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Editorial

Green Coffee and Metabolic Syndrome: Potential Benefits and Risks

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Summary

Major risk factors for cardiovascular diseases (CVD) such as diabetes, abdominal obesity, high blood pressure, and cholesterol are linked to the metabolic syndrome (MetS) [1]. MetS is typically characterized by the release of pro-inflammatory adipokines from adipose tissue, which are mostly made by invading macrophages, such as resistin, leptin, interleukin (IL-6), tumor necrosis factor-α (TNF-α), and monocyte chemoattractant protein-1 (MCP-1) [2-5]. Additionally, truncal subcutaneous fat storage and overall adiposity are linked to an increased risk of atherosclerosis in adulthood and it is crucial to develop effective treatments for MetS requiring an understanding of its biological underpinnings and how it advances within the framework of an exercise intervention [6]. One of the most popular drinks consumed worldwide is coffee. It has a high content of phenolic chemicals, which are known to act as preventive measures against degenerative illnesses that are chronic [7]. Epidemiological studies have shown a growing body of evidence linking coffee drinking to a decreased risk of acquiring the Mets [8, 9] and T2DM [10, 11]. The main phenolic components in coffee are called chlorogenic acids (CGAs). Although many plant foods naturally contain CGA, which are esters of specific cinnamic acids (caffeic, ferulic, or coumaric acid) with quinic acid, coffee beans are their main dietary supply [12-14]. Since a significant portion of the CGA is lost during roasting, green coffee (GC) beans have a higher concentration of CGA [15]. Numerous animal studies have shown that CGA has anti-diabetic, anti-obesity, and anti-lipidemic qualities [16, 17]. It may also have the ability to reduce insulin resistance. Furthermore, in human trials, CGA has been shown to be able to lower blood pressure and postprandial glucose absorption [18, 19]. It has been suggested that GC may be able to protect against T2DM and the Mets [16, 20]. Some studies have shown that GC has mitigating effects on some Mets components, such as blood pressure, blood glucose, and lipid profile, as well as major Mets aetiological variables, such as obesity and insulin resistance, despite some null findings [16, 21]. For example, it is examined the effects on obese mice generated by high-fat diet (HFD) by ingesting 50, 100, or 200 mg/kg green coffee bean extract (GCE) for six weeks. In this study, when 100 or 200 mg/kg GCE with HFD was compared to HFD alone, there was a substantial decrease in body weight gain, fat mass, glucose, TAG, LDL, and total cholesterol (TC) concentration and a significant increase in HDL-cholesterol [22]. GCE shows encouraging outcomes in reducing the negative effects of an HFD-induced obesity [23]. Two important ingredients in green bean coffee, caffeine (CF) and chlorogenic acid (CLA), enhance thermogenesis in brown adipose tissue [24]. The obesity epidemic is becoming more widely acknowledged, but rates are still rising [25]. Poor adherence is commonly observed to the current first-line therapy, which include dietary modifications, calorie restriction, and physical activity [25]. Innovative dietary strategies can help people lose weight by addressing the underlying reasons of obesity, such as mitochondrial dysfunction [25]. The research about the efficacy of green bean coffee extract (500 mg/day) in reducing weight gain is currently outdated, and there are other dosages of the supplement that contain CGA [26]. Another, over a 10-week supplementation period, it was demonstrated that GCE had positive effects on SBP, TG, hs-CRP, and HDL levels in patients with T2D and overweight/obesity [27]. The green coffee bean showed great potential in promoting liver health, increasing glucose-insulin sensitivity, and helping people maintain their weight in a healthy way [28]. However, there isn't enough information about green coffee to provide precise dosage guidelines.

Although generally harmless, green coffee carries a few possible risks [29, 30]. Green coffee beans are inherently high in caffeine, much like roasted coffee beans [31]. While most healthy individuals may probably consume moderate amounts of caffeine without adverse effects, excessive consumption may cause negative symptoms like anxiety, insomnia, and elevated blood pressure [32]. The information about GCE's effects on Met's components is not entirely consistent. The majority of earlier research was done using animal models, and it evaluated CGA effects as opposed to GCE implications [15, 33, 34]. There are few interventional research examining the effects of GCE, and the ones that do usually have limited sample sizes and durations, lack randomization, blinding, and placebo control, among other drawbacks [27, 35].

As far as we are aware, no clinical investigation has been carried out on the impact of GCE on Mets patients thus far, specifically. Further studies are expected to refine the pharmacological effects of green coffee on the metabolic syndrome for clinical use.

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