RESEARCH ARTICLE

Effect of the Ethanolic Extracts of *Jatropha gossypifolia* (L.) on Blood Glucose Level in Streptozocin Induce Hyperglycemic Rats

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Received: 16th Oct 2024; Revised: 20th Nov Oct, 2024; Accepted: 1st Dec, 2024; Available Online: 25th Dec, 2024

ABSTRACT

A record of various medicinal plants with their established antidiabetic and other health benefits has been reported literature review stated that the *Jatropha gossypiifolia* not all plants parts has been tested for the anti-diabetic activity, we proposed and will perform the hypothetical approach it may be proved after carrying the experimentation work. Diabetes was induced in rats with an intraperitoneal injection of STZ ((40 mg/kg bwt) freshly prepared in 0.1 M sodium citrate buffer (PH 7) after overnight fasting. The ethanol extracts at 200 mg/kg dose level registered 140.30, mg/dl at the end of 10 h of the study, while it was 130.23, mg/dl with dose level of 400 mg/kg. However, at the same time the standard drug glibenclamide at 5mg/kg showed 96.30 mg/dl of BGL. For the sub-acute model the ethanol extracts at 200 mg/kg dose level registered 170.20, mg/dl at the end of 11 days of the study, while it was 142.51, mg/dl with dose level of 400 mg/kg. However, at the same day the standard drug glibenclamide at 5mg/kg showed 102.7 mg/dl of BGL. Study results reveals that on treatment with crude ethanolic extract at dose level 200 and 400 mg/kg reduce the BGL to an extent of 56.10% and 64.13% respectively at the end of 11 days study. The ethanolic fraction and hexane fractions at 150 mg/dl showed 140.23, 139.26 mg/dl total triglyceride level at the end of 21-day of the study, while at the same day the standard drug glibenclamide at 5mg/kg dose showed 132.06 mg/dl of total triglycerides.

Keywords: *Jatropha gossypiifolia* (L.); STZ; BGL; Antidiabetic; Hyperglycemic

How to cite this article: Bhumika Dadheech, Y S Sarangdevot, Bhupendra Vyas. Effect of the Ethanolic Extracts of *Jatropha Gossypifolia* (L.) on Blood Glucose Level in Streptozocin Induce Hyperglycemic Rats. International Journal of Pharmaceutical Quality Assurance. 2024;15(4): 2492-99. doi: 10.25258/ijpqa.15.4.50

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

Diabetes is becoming more and more commonplace worldwide at an alarming rate.[1] In the last thirty years, diabetes's reputation has shifted from that of a benign illness affecting the elderly to that of one of the leading causes of morbidity and death that affects children and middle-aged adults. It is important to remember that all six of the world's inhabited continents are experiencing a rise in prevalence. Diabetes is a fatal illness that affects both industrialized and poor nations. It is estimated that 354 million people worldwide would have diabetes by 2030, up from the likely 175 million in 2000.

From these species, *Jatropha gossypiifolia* L. (Figure 1) is discussed here.[2] It is a vegetal species widely known as "*bellyache bush*" and is a multipurpose medicinal plant largely used in folk medicine for the treatment of various diseases.[3,5,6] It is widely distributed in countries of tropical, subtropical, and dry tropical weather and tropical semiarid regions of Africa and the Americas.[7]

In Brazil, it predominates in the Amazon, Caatinga, and Atlantic Forest and is distributed throughout the country in the North, Northeast, Midwest, South, and Southeast regions.[8]

MATERIALS AND METHODS

Plant was collected from the India, during the months of august and September 2021. Taxonomic and ethno medicinal identification of the collected fruits of plant by Dr. S.K. Sukla principal and botanist Shrinathji Agriculture College, Nathdwara (Raj.) 1 kg of powdered drugs were packed in soxhlet apparatus and continuously extracted with petroleum ether to defat the leaves powder. Petroleum ether was removed from the powdered defatted drug, which was then extracted with ethanol (90). The extracted was evaluated for anti-diabetic activity, then most bio potent extract further fractioned with hexane and ethanol.[9]

Determination of the Antidiabetic Effect of the *Jatropha Gossypiifolia* in Rats

Streptozotocin was purchased from Sigma-Aldrich. Glucose kits were purchased from Agappe Diagnostics Ltd., India. All other chemicals were obtained from Hi Media (Mumbai, India) and SD Fine Chemicals Limited (Mumbai, India).

Experimental Induction of Diabetes

Diabetes was induced in rats with an intraperitoneal injection of STZ ((40 mg/kg bwt) freshly prepared in 0.1 M sodium citrate buffer (PH 7) after overnight fasting.[10] The rats exhibited diabetes after 5 days (i.e., fasting blood glucose concentration, >300 mg/dl) and were selected for the treatment with *Jatropha gossypiifolia* dissolved in water.

**Author for Correspondence:*

Parameters	Unit
Glucose (GLU)	mg/dL
Total Protein (TP)	g/dL
Albumin (Alb)	g/dL
Globulin (Glo)	g/dL
Albumin/Globulin ratio (A/GR) (Calculated)	-
Alanine Aminotransferase (ALT)	U/L
Aspartate Aminotransferase (AST)	U/L
Alkaline Phosphatase (ALP/ALKP)	U/L
Gamma Glutamyl Transferase (GGT)	U/L
Total Bilirubin (BIL)	mg/dL
Blood Urea Nitrogen (BUN)	mg/dL
Creatinine (CRE)	mg/dL
Triglycerides (TRG)	mg/dL
Total Cholesterol (CHO)	mg/dL
Calcium	mg/dL
Potassium	mg/dL
Sodium	mg/dL

Effect of the Ethanolic Extracts on Blood Glucose Level in Streptozocin Induce Hyper Glycemic Rats (Acute and Sub-Acute Models)

Acute Model (In Single Dose Treated Streptozocin Induced Hyperglycemic Rats)

