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Momordica charantia Protects the Liver from Hyperglycemia Induced Toxicity during Diabetes in Swiss Albino Mice

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Diabetes mellitus is a universal problem affecting human societies at all stages of development. It is a condition where sufýcient amount of insulin is either not produced or the body is unable to use the insulin that is produced, leading to excess glucose in the blood. The aim of this study was to investigate the anti- hyperglycemic activity of *Momordica charantia* fruit on alloxan induced diabetic mice and its antitoxic effect on liver. Mice were alloxanized (alloxan monohydrate 150 mg/kg body weight administered intraperitoneally) and aqueous extract of *Momordica charantia* at the rate of 100 mg/kg body weight was administered for 21 days to evaluate its anti- hyperglycemic activity. There serum glucose levels as well as the Liver Function Tests (LFT) - SGPT, SGOT and total bilirubin levels were analyzed statistically using ANOVA and Dunnettís tests. Alloxan caused signiýcant increase in the levels of serum glucose, SGPT, SGOT and bilirubin levels but after administration of *Momordica charantia* aqueous extract there was signiýcant decrease in the serum glucose levels as well as SGPT, SGOT and total bilirubin levels. The study suggests that *Momordica charantia* possesses antidiabetic and antitoxic effects.

Keywords: Antidiabetic; Antitoxic; *Momordica charantia*; Alloxan

Introduction

Diabetes mellitus (DM) is a group of syndrome characterized by hyperglycemia and altered metabolism of carbohydrates, lipids and proteins. Chronic hyperglycemia during diabetes causes glycation of body proteins that in turn leads to secondary complications a ecting eyes, kidneys, nerves and arteries [1]. Increasing evidences from both experimental and clinical studies suggest that oxidative stress plays a major role in the pathogenesis of DM. Free radicals are formed disproportionately in diabetes by glucose oxidation, nonenzymatic glycation of proteins and the subsequent oxidative degradation of glycated proteins [2]. Without insulin, the cells of the body cannot absorb su cient glucose from the blood; hence blood glucose level increases, which is termed as hyperglycemia. If the glucose level in the blood remains high over a long period of time, this can result in long-term damage to organs, such as the kidneys, liver, eyes, nerves and heart [3].

Ayurvedic medicine is an ancient system of medicine that is native to Indian subcontinent. Many medicinal herbs are presently being used either as medicine or food supplant by millions of people in Indian subcontinent [4]. *Momordica charantia* (Cucurbitaceae) is a creping or climbing annual weak herb. It is extensively cultivated in India, China and other parts of south east. Medicinal properties of this fruits were studied for hypolipidemic and hepato-protective e ects to animals also to be human subjects [5]. Since, no work has been reported on hepatoprotective e ects of *Momordica charantia* during diabetes, the present work deals to observe the antidiabetic and antitoxic e ects of *Momordica charantia.*

Materials and Methods

Animals

Twenty four female Swiss albino mice (28 g to 32 g) and 8 weeks old were obtained from animal house of Mahavir Cancer Institute and Research Centre, Patna, India (CPCSEA Regd. No. 1129/bc/07/CPCSEA, dated 13/02/2008). e research work was approved by the IAEC (Institutional Animal Ethics Committee) with no. IAEC/2011/12/01. Food and water to mice were provided *ad libitum* (prepared mixed formulated feed by the laboratory itself). Animals were maintained in colony rooms with 12 h light/dark cycle at 22 ± 2°C.

Chemicals

Alloxan was purchased from the Loba chemie, Mumbai. Commercially available kit from Crest Coral Clinical System, Goa, India was used for the measurement of glucose, Serum Glutamate Pyruvate Transaminase (SGPT), Serum Glutamate Oxalate Transaminase (SGOT) and bilirubin.

Plant material

e fresh fruit of *Momordica charantia* (Local name-Karela) were procured from local market (Patna). e identity of the fruit of *M. charantia* was con rmed by Dr. Ramakant Pandey (Botanist), Department of Biochemistry, Patna University, Patna, Bihar, India. e fruit were washed with distilled water and dried completely under the mild sun and crushed with electrical grinder coarse powder. Aqueous extract was made by dissolving it in distilled water using by mortal and pistal. e dose was nally made to 100 mg/kg body weight for oral administration a er the LD_{50} estimation.

Experimental design

In the present study 18 mice were taken and divided into three groups – control (n=6), alloxan treated (n=12). e alloxan (alloxan monohydrate) at the rate of 150 mg/kg body weight were administered intraperitoneal (i.p) for making the alloxan induced diabetic mice model. Alloxan was administered on 7th and 14th day to make the perfect diabetic model. To this alloxan treated group (n=6) *M. charantia* at the

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in a wide variety of animal species by damaging the insulin secreting pancreatic β-cell, resulting in a decrease in endogenous insulin release, which paves way for the decreased utilization of glucose by the tissues [6-8]. In the present study the alloxan induced group resulted in the steady increase in the serum glucose level during experimental period, indicating hyperglycemia as similar observations were also observed in a variety of species [9,10].

e liver is one of the tissues that bear the brunch of chronically