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Histomorphological Changes of Heart and Kidney of An Alloxan Induced Wister Rats Treated with Gongronema Latifolium Leaf Extract

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Abstract:

Diabetes causes a variety of changes in the heart and kidney tissues. The objective of this study was to determine the histomorphological alterations in the heart and kidneys of rats treated with leaf extract from Mongronema latifolium after being induced with alloxan. This leaf extract was made using the maceration extraction process. Five groups, each consisting of twelve rats, were created from sixty (60) seemingly healthy rats of both sexes.Normal group as control group 1, Alloxan induced was group 11, Group 3, 4 and 5 were the treatment group. Rats from Group 2 to 5 were induced with Alloxan at 150mg/kg b.w by intra-peritoneal treatment control group 1 rats were not induced. The treatment of the rats in group 3, 4 & 5 commenced when the rats confirmed of being diabetic G. Latiofolium extract were administered in 3 doses namely – 200mg/kg, 600mg/kg and 800mg/kg body weight for 6 weeks. The result showed significant increase ($P<0.05$) of the glucose in Alloxan induced group (II) as when compared with the Normal control of Group (I). On treatment with the G.Latifolium extract of 200mg.kg, 600mg/kg, and 800mg/kg, there were remarkable significant decrease ($P<0.05$) of TC, TG, LDL and HDL as when compared with normal control. Nevertheless, administration of Latifolium extract markedly counteracted the deleterious alterations noted in rats of group two that were induced by Alloxan (2). Significantly favorable and restorative improvements were noted in groups 4 and 5. When compared to the modificationsin group two (2), the difference shown in group three was not as noticeable. This study demonstrated that Gongronema Latifolium leaf extract enhanced and had healing effects on cardiac cardiomyocyte cells, as well as on the kidney glomeralus's distal and proximal convoluted tubules. Furthermore, the blood level of hyperglycemia decreased dramatically ($P<0.05$).

Keywords: histomorphological , heart,kidney , alloxan , wister rats , gongronema latifolium, leaf extract.

Introduction

It is currently discussed worldwide to reduce the rise in blood glucose by half by 2025. Elevated blood glucose is a chronic metabolic condition that damages the heart, blood vessels, eyes, kidney, and nerves [1]. separated into two primary categories: Type 1- Insulin Dependent Diabetes Melitus (IDDM), which is primarily diagnosed in infants, and Type 2- Non-Insulin Dependent Diabetes Melitus (NIDDM), which is diagnosed in adults. An estimated 422 million people worldwide are estimated to have diabetes, with the majority residing in low- and middle-income nations. The disease is directly responsible for 1.5 million fatalities each year [2]. Over the past few decades, the prevalence of diabetes and its recurrence have increased. The presence of persistent hyperglycemia caused by insufficient insulin secretion from the pancreatic islet of Langerhans beta cells, aberrant insulin action on target tissues, or a combination of the two is known as increased blood glucose, a metabolic disease [3].

This illness is brought on by insufficient or nonexistent insulin production by the pancreas. An imbalance between the body's intake of glucose and its efficient usage by the cells in different organs is

reflected in an abnormal blood sugar level [4]. Because prolonged hyperglycemia causes numerous changes in vascular tissue that may both start and exacerbate various diabetes problems, such as atherosclerosis, it is now understood to be the main causal factor in the pathogenesis of diabetic complications [6]. Worldwide demand for diabetic mellitus treatment is currently very high [8]. In an experimental model of diabetes, there is experimental evidence that certain medicinal herbs have hypoglycemic effects [9].

Momordicacharantia fruit extracts that are bitter [10] The 2009 categorization of Angrosperm Phylogenetics SPIII (AGPIII) uses the ancient family name Asclepeiadaceae.Gongronema Latifolium (A sclepiadceae) is a widespread to plant in the tropical and subtropical region of Africa. It is locally called utazi and in south western part-Arokeke [11]. It is also found in south America and some part of North and South Asia. It has been recognized as an African Traditional remedy for some health care like hypertension, diabetes mellitus, intestinal disorder etc. [12] . In the United States Gongronema Latifolium leaves are said to have been incorporated into a tea blend that is mainly marketed to diabetes patients. [13]

Several pharmacological activities of G.L extracts have been studied and reported which provide experimental support for the empirical ethnopharmacological use of this plant in the folk medicine [14

]Increased blood glucose (diabetes) has become today a major global and public health problem in the developed and developing countries and it is among the leading causes of death in the world. This is a fastest growing metabolic disease in the whole world and also the knowledge of the multi-Heterogenous nature of the disease so does the need for more challenging and appropriate therapies. Diabetes Melitus is one of the most common chorionic diseases and is associated with hyper Lipidemia and co-morbidities such as Obesity and Hypertension [15]

The management of diabetes mellitus is considered a global problem because a successful and effective treatment is yet to be established. Most of the modern anti-diabetes drugs like insulin and oral hypoglycemic agent only control blood sugar levels as long as they are regularly administered and are associated with a number of undesirable effects [16].