The acclimatized animals were kept fasting for 24 h with water *ad libitum* and injected intraperitoneally a dose of 40mg/kg of streptozocin in normal saline. After 1 h, the animals were provided feed *ad libitum*. The blood glucose level was checked before streptozocin and 24 h after streptozocin as above. Animals were considered diabetic when the blood glucose level was raised beyond 200 mg/100 ml of blood. This condition was observed at the end of 72 h after streptozocin. The animals were segregated into six groups of six rats in each. Group I served as normal control, Group II served as diabetic control and received vehicle (2 ml/kg) through the oral route. Group III received glibenclamide (5 mg/kg). Groups IV to VI ethanolic extracts of *Jatropha gossypiifolia* at doses of 200, 300 and 400 mg/kg. Blood glucose level of each rat was estimated at 1, 2, 4, 6, 8 and 10 h, respectively.[11]

Figure 1: *Jatropha gossypiifolia* L

Sub Acute Model (In Multi Dose Treated Streptozocin Induced Hyperglycemic Rats)

The animals were kept fasting for 24 h with water *ad libitum* and injected streptozocin intraperitoneally at a dose of 40mg/kg in normal saline. After 1 h, the animals were provided rat diet *ad libitum*. The blood glucose level was measured 72 h after administration of streptozocin. The animals showing blood glucose level beyond 200 mg/dl were considered for the study. The diabetic animals were segregated into five groups of six rats each. Group I served as normal control, Group II served as diabetic control and received only vehicle (2 ml/kg) through the oral route. Group III received glibenclamide (5 mg/kg); Groups IV and VI received ethanolic extracts of *Jatropha gossypiifolia* at doses of 200, 300 and 400 mg/kg respectively for 11days. The Group I served as normal reference. The blood glucose level was measured on 0, 3, 7 and 11th day of treatment.[12]

Hypoglycemic Activity Study of Ethanolic Fraction and Hexane Fractions on Normoglycaemic Animals

Single Dose Treated Normoglycemic Rats

In this experiment, the effect of the ethanolic fraction on

Table 1: Effect of extracts of *Jatropha gossypiifolia* on blood glucose level in single dose treated streptozocin induced hyperglycemic rats

Groups	Treatment and dose	Blood Glucose Levels (mg/dl)							%age decrease at 10hrs
		0 hr	1 hr	2 hr	4 hr	6 hr	8 hr	10 hr	
I	Normal Control	93.09 ± 1.38	89.50 ± 0.64	88.50 ± 1.67	90.50 ± 1.78	87.59 ± 0.98	88.67 ± 2.14	89.76 ± 2.33	--
II	Diabetic Control (Tween + Water)	307.5 ± 4.34	297.63 ±4.93**	301.81 ± 2.89**	291.88 ± 3.51**	287.89 ± 3.67**	303.77 ± 4.29**	279.61 ± 2.71**	--
III	Glibencamide (5mg/kg)	295.7 ± 2.17	258.62 ±3.21**	198.31 ± 2.49**	139.21 ± 2.63**	126.31 ± 3.28**	118.91 ± 2.96**	96.30 ± 2.87**	63.23
IV	Eth. Ext. (200mg/kg)	363.2 ± 3.98	348.38 ± 3.26	307.53 ± 3.24	240.79 ± 3.81**	211.44 ± 2.59**	163.53 ± 4.28**	140.30 ± 3.71**	58.87
V	Eth. Ext. (300mg/kg)	372.1 ± 3.90	352.30 ± 2.20	312.50 ± 3.21	252.79 ± 3.80**	224.44 ± 2.09**	166.53 ± 4.24**	148.32 ± 2.50**	61.22
VI	Eth. Ext. (400mg/kg)	382.7 ± 4.15	369.68 ± 2.88	309.81 ± 2.36*	222.37 ± 3.77**	153.69 ± 3.91**	141.84 ± 3.28**	130.23 ± 2.93**	65.35

Values are expressed in MEAN ± S.E.M of six animals. One Way ANOVA followed by Dunnet's t-test (t-value denotes statistical significance at * p <0.05, ** p <0.01 respectively, in comparison diabetic control group)

blood glucose of normal rats has been studied after a single dose administration. The animals were fasted for 18h, but were allowed free access to water before and throughout the duration of experiment. At the end of the fasting period, taken as zero time (0 h), blood was withdrawn (0.1 ml) from the tip of the tail of each rat under mild ether anaesthesia. Plasma was separated following centrifugation the glucose was estimated by GOD/POD method using Glucose estimation kit from M/s. Sigma Diagnostics (India) Pvt. Ltd. India. The normal rats were then divided into five groups of six animals each.[12] Group I served as solvent control and received only vehicle (2 ml/kg) through the oral route, Group II received standard drug glibenclamide (5 mg/kg) and served as reference control. Groups III treated with ethanolic fraction (E1F1) at a dose of 150 mg/kg. Group IV received the hexane fractions (E1F2) at a dose of 150 mg/kg, respectively, through the oral route. The Blood glucose levels were observed at time points of 0, 1, 2, 4, 6, 8 and 10 h after administration of a single dose of the test and control samples.[13]

Study of the Effect of the Ethanolic Extract and Fractions on Serum Lipid Profile in Multi-Dose Treated Diabetic Rat

At the end of 21 days of treatment with the test extract and fractions the animals were sacrificed by decapitation under ether anaesthesia and blood samples were collected from test, standard and solvent-treated groups including normal animal as reference. The serum supernatant was separated by centrifugation and was subjected for the determination of the lipid profile studies such as total cholesterol, triglycerides, HDL, LDL and VLDL as per the standard experimental procedures described.[14]

