

**COMPARATIVE STUDY OF ETHANOLIC AND METHANOLIC EXTRACTS OF
MOMORDICA CHARNTIA LEAVES IN ALLOXAN
INDUCED HYPERGLYCEMIA IN MICE**

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ABSTRACT

The study was comparative study of two different solvent extracts of *Momordica charntia* leaves in alloxan-induced hyperglycemia in mice. Ethanolic and Methanolic extracts of *Momordica charntia* leaves were prepared using a soxhlet extractor. Diabetes was induced in mice by intraperitoneal administration of alloxan (70 mg/kg b.w.) and blood glucose levels were measured by a glucose meter during the experimental study. The results were compared to both methanolic and ethanolic extracts at the same dose (150mg/kg b.w.). It was found that the methanolic *Momordica charntia* leaves extract was potent than ethanolic *Momordica charntia* leaves extract. The results showed a significant ($P < 0.05$) reduction in blood glucose revert back to near normal level in alloxan-induced diabetic mice administered with (150 mg/kg b.w.) methanolic and ethanolic leaves extracts. Overall, the results suggest that both ethanolic and methanolic *Momordica charntia* extract contains an effective anti-hyperglycemic potential which may find applied in the treatment of diabetes without causing toxic effects.

Keywords: Hyperglycemia, Alloxan, *Momordica charntia* comparison, Glibenclamide.

INTRODUCTION:

Diabetes mellitus is accredited as a group of heterogeneous disorders with common elements of hyperglycemia and glucose intolerance due to insulin deficiency, impaired insulin efficacy, or both. Type 2 diabetes is often, but not always, associated with obesity, which in itself can cause insulin resistance and increase blood glucose. It is highly familial, but major susceptibility genes have not yet been identified. There is no single definition for each type of complication (e.g. retinopathy, neuropathy, or nephropathy), so studies of the complications of diabetes are often difficult to compare [1]. Medicinal plants, also called medicinal herbs, have been discovered and used in traditional medical practice since prehistoric times. Plants synthesize hundreds of

chemical compounds for functions, including protection against insects, fungi, diseases, and Herbivorous mammals. Numerous phyto chemicals with potential or identified biological activity have been identified. However, because one plant contains a wide. Variety of phytochemicals, the effect of the whole plant as a drug is not clear [2]. *Momordica charntia* is an important medicinal plant in the Rutaceae family, alkaloids, flavonoids, and essential oils with antimicrobial and anticancer properties. This is thus considered to be a shown that essential oils, protopine, corydaline, alkaloids, limonoids, lactones, polyacetylene, acyclic sesquiterpenes, hypericin, and pseudohypericin compounds present in *Momordica charntia* are responsible for its therapeutic properties [3]. Present study mainly deals with the identification of antidiabetic potential of the leaves of the plant *Momordica charntia*.

MATERIAL AND METHODS:

Collection of plant material:

Fresh matured *Momordica charntia* leaves were collected from the campus of Jayoti Vidyapeeth women's University, Jaipur. The leaves were washed with normal Water then rinsed with distilled water and shade dried to remove traces of moisture and dust.

Preparation of methanolic and ethanolic leaves extracts:

Ethanolic extract was prepared by the method of continuous soxhlet extraction. Freshly collected leaves were dried under shade and the dried material was ground to obtain a powder. The 50gm powder was packed in a soxhlet apparatus and extracted with 300 ml of alcohol. The extract was concentrated at temperatures 40-50°C then air-dried at room temperature. The extract was preserved in the refrigerator till experimental use. The other extract was prepared as a process of ethanolic extract using methanol as the solvent.

Experimental animals:

Normal healthy mice with an average weight of 20-30g, of both sex, were obtained from CPCSEA registered, animal house of Jayoti Vidyapeeth Women's University, Jaipur, Rajasthan. The mice were housed under standard laboratory conditions in an animal house at Jayoti Vidyapeeth Women's University and were used for the experiment. Mice were kept in

polypropylene cages under controlled temperature 22-25°C with 12:12 hrs light and dark cycle. Mice were fed on a balanced diet and water *ad libitum*.

Experimental Design:

Mice were separated into five groups, with six mice in each group. Group I was a non-diabetic control (NC) that received distilled water. Groups II-V fasted overnight, diabetes was induced in mice by intraperitoneal injection of 70 mg/kg alloxan monohydrate in 0.9% w/v NaCl overnight in fasted mice. Mice were kept for the next 24 hours on 10% glucose solution bottles in cages to prevent hypoglycemia [4-6]. Three days after the increment in diabetes, mice with moderate diabetes (i.e., Blood glucose ≥ 250 mg/dl) with hyperglycemia were selected for the experiment [7]. Group II was given distilled water as a diabetic control (DC) and group III (GB5) was given 5 mg/kg glibenclamide dissolved in saline as a standard solution, group IV (CLM150) treated with 150 mg/kg b.w. methanolic *Momordica charntia* leaves extract, Group V (CLE150) treated with 150 mg/kg b.w. ethanolic *Citrus limon* leaves extract. All of these treatments were administered orally for 28 days, and on the last day, blood samples were taken by cardiac puncture and estimation of serum glucose using commercially available kits ERBA Diagnostics Mannheim kits.

