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EVALUATION OF ANTIDIABETIC ACTIVITY OF URARIA PICTA LEAVES ON EXPERIMENTAL ANIMALS

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ABSTRACTS

The present work is an effort to look at the effect of Uraria picta leave extract on streptozotocin induced diabetes in Wistar mice. Two groups of streptozotocin persuaded diabetic mice were orally treated through *Uraria picta leave* extract (150 and 300mg/kg) respectively. The blood glucose level, body mass, Glycosylated hemoglobin, liver glycogen, lipid profile, Antioxidant status were measured at the finish of the study that is after 100 days of *Uraria picta leave* extract were originate to be significant ($p < 0.05$) in dropping the blood glucose level, glycosylated hemoglobin, triglyceride, cholesterol, LDL, VLDL, HDL, blood urea, lipid profile, while both the treatments enhanced body weight, liver glycogen satisfied status once compared to the diabetic control. It have been concluded that *Uraria picta leave* extract, in adding to the antidiabetic action, too own antihyperlipidemic actions in the streptozotocininduced diabetic model.

INTRODUCTION

Diabetes is a chronic metabolic disorder that causes high blood sugar levels above a long era of time. The word "meritas" or else "of honey" be located added through John-Rolle of England into the getting on 1700s near distinct the illness as of diabetes insipid us, which is too related through pollakiuria. Its a rapidly rising worldwide problem through substantial community, wellbeing and financial significances. In 2010, it was assessed that 285 billion persons worldwide (about 6.4 % of the grown-up people) suffered from this illness. This integer is assessed to rise to 430 billion if not controlled or better treated. There are two main reasons for the aging population and the increase in obesity. Furthermore, the true prevalence of diabetes worldwide must be astronomically high, as approximately 50% of diabetics are estimated to be undiagnosed up to 10 years after onset.

MATERIALS AND TECHNIQUES

Materials

Preparation of the plant material

The plant material is collected from botanical garden of our college. With the help of a botanist, it was identified as Uraria picta the plants material (drug sample) was authentication from CH. CHARAN SINGH UNIVERSITY MEERUT by Prof. Vijai Malik. It was identified as Uraria picta Sample is been preserved and documented in the herbarium. A small pieces of plant root were washed. Then it will be dried in room temperature. By the use of electric mixer these roots are converted into the powder form. experiment is carryout to study the effects of ethanolic roots extract of Uraria picta. Around 60g of powder is been weighed and soaked into 600ml of 90% ethanol solution at room temperature. For occasionally shaking this preparation is leave for overnight. Whatman filter paper is use for filtration of extraction. By using Soxhlet evaporation method for the filtration and it should be done until drying and dried to obtained 5g of dried extract.

Biochemical parameters measurement

Diabetic state is been judge by blood glucose measurement. By the use of GOD/POD method estimation of autopsy plasma glucose. GOD/POD enzymes in glucose kit is used for chromogen 4-aminoantipyrine and phenol. D-glucomic acid and hydrogen peroxide is been given by GOD enzyme. Phenol is been oxidised in POD oxidises. It combined with 4-aminoantipyrine which produce red coloured quinoneinne dye. RIA kit is been used for the duplication of plasma insulin level with rat insulin consider as a standard. Glycosylated haemoglobin measurement (HbAlc) was used for the diagnosis of diabetes. Triglyceride were used for the measuring of enzyme-colorimetric method. LDL particles are been modified to form glycated LDL, oxidized LDL and glyco-oxidized LDL. These are more susceptible than native LDL. HDL may protect LDL. It may form the anticoagulant and antiplatelet. By using enzymatic method, Serum cholesterol, HDL-cholesterol were measured. LDL-cholesterol and VLDL-cholesterol is also measured by cholesterol Oxidises peroxides method.

