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RESEARCH

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Antidiabetic activity of mango peel extract and mangiferin in alloxan-induced diabetic rats



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Abstract

Background In diabetic animals, there is a significant increase in plasma glucose, serum total cholesterol, triglyceride, and low-density lipoprotein levels, and decreased body weight, liver and muscle glycogen, and high-density lipoprotein. Effective treatment of diabetes mellitus is not yet known, even though the management of diabetes mellitus is considered a global concern. Plants and herbs have played an important role in the healthcare of many societies throughout history. Today's researchers are investigating the potential for using these nonpharmaceutical approaches to treat and control diabetes, either in conjunction with standard treatments or as an alternative to them. Herbal formulations are favored because to lower cost and fewer side effects compared to other methods for alleviating diabetes and its consequences. In ethnomedicinal practices, different parts of *Mangifera indica* are used to treatment of diabetes. The present investigation was undertaken to evaluate the antidiabetic activity of an ethanolic extract of *Mangifera indica* and mangiferin in alloxan-induced diabetic rats. This experiment was conducted in a set of two with four groups of animals namely control (Tc), treatment alloxan (Ta), treatment extract (Tae), and treatment mangiferin (Tam). To develop diabetes, Wistar rats treated with 150 mg/kg b.w. of alloxan monohydrate were injected intraperitoneally. Tae and Tam's groups received a freshly prepared single dose of extract and mangiferin in distilled water via the oral route. All experimental groups received laboratory pallet feed diet and drinking water ad libitum. Diabetic rats were treated for 21 days with an ethanolic extract of mango peel and pure mangiferin orally daily at rates of 200 mg/kg b.w. and 20 mg/kg b.w.

Results An alloxan-induced diabetic rat treated with mango peel extract and mangiferin significantly improved the overhead impact due to diabetes. There was a significant ($p < 0.05$) body weight loss in the alloxan-induced diabetic rats (Ta), whereas animals given mango peel extract and mangiferin showed a significant increase in body weight from 2 weeks onwards in comparison with control. Alloxan-induced rats (Ta) group have higher blood glucose levels and are significantly different ($p < 0.01$) from the control group. Mango peel extract and mangiferin significantly reduced the levels of fasting glucose after 21 days of treatment in comparison with diabetic animals. Mango peel extract and mangiferin influence the glycogen synthesis pathway in diabetes groups by increasing glycogen levels in muscle and liver. mango peel extract and mangiferin were found to have a nonsignificant impact on plasma cholesterol and HDL levels compared with the control group. Mango peel extract was found to have a significant difference ($p < 0.05$) in LDL levels compared with the control group. Mangiferin was found to have a significant difference ($p < 0.05$) in triglyceride and VLDL levels when compared with the control group. Histopathological examination of the pancreas in rats with type I diabetes caused by alloxan found that therapy with an ethanolic extract of mango peel and mangiferin restored beta cell function as well as rejuvenation of islets of Langerhans.


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