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File: ■ Hibiscus (*Hibiscus sabdariffa*)

■ Hypertension
■ Blood Pressure

HC 021066-396

Date: March 15, 2010

RE: Hibiscus Tea May Help Lower Blood Pressure in Mild Hypertension

McKay DL, Chen CY, Saltzman E, Blumberg JB. *Hibiscus sabdariffa* L. tea (tisane) lowers blood pressure in prehypertensive and mildly hypertensive adults. *J Nutr.* Feb 2010;140(2):298-303. doi: 10.3945/jn.109.115097

Hibiscus (*Hibiscus sabdariffa*) calyces are popular ingredients in herbal teas and other beverages. Pre-clinical studies have shown that hibiscus flowers possess hypocholesterolemic effects, and clinical trials have demonstrated that hibiscus tea lowers blood pressure and lipid profiles.^{1,2} The purpose of this study was to determine if hibiscus calyces tea lowers the blood pressure of healthy adults who are at risk of developing high blood pressure.

The trial was conducted at Tufts University Health Sciences Campus and Tufts Medical Center (Boston, Massachusetts). The authors recruited non-smoking men and women, aged 30-70 years, from the greater Boston, Massachusetts area through advertisements, direct mailings, postings in clinics, and community health events. The subjects had systolic blood pressures (SBPs) in the range of 120-150 mmHg and diastolic blood pressures (DBPs) below 95 mmHg. Between August 2005 and October 2007, researchers assessed the blood pressure of potential subjects at 2 separate baseline visits 1 week apart. The subjects were randomized using a computer-generated randomization list stratified by gender and age to receive either hibiscus tea or a placebo with a similar taste and appearance 3 times a day (720 ml/day) for 6 weeks. The subjects receiving hibiscus tea were instructed to infuse 1 bag containing 1.25 g hibiscus in 240 ml boiled water for 6 minutes. The subjects receiving the placebo were instructed to add 16-18 drops (1.2 ml) of the placebo concentrate to 240 ml of water. The placebo concentrate consisted of artificial cranberry and raspberry flavor concentrates and red food coloring and is used in commercial preparations to mimic the taste of hibiscus. The subjects and study personnel, except for the dietician, were blinded to the treatment allocations and informed that the clinical study was examining a hibiscus beverage without the mention of the word "tea."

The subjects returned once a week during the study period for blood pressure readings and data collection. At each weekly visit, the subjects' blood pressures were taken following a 12-hour fast using an automated device and a standardized protocol. The

subjects' blood pressures were taken at the same time of day in a quiet environment every 5 minutes during 2 sessions lasting 15 minutes each. The researchers then averaged the values from the readings for SBP, DBP, and mean arterial pressure (MAP). The subjects were also asked about changes in health, as well as the use of prescription or over-the-counter drugs, caffeine, tobacco, and dietary supplements. In a separate pilot study, the researchers used high performance liquid chromatography (HPLC) to measure the levels of anthocyanins and total phenols in their own urine and blood samples 1 hour after drinking the hibiscus tea after having drunk 3 cups of hibiscus tea the previous day. The researchers examined the total phenol count of the hibiscus tea using the Folin-Ciocalteu method and the oxygen radical absorbance capacity (ORAC) assay to measure antioxidant capacity of the test beverages. The researchers used the Fred Hutchinson Cancer Research Center Food Frequency Questionnaire version 06.10.88 (FFQ) to assess the subjects' diets at baseline and at the end of the study.

At baseline, there were no significant differences in the demographics or clinical characteristics between the 2 groups. There were no significant differences between the 2 groups in the subjects' dietary intakes of energy, macronutrients, or micronutrients that affect blood pressure, alcohol, or caffeine during the study period. Out of 66 subjects who completed the trial, 1 subject in the placebo group was excluded from the data analysis due to the discovery of undisclosed peripheral vascular disease. The subjects' compliance with the treatment protocols was over 90%, as assessed by the study dietician's counts of unused tea bags and concentrates, as well as a daily diary chart completed by the subjects. The placebo beverage did not contain any of the anthocyanins found in the hibiscus tea, and its ORAC antioxidant capacity and levels of total phenols were significantly lower compared to the hibiscus tea.

Following 6 weeks of treatment, the change in SBP, but not DBP, was significantly greater in the hibiscus tea group compared to the placebo group ($P=0.030$). The change in MAP was greater in the hibiscus tea group compared to the placebo group, but the difference was not statistically significant. In the hibiscus group, MAP, SBP, and DBP were all significantly lower compared to baseline values after 6 weeks of treatment ($P=0.002$, $P=0.001$, and $P=0.013$, respectively). There were no significant changes compared to baseline in the placebo group. In the hibiscus group, the reduction in SBP from baseline was much greater in subjects with higher baseline SBPs, and there was a statistically significant correlation between baseline SBP and change in SBP ($r = -0.421$, $P=0.010$). In the pilot study, the researchers did not find detectable levels of the major hibiscus anthocyanins in their urine or blood plasma samples and did not attempt to measure them during the main study.

The authors conclude: "Daily consumption of 3 servings of *H. sabdariffa* (hibiscus) tea, an amount readily incorporated into the diet, effectively lowered BP [blood pressure] in pre- and mildly hypertensive adults." The authors also state that the effects of hibiscus tea on BP were greater than those reported in the Dietary Approaches to Stop Hypertension (DASH) and PREMIER clinical trials. They suggest future research on the effect on blood pressure of the combination of the DASH diet with daily hibiscus tea consumption. The authors note that the hibiscus flavonoids delphinidin-3-sambubioside and cyanidin-3-sambubioside could be the active principles, but other phytochemicals may also be involved. Further research is needed to determine the chronic effects of hibiscus tea on blood pressure. Potential mechanisms of action include vasorelaxant, ACE-inhibitory, and diuretic effects, but further research is needed for confirmation.

—Marissa Oppel-Sutter, MS

References

1. Herrera-Arellano A, Miranda-Sanchez J, Avila-Castro P, et al. Clinical effects produced by a standardized herbal medicinal product of *Hibiscus sabdariffa* on patients with hypertension. A randomized, double-blind, lisinopril-controlled trial. *Planta Med.* 2007;73: 6-12.
2. Mozaffari-Khosravi H, Jalali-Khanabadi BA, Afkhami-Ardekani M, Fatehi F. Effects of sour tea (*Hibiscus sabdariffa*) on lipid profile and lipoproteins in patients with type II diabetes. *J Altern Complement Med.* Aug 2009;15(8): 899-903.

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