

PUBLICATIONS

ANALYSIS OF CHARANTIN STEROIDAL GLYCOSIDE FROM *Momordica charantia* EXTRACT AND INVESTIGATION OF ITS ANTIDIABETIC PROPERTIES

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Momordica charantia (bitter melon) is a medicinal plant widely recognized for its antidiabetic properties. Among its bioactive compounds, charantin, a steroidal glycoside, has been extensively investigated for its potent hypoglycemic activity. This study aimed to identify charantin in *M. charantia* fruit extract using UV spectrophotometry and to evaluate its therapeutic efficacy following intravenous (tail vein) administration in a rat model of type 2 diabetes mellitus (T2DM).

Ripe fruits of *M. charantia* were dried, powdered, and extracted with ethanol. Qualitative phytochemical analyses, including Molisch, Liebermann–Burchard, and lead acetate assays, were performed to detect carbohydrates, steroidal compounds, and tannins, respectively. The extract was further characterized using UV–Vis spectrophotometry in the wavelength range of 200–800 nm. A rat model of T2DM was induced in 30 male albino outbred rats by feeding a high-fat diet for eight weeks, followed by a single low-dose streptozotocin injection (30 mg/kg body weight). A liposomal formulation of the charantin-rich extract was administered intravenously via the tail vein at a dose of 80 mg/kg once daily for five consecutive days. Fasting blood glucose (FBG) levels were measured before and after treatment.

Qualitative phytochemical screening confirmed the presence of carbohydrates and steroidal compounds, suggesting the occurrence of steroidal glycosides in the extract. UV–Vis spectrophotometric analysis revealed characteristic absorption peaks at 220 and 254 nm in 10% extract solutions, and at 228 and 266 nm in 50% extract solutions, indicating the presence of charantin and a concentration-dependent increase in absorbance. Following the induction of T2DM, rats exhibited significantly elevated FBG levels (8.64 ± 0.31 mmol/L). Intravenous administration of the liposomal *M. charantia* extract significantly reduced FBG levels to 5.98 ± 0.21 mmol/L after five consecutive days of treatment, corresponding to a 30.8% reduction from baseline ($p < 0.05$). No significant adverse effects, behavioral abnormalities, or signs of toxicity were observed during the experimental period.

UV–Vis spectrophotometry serves as a valuable preliminary method for identifying charantin-containing fractions in *M. charantia* extracts. Furthermore, intravenous administration of a liposome-encapsulated *M. charantia* extract produced a significant antihyperglycemic effect in albino outbred rats with T2DM. These findings support the potential of charantin as a natural antidiabetic agent and highlight intravenous liposomal delivery as a promising systemic therapeutic strategy for the management of T2DM.