doi:10.1016/j.ypmed.2011.12.009.

Tea (*Camellia sinensis*) has been reported to promote good health. Black tea contains high levels of polyphenols, with the major phenols being the flavan-3-ols, the flavonols, the flavones, and quinic acid esters of gallic, coumaric, and caffeic acids. Although tea consumption may help protect against cardiovascular diseases (a benefit attributed to its polyphenols), "the intricate mechanisms of polyphenolic action still need to be comprehensively understood," write the authors. They conducted a randomized, controlled, parallel clinical trial to determine the effects of black tea consumption on fasting serum glucose, total cholesterol (TC), triglycerides (TGs), high-density lipoprotein (HDL) cholesterol, and low-density lipoprotein (LDL) cholesterol, as well as the antioxidant status in a normal population in the Republic of Mauritius.

To be eligible, the participants had to be nonsmokers or former smokers between ages 25 and 60 years, with an alcohol intake of fewer than 2 drinks daily, and a cardiac ejection fraction (a measure of how well the heart is pumping) greater than 40%. If postmenopausal, female participants could not be receiving hormone replacement therapy (HRT). Of the 87 participants recruited for the 15-week trial, 77 (42 men and 35 women) completed it.

The treatment group consumed 3 standard cups of 200 mL of black tea infusate daily for 12 weeks without additives, followed by a 3-week washout period during which they drank the same amount of hot water daily. The control group consumed equal amounts of hot water for the same intervention period. Tea bags were purchased from Mauritius Corson Tea Estate Co. Ltd (Curepipe, Mauritius). The tea had high levels of gallic acid derivatives (50 ± 0.4 mg/L), flavan-3-ols (42 ± 2 mg/L), flavonols (32 ± 1 mg/L), and theaflavins (89 ± 1 mg/L). The Trolox equivalent antioxidant capacity (TEAC) and ferric reducing ability of plasma (FRAP) values were 1055 ± 25 μ mol/g and 825 ± 23 μ mol/g of dry weight, respectively.

Fasting blood samples were drawn at baseline, at week 12, and at week 15. The mean fasting blood glucose level at baseline was 134 ± 66 mg/dL for the men and 111 ± 38 mg/dL for the women. At 12 weeks, those levels dropped significantly for the men (30.2%) and for the women (14.8%) ($P < 0.001$). Nonsignificant decreases were observed in the control groups. The washout generally increased the blood glucose level in the study groups. The authors note that the baseline levels in both groups were higher than the international standard values and that the Mauritian population is reported to have a 23.6% incidence of diabetes. Examining the results of this trial, the authors conclude that "an antihyperglycemic effect of black tea can therefore be anticipated."

Tea consumption did not significantly influence TC levels in the men, but an increase of 14% ($P < 0.05$) was reported for the women. After the washout period, very slight nonsignificant increases were reported in the tea group compared with the levels at week 12. Very slight nonsignificant increases were also noted in the control group.

The baseline TG levels (166 ± 138 mg/dL for the men and 102 ± 65 mg/dL for the women) were significantly reduced by 38.6% for the men and 28.6% for the women ($P < 0.01$) after 12 weeks of tea consumption. After the washout, TG levels increased significantly by 25% in the men and 24% in the women ($P < 0.05$). At week 12, the control group reported nonsignificant decreases of TG levels in both men and women, which were then followed by nonsignificant increases after the washout period. "Relatively marked non-significant reductions were also observed in the control groups thereby questioning the apparent inertness of hot water," the authors state.

At week 12, a slight nonsignificant reduction of LDL cholesterol was noted in the men in the tea group, while a nonsignificant increase was seen among the women. Washout increased the LDL levels nonsignificantly in both men and women. In the hot water group, nonsignificant increases in LDL cholesterol were noted in both men and women.

At week 12, those in the tea consumption group had significantly increased HDL cholesterol levels: 17% ($P < 0.05$) in the men and 24% in the women ($P < 0.05$). After the washout period, highly significant increases of 15% in the men and 29% in the women ($P < 0.001$) were recorded. In the control group, no significant changes were recorded for the men, while a highly significant increase of 50% ($P < 0.001$) was reported for the women's HDL cholesterol levels; a significant increase (16.7%, $P < 0.05$) continued during the washout period.

The mean LDL/HDL ratio (a predictor of atherosclerosis risk, with a ratio < 3 considered normal) values for the men and women in the tea group were 2.65 ± 1.3 and 2.47 ± 1.5 , respectively. After tea consumption, the tea-treated group reported an overall significant decrease of 16.6% ($P < 0.05$). The ratio values decreased further during the washout period (nonsignificantly in the men and significantly [$P < 0.05$] in the women).

The plasma total antioxidant activity was assessed by measuring TEAC and FRAP values. A significant increase was seen in FRAP values in tea-treated men (440%, $P < 0.05$) and tea-treated women (386%, $P < 0.05$) at week 12, followed by a significant increase in the men during the washout period ($P < 0.01$). Hot water induced a significant increase of 482% ($P < 0.01$) in the men and a nonsignificant increase in the women at week 12.

TEAC values were slightly reduced by tea intake in the men ($P < 0.05$) and women ($P < 0.05$) at week 12. Following the washout period, the decrease continued for the men, while the women recorded a very slight significant increase ($P < 0.01$). In the control group at week 12, a decrease in TEAC values was observed for both men ($P < 0.01$) and women (nonsignificant), followed by nonsignificant increases after the washout.

As seen in this study, the moderate intake of black tea improved the plasma levels of some of the cardiovascular disease risk factors and total antioxidant capacity. "Although the underlying biological mechanisms for these effects and the exact role of phenolics warrant an extensive study, tea may provide an important source of dietary antioxidants in many individuals," conclude the authors.

—*Shari Henson*

The American Botanical Council has chosen not to reprint the original article.

The American Botanical Council provides this review as an educational service. By providing this service, ABC does not warrant that the data is accurate and correct, nor does distribution of the article constitute any endorsement of the information contained or of the views of the authors.

ABC does not authorize the copying or use of the original articles. Reproduction of the reviews is allowed on a limited basis for students, colleagues, employees and/or members. Other uses and distribution require prior approval from ABC.