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FILE: ▪ Green Tea (*Camellia sinensis*)
▪ Abdominal Fat Loss
▪ Obesity

HC 030391-373

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RE: Green Tea Catechin Consumption Enhances Loss of Abdominal Fat

Maki KC, Reeves MS. Farmer M, et al. Green tea catechin consumption enhances exercise-induced abdominal fat loss in overweight and obese adults. *J Nutr*. February 2009;139(2):264-270.

According to the National Center for Health Statistics, more than 72 million adults in the United States are overweight or obese. Excess adiposity, and particularly, excess abdominal fat, places these adults at an increased risk for morbidity from certain health conditions, including hypertension, heart disease, and diabetes, and is also associated with greater risk for certain cancers. Studies have shown that green tea (*Camellia sinensis*) catechins may have favorable effects on body composition in humans. The authors report on their study evaluating the influence of a green tea catechin beverage on body composition and fat distribution in overweight and obese adults during exercise-induced weight loss.

The randomized, double-blind, controlled clinical trial was conducted at 2 clinical research sites (Provident Clinical Research in Bloomington, Indiana, and Meridien Research in St. Petersburg, Florida) and included a 2-week screening period followed by 12 weeks of treatment. To be eligible, subjects had to be 21 to 65 years old, have a waist circumference ≥87 cm for women or ≥90 cm for men, and total cholesterol ≥5.2 mmol/L (200.7 mg/dL). Of the 337 persons screened, 132 were randomly assigned to receive either a beverage containing ~625 mg catechins or a control beverage. Because 2 subjects from each group did not return for a second visit, the study sample discussed in this article included 128 subjects (21 of whom did not complete the entire study for various reasons). For both groups, the demographic and baseline characteristics were similar. Mean age was 48 years. Most were non-Hispanic whites, and about one-half of the subjects were men. The mean body mass index was ~32 kg/m^2. The generally healthy, normally sedentary participants agreed to consume no more than 2 caffeinated beverages per day. Pregnant or lactating women (including those planning to get pregnant during the study) were excluded and advised to avoid consuming brewed tea and catechin-containing foods, as well as over-the-counter dietary supplements or medications containing caffeine.

The authors report that both the catechin beverage and the control beverage contained water, sodium chloride, artificial citrus flavoring, glucose, erythritol, and sucralose. A 500-mL serving provided 63 kJ (15 kcal) of energy and 250 mg of sodium. The catechin beverage was also mixed with an amount of green tea extract, and the placebo beverage contained added caffeine to match the final caffeine content of the catechin beverage (~39 mg). The subjects were instructed to consume 1 500-mL bottle per day within 30 minutes, at

any time of the day, with or without food. They were asked to maintain their habitual energy intake during the study. Three-day diet records were collected at baseline and at 6 and 12 weeks and analyzed to evaluate consistency of energy intake.

At baseline and at week 12, the subjects underwent maximal treadmill graded exercise testing. The day after baseline, the subjects began an exercise program and were instructed to increase their activity level, with a goal of achieving ≥180 minutes per week of moderate-intensity physical activity, and to attend at least 3 supervised exercise sessions per week. Pedometer readings were recorded before and after each session. A physical activity score was calculated at baseline and at 6 and 12 weeks. At each study visit, anthropometric, blood pressure, and body composition measurements were recorded. Laboratory tests included measurements of serum lipid levels, free fatty acid (FFA) level, fasting insulin and glucose, plasma high-sensitivity C-reactive protein, and whole blood glycosylated hemoglobin (HBA_{1c}).

The authors report that the mean compliance with beverage consumption was similar for both treatment groups (P=0.103) and that physical activity was also similar for both groups throughout the study. The 2 groups did not differ in dietary variables at baseline or in the changes from baseline to week 12 in energy intake or any nutrient variables.

At week 12, the catechin group tended to have greater loss of body weight than the control group (P=0.079). The 2 groups did not differ in the percentage changes in fat mass or intra-abdominal fat; however, both total abdominal fat area and abdominal subcutaneous fat area had decreased more at week 12 in the catechin group. Triglyceride (TG) (P=0.023) and FFA (P=0.038) levels had decreased more at week 12 in the catechin group than in the control group. Groups did not differ at week 12 in the changes from baseline in total, low-density lipoprotein, or high-density lipoprotein cholesterol levels. Fasting glucose, fasting insulin, and HbA_{1c} levels did not differ significantly between the 2 groups at week 12.

The frequencies of adverse events were similar for both groups; most commonly, joint pain, rhinitis, and sinusitis, judged to be of mild to moderate intensity and considered unlikely to be related to the test product. However, a total of 14 adverse events (5 in the catechin group and 9 in the control group) were thought to be possibly related to the study product in the catechin group; 3 developed hypertension, 1 dyspepsia, and 1 elevated liver enzymes.

It is possible, say the authors, that enhanced fat oxidation contributed to the reduced levels of TG and FFA, although they were measured after an overnight fast when any effect from prior catechin consumption would have been minimal. Therefore, "we think that the greater reductions in these variables in the catechin group are more likely to be secondary to reduced abdominal fat storage."

In summary, the findings of this study suggest that consumption of a beverage containing green tea catechins may enhance exercise-induced loss of abdominal fat and improve FFA and TG levels. Future research should clarify the mechanisms responsible for these effects.

—*Shari Henson*

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