Clinical Pathology

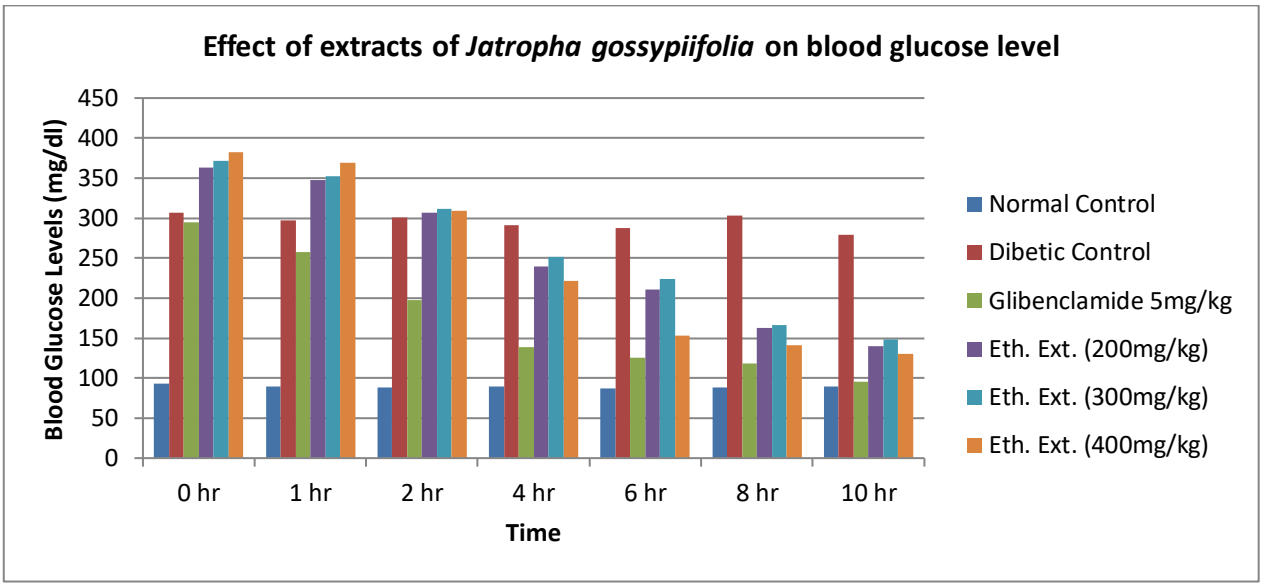

Figure 2: Effect of extracts of *Jatropha gossypiifolia* on blood glucose level in single dose treated streptozocin induced hyperglycemic rats

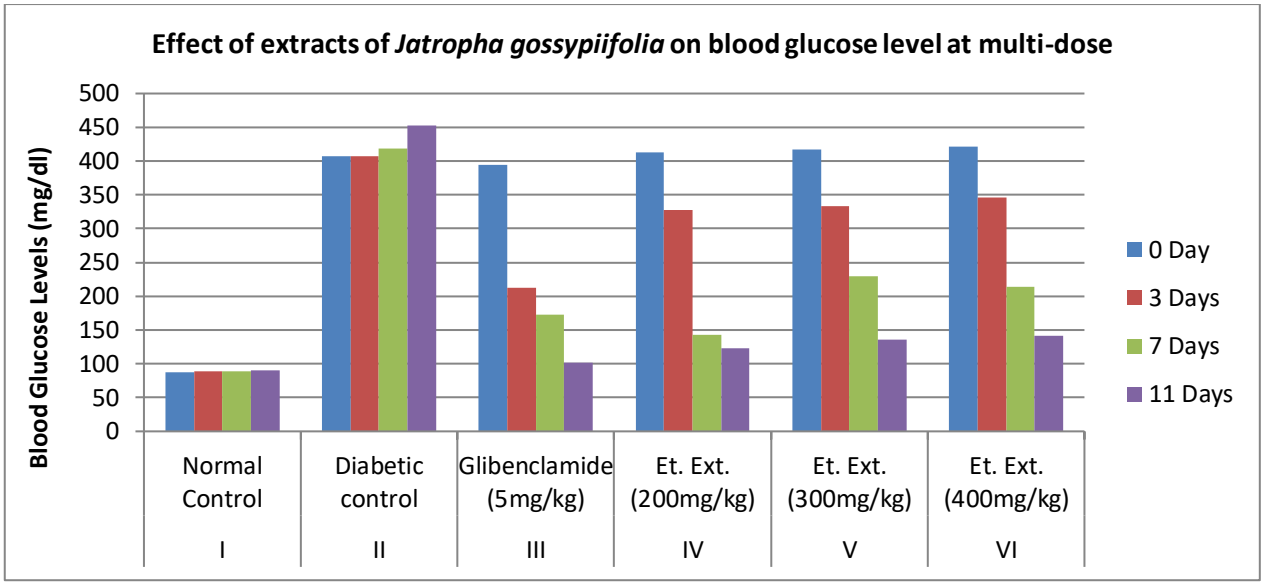

Figure 3: Effect of extracts of *Jatropha gossypiifolia* on blood glucose level in multi dose treated streptozocin induced hyperglycemic rat

Clinical Pathology investigations will be performed for animals on next day after completion of study period. Blood will be collected from overnight fasted (water allowed) animals through retro-orbital.[15-17] Clinical pathology investigations which will be carried out are as follows; Blood (~2 mL) will be collected in tubes without anticoagulant. Serum will be collected by centrifugation approximately at 3500 rpm for 10 min at 4 ºC. Samples will be analysed for following clinical chemistry parameters as listed below with the help of biochemical analyser using standard reagent kits and laboratory methodology.[18,19]

RESULT AND DISCUSSION

Acute Model (In Single Dose Treated Streptozocin Induced Hyperglycemic Rats)

