
A BRIEF REVIEW ON ANTI-OBESITY EFFECTS OF GREEN TEA

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Abstract

Obesity and obesity-related co-morbidities remains a public health issue. Green tea catechins (GTC) are polyphenolic compounds found in Camellia sinensis, the unfermented dried leaves of the plant. Data from a number of randomised, regulated intervention studies have shown that GTC (270 mg to 1200 mg/day) intake may decrease body weight and fat. There are many suggested pathways by which GTC can affect body weight and composition. The prevailing theory is that GTC impacts the operation of the sympathetic nervous system (SNS), increasing energy consumption and facilitating fat oxidation. Naturally found in green tea, caffeine also affects the activity of SNS, which can function synergistically with GTC to improve energy consumption and oxidation of fat. Appetite increases, up-regulation of enzymes involved in hepatic fat oxidation, and reduced nutrient absorption are other possible pathways. This essay discusses the evidence, with special regard to human experiments, for both of these proposed processes.

Keywords: Fat, Green, Obesity, Weight, Tea, Side effects, Health care.

I. INTRODUCTION

Weight problems and the co-morbidities associated with obesity continue to be a global health trouble. Latest estimates inside the USA indicate that approximately one-1/3 of the adult population is obese. Despite the fact that there are numerous proposed genetic and environmental factors that predispose individuals to weight advantage, the fundamental motive of obesity is an imbalance among nutritional consumption and strength expenditure. Extra fats mass develops over time from a completely small positive power imbalance. In general, average weight advantage according to yr is small, approximately 0.5 kg throughout all race, financial, and sex groups [1].

There are many nutritional, and to a lesser quantity, pharmacological strategies which have been proven to have an effect on electricity stability in a manner that outcomes in a success weight loss. Such treatment options commonly have an effect on one or extra elements of power stability consisting of appetite, nutrient absorption, or thermogenesis. Epidemiological proof and numerous randomized managed intervention trials have shown an inverse relationship among recurring tea consumption (predominately inexperienced tea) and ranges of frame fat and waist circumference [2]. While green tea carries an array of compounds, the putative antiobesity results had been most usually attributed to the polyphenolic fraction of

inexperienced tea, specifically the catechins. Green tea catechins (GTC) may affect multiple elements of energy stability that, in aggregate, result in frame weight and fat loss. In this paper, we review the relationships between GTC consumption and frame composition and discuss the purported mechanisms whereby GTC may confer antiobesity activity [3].

Antiobesity effects of green tea catechins

Over the last 10 years, there had been some of in general small trials in people showing favorable results of GTC (270 to 1200 mg/d) on body weight and frame composition below free-dwelling situations, even though now not all research showed consistent outcomes. A recent meta-analysis of 11 GTC trials reported an average frame weight loss of 1.31 kg for subjects within the treatment agencies relative to controls, with maximum intervention durations being about 12 weeks [4].

Most of the people of trials in human beings showing reductions in body weight and fats mass with GTC consumption have examined subjects of Asian descent. A latest meta-analysis of 11 trials showed that the common effect of GTC on frame weight reduction become larger for Asian contributors (-1.51 kg) versus Caucasian individuals (-0.82 kg). However, high quality findings were reported in a examine which compared the consequences of a excessive- GTC-beverage (625 mg/d GTC+39 mg caffeine) as opposed to a control beverage (39 mg caffeine) in Caucasian topics with increased imperative adiposity following a slight-intensity exercising software (\geq one hundred eighty min/week) for 12 weeks. Discounts in belly fats region (-7.7 vs. -0.3%) and subcutaneous belly fats vicinity (-6.2 vs. 0.8%), as measured by means of computerized tomography, were extra inside the GTC institution compared to manipulate, despite simplest a marginal distinction in frame weight reduction (-2.2 vs. -1.0 kg). Different studies in Caucasian topics have shown similar, favorable effects, although it is potential that topics of Asian descent are more responsive to the consequences of GTC doubtlessly because of greater adiposity at a given frame mass index in comparison to Caucasian subjects or other elements as discussed later in this review [5].