Histological Studies

Rat pancreases were dipped into the Bouin-Hollande sublimate solution around 20 to 24 hours. These were standardized in various fixatives. These are the preservative, fixative test comparisons. Pancreas was embedded by Paraffin at 5 to 6 µ. It was mounted on albumin coated glass slides. Every second slide was used for staining. staining techniques, Chromalum-Hematoxylin and Phloxin (CHP) method shows the best result in between islets and the adjoining exocrine pancreas. These were also use for the differentiated b/w two types of cells within islets of pancreas. In CHP staining method, alcohol is use for the hydration which is been treated with $KMnO_4$ solution. It is been decolourised by sodium bisulphite solution. It will be stained with haematoxylin for 15 minutes. Counter stained in phloxin for few minutes then mordent in phosphotungstic acid, differentiated in 95% alcohol, dehydrated and mounted with DPX. This was observed in the whole pancreases at regular interval of time.

Morphometric analysis

For type-1 and type-2 diabetes, from all group of animal one rat 100 islets were determine as of 100 arbitrarily designated cross sections of the pancreas in experiment from every of the rat and their β cell is also counted. For morphometric analyses each group consist of total 700 to 800 islets are used. Islet of Langerhans dimension was complete on their lengthiest axis at 400 to 600X and size was calculated. This was done by the use of ocular microscope and light microscope.

RESULTS AND DISCUSSIONS

Results of type 1 diabetes experimentation

Table 1: Possessions of Uraria picta leave *abstract* on body mass of regulator and investigational groups of type.

Groups and Body weight	Normal	Final
Control I	147 ± 8.23	185 ± 16.58
Control + Uraria picta 250 mg/kg/day II	148 ± 4.55	187 ± 5.05
Diabetic III	150.4 ± 5.75	160.3 ± 14.8
Diabetic + Uraria picta 250 mg/kg/day IV	156.5 ± 4.06	163.55 ± 8.4
Diabetic + Uraria picta 300 mg/kg/day V	159.7 ± 8.42	168.56±8.6
Diabetic + Uraria picta 350 mg/kg/day VI	156.37±3.45	180.45±6.49
ANOVA F values (df = 4,35)	0.326 P< 0.05	19.148 P<0.05

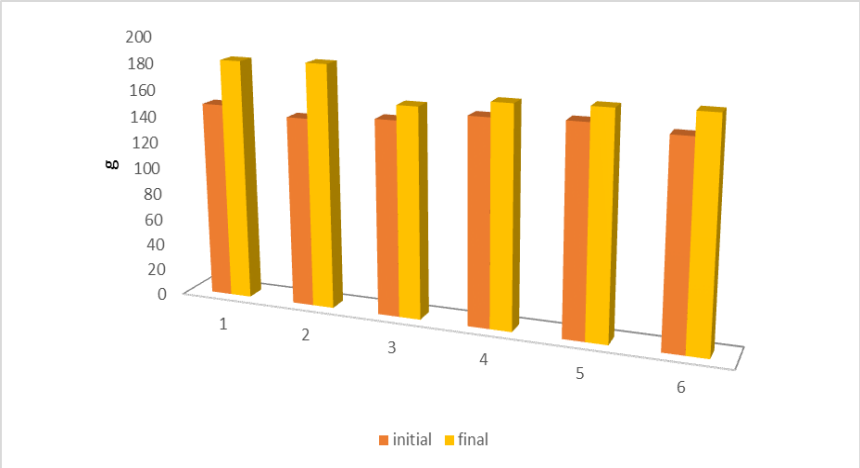

Figure 1: Effects of Uraria picta leave extract on body mass of control and experimental groups of type.

Table 2: Effects of Uraria picta leave abstract on blood-glucose levels(mg /dl) of regulator and investigational groups of type1 diabetic mice.