Increased blood glucose has been a global problem for decades and non-conventional pharmaco-therapeutic solution observed even with its undesirable adverse effect of the drugs.

There is need for a better convenient and less toxic and affordable options. It is possible traditional anti-diabetic plants like Gongronema Latifolium might provide a better and faster source of new oral hypoglycemic compound for development as simple dietary adjuncts to existing therapies [17]. Considering the medical effect of the leaf of the Gongronema Latifolium and its efficacy either at short term or long-term usage on the histological architecture of the kidney and heart after alloxan necrotic damage. This study was therefore designed to evaluate the possible histological changes of G.L and even the alloxan of G.L on the heartand kidney.

Materials And Methods

This study was carried out in Imo State University Teaching Hospital (IMSUTH) Orlu. It is one of the tertiary hospitals which serves as a referral centre for treatment of cases from Imo State and other neighbouring state in Nigeria.

Study Design

The period of the subject enrolment clarification, treatment and sample collection and the laboratory test determination lasted from June 2023 till date.

Experimental Animal

Sixty (60) mature apparently albino rats of both sexes weighing 110-150g were obtained from the animal home of Imo state University Owerri. The rats were taken to the Morbid Anatomy Dept. at Imo State University Teaching Hospital-Orlu, Imo State. They were at this place for 6 weeks; the rats were kept in properly arranged polypropylene cages with stainless steel top grill having material for selected food. The rats were maintained in 12 hours light and dark cycle at 28°c, well-ventilated environment under natural condition for these 6 weeks, prior to the commencement of the experiment. Standard chief of grower's fresh food from Gee Ric Nigeria were given to them, clean drinking water was always available to the rats, throughout this rat experimental period.

Maceration Extraction Method

The crude extract was obtained by using a sublet assembly from Uni Calabar where Mongronema Latifolium powder was extracted with 100% ethanol with all the (colouring) matter is extracted, the obtained crude oil extract was concentrated to semisolid mass by evaporating ethanol.

Phytochemical Analysis of Bioactive Substances That In Mongronema Latiofolium Extracts A Medical Plant

S/N	*CONSTITUENTS*	*CRUDE EXTRACT*	*METHANOL EXTRACT*
1.	Saponnium	+++	+++
2.	Tannins	_	_
3.	Proteins	+++	+++
4.	Carbohydrate	+++	+++
5.	Reducing sugar	_	_
6.	Resins	+++	+
7.	Flavanoids	++	+

8.	Alkanoids	+++	++
9.	Glycosides	+++	+++
10.	Steroids	-	-

Key +++ highly detected

++ moderately detected

notdetected

Experimental Rat in Group

Group of Rats	Treatment	No of Rats
Group 1	Normal control	12
Group 11	Alloxan Induced Rats	12
Group 111	Low Dose G.L 200mg /kg Latifolium Extract	12
Group 1v	High dose 400mg/kg Latifolium Extract	12
GrGroup V	Higher Dose Latifolium Extract	12

The albino rats were kept in separately labeled plastic cages, during the period. They were free with water and standard food, the cages were always clean and feaces removed every morning, their entire body always checked signs of any infections. There were no discharges from nose and eyes etc.

Experimental Design

The 60 albino rats of almost same body weight of 180g were grouped into different cages after undergoing a thorough check:

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a. The date of arrival of animals to Morbid Anatomy IMSUTH.

b. The animal's physical status agility rate and response to immediate environment.

c. Various body weight of each animal and sex.

d. Food and water supply always available

Animal group	*Treatment*
Group 1 ***Normal Control***	Wister Rats of both sexes in this group were given only food and water. No alloxan drug was administered in this group. The hearts and kidney were harvested at the end of the experiment. The weight of the rat noted before harvesting the organs.
Group 11 ***Alloxan induced rats***	Rats in this group were intra puritanically administered with alloxan 40mg/kg daily, 3 times a week and 3 days. The rats were sacrificed at the end and heart and kidney harvested Rats in this group were used as an alloxan control. The weight of the rats noted before sanitary.
Group III	Rats were subjected to alloxan drug 40mg/kg intra-peritoneally a

	week for a week and 3 days. Following induction the rats were treated with 0.2ml low dose of the mongrenema lati folium for 6 weeks orally. Rats were scarified and heart and kidneys harvested. The weight documented before sanitary.
Group IV	Rats were subjected to alloxan drug 40mg/kg intra peritoneally 3 times a week and days. Following induction by alloxan they were treated with 0.6ml/mg of highest dose Latifolinum extract.
Group V	Rats were induced with alloxan drug 40mg/kg intraperitoneally twice a week for 1 week and 3 days. Following this induction, rats were treated with 0.8ml of higher dose of Latifolium extract for 6 weeks Rats were sacrificed and hearts and kidney harvested.