The favorable consequences of GTC on weight problems-associated consequences can be in part as a consequence of the caffeine aspect of inexperienced tea. Caffeine is thought to independently boom strength expenditure, but every day caffeine consumption (200 mg/d) has no longer ended in extra frame weight loss in longer-time period feeding trials. A recent meta-evaluation of six randomized, managed trials comparing the antiobesity outcomes of GTC (median 588 mg/d)+caffeine as compared to caffeine alone showed considerable discounts in frame weight (-1.38 kg) and waist circumference (-1.93 cm) with the GTC+caffeine circumstance. A meta-evaluation indicated that studies imparting GTC within the absence of caffeine did no longer bring about big variations in body weight or waist circumference relative to caffeine-loose controls, despite the fact that handiest two studies had been blanketed in the meta-analysis.

It's far essential to note that no longer all studies the use of GTC+caffeine combinations produced favorable modifications in body weight or frame composition. The effectiveness of GTC+caffeine on anthropometric modifications can be stimulated through ordinary caffeine intake. Research wherein GTC+caffeine changed into ate up as a part of a weight upkeep length following 4 weeks of a completely-low-power weight loss program showed that weight and waist regain became attenuated within the subjects habitually ingesting less than 300 mg/d of caffeine. The authors speculated that GTC+caffeine may only be effective whilst recurring

caffeine consumption is underneath a sure threshold and that higher doses of GTC are vital while habitual caffeine intakes are high. This is consistent with a current trial in Thai men and postmenopausal girls, a populace that habitually consumes low stages of caffeine, in which consumption of low ranges of GTC (141 mg/d)+caffeine (87 mg) in comparison to a caffeine-free placebo for 8 weeks led to greater losses of frame weight (-4.4 vs. -1.9 kg), waist circumference (-6.6 vs. -5.8 cm) and general body fats (-7.2 vs. -3.0%) [6].

Antiobesity mechanisms of green tea catechins

The mechanisms whereby GTC influence body weight and frame composition remain an energetic location of investigation. Lots of the work in people has focused at the consequences of GTC on thermogenesis and substrate oxidation, both of which might be mediated by sympathetic worried gadget hobby. Other capability mechanisms consist of changes in appetite manipulate, down-law of enzymes worried in hepatic lipid metabolism, and reduced nutrient absorption [7].

Energy expenditure

The sympathetic fearful system (SNS) performs a major position within the regulation of power expenditure and lipolysis. Substances that stimulate or prolong the presence of norepinephrine (NE), a key mediator of SNS interest, boom power expenditure and sell the oxidation of fats. In 1975, Borchardt and Huber provided proof that GTC inhibits catechol O-methyltransferase (COMT), the enzyme that degrades norepinephrine, accordingly prolonging the movement of sympathetically- launched NE in the synaptic cleft. Caffeine, obviously present in inexperienced tea, also affects SNS interest through inhibition of phosphodiesterase, the enzyme which rapidly degrades intracellular cyclic adenosine monophosphate (camp), a sign released in response to NE. It is viable that after ate up collectively, GTC and caffeine act synergistically, resulting in suggested results on the SNS and as a result, energy expenditure and lipolysis [8].