Groups	0days	5st day	15th day	20th day	25th day	30th day
Control I	87.4±4.13	79.85±5.58	89±2.46	89±3.48	90±6.6	91±2.6
Control + Uraria picta 250 mg/kg/day II	74.4±5.74	83.46±6.48	77.1±3.16	70.15±4.49	68±4.6	69±2.3
Diabetic III	75.48±4.60	511±16.75	391±45.29	388±24.79	376.45±18.49	390±8.8
Diabetic + Uraria picta 250 mg/kg/day	75.5±3.06	391±27.4	279±17.46	290±17.59	191±18.48	151±7.6

IV						
Diabetic Uraria picta 300 mg/kg/day V	77.5±3.76	396.48±15.6	325±19.46	221.4±6.49	171±15.48	158±5.7
Diabetic Uraria picta 350 mg/kg/day VI	79.52±6.49	399.15±16.49	351±18.46	236±5.86	172±16.76	101±3.99
ANOVA F-value (df= 4,35)	4.48 P<0.05	118.41 P<0.05	41.8 P<0.05	59.16 P<0.05	151.48 P<0.05	61.46 P<0.05

Table 2: Effects of Uraria picta leave *abstract* on glycosylated Hb (HbAlc%) levels of controller and investigational groups of type1 diabetic mice.

Groups	Glycosylated Haemoglobin (%)
Control I	8.19 ± 0.21
Control + Uraria picta 250 mg/kg/day II	5.77±4.73
Diabetic III	17.19 ± 0.51
Diabetic + Uraria picta 250 mg/kg/day IV	8.17 ± 0.37
Diabetic + Uraria picta 300 mg/kg/day V	8.09 ± 0.79
Diabetic + Uraria picta 350 mg/kg/day VI	9.35 ± 0.96
ANOVAF value(df = 4,35)	170.47 P< 0.05

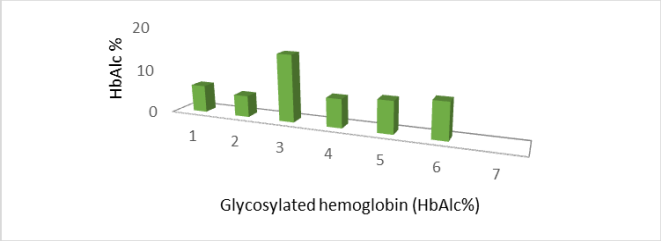

Figure 2: Effects of Uraria picta leave *abstract* on glycosylated Hb (HbAlc %) levels of governor.

Table 4: Effects of Uraria picta leave abstract on triglyceride levels of regulator and *investigational* groups of type1 diabetic mice.

Groups	triglyceride (mg/dL)
ControlI	56 ± 0.80
Control + Uraria picta 250 mg/kg/day II	55.8 ± 3.03
Diabetic III	87.8 ± 3.7
Diabetic + Uraria picta 250 mg/kg/day IV	78 ± 1.6
Diabetic + Uraria picta 300 mg/kg/day V	70.36 ± 2.7
Diabetic + Uraria picta 350 mg/kg/day VI	72.82 ± 6.7
ANOVAF value(df= 4,35)	110.47 P< 0.05

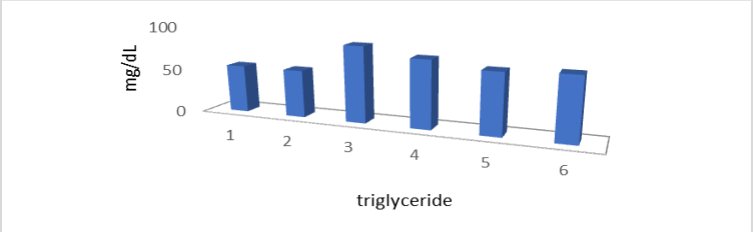

Figure 3: Effects of Uraria picta leave abstract on triglyceride levels of control and investigational groups of type1 diabetic mice.

Table 3: Effects of Uraria picta leave *abstract* on cholesterol levels of controller and *investigational* groups of type1 diabetic mice.

