

# Therapeutic Efficacy of *Ficus Glomerata* leaves in Alloxan Monohydrate Induced Type-1 Diabetes in Albino Rats

Sanjeev Kumar<sup>1\*</sup>, N.K. Prasad<sup>2</sup>, Kumari Shachi<sup>3</sup>

<sup>1</sup>Department of Zoology, B.M. College, Rahika L.N. Mithila University Darbhanga, Bihar, India; <sup>2</sup>Department of Zoology, RRM, Campus, Tribhuvan University, Kirtipur, Nepal; <sup>3</sup>Department of Zoology, K.S. College, Laheriasarai L.N. Mithila University Darbhanga Bihar, India

## ABSTRACT

Present study was aimed to evaluate the anti-diabetic efficacy of *Ficus glomerata* in Alloxan monohydrate induced in the albino rats. Oral administration of fresh *Ficus glomerata* leaves (2-4 g/day) for 60 days shows significant blood glucose lowering effect in experimental alloxan induced diabetic rats. These diabetic rats blood glucose level became normal when fed with *Ficus glomerata* leaves. It is amply revealed that fresh *Ficus glomerata* leaves possessed anti-diabetic properties. The results suggest that statistically significant anti-diabetic potential in alloxan monohydrate induced diabetic rats. The *Ficus glomerata* leaves to be almost similar effect like insulin treatment in alloxan monohydrate administered animal model. From the present investigation it appeared that *Ficus glomerata* leaves might have some ingredients to increase the output of insulin by binding to the receptors of the Beta cells of the Langerhans located in the pancreas. Once they bind to the Sulphonyl urea receptors, the channels are probably closed and therefore the membrane is depolarized and insulin production is stimulated.

**Keywords:** Blood glucose; Insulin; *Ficus glomerata* leaves; Diabetes

## INTRODUCTION

Diabetes mellitus, increased blood sugar level, not only common disease, but creates several problems in human body like retinopathy, angiopathy, nephropathy, neuropathy, cardiomyopathy [1]. Gradually increasing order of this disease affects the present society, for that medical sciences is busy to search some positive technology by which this abnormality can be easily removed. The current allopathic therapies still face difficulty on way to cure diabetes or minimize blood glucose levels due to severe side effects associated with the use of allopathic medicine.

Herbal therapies, an alternative system, with its champion power to reduced blood glucose levels. It has been matter of concern from time immemorial several plant extracts are known for their anti-diabetic properties and are being used for the traditional treatment of diabetes due to low cost, easy availability and lesser side effects [2]. *Ficus glomerata* extracts have also been reported to possess significant medicinal and pharmacological

properties like hepatoprotective, gastroprotective, hypoglycemic, anti-microbial and anti-ulcer activities. [3]

## AIM OF THE STUDY

The aim of present study was to investigate the effect of *Ficus glomerata* leaves on blood glucose in normal and alloxan diabetic rats given after successful establishment of type-1 diabetes to examine its role as therapeutic efficacy and to see its influence, if any prevention of the type-1 diabetes.

## MATERIALS AND METHODS

Plant materials *Ficus glomerata* leaves were collected from rural area of Darbhanga, India.

Albino rats (175-210 g) were used as experimental animals. All the animals are procured from local supplier of animals. The albino rats are acclimatized for 10 days. All animals were fed with rodent pellet diet. Water was allowed ad-libitum under strict

**Corresponding Author:** Sanjeev Kumar, Department of Zoology, B.M. College, Rahika L.N. Mithila University Darbhanga, Bihar India; Email: sanjeev.kdbg@gmail.com

**Received:** April 20, 2021; **Accepted:** May 04, 2021; **Published:** May 11, 2021

**Citation:** Kumar S, Prasad NK, Kumari S (2021) Therapeutic Efficacy of *Ficus Glomerata* leaves in Alloxan Monohydrate Induced Type-1 Diabetes in Albino Rats. J Diabetes Metab. 12:875

**Copyright:** © 2021 Kumar S, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

hygienic condition. Induction of diabetes: Fasting blood glucose was determined after depriving food for 12 hours. Diabetes was induced by single intra-peritoneal injection of (150 mg/kg body weight) alloxan monohydrate sterile saline. Alloxan is a toxic glucose analogue which selectively destroys insulin producing cells in pancreas. This causes insulin dependent diabetes mellitus called "alloxan diabetes" [4].

## EXPERIMENTAL DESIGN

Group A-Normal rats.

Group B-Diabetic control.

Group C-Alloxan+Insulin treatment group.

Group D-Alloxan+*Ficus glomerata* leaves treatment group.

72 hours of alloxan monohydrate injection the diabetic rats (blood glucose levels greater than 270 mg/dl) were separated. Treatment was started except normal rats and diabetic control rats. During experimental period, animals in all groups were given to standard water and pellet diet. Blood glucose were monitored by digital glucometer [5].

