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Effects of Green Coffee Bean Extract on Obesity

Results from a clinical trial

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Reference

Verma N, Mittal M, Ali Mahdi A, et al. Clinical evaluation of a novel, patented green coffee bean extract (GCB70®), enriched in 70% chlorogenic acid, in overweight individuals. *J Am Nutr Assoc*. 2024;43(4):315-325.

Study Objective

To examine the effectiveness of an enhanced green coffee bean extract for obesity-associated health factors

Key Takeaway

Green coffee bean extract enhanced with chlorogenic acid offers an advantageous therapeutic approach in weight management and reduction of other metabolic components.

Design

Open-label, single-center clinical study

Participants

A total of 105 participants (52.4% male, 47.6% female; aged 18 to 65 years) participated in this 12-week study. All participants were overweight (body mass index [BMI] > 25 kg/m^2) or obese (BMI > 25 kg/m^2). Additionally, participant criteria included normal thyroid gland functionality and no current use of steroids.

Exclusion criteria included failure to cooperate, those lactating or pregnant, those deemed physically or mentally unwell, or patients involved in clinical trials 30 days prior.

Intervention

Participants received a capsule (500 mg) of green coffee bean extract containing 70% chlorogenic acid (GCB70), dosed twice daily for 12 weeks; they also maintained a record of input in a daily diary.

Study Parameters Assessed

Participants received diaries to record reactions in addition to biweekly routine physicals. Management of patient safety was evaluated for adverse reactions starting from baseline until the last follow-up visit.

During baseline and after weeks 4, 8, and 12 of treatment with GCB70, investigators assessed participants for the following: body weight, BMI, waist circumference, fasting blood glucose (FBG), and glycated hemoglobin (HbA1c).

Investigators assessed thyroid-stimulating hormone (TSH) and plasma leptin at baseline and after 12 weeks of treatment with GCB70, using an enzyme-linked immunosorbent assay (ELISA). They also assessed levels of glutamic-oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), alkaline phosphatase (ALP), bilirubin, blood urea nitrogen (BUN), serum creatinine, hemoglobin (Hb), total leukocyte count (TLC), triglycerides, and cholesterol (low-density lipoprotein and high-density lipoprotein cholesterol, respectively LDL-C and HDL-C) at baseline and after 12 weeks of supplementation.

Primary Outcome

Investigators assessed the values for BMI, body weight, FBG, and waist circumference after use of GCB70 and observed comparative values for efficacy distinguished between male and female patients.

Additionally, they evaluated the effects of GCB70 on TSH, HbA1c, and plasma leptin levels, with comparison starting from baseline following 12 weeks of treatment in both males and females. Other biochemistry markers assessed after completion of treatment included total cholesterol, LDL-C, HDL-C, SGOT, SGPT, ALP, TLC, hemoglobin, and triglycerides. Investigators monitored for adverse events, defined as any unpleasant reactions or difficulties while supplementing with GCB70 during treatment.

Key Findings

Mean body weight was significantly reduced from 84.04 kg to 79.03 kg after supplementation with GCB70. The study population's mean body weight reduction was 5.96%. BMI was reduced by 5.65%. Waist circumference decreased from a baseline of 108.10 cm to 100.85 cm after 12 weeks of treatment. For waist circumference, mean body weight and BMI (P<0.001 for each) were statistically significant.

Observations showed mean body weight decreases in males compared to females, with 1.9% and 2.28% at week 4, respectively; 3.92% and 3.83% at week 8, respectively; and 5.9% and 6.01% at week 12, respectively.

Similarly, with BMI, investigators compared reductions for males vs females at week 4 (1.33% vs 2.31%), week 8 (3.93% vs 3.92%), and week 12 (5.92% vs 6.08%).

The mean waist circumference reductions in male and female participants were 2.33% and 3.01%, respectively, at week 4; and 4.54% and 4.73%, respectively, at week 8.

FBG decreased from 109.95 mg/dL to 103.72 mg/dL at week 4; to 98.63 mg/dL at week 8; and to 95.60 mg/dL after 12 weeks, indicating a 13.05% reduction (*P*<0.001). The FBG variations in reduction between male and female participants were 4.23% and 7.32%, respectively, at week 4; 8.41% and 12.71% at week 8, respectively; and 11.99% and 14.42% at week 12, respectively.

HbA1c was significantly reduced from 6.39% to 6.01%; TSH decreased from 2.77 µU/mL to 2.38 µU/mL; and plasma leptin decreased from 4.56 ng/mL to 3.94 ng/mL following treatment, each with significance (*P*<0.001). After 12 weeks, mean reductions between male and female patients were observed for HbA1c (4.77% and 7.34%, respectively), TSH (14.33% and 13.43%, respectively), and plasma leptin (13.03% and 14.29%, respectively).