Groups	Cholesterol(mg/dL)
Control I	47.81 ±4.22
Control + Uraria picta 250 mg/kg/day II	49.11 ±3.13
Diabetic III	78.9 ± 3.13
Diabetic + Uraria picta 250 mg/kg/day IV	50.8 ± 3.02
Diabetic + Uraria picta 300 mg/kg/day V	49.33 ± 3.2
Diabetic + Uraria picta 350 mg/kg/day VI	46.57 ± 5.7
ANOVA F value (df = 4,35)	116.47 P<0.05

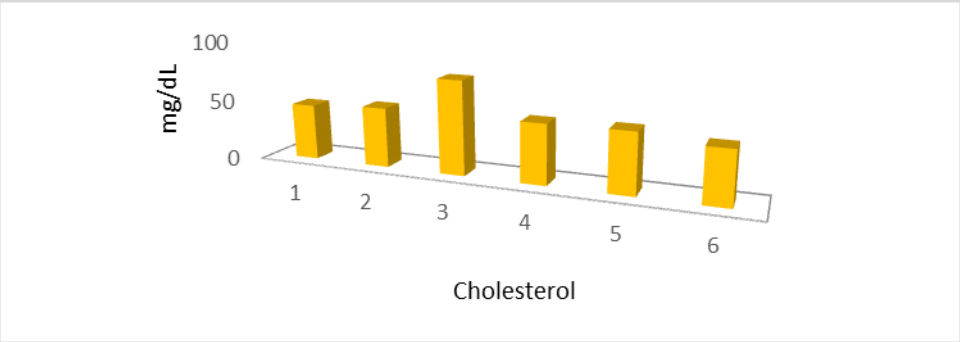

Figure 4: Effects of Uraria picta leave extract on cholesterol level of regulator, investigational groups of type1 diabetic mice.

Table 4*:* Effects of Uraria picta leave extract on LDL levels of regulator and investigational investigational groups of type1 diabeticrat.

Groups	LDL (mg/dL)
Control-I	28.13 ± 3.12
Control + Uraria picta 250 mg/kg/day II	22.43 ± 2.64
Diabetic III	41.2 ± 6.13
Diabetic + Uraria picta 250 mg/kg/day IV	31.9 ± 2.97
Diabetic + Uraria picta 300 mg/kg/day V	27.37 ± 7.3
Diabetic + Uraria picta 350 mg/kg/day VI	25.16 ± 6.6
ANOVA F value (df = 4,35)	18.56 P < 0.05

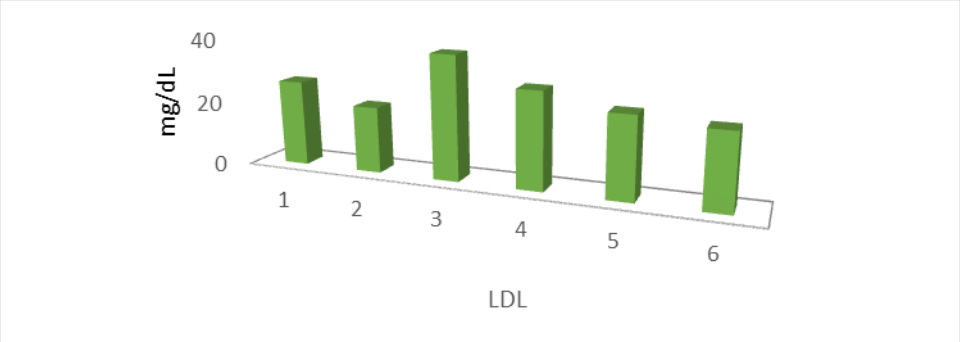

Figure5. Effects of Uraria picta leave *extract* on LDL levels of regulator, investigational groups of type1 diabetic mice

Table 5: Effects of Uraria picta leave *extract* on VLDL levels of regulator and *investigational* groups of type1 diabetic mice.