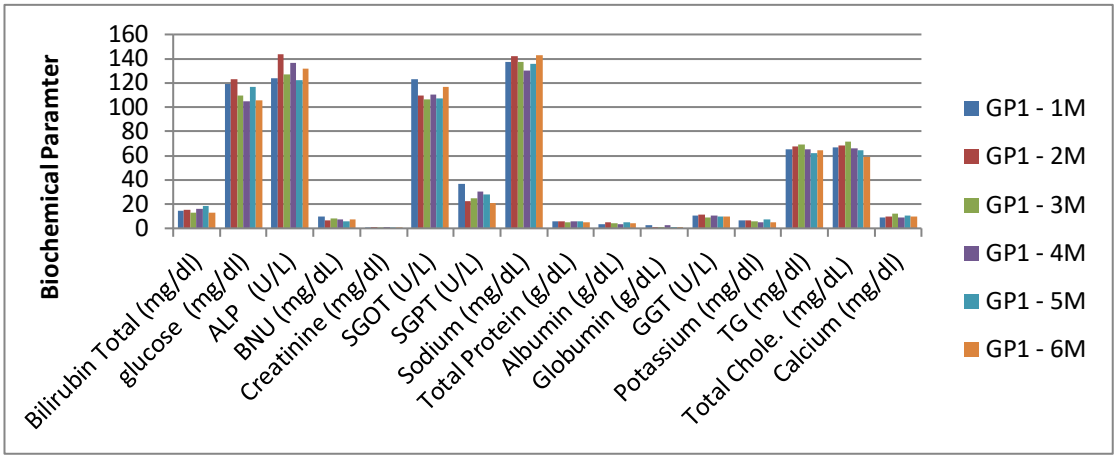

Figure 4: Biochemistry of serum profile of animals Group-1

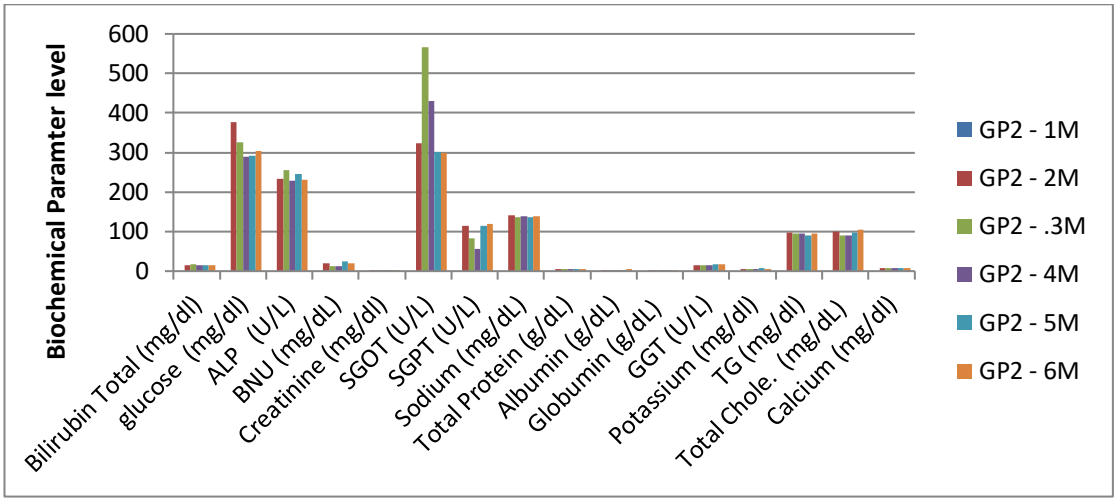

Figure 5: Biochemistry of serum profile of animals Group-2

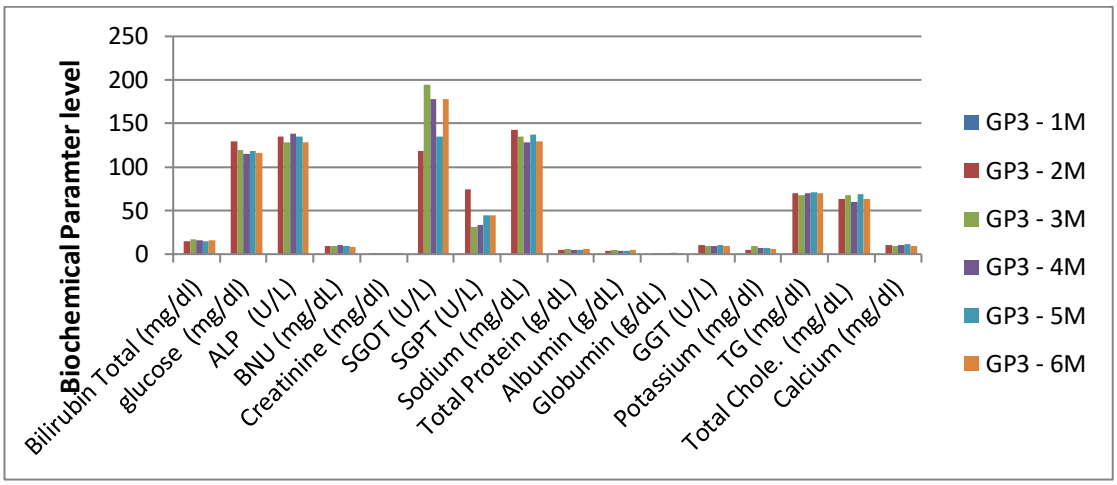

Figure 6: Biochemistry of serum profile of animals Group-3

Table 2: Effect of ethanolic extract of *Jatropha gossypiifolia* on blood glucose level in Multi- dose treated streptozocin induced diabetic rats

