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File: ■ Hibiscus (*Hibiscus sabdariffa*)
■ Obesity
■ Liver Steatosis

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RE: Hibiscus Supplementation Resulted in a Decrease in Waist Circumference, Percent Body Fat, Free Fatty Acids, and Waist-to-hip Ratio in Obese Subjects

Chang HC, Peng CH, Yeh DM, Kao ES, Wang CJ. *Hibiscus sabdariffa* extract inhibits obesity and fat accumulation, and improves liver steatosis in humans. *Food Funct.* April 2014;5(4):734-739.

The prevalence of obesity has increased throughout the industrialized world over the past 3 decades. Obesity is correlated with a number of serious illnesses, including cardiovascular disease, type 2 diabetes, cancer, and metabolic syndrome. Individuals with metabolic syndrome generally have higher than normal body fat and abdominal fat, high serum levels of triglycerides and low-density lipoproteins (LDLs), low serum levels of high-density lipoproteins (HDLs), and low free fatty acid (FFA) flux. Liver steatosis is the accumulation of fat in the liver and is often seen in obese individuals. In severe cases of liver steatosis, the liver can become inflamed and cell death can occur. *Hibiscus* (*Hibiscus sabdariffa*) is often used for the treatment and prevention of hypertension, inflammation, and liver disease. *Hibiscus* has been shown to inhibit LDL oxidation and decrease serum levels of cholesterol in rats and rabbits. These effects are suggested to be due to the high levels of anthocyanins, flavonoids, and phenolic acid present in *hibiscus* extracts. The effect of *hibiscus* on weight, body fat, serum lipids, and liver enzymes was measured in this double-blind, randomized, controlled study.

Obese subjects (body mass index [BMI] ≥ 27 kg/m²) aged 18-65 who had been diagnosed with fatty liver were recruited to the Chung Shan Medical University Hospital in Taichung City, Taiwan for a study that took place from July 2007 to June 2009. Subjects were excluded if they were pregnant; taking medication to treat fatty liver; consumed more than 19 g of alcohol per day; had high alanine transaminase (ALT) or bilirubin levels; had a history of kidney, cardiovascular, or endocrine disease; or were taking over-the-counter, prescription, or alternative medications.

Subjects were randomly divided into 2 groups that consumed either 2 *hibiscus* tablets (450 mg *hibiscus* and 50 mg starch) or 2 placebo tablets (500 mg starch), 3 times per day after meals for 12 weeks. The *hibiscus* tablets contained aqueous, filtered, dried extracts of *hibiscus* flowers. The extract contained 1.43% flavonoids, 2.5%

anthocyanins, and 1.7% phenolic acid. Height, waist-to-hip ratio, BMI, and body fat were measured at the beginning and end of the study, and weight at 0, 6, and 12 weeks. Serum lipids, glucose, ALT, aspartate transaminase (AST), and a number of other serum biomarkers were measured at the beginning and end of the study. An ultrasound of the liver was conducted, and a fatty liver score (FS) was calculated at the beginning and end of the study. A lower FS indicates a healthier liver. Unpaired student t-tests and paired student t-tests were used to analyze the data.

Of the 40 subjects that began the study, 4 were removed for non-compliance, leaving 17 subjects in the placebo group and 19 in the treatment group. At the beginning of the study, baseline levels of ALT and AST were significantly higher in the treatment group than in the control group ($P = 0.033$ and $P = 0.049$, respectively). No other significant differences were found between the groups at the beginning of the study.

There was a significant decrease in waist circumference, percent body fat, and waist-to-hip ratio in the hibiscus treatment group compared to the control group over the course of the study ($P < 0.038$, $P < 0.044$, and $P < 0.026$, respectively). On average, approximately 1.2 kg was lost in the treatment subjects compared to 0.7 kg in the control group, a statistically insignificant difference. There was no significant difference in lipids between the 2 groups. FFA decreased significantly in the hibiscus group compared to the control group ($P = 0.026$).

Hibiscus supplementation led to a decrease in waist circumference, percent body fat, FFA, and waist-to-hip ratio over the 12-week course of this study. Hibiscus contains a number of secondary compounds that have been shown to affect weight loss and fat metabolism, including galloyl ester, chlorogenic acid, caffeic acid, quercetin, tiliroside, and anthocyanins. The authors note that the dosage used may be too low to affect blood lipids and suggest further research on hibiscus dosage level.

–Cheryl McCutchan, PhD

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

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