Groups	VLDL (mg/dL)
Control I	16.46 ± 0.12
Control + Uraria picta 250 mg/kg/day II	14.51 ± 0.67
Diabetic III	27.3 ± 0.93
Diabetic + Uraria picta 250 mg/kg/day IV	17.83 ± 0.58
Diabetic + Uraria picta 300 mg/kg/day V	14.20 ± 6.4
Diabetic + Uraria picta 350 mg/kg/day VI	16.15 ± 5.6
ANOVA F value(df = 4,35)	70.36 P < 0.05

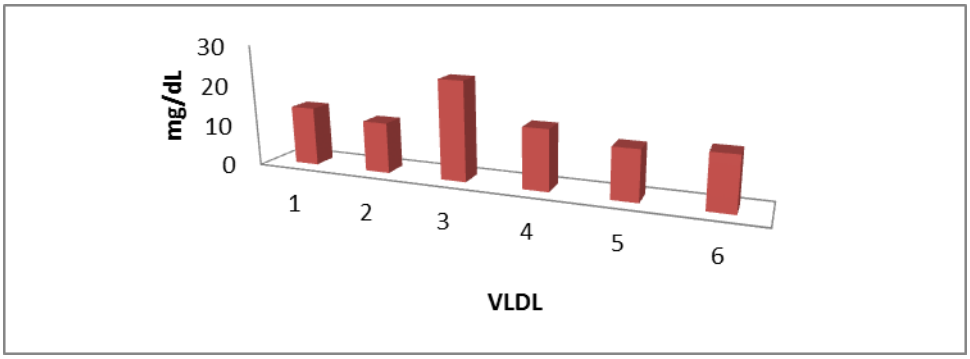

Figure 6: Effects of Uraria picta leave *abstract* on VLDL level of regulator, investigational groups of type1 diabetic mice.

Table 8: Effects of Uraria picta leave abstract on HDL level of regulator and investigational groups of type1 diabeticrats.

Groups	HDL (mg/dL)
Control I	23.46 ± 0.91
Control + Uraria picta 250 mg /kg/dayII	26.45 ± 0.73
Diabetic III	20.3 ± 0.57
Diabetic + Uraria picta 250 mg/kg/day IV	30.33 ± 4.47
Diabetic Uraria picta 300 mg/kg/day V	29.27 ± 5.4
Diabetic Uraria picta 350 mg/kg/day VI	33.12 ± 6.6
ANOVA F value (df = 4,35)	119.46 P <0.05

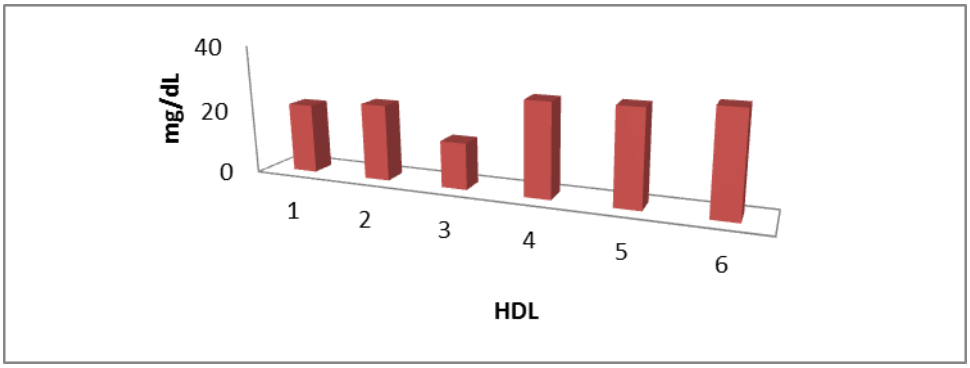

Figure 7: Effects of Uraria picta leave extract on HDL level of regulator and investigational groups of type1 diabetic mice.

Table 6: Effects of Uraria picta *leave abstract* on blood urea level of regulator and investigational groups of type1 diabetic mice.