Groups	Treatment and dose	Blood glucose concentration (mg/dl)				%decrease at 11 day
		0th day	3rd day	7th day	11th day	
I	Normal Control	88.33 ± 2.155	89.33 ± 1.745	89.33 ± 1.820	90.33 ± 1.687	--
II	Diabetic control	407.5 ± 4.341	407.7 ± 6.458**	419.5 ± 5.708**	452.7 ± 10.53**	--
III	Glibenclamide (5mg/kg)	395.7 ± 27.17	212.3 ± 3.603**	173.5 ± 3 .63**	102.7 ± 4.90**	73.11
IV	Et. Ext. (200mg/kg)	413.2 ± 7.998	327.8 ± 8.080**	143.2 ± 11.57**	170.20 ± 5.97**	56.10
V	Et. Ext. (300mg/kg)	417.7 ± 14.10	334.9 ± 7.040**	230..6 ± 4.080**	136.01 ± 3.427**	60.37
VI	Et. Ext. (400mg/kg)	422.7 ± 15.15	346.7 ± 7.360**	214.8 ± 5.081**	142.51 ± 4.787**	64.13

Values are expressed in MEAN ± S.E.M of six animals. One Way ANOVA followed by Dunnet's t-test (t-value denotes statistical significance at * p <0.05, ** p <0.01 respectively, in comparison diabetic control group)

The effects of ethanol and aqueous extracts on fasting blood glucose levels on single dose treated streptozocin induced diabetic rats. The ethanol extracts at 200 mg/kg dose level registered 140.30, mg/dl at the end of 10 h of the study, while it was 130.23, mg/dl with dose level of 400 mg/kg. However, at the same time the standard drug glibenclamide at 5mg/kg showed 96.30 mg/dl of BGL. A dose dependent effect of the test extracts was observed.