Total cholesterol decreased from 165.48 mg/dL to 152.4 mg/dL. LDL-C decreased from 95.8 mg/dL to 90.59 mg/dL; HDL-C increased from 39.96 mg/dL to 44.4 mg/dL; triglycerides decreased from 155.52 mg/dL to 143.32 mg/dL; and Hb increased from 13.31 g/dL to 14 g/dL following treatment, each with significance (*P*<0.001). Additionally, the following values also decreased after 12 weeks of treatment: SGOT (*P*=0.002) from 38.48 U/L to 33.18 U/L; SGPT (*P*=0.014) from 47.28 U/L to 41.49 U/L; ALP (*P*<0.001) from 96.95 U/L to 87.05 U/L; TLC (*P*<0.001) from 7.79×10^9/L to 7.14×10^9/L, defined by decreased eosinophils (*P*=0.025) and basophils (*P*=0.048) with increased monocytes (*P*<0.001).

Transparency

Study received funding from Chemical Resources, Panchkula, India, and Haryana, the patent holder of a green coffee bean extraction process and owner of the GCB70 brand used in this study. The authors reported no personal conflicts of interest.

Practice Implications & Limitations

Obesity can be associated with several chronic diseases such as diabetes, cardiovascular disease, and degenerative disorders. The impact of obesity on the body leads to metabolic disturbance, immune system dysfunction, and persistent inflammation. The global increase of obesity has reached unprecedented numbers, indicating that 30% of the world's population (approximately more than 2 billion people) is either overweight or obese.[1] Obesity, as defined by the World Health Organization (WHO), characterizes overweight as a BMI greater than 25 kg/m^2 and obese as a BMI greater than 30 kg/m^2.[2] Practitioners should be aware of the contributing lifestyle factors that influence obesity rates such as unhealthy dietary choices, sedentary behavior, minimal physical activity, lack of environmental resources, and economic status. Adapting holism allows for an integrated approach to understanding the multifaceted influences that impact behavior surrounding dietary choices linked to obesity.

The approach to improve the management of various chronic diseases includes the use of food- and plant-based products.[3] Many naturally occurring foods and medicinal products offer natural compounds that contain beneficial properties. Polyphenols have been shown to reduce inflammation, cardiovascular disease, diabetes, and cancer.[3] Dietary polyphenols can be derived from plant-based foods such as vegetables, fruits, olives, legumes, and chocolate.[3] Research on the health benefits of polyphenols has increased remarkably over the last 20 years.[3] Anthocyanins, a class of polyphenols, contain antidiabetic properties, thus decreasing HbA1c levels and blood glucose and improving insulin resistance.[4]

Many botanicals serve as agents that regulate biochemical processes in the body and contribute to a reduction of disease progression. For example, cinnamon-based therapy helps to improve lipid and glucose dysregulation, hindering the advancement of type 2 diabetes.[5]

Green coffee predominantly contains phenolic compounds such as chlorogenic acid (CGA).[6] Green coffee extract (GCE) is a great potential alternative to treating obesity and other degenerative diseases; however, it contains caffeine, which can cause harmful effects if overconsumed. Therefore, further assessment may be needed to determine the long-term impact of GCE in some individuals.

> The question that arises is how do we begin to manage obesity?

The metabolic effects of CGA appear to be unique when there is a higher concentration of adiponectin released from adipose tissue, facilitating glucose modulation and fatty acid oxidation.[6]

Proper function of the gut not only influences a healthy immune system but enables the breakdown of metabolites generated by CGA absorption. CGA's effects may depend, at least somewhat, on the microbiota. One-third of ingested CGA is absorbed in the small intestine, with the remainder metabolized in the colon.[7] Those metabolites produced in the gut influence biological activity through signaling pathways associated with molecular metabolism processes.[8] This raises the question of whether CGA directly influences the associated health benefit discussed or whether the effects stem from the metabolites produced by its breakdown.[7]

The question that arises is how do we begin to manage obesity? Some of the common approaches include diet and lifestyle modification, increased physical activity, pharmacotherapy, or surgical interventions. However, the associated risk of certain pharmaceutical drugs for weight loss can cause adverse effects. Therefore, we can begin to look toward other, safer treatment recommendations. Awareness of alternative medicine has drastically increased, highlighting the safe and effective benefits of natural and herbal medicine -to treat chronic diseases.[9]

In assessing the impact of diet on health, we must begin to look at factors that influence food choices such as lifestyle, socioeconomic status, environment, and cultural backgrounds while additionally considering genetic predisposition to obesity and chronic disease. In the United States, economically challenged areas have increased rates of obesity, with higher rates disproportionately affecting minority and low-income groups.[10] In a comparison of women groups in the US, African American women have the highest rates of obesity, at 57%, followed by 44% of Hispanics, 40% of Caucasians, and 17% of Asian women.[2] It's crucial for us to advocate for nutritional education and resources in marginalized areas. Complementary and alternative medicine (CAM) practitioners can provide education about nutritional and herbal medicine, increasing awareness about the therapeutic treatment we offer. Dietary changes are commonly recommended as the first defense for glucose impairment and dyslipidemia. The importance of proper nutrition and knowledge surrounding its benefits have increased, highlighting the medical necessity of patient education to improve quality of life. Natural medicine offers beneficial therapeutic approaches to managing obesity and chronic diseases. As CAM practitioners, we should offer a comprehensive approach for weight management that allows individualized treatment plans, patient education, goal-based strategies, and lifestyle tools to optimize the health of our patients.

Conflict of Interest Disclosure

The author declares no conflict of interest.

Categorized Under

- ABSTRACTS & COMMENTARY (/ABSTRACTS-COMMENTARY)

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