Groups	Blood urea (mg/dL)
Control I	46 ± 0.98
Control + Uraria picta 250 mg/kg/day II	47 ± 3.13
Diabetic III	68.7 ± 8.16
Diabetic + Uraria picta 250 mg/kg/day IV	49 ± 3.6
Diabetic + Uraria picta 300 mg/kg/day V	45.17 ± 7.8
Diabetic + Uraria picta 350 mg/kg/day VI	46.13± 8.5
ANOVA F value (df= 4,35)	28.48 P < 0.05

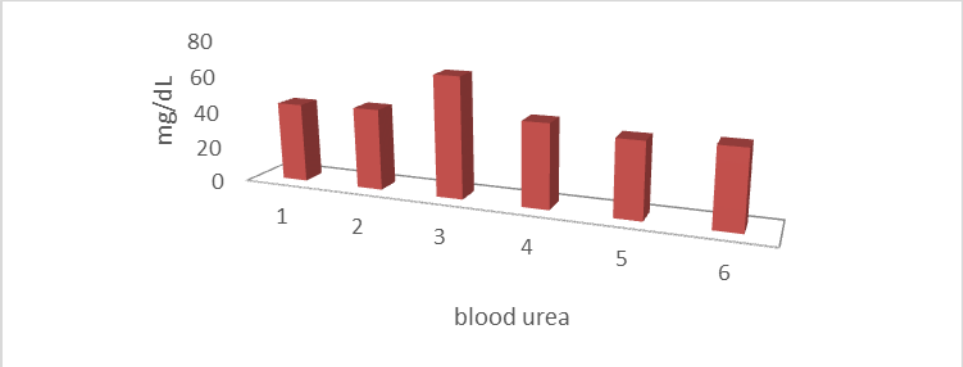

Figure 8: Effects of Uraria picta *leave extract* on blood urea level of regulator and investigational groups of type1 diabetic mice.

Table 7: Effects of Uraria picta leave abstract on relative mass of pancreas of regulator and *investigational* groups of type1 diabetic mice.

Groups	Relative weight of pancreases
Control I	0.368 ± 0.09
Control + Uraria picta 250 mg/kg/day II	0.378 ± 0.05
Diabetic III	0.389 ± 0.07
Diabetic + Uraria picta 250 mg/kg/day IV	0.310 ± 0.11
Diabetic + Uraria picta 300 mg/kg/day V	0.319 ± 0.16
Diabetic + Uraria picta 350 mg/kg/day VI	0.469 ± 0.10
ANOVA F value (df = 4,35)	29.49 P < 0.05

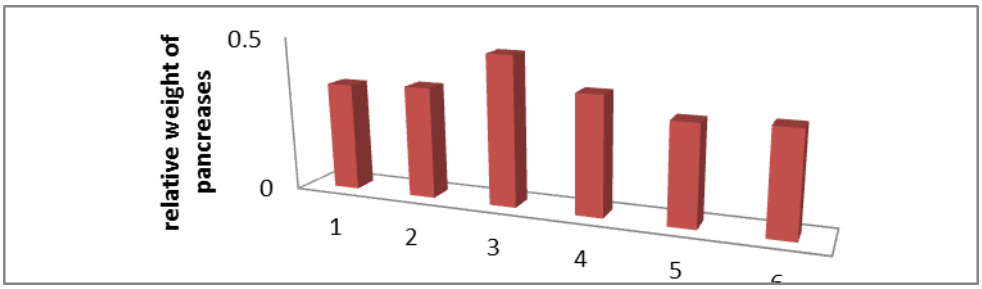

Figure 9: Effects of Uraria picta *leave abstract* on relative mass of pancreas of regulator and investigational groups of type1 diabetic mice.

Table 8: Effects of Uraria picta *leave abstract* on diameter of islets of regulator and investigational groups of type1 diabetic mice.

