

Bitter Gourd Honey Ameliorates Hepatic and Renal Diabetic Complications on Type 2 Diabetes Rat Models by Antioxidant, Anti-Inflammatory, and Anti-Apoptotic Mechanisms

ABSTRACT

Honey has several pharmacological effects, including anti-diabetic activity. However, the effectiveness of bitter gourd honey (BGH) in the treatment of diabetes mellitus (DM) is unknown. The aim of this study was to determine the antioxidant, anti-inflammatory, and anti-apoptotic properties of BGH on the kidney and liver of a streptozotocin-induced diabetes rat model. Methods: A single dose (nicotinamide 110 mg/kg, streptozotocin (STZ) 55 mg/kg, intraperitoneal (i.p.)) was used to induce DM in male rats. For 28 days, normal or diabetic rats were administered 1 g/kg/day and 2 g/kg/day of BGH orally. After the treatment, blood, liver, and kidney samples were collected and analysed for biochemical, histological, and molecular parameters. In addition, liquid chromatography–mass spectrometry (LC-MS) was used to identify the major bioactive components in BGH. Results: The administration of BGH to diabetic rats resulted in significant reductions in alanine transaminase (ALT), aspartate aminotransferase (AST), creatinine, and urea levels. Diabetic rats treated with BGH showed lesser pathophysiological alterations in the liver and kidney as compared to non-treated control rats. BGH-treated diabetic rats exhibited reduced levels of oxidative stress (MDA levels), inflammatory (MYD88, NF κ B, p-NF κ B, IKK β), and apoptotic (caspase-3) markers, as well as higher levels of antioxidant enzymes (SOD, CAT, and GPx) in the liver and kidney. BGH contains many bioactive compounds that may have antioxidative stress, anti-inflammatory, and anti-apoptotic effects. Conclusion: BGH protected the liver and kidney in diabetic rats by reducing oxidative stress, inflammation, and apoptosis-induced damage. As a result, BGH can be used as a potential therapy to ameliorate diabetic complications.