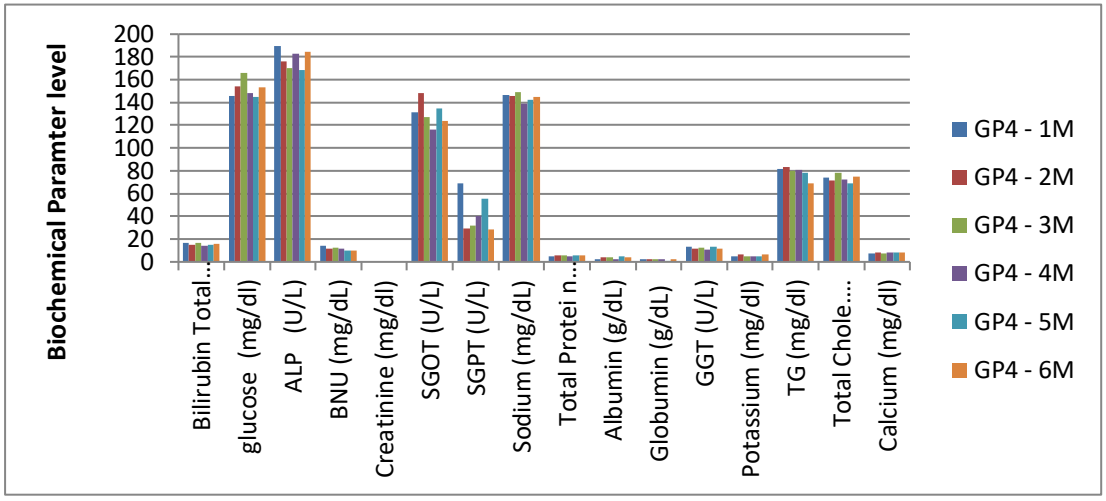

Figure 7: Biochemistry of serum profile of animals Group-4

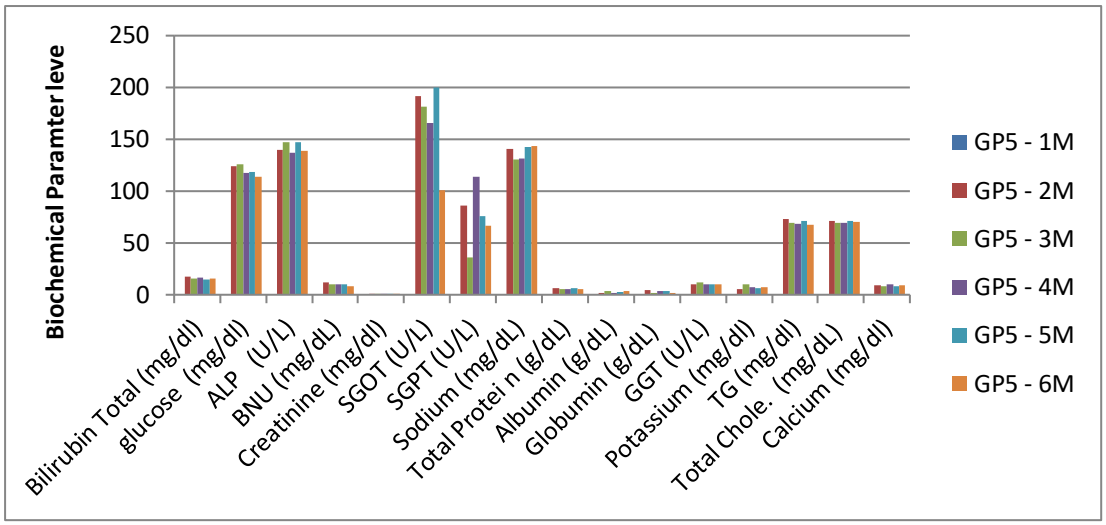

Figure 8: Biochemistry of serum profile of animals Group-5

Table 3: Biochemistry of serum profile of animals

Species of Animal		Rat (Wistar)					Gender of Animal Male									
Group	Animal ID	Bilirubin Total (mg/dl)	Glucose (mg/dl)	ALP (U/L)	BNU (mg/dL)	Creatinine (mg/dl)	SGOT (U/L)	SGPT (U/L)	Sodium (mg/dL)	Total Protein (g/dL)	Albumin (g/dL)	Globumin (g/dL)	GGT (U/L)	Potassium (mg/dl)	TG (mg/dl)	Total Chole(mg/dL)	Calcium (mg/dl)
Group-1	GP1 - 1M	14.23	118.76	123.76	9.45	0.78	123.00	36.50	137.50	5.68	3.20	2.48	10.23	6.44	65.09	66.54	9.20
	GP1 - 2M	15.32	123.08	143.60	6.45	0.93	109.50	22.20	142.10	6.16	4.80	1.36	11.03	6.19	67.54	68.23	9.76
	GP1 - 3M	13.23	109.67	126.76	8.48	0.67	106.20	25.20	137.20	5.26	4.20	1.06	9.32	6.01	69.08	71.76	11.75
	GP1 - 4M	16.23	104.99	136.87	7.02	0.99	110.00	30.43	130.55	5.68	3.20	2.48	10.23	5.07	64.89	65.98	8.67
	GP1 - 5M	18.19	116.98	122.45	6.05	0.69	107.50	28.00	135.43	6.16	4.80	1.36	9.54	7.03	61.78	64.70	10.23
	GP1 - 6M	13.28	105.87	131.56	7.45	0.72	117.10	21.18	142.78	5.26	4.41	0.85	10.11	5.33	64.76	59.09	9.56
MEAN		15.08	113.23	130.83	7.48	0.80	112.22	27.25	137.59	5.70	4.10	1.60	10.08	6.01	65.52	66.05	9.86
SEM		0.78	3.04	3.35	0.52	0.05	2.65	2.33	1.84	0.16	0.30	0.29	0.25	0.29	1.03	1.71	0.43
p-Value		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Group-2	GP2 - 1M	16.32	324.98	231.56	20.06	1.87	288.000	79.600	137.500	4.98	3.48	1.50	12.50	4.08	91.98	101.23	7.50
	GP2 - 2M	15.34	376.09	234.53	18.76	2.09	322.40	114.60	141.100	4.23	3.32	0.91	14.80	5.03	97.04	98.78	6.93
	GP2 - .3M	17.23	326.98	254.43	12.00	1.76	566.40	82.30	137.500	5.02	3.71	1.31	15.50	5.98	94.82	91.23	8.54
	GP2 - 4M	14.08	289.01	227.98	13.67	1.56	430.00	57.30	139.200	4.98	3.81	1.17	14.56	4.09	96.32	90.45	6.98
	GP2 - 5M	16.03	291.09	245.65	25.78	1.42	301.00	113.70	135.900	4.97	4.02	0.95	16.59	6.66	89.74	98.34	6.98
	GP2 - 6M	14.56	302.89	231.01	20.21	1.65	298.00	120.00	138.90	5.61	4.06	1.55	16.26	5.43	94.32	104.08	8.67
MEAN		15.59	318.51	237.53	18.41	1.73	367.63	94.58	138.35	4.97	3.73	1.23	15.04	5.21	94.04	97.35	7.60
SEM		0.48	13.29	4.20	2.03	0.10	45.12	10.29	0.73	0.18	0.12	0.11	0.60	0.42	1.12	2.22	0.33
p-Value		<0.001	0.01	0.01	0.01	0.01	<0.001	<0.001	0.01	0.01	0.01	0.01	<0.001	0.01	0.01	0.01	0.01
Group-3	GP3 - 1M	16.90	112.67	123.66	11.34	0.76	178.80	38.70	136.89	5.98	4.27	1.71	11.02	4.49	71.03	71.23	9.56
	GP3 - 2M	15.07	129.06	134.87	9.56	0.87	118.00	74.60	143.21	5.34	4.27	1.07	10.72	4.79	69.84	63.45	10.11
	GP3 - 3M	16.93	119.04	128.87	8.98	0.94	195.00	31.20	134.66	5.87	4.97	0.90	9.81	8.89	67.43	67.23	9.45
	GP3 - 4M	16.09	115.14	138.07	10.05	0.64	178.50	33.50	128.66	4.98	4.27	0.71	9.67	7.32	69.75	60.03	10.45
	GP3 - 5M	14.76	118.04	134.56	9.67	0.75	134.66	44.70	137.20	5.43	4.27	1.16	10.82	6.65	70.54	69.34	11.75
	GP3 - 6M	16.09	116.04	128.90	8.34	0.81	178.17	45.10	129.79	5.81	4.97	0.84	8.99	6.18	69.72	63.49	9.78
MEAN		15.97	118.33	131.49	9.66	0.80	163.86	44.63	135.43	5.57	4.50	1.07	10.17	6.39	69.72	65.80	10.18
SEM		0.37	2.33	2.15	0.42	0.04	12.34	6.42	6.42	0.16	0.15	0.14	0.33	0.67	0.50	1.71	0.35
p-Value		<0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	<0.01	0.01	0.01	<0.001	0.01	0.01	0.01	0.01

*p-value <0.001±0.05

The ethanol extracts of *Jatropha gossypiifolia* in both dose levels (200 and 400 mg/kg) showed a persistent decrease in blood glucose level till the end of 10 hr., while the standard drug glibenclamide showed a 63.23% decrease. The statistical significance of one way ANOVA showed significant reduction of BGL @ p<0.05 to 0.01 starting from 1 hr up to the end of 10 hr within the groups.[20] The potency order of the test extracts towards the falling of BGL is ethanolic extract.