Groups	Diameter of islets(µm)
Control I	170.79 ± 6.38
Control + Uraria picta **250 mg/kg/day II**	189.08 ± 6.14
Diabetic III	121.15 ± 5.83
Diabetic + Uraria picta **250 mg/kg/day IV**	172.73 ± 5.18
Diabetic + Uraria picta **300 mg/kg/day V**	184.46 ± 3.46
Diabetic + Uraria picta **350 mg/kg/day VI**	190.19 ± 5.80
ANOVA F value (df = 4,35)	46.49 P <0.05

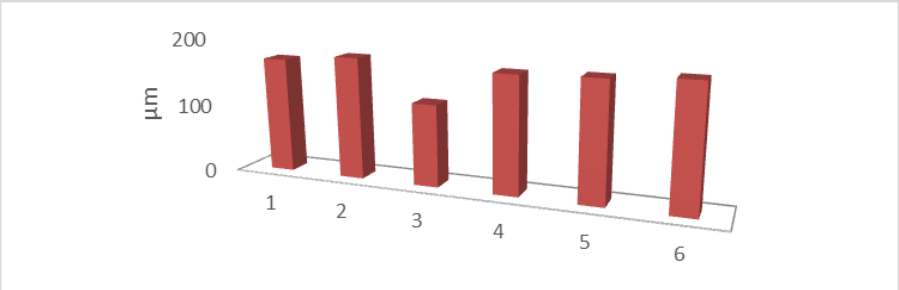

Figure 10: Effects of Uraria picta *leave abstract* on diameter of islets of regulator and investigational groups of type1 diabetic mice.

Table 9: Effects of Uraria picta *leave abstract* on β-cells no. per islet of regulator and investigational groups of type1 diabetic mice.

Groups	No. of β cells/islet
Control I	178.42± 5.4
Control + Uraria picta 250 mg/kg/day II	167± 4.19
Diabetic III	101.49± 6.11
Diabetic + Uraria picta 250 mg/kg/day IV	197.16 ± 5.45
Diabetic + Uraria picta 300 mg/kg/day V	198.19 ± 6.20
Diabetic + Uraria picta 350 mg/kg/day VI	190.20 ± 7.30
ANOVA F value (df = 4,35)	108.86 P < 0.05

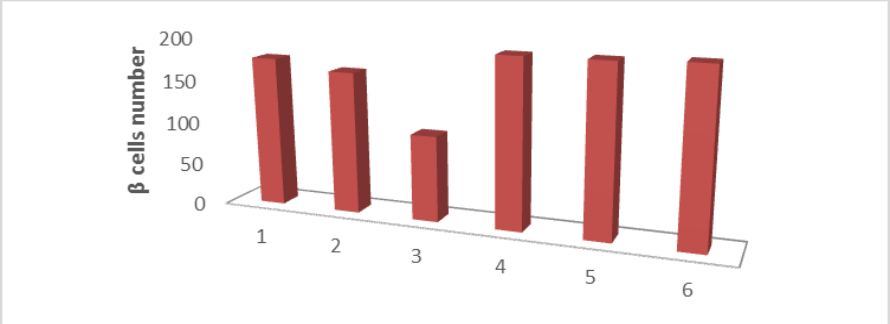

Figure 11: Effects of Uraria picta *leave abstract* on β-cells no. per islet of controller and investigational groups of type1 diabetic mice.

Results of type 2 diabetes experiment

In type 2 diabetes body weight of the experimental animals were shown in table13 and figure15. Group I animals increased the body mass reaching 247±7.19with 100 days of the experiment. This was advanced as compared to primary body mass of the animal (95.6±5.16g. From the day of 35 to 75 the animals which are in group II, III, IV and V. these animals are feed with

higher diet. The body weight is been slightly decreases in 100 days. The final body weight was higher as compared to other weight. Group IV and V animals (336±5.50g and 349±7.20g) as compared to diabetic group (301±6.20).

Table 10: Effect of Uraria picta leave *abstract* on body mass (g) of control and experimentation group of type2 diabetic mice.

