

Is There Enough Scientific Evidence for Prescribing Green Tea for Weight Loss?

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Received: December 16, 2016; **Published:** December 23, 2016

Obesity is a major risk factor for many adverse health outcomes such as type 2 diabetes, coronary heart disease and some types of cancer. Globally, the annual cost of obesity is estimated to be \$2 trillion, and by 2030 it is expected that 41% of world's population will be overweight or obese [1].

Researches have shown that the prevalence of obesity has risen significantly in different nations due to inadequate dietary habits and sedentarism. Recommendations of life style changes are made to promote weight loss, however, most studies on weight maintenance have shown an undesired weight regain, indicating that individuals did not change their eating and activity behavior adequately [2]. Thus, alternative weight reduction strategies have been developed, such as the use of natural herbal supplements.

Tea is traditionally used as a medication based on experience, and the physiological components of tea have been extensively described in Asian countries. Green tea, long consumed in Japan and China, contains low-molecular-weight polyphenols consisting mainly of flavanol (flavan-3-ol) monomers, which are referred to as catechins. Epigallocatechin-3-gallate (EGCG) is the most abundant catechin in green tea and is believed to be the most pharmacologically active catechin [3].

Although the exact mechanism of action of green tea is not completely understood, it is proposed that it could act stimulating the sympathetic nervous system (SNS) through the inhibition of the enzyme catechol O-methyltransferase, increasing energy expenditure and fat oxidation [4]. Some evidence suggests that green tea might also diminish fat absorption and have prebiotic effects by decreasing the presence of unfavorable gut microbiota [4].

Experiments in animal models demonstrated that green tea reduced body mass, waist circumference and fat mass [5,6], acting as an anti-obesity supplement, however, could this results be extrapolated to human studies?

In a randomized controlled trial, Nagao, *et al.* [7] found a significant reduction of body weight, waist circumference and body fat percentage in obese and eutrophic men compared to the placebo group after supplementing 690 mg of EGCG for 12 weeks. Similar results were found by Zhang, *et al* [8]. In contrast, Hsu, *et al.* [9], did not find any reduction in body weight in obese women after supplementing 491 mg of green tea extract (392 mg of EGCG). More Recently, the same research group supplemented a higher dose of EGCG (856,8 mg) to obese women [10]. Although within-group analysis showed that the experimental group reduced body weight and waist circumference, there was no difference when compared to placebo group.

The conflicting results of these researches might be due to the different methodologies used. It also should be noted that most studies do not associate green tea or catechin supplementation with a dietary or exercise intervention. However, even those articles that implemented exercise protocols have shown minimal effects of green tea on body weight and composition (a difference of approximately 1 kg of body weight between experimental and control groups after supplementation) [11].

A meta-analysis performed by Hurssel, *et al.* [12] found that green tea supplementation would result in an oxidation of 0.02mg of fat per catechin ingested. In a practical view, according to this result, a high dose of 1000mg of catechin, which is equivalent to more than

15 cups of green tea, would result in an oxidation of only 20g of body fat, which is much less than what could be achieved by having an adequate diet.

Some author's suggest that green tea supplementation would improve the effects of a balanced diet over long-term body weight maintenance [13], however, there was no additional effect of green tea supplementation in obese men after a moderate weight loss [12]. Habitual coffee consumers also did not have any effect on body composition after green tea supplementation [14].

These results demonstrate that, although animal experiments have shown a potentially anti-obesity effect of green tea, its applicability and efficacy is still controversy in humans at the moment. The different dosages used and the lack of an adequate diet and exercise control makes it difficult to establish recommendations for the appropriate use of green tea for the treatment of obesity.

Conflict of Interest

There is no conflict of interest.

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Volume 6 Issue 2 December 2016

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