


RESEARCH ARTICLE

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Randomized double-blind clinical trial examining the Ellagic acid effects on glycemic status, insulin resistance, antioxidant, and inflammatory factors in patients with type 2 diabetes

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Oxidative stress can worsen glycemic status. Considering the antioxidant properties of Ellagic acid (EA), this study was designed to evaluate the effect of EA on glycemic indices, lipid profile, oxidative stress, and inflammation status in type 2 diabetic patients. Overall, 44 patients were recruited and were randomly allocated consumed 180 mg of EA per day ($n = 22$) or placebo ($n = 22$) for 8 weeks. The blood sugar (BS), insulin, insulin resistance (IR), hemoglobin A1c (HbA_{1c}), total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL), high-density lipoprotein (HDL), total antioxidant capacity (TAC), malondialdehyde (MDA), the activity of glutathione peroxidase (GPx) and superoxide dismutase (SOD), C-reactive protein (CRP), TNF- α and interleukin 6 (IL-6) were measured at the beginning and end of the study. At the end of the study, the mean of BS, insulin, IR, HbA_{1c}, TC, TG, LDL, MDA, CRP, TNF- α , and IL-6 were significantly decreased in the intervention group ($p < .05$). Also, the mean of TAC ($+0.8 \pm 0.01$) and activity of GPx ($+10.26 \pm 0.22$) and SOD enzymes ($+459.6 \pm 9.76$) significantly increased in the intervention group ($p < .05$). EA supplementation can be helpful as a diet supplement in patients with type 2 diabetes through improvement in chronic adverse effects.

KEYWORDS

diabetes, Ellagic acid, glycemic status, inflammation, stress oxidative

1 | INTRODUCTION

Diabetes Mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia caused by defects in insulin secretion, insulin activity, or both. Diabetes is the most common serious metabolic disorder that is one of the five leading causes of death in the world. DM is divided into two main categories: type 1 and type 2 diabetes (Yin, Wang, Yang, Sui, & Liu, 2018). Type 2 diabetes is a chronic metabolic disease classically characterized by hyperglycemia and insulin

resistance (Polce et al., 2018). According to forecasts by the World Health Organization (WHO), people with type 2 diabetes in 2030 will increase to 552 million. The global prevalence of diabetes has almost doubled since 1980, increasing from 4.7% to 8.5% in adults (Rubino et al., 2016; Whiting, Guariguata, Weil, & Shaw, 2011). Studies have shown that in 2011 almost 11.9% of Iranian adults had diabetes, which is almost 35% higher than in 2005. It is also estimated that in 2030, about 10 million of Iranian people will develop diabetes (Mirzaei, Rahmanian, Mirzaei, Nadjarzadeh, & Dehghani tafti, 2020).