Groups	0 days	35 days	45 days	60 days	75days	80days	90days	100 days
Control I	87.6±3.65	95.6±5.16	128.5±5.60	160±1.95	210±4.25	219±2.30	220±4.18	247±7.19
Control + *E. aureum* 250 mg/kg/day II	83.8±4.16	120±3.48	156±6.58	213±2.20	336±3.54	320±5.28	318±3.19	278±5.19
Diabetic III	79.5±5.16	115.4±4.49	159±6.20	260±2.78	334±3.14	319±3.44	320±4.28	301±6.20
Diabetic + *E. aureum* 300mg/kg/day IV	84.6±4.16	126.4±2.68	163±7.04	248±4.49	246±5.28	329±2.26	325±6.25	336±5.50
Diabetic *E. aureum* 350 mg/kg/day V	85.7±5.58	133.9±3.76	169±6.20	232±2.54	234±4.48	335±3.16	330±5.45	349±7.20
ANOVA F value (df= 3, 28)	0.589 P<0.05	18.86 P<0.05	19.59 P<0.05	10.59 P<0.05	67.56 P<0.05	52.225 P<0.05	32.56 P<0.05	35.75 P<0.05

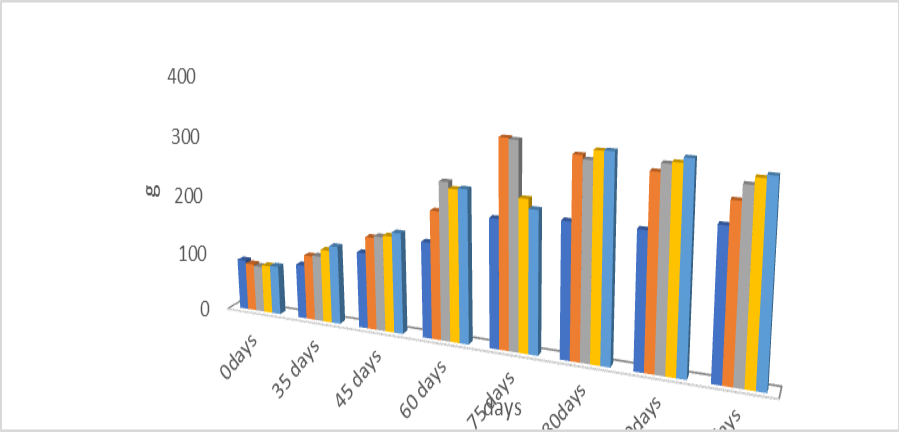

Figure 12: Effects of Uraria picta leave *abstract* on body mass (g) of regulator and investigational groups of type-2 diabetic mice

CONCLUSION

The main goal of the current study is to develop an animal model for traditional medicine (Uraria picta*)* in anti-diabetic activity. Animals become obese by high fat fed and the blood glucose level reached 129 mg/dl. Animal model may cause obesity and causes stress this may result into hyperglycaemia. The current task was to evaluate the healing efficiency of Uraria picta leave on type 1 and type 2 diabetes that made the Wistar rat model. Variety investigated biochemical parameters include blood glucose, triglyceride, cholesterol, LDL, VLDL, HDL, glycosylated Hb percent (HbAlc%) and blood urea. Besides HDL, blood glucose levels, triglyceride, cholesterol, LDL, VLDL, glycosylated the percentage of hemoglobin and blood urea increased in the diabetic group. After treatment and Uraria picta leave leave with 150,250 and 300 mg / kg / day in the diabetic group. While the HDL level dropped in the diabetic group and the HDL level was restored to that of the Uraria picta account control group. Studies on the Langerhans Islands recommend that the shrub release treatment in the diabetic group (150,250 and 300 mg / kg / day) type 1 and type mice in diabetes which has resulted in the detection of damaged islands and the restoration of cell no., which is why insulin secretion has been improved. Plant extraction of Uraria picta break enhances injured Langerhans islands and increases insulin secretion of β cells

Type 1 and type 2 sugar. Thus, the abstraction of Uraria picta plant is treatable effective in reducing type 1 and type 2 diabetes. While Uraria picta left the extract has a healing capacity, a real computer that will slow down Diabetes is still under examination.

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