



# HerbClip™

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**File: ■ *Garcinia (Garcinia cambogia, Clusiaceae)***

**HC 041565-529**

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**RE: A Comprehensive Review of *Garcinia***

Semwal RB, Semwal DK, Vermaak I, Viljoen A. A comprehensive scientific overview of *Garcinia cambogia*. *Fitoterapia*. April 2015;102:134-148.

*Garcinia (Garcinia cambogia, Clusiaceae)* is a widely consumed botanical, native to India, Nepal, and Sri Lanka. *Garcinia* has myriad traditional uses, is consumed as a food, and is used for curing meats. It is used traditionally to treat gastrointestinal complaints, rheumatism, and for certain diseases in animals. *Garcinia* has been found to contain a wide range of phytochemicals including alkaloids, flavonoids, phenolic compounds, and saponins. In this review, *garcinia* bioactivity and toxicity are discussed.

There have been multiple reports of both appetite-suppressant and anti-obesity bioactivity of *garcinia*. For example, rats in one study with the *garcinia* compound hydroxycitric acid (HCA) at dosages of 1.1, 3.7, and 5.5 mmol/kg body weight/day for eight weeks showed less food intake in a dose-dependent manner. Another study showed that HCA may also impact serotonin uptake in vitro. In human subjects, a 300 mg daily dose of HCA over 14 days resulted in decreased body weight and energy intake. In women, 250 mg of HCA daily for five days led to an elevated metabolism of fat and lessened both respiratory exchange ratio and carbohydrate metabolism in exercise. In obese mice fed a high-fat diet, *garcinia* extract decreased weight gain, visceral fat, lipids in blood and liver, and insulin and leptin concentrations.

In another clinical study with overweight subjects, *garcinia* extract supplementation (500 mg taken three times daily for eight weeks) resulted in decreased weight and cholesterol and triglyceride concentrations. A clinical trial with a *garcinia* extract (1000 mg of HCA daily) taken for 12 weeks caused a decrease in total fat, particularly visceral and subcutaneous fat. This was also seen in an animal study; high-fat diet-fed obese mice given *garcinia* at a dose of 1% per weight had less visceral fat. These mice also showed evidence of elevated antioxidant and inflammation response, as well as modulation of fat metabolism. Despite these studies, some reports are conflicted. For example, fat and carbohydrate metabolism rates in endurance-trained humans taking 3.1 ml/kg body weight of *garcinia* extract were not impacted. Another clinical trial in humans taking 2000 mg/day of *garcinia* extract for ten weeks showed no impact on body fat or other metabolic parameters such as cholesterol or triglycerides.

Garcinia has also been shown to have other bioactivity. In obese women taking 800 mg of garcinia extract (containing 50% HCA) three times per day for 60 days, triglyceride concentrations decreased, but no effects on leptin or insulin concentrations were observed. In rats given 310 mg/kg body weight of HCA, glucose absorption and postprandial glucose concentrations were modulated. In a rat model of colitis, consumption of 500 and 1000 mg/kg body weight doses of garcinia extract (51.2% HCA) attenuated the activity of inflammation markers such as cyclooxygenase-2 (COX-2) and inducible nitric oxide, suggesting anti-inflammatory activity. In the 2,2-diphenyl-1-picrylhydrazyl (DPPH) antioxidant assay, garcinia fruit rind extract showed antioxidant activity was comparable with, but slightly less potent than, ascorbic acid, quercetin, and Trolox<sup>®</sup> (Hoffmann-La Roche Inc.; Basel, Switzerland). Garcinia has also been reported to have hepatoprotective, anticancer, and antimicrobial activity. In liver cells, a 1% concentration of garcinia extract (60% HCA) alleviated toxicity from palmitate. In another in vitro study with mouse neuroblastoma cells, garcinia fruit extract showed cytotoxic bioactivity. Multiple solvent extracts made from fruit rind were found to inhibit the growth of multiple bacteria species.

There are several studies that have addressed garcinia toxicity. One study in male rats showed that the dosages of 778 and 1244 mg/kg body weight daily for 18 weeks were toxic. Another study done in humans with 1667.3 mg/day (containing 1000 mg of HCA) did not result in any toxicity or adverse side effects. In a study on obese-prone mice, garcinia (preparation not mentioned) delivered at 1% per weight for 16 weeks showed no liver toxicity and decreased inflammation markers in multiple tissues. However, in one case study, possible toxicity from garcinia consumption was demonstrated. The woman suffered from slurred speech, tremors, and sweating following the consumption of 1000 mg of garcinia rind extract for two to three months while also taking the antidepressant escitalopram (a selective serotonin reuptake inhibitor, 20 mg) for one year. She was apparently suffering from serotonin toxicity, and one explanation is the potentiation of escitalopram by garcinia.

In summary, garcinia has shown a broad range of bioactivity and may be a possible treatment for multiple conditions.

—Amy C. Keller, PhD

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