## RESULTS AND DISCUSSION

Experimental group	Fasting blood glucose (mg/dl)			
	15 <sup>th</sup> day	30 <sup>th</sup> day	45 <sup>th</sup> day	60 <sup>th</sup> day
Group A-normal rats	88.14 ± 1.02	88.09 ± 1.25	86.09 ± 1.64	80.02 ± 0.31
Group B-diabetic control vehicle	294.5 ± 0.34	291.5 ± 1.08	297.9 ± 1	290 ± 2.13
Group C-alloxan +insulin treatment group	159 ± 3.21 p<0.05	161 ± 1.21 p<0.05	107 ± 2.11 P<0.05	105 ± 1.6 p<0.05
Group D-alloxan+ <i>Ficus glomerata</i> treatment group	160 ± 1.63 p<0.05	148 ± 2.67 P<0.05	109 ± 2.10 p<0.05	107 ± 2.15 p<0.05

**Table 1:** Effect of *Ficus glomerata* leaves in alloxan induced diabetic rats and normal rats.

Values are Mean ± SEM, n=10, P< 0.05 and diabetic Control. [6]

A marked rise in fasting blood glucose level were observed when compared to normal control rats. Anti- hyperglycemic activity was observed in *Ficus glomerata* leaves fed rats on there 15<sup>th</sup>, 30<sup>th</sup>, 45<sup>th</sup> and 60<sup>th</sup> days post treatment. However anti-hyperglycemic was a effect of *Ficus glomerata* leaves was found less effective than that of insulin treatment group. The results of the present study indicated that *Ficus glomerata* leaves do have the property to reduce the blood glucose. Alloxan monohydrate induce free radical production and causes tissue injury [7]. The pancreas are susceptible to such damage. It appears that *Ficus glomerata* leaves have tissue protective function. However, stimulation of beta

cells and subsequent release of insulin cannot ruled out in this regard. Estimation of insulin level, here might give insight into the mechanism. Nevertheless, there is no doubt in the uses *Ficus glomerata* leaves have therapeutic effect on blood glucose level.

To elucidate the mechanism of action and to project this Indian champion plant as an therapeutic target, further investigation are needed [8]. Has reported that *Ficus glomerata* leaf extract, subsequent increase in uptake of blood glucose and its utilization may be another mechanism of action of the extract also demonstrated that ethanolic extract of *F. Glomerata* root in diabetic rats. Present investigation suggested hypoglycemic effects of *Ficus glometata* leaves in diabetic condition rats [9]. *Ficus glomerata* leaves has been widely used for curing various ailments due to its tremendous potential. The present study will be helpful in establishing a scientific basis for therapeutic uses of the plant leaves of *Ficus glomerata*. However much more studies are still required to explore other potential of this plant leaves [10].

## CONCLUSION

This research appears that *Ficus glomerata* leaves works as anti-diabetic agent. So, this plant leaves will be helpful in treating the diabetes in ruler India due to low cost, easily availability and lesser side effects associated with the use of this plant leaves.

## REFERENCES

- Hung THW, Peng G, Kota PB, Yamahara J. Antidiabetic action of Punica granatum flower extract: Activation of PPAR-γ and identification of an active component. *Toxi Appl Pharm.* 2005; 207(2):160-169.
- Akhtar MS, Qureshi AQ. Psychopharmacological evaluation of *Ficus glomerata*, Roxb. fruit for hypoglycaemic activity in normal and diabetic rabbits. *Pak J Pharm Sci.* 1988;1(2):87-96.
- Lenzen S. The mechanisms of alloxan and streptozotocin induced diabetes. *Diabetologica.* 2008;51(2):216-226.
- Mandal SC, Maity TK, Das J, Pal M, Saha BP. Hepatoprotective activity of *Ficus racemosa* leaf extract on liver damage caused by carbon tetrachloride in rat. *Phytother Res.* 1999;13(5):430-32
- Owu DU, Antai AB, Udofia KH, Obembe AO, Obasi KO, Eteng MU, et al. Vitamin C improves basal metabolic rate and lipid profile in alloxan-induced diabetes mellitus in rats. *J. Biosci.* 2006;31(5):575-579.
- Kesavulu MM, Giri R, Kameswara RB, Apparao C. Lipid peroxidation and antioxidant enzyme levels in type 2 diabetic with microvascular complications. *Diabetic Metabol.* 2000;26(5): 387-392.
- Trivedi NA, Majumder B, Bhatt JD, Hemavathi KG. Effect of Shilajit on blood glucose and lipid profile in alloxan- induced diabetic rats. *Indian J Pharmacol.* 2004;36:373-76.
- Prince SM, Menon VP. Hypoglycemic and other related actions of *Tinospora cardifolia* roots in alloxan induced diabetic rats. *J. Ethnopharmacol.* 2000;70(1):9-15
- Ugochukwu NH, Babady NE, Cobourne M, Gasset SR, The effect of *Gangronema latifolium* extracts on serum lipid profile and oxidative stress in hepatocytes of diabetic rats, *J Biosci* 2003;28(1):1-5.
- Owu DU, Antai AB, Udofia KH, Obembe AO, Obasi KO, Eteng MU, et al. Vitamin C improves basal metabolic rate and lipid profile in alloxan-induced diabetes mellitus in rats. *J. Biosciences.* 2006;31(5): 575-579.