Alterations in fat metabolism

Another ability mechanism wherein GTC induce antiobesity results may additionally relate to modifications in fatty acid oxidation and metabolism. Under the effect of the SNS, NE stimulates lipolysis in peripheral tissues (adipose, liver, skeletal muscle), releasing loose fatty acids into circulate and up-regulating hepatic lipid metabolism. Augmenting sympathetic simulation with the aid of inhibition of COMT and phosphodiesterase might, theoretically, be predicted to increase fats oxidation. Research in rodents assist this hypothesis; however, research in people have proven mixed outcomes on the respiration quotient (RQ), a hallmark of the ratio of fat to carbohydrate oxidation. A look at said that GTC (375 mg+a 100 and 50 mg caffeine) decreased RQ by means of 3.4% relative to a caffeine-unfastened placebo, suggesting an boom in fats oxidation, while there has been no impact of caffeine alone (one hundred fifty mg). A comparable impact (-3.5%) was discovered following an acute dose of three hundred mg EGCG in Caucasian men. Other acute feeding research have not proven changes in fats oxidation relative to caffeine-unfastened controls. But, it has been advised that the outcomes of GTC on fats oxidation are cumulative through the years, a hypothesis that is supported via evidence in animal research. GTC, specially EGCG, up-regulated the expression of numerous genes worried in hepatic beta-oxidation in mice following 1 month of feeding, which include acyl-coa oxidase and medium chain acyl-coa dehydrogenase. This turned into accompanied with the aid of a lower within the expression of hepatic fatty acid synthase and

an increase in betaoxidation by means of 285% compared to control mice following a low-fats weight-reduction plan. Such findings have been not obvious 24 h after feeding GTC. As such, acute feeding research may not reflect the potential continual results of GTC on fat oxidation and substrate utilization [9].

Appetite inhibition

Materials acknowledged to boom hepatic fatty acid oxidation, such as beta-adrenergic agonists, decrease voluntary food intake in rats. It's been hypothesized that strength fame in the liver, generally the production of ATP, triggers signals to the appetiteregulating facilities of the brain via vagal sensory neurons. As such, when hepatic fatty acid oxidation is low and there is a concomitant lower in ATP stages, appetite is extended. Consumption of medium-chain fatty acids and 1, three-diacylglyceride oil, substances that boom hepatic fatty acid oxidation, were shown to lessen food intake in human subjects. Given the evidence that GTC may additionally growth hepatic fats oxidation, it is viable that urge for food may be altered with the aid of GTC [10].

Reduced nutrient absorption

Decreased nutrient absorption within the gastrointestinal tract has been proposed as a ability mechanism explaining the anti-obesity results of GTC. In vitro information endorse that GTC can also lessen glucose absorption by way of inhibiting gastrointestinal enzymes concerned in nutrient digestion, particularly, α -amylase and α -glucosidase pastime. Cellular studies have also shown that GTC decreases glucose uptake in intestinal cells and inhibits the sodium-dependent glucose transporter. Certainly, a study mentioned that check food containing a aggregate of green tea (one hundred mg ECG and three hundred mg EGCG), black tea and mulberry tea resulted in carbohydrate malabsorption of 25% (~60 kcal) compared to placebo in wholesome adults, as assessed by way of breath hydrogen evaluation. Similar results had been said in animal studies. Research in each rats and people have also pronounced decreased blood glucose tiers following an oral glucose tolerance take a look at when co-administered with oral intakes of GTC and EGCG [11].

II. CONCLUSION

During the last decade, there had been some of intervention trials showing discounts in body weight and fat after persistent intake of GTC with caffeine. Early mechanistic work advised that GTC may additionally growth strength expenditure, stimulating thermogenesis to a extra degree than caffeine on my own. But, as indicated in this evaluation, more current investigations have not universally supported that speculation. The connection among GTC and caffeine and thermogenesis is, at gift, unclear, and destiny work ought to seek to clarify the impact of recurring caffeine intake and character differences in COMT enzyme activity on power expenditure below each acute and chronic look at conditions. Other viable mechanisms, which includes expanded fats oxidation, reduced urge for food, and disrupted nutrient absorption, may play roles within the anti-obesity consequences of GTC. Those mechanisms may also be stimulated, at the least in part, with the aid of concomitant caffeine intake and variations throughout populations in enzyme sports. Moreover, the effects of dose, approach of consumption (e.g., empty or complete stomach, complement, brewed beverage, and so on.), length of intake, sex, degree of adiposity and capability fantastic interaction with physical pastime benefit in addition inquiry in each mechanistic research and randomized, controlled intervention trials.

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