Sub-Acute Model (In Multi Dose Treated Streptozocin Induced Hyperglycemic Rats)

The streptozocin-induced hyperglycaemia was significantly (p <0.05 to 0.01) corrected by the ethanol extracts of fruit powder of *Jatropha gossypiifolia* at the end of the treatment (11 days). The effects of ethanol extracts on fasting BGL on multi dose treated streptozocin induced diabetic rats. The ethanol extracts at 200 mg/kg dose level registered 170.20, mg/dl at the end of 11 days of the study, while it was 142.51, mg/dl with dose level of 400 mg/kg. However, at the same day the standard drug glibenclamide at 5mg/kg showed 102.7 mg/dl of BGL. Study results reveals that on treatment with crude ethanolic extract at dose level 200 and 400 mg/kg reduce the BGL to an extent of 56.10% and 64.13% respectively

Table 4: Biochemistry of serum profile of animals

Species of Animal		Rat (Wistar)					Gender of Animal			Male							
Group	Animal ID	Bilirubin Total (mg/dl)	Glucose (mg/dl)	ALP (U/L)	BNU (mg/dL)	Creatinine (mg/dl)	SGOT (U/L)	SGPT (U/L)	Sodium (mg/dL)	Total Protei n (g/dL)	Albumin (g/dL)	Globumin (g/dL)	GGT (U/L)	Potassium (mg/dl)	TG (mg/dl)	Total Chole. (mg/dL)	Calcium (mg/dl)
Group-4	GP4 - 1M	16.45	145.32	189.76	13.89	0.87	131.50	68.60	146.50	5.07	2.38	2.69	12.98	4.71	81.65	74.09	7.34
	GP4 - 2M	15.05	153.76	176.34	11.76	1.01	148.00	29.70	145.60	5.83	3.70	2.13	11.90	6.80	83.02	71.23	8.23
	GP4 - 3M	16.41	165.98	169.89	12.76	0.99	127.00	31.50	149.40	5.94	3.65	2.29	12.87	4.70	79.64	78.43	7.45
	GP4 - 4M	14.33	148.09	183.09	12.02	0.89	116.04	40.10	139.34	5.07	2.38	2.69	10.99	5.10	80.43	72.03	7.98
	GP4 - 5M	15.07	144.87	168.12	10.06	0.95	134.60	55.40	142.21	5.83	5.15	0.68	13.02	4.80	78.43	69.34	8.03
	GP4 - 6M	16.08	152.98	184.80	10.20	0.98	123.70	28.66	145.00	5.94	4.00	1.94	11.87	6.76	69.03	75.12	8.23
MEAN		15.57	151.83	178.67	11.78	0.95	130.14	42.33	144.68	5.61	3.54	2.07	12.27	5.48	78.70	73.37	7.88
SEM		0.36	3.21	3.53	0.60	0.02	4.44	6.66	1.43	0.17	0.43	0.30	0.33	0.42	2.04	1.31	0.16
p-Value		<0.001	0.01	0.01	<0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	<0.001	0.01	0.01	0.01	0.01
Group-5	GP5 - 1M	16.34	116.76	143.89	7.45	0.89	197.80	67.00	132.40	5.46	3.98	1.48	11.08	4.78	71.28	66.54	8.45
	GP5 - 2M	17.34	123.87	139.76	11.45	0.67	191.90	86.00	141.00	6.16	2.10	4.06	10.23	5.02	72.90	71.03	9.01
	GP5 - 3M	15.91	125.87	146.98	10.32	0.77	181.20	35.89	130.90	5.26	3.88	1.38	11.93	9.65	69.64	69.34	8.64
	GP5 - 4M	16.63	117.89	137.05	9.64	0.87	165.78	113.45	131.86	5.46	2.15	3.31	9.87	7.34	68.64	69.34	9.78
	GP5 - 5M	14.97	118.56	147.08	10.11	0.79	199.67	75.45	142.34	6.13	2.79	3.34	10.01	6.79	71.24	71.02	8.42
	GP5 - 6M	15.45	113.98	139.09	8.34	0.91	101.08	66.90	143.67	5.29	3.40	1.89	9.83	6.88	67.62	70.01	9.04
MEAN		16.11	119.49	142.31	9.55	0.82	172.91	74.12	137.03	5.63	3.05	2.58	10.49	6.74	70.22	69.55	8.89
SEM		0.35	1.84	1.75	0.59	0.04	15.25	10.41	2.41	0.17	0.34	0.46	0.34	0.72	0.79	0.68	0.21
p-Value		0.01	0.01	0.01	0.01	0.01	0.01	<0.01	0.01	0.01	0.01	0.01	<0.001	0.01	0.01	0.01	0.01
Group-6	GP6 - 1M	16.20	101.89	132.87	8.56	0.97	130.70	57.30	144.60	6.61	4.75	1.86	10.80	6.50	69.42	68.74	9.06
	GP6 - 2M	12.98	99.87	121.76	9.13	0.87	109.60	44.70	140.40	6.60	3.86	2.74	9.83	6.19	68.72	64.98	10.78
	GP6 - 3M	14.76	105.08	136.98	11.42	0.75	120.56	33.50	137.40	6.60	4.92	1.68	9.67	4.42	71.20	66.72	9.74
	GP6 - 4M	13.79	106.50	127.54	10.76	0.82	102.65	43.77	142.56	6.61	4.61	2.00	10.91	5.29	69.41	69.54	9.69
	GP6 - 5M	14.98	112.87	131.90	9.46	0.88	159.50	74.34	135.62	6.60	3.86	2.74	9.87	5.46	68.42	61.23	10.11
	GP6 - 6M	15.98	102.34	121.54	10.13	0.69	140.70	52.15	142.56	6.60	4.92	1.68	11.00	4.68	69.04	60.34	9.89
MEAN		14.78	104.76	128.77	9.91	0.83	127.29	50.96	140.52	6.60	4.49	2.12	10.35	5.42	69.37	65.26	9.88
SEM		0.51	1.89	2.56	0.44	0.04	8.55	5.73	1.40	0.00	0.20	0.20	0.25	0.33	0.40	1.56	0.23
p-Value		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