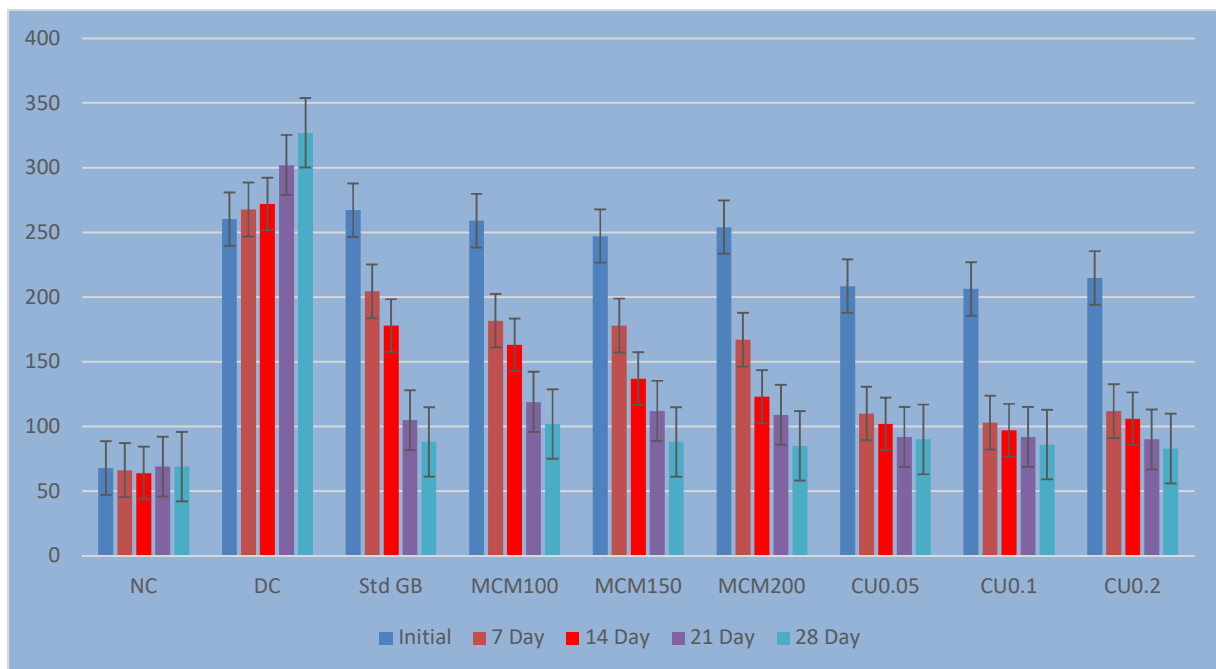
Statistical Data Analysis:

The grouped data were statistically evaluated with SPSS (version 22.00) software. The results were expressed as Mean \pm Standard Deviation for 6 mice in each group. The statistical evaluation carried out by ANOVA (LSD) and the probability <0.05 was chosen as the level of significance.

RESULTS AND DISCUSSION:

The results showed that Alloxan-induced diabetic mice significantly reduced the blood glucose levels in both ethanolic and methanolic extracts. The diabetic control group significantly increased the glucose level and the standard glibenclamide 5mg/kg produced a significant reduction of blood glucose levels. From the data observation, the methanolic extract was more potent than the ethanolic extract of *Momordica charntia* leaves. The Methanolic extract of *Momordica charntia* leaves and ethanolic extract of *Momordica charntia* leaves produced a

significant reduction in blood glucose levels similar to the Glibenclamide compared to the diabetic control group, the results were represented below in the graph (Fig. 1).



Comparison of anti-hyperglycemic activity of methanolic and ethanolic extracts of *Momordica charntia* leaves.

Momordica charntia have well-known nutritional and medicinal property. *Momordica charntia* are one of the most popular plants in the world [8]. *Momordica charntia* hexane extract, which contains about 60 volatile compounds, showed significant blood glucose lowering activity [9]. Have been study for revealed that both extracts (ethanolic and methanolic) have antihyperglycemic potential to reduce the elevated glucose level. This study provides insight into the antidiabetic potential of *Momordica charntia*

CONCLUSION

The results found this study revealed that both solvent extracts the plant leaves of *Momordica Charntia* were extracted with two solvent such as Ethanol and Methanol by

(Hot percolation method) soxhlet extractor, and phytochemical evaluation showed the presence of Alkaloids, flavonoids, tannins, phenol, Saponins, glycosides, Steroids, proteins, amino acids, and carbohydrates of *Momordica Charntia* leaves were effective on reducing blood glucose level in alloxan induced diabetic mice. So, it can be concluded the both solvent extracts of *Momordica Charntia* can significantly improve the high blood glucose level. These *Momordica Charntia* leaves extracts were very effective in prevention of diabetes, so furthermore investigations are needed in this field to evaluate its medicinal properties. The effect of the plant extract on various parameters in control and the diabetic mice were assayed. It was concluded that the dose (200mg/kg body weight) of the all plant extracts and at dose 200mg/kg body weight were highly effective and boosted in the management of the blood glucose level in the diabetic mice. The medications are Ayurvedic, so they have no other side effects. Detailed mechanisms of action of these drugs and clinical trials that may be useful and effective in the treatment of diabetes in human beings may continue.

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