*p-value <0.001±0.05

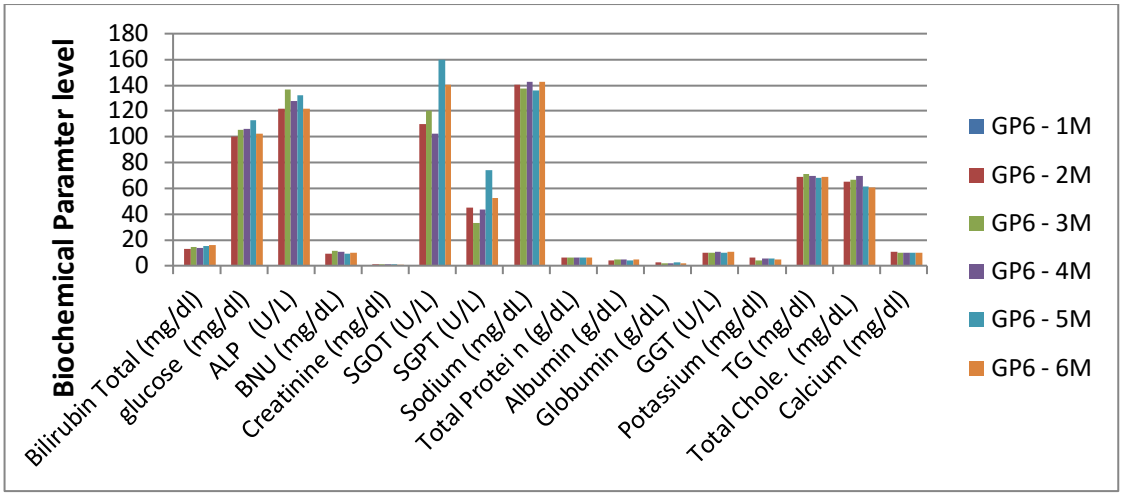

Figure 9: Biochemistry of serum profile of animals Group-6

at the end of 11 days study. However, at the same day the fasting mean BGL of diabetic rats treated with standard drug glibenclamide showed a reduction of 73.11% as compared with diabetic control (positive control) rats.[21]

However the individual data for test plant treated groups showed a statistical significance p <0.05 to 0.01 throughout the experimental result when compared with solvent control. This study indicated that the reduction of blood glucose level in ethanol extracts of *Jatropha gossypiifolia.*in streptozocin-induced diabetic rats was a dose dependent.

Effects of Ethanolic Fraction and Hexane Fractions of *Jatropha Gossypiifolia* on Serum Lipid Profile

In streptozocin induced diabetic rats, the marked hyperglycemia is accompanied by hypercholesterolemia and hypertriglyceridemia. The levels of serum lipid profile such as total cholesterol, total triglycerides, HDL, LDL, VLDL on 21st day of the study. The diabetic rats showed significant (p <0.01) increase level of all tested lipid profiles except HDL, which showed decreased value in a significant (p <0.05) extent.

The ethanolic fraction and hexane fractions at 150 mg/dl showed 140.23, 139.26 mg/dl total triglyceride level at the end of 21-day of the study, while at the same day the standard drug glibenclamide at 5mg/kg dose showed 132.06 mg/dl of total triglycerides. Similarly, by ethanolic fraction and hexane fractions at 150 mg/dl registered 57.41 56.22 mg/dl and 59.51 mg/dl total cholesterol, while at the same day of study glibenclamide showed 53.23 mg/dl total cholesterol level.

Similarly the LDL level decreased to 24.98, 21.06 mg/dl and 25.08 mg/dl and VLDL level was decreased to 22.06, 20.93 mg/dl and 22.75 mg/dl by ethanolic fraction and hexane fractions while standard drug glibenclamide at 5mg/kg dose decreased 14.42 mg/dl, LDL level and 17.06 mg/dl, VLDL level. In diabetic rats the HDL level decreased, which was increased to 14.23, 15.98 mg/dl and 15.32 mg/dl by the ethanolic fraction and hexane fractions, while glibenclamide increase HDL level upto 18.60 mg/dl. The decreased in TG, TC, LDL and VLDL level, while increased in HDL level by test extract and both fractions, in different test days showed a statistical significant of p <0.05 to p<0.01, while analyzed by using ANOVA followed by Dunnett's t-test. The extent of decrease lipid parameters except HDL of the 21-days treated rats were glibenclamide followed by ethanolic fraction and hexane fractions treated groups.

CONCLUSION

Diabetes was induced in rats with an intraperitoneal injection of STZ ((40 mg/kg bwt) freshly prepared in 0.1 M sodium citrate buffer (PH 7) after overnight fasting. The rats exhibited diabetes after 5 days (i.e., fasting blood glucose concentration, >300 mg/dl) and were selected for the treatment with *Jatropha gossypiifolia* dissolved in water. Assessment of Diabetes by Estimation of Blood Glucose was estimated by the method of Trinder (1969) using reagent kit. The ethanol extracts at 200 mg/kg dose level registered 170.20, mg/dl at the end of 11 days of the study, while it was 142.51, mg/dl with dose level of 400 mg/kg. However, at the same day the standard drug glibenclamide at 5mg/kg showed 102.7 mg/dl of BGL. Study results reveals that on treatment with crude ethanolic extract at dose level 200 and 400 mg/kg reduce the BGL to an extent of 56.10% and 64.13% respectively at the end of 11 days study. However, at the same day the fasting mean BGL of diabetic rats treated with standard drug glibenclamide showed a reduction of 73.11% as compared with diabetic control (positive control) rats. Study results reveals that on treatment with crude ethanolic extract at dose level 200 and 400 mg/kg reduce the BGL to an extent of 56.10% and 64.13% respectively at the end of 11 days study. The ethanolic fraction and hexane fractions at 150 mg/dl showed 140.23, 139.26 mg/dl total triglyceride level at the end of 21-day of the study. The ethanolic extract of *Jatropha gossypiifolia* give significant anti-diabetic activity as per observed data.

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