i.Experimental Protocol and Treatment Method

Sources Gongronema Latifolium

Specimen Collection Protocol

The entire experimental rats were derived food for a day before being sacrificed. Being in various groups, they were easily identifiedbefore subjected to either suffocation (Mairo *et al.*, 2014). Before suffocation all their weight were documented.

Macroscopic Examination

Collectionofheartandkidneytissues

On different days of sacrifice, the macroscopic examination of the heart and kidney of each rat was taken.

- Shape of the organs
- Colour of the organs
- Weight of the organs
- Length of the organs
- Softness and or hardness of the organs

Materials Required

a. Weighing machine

b. Wooden board

c. Scaped blade – (disposable)

d. Meter rule

e. Foam

f. Tissue tac plastic cassette

g. Running tap water

Inside the tissue cup-up room, with running tap water, the satocated rat. One by one was pinned down in anatomical position and was dissected with disposable blade and all the necessary macroscopic examination taken. At the end of the cut-up the heart and kidney of each rat of different group got fixed in a 10% formal saline fixation. This is after well package into the plastic cassette well labeled with pencil according to their group. The organs were fixed for 72 hours before processing started.

Tissue Processing

This is the procedure taken to prepare the organs for embedding and sectioning. It involves different stages as follows:

a. Dehydration

b. Clearing

c. Impregnation or infiltration

Dehydration is careful and gradual removal or water from the tissue-cells of the organs. It is done by dehydrating agents like – etharrol, propamol, Iso-propy ethanol, Methanol, etc.

This dehydration taken about 2 hours after alcohol was used here clearing is the sequential removal of alcohol form the inter-tissue space which is about 30 minutes each in 2 changes. Among the clearing agents are, Xylere, chloroturm, Benzene, Seda-wood oil etc.

In this experiment, xylene was used due to its availability and its low toxicity.

Impregnation was done using motten paraction wax of 2 changes.

Automatic Tissue Processor (ATP) was used in this heart and kidney processing

Statistical Analysis

All data are expressed as mean + standard elevation (SD). Camparison of the data from test control groups of animals were analyzed by one way analysis of variance (ANOVA) at the confidence limit of5% and where applicable, least significance (LSD) was used to determine significant results, differences between groups were considered statistically significant at $P < 0.05$.

Result

The rat in normal control group were given only food and water throughout the treatment period .There was no death recorded the histopathology report shows that the kidney's renal capsules were of well distinct nuclei and in their Bowman's space epithelium, tubules appeared normal and the myocytes of the heart tissue of the diabetic control rat showed intercalated disc and interdigitation. The nuclei were centrally placed and no significant change was identified in the micrographic when compared to the non-diabetic rats. At a test dose of 200mg/kg body weight, the heart of diabetic rats showed observable change from the heart tissue of diabetic control rat showed intercalated discs and inter-digitation. The heart muscles

showed some thickness and become hypertrophied with increased treatment of the extract.

Diabetic mellitus was induced in animals of group II by a single interpersonal injection of 150mg/kg body weight of alloxan monohydrate suspended in normal saline after an overnight fatigues. Three days after alloxan injection, diabetes was confirmed using glucose strips. Animal with fasting blood glucose level of 200-260mg/100ml were considered (virtually all) for the study. After ten days, treatment with leave extract started. The rats in the low, high and very high dose were treated with 200mg/kg (0.2mls), 400 mg/kg, 600mg/kg of the Gongronema latifolium.

The group three were treated for 6 weeks, and group 4 were treated for 6 weeks and the rats in group 5 were treated for 6 weeks. There were significant increase ($P<0.05$) of blood glucose in Alloxan induced of group 3 when compared with normal control. Also there were significant increase ($P<0.05$) of this same blood glucose in groups 3, 4 and 5 as well compared with the normal control. At the end of 6 weeks, the kidneys and hearts of all the rats in different group were harvested and fixed in 10% formal saline.

The histological changes of the kidney in group one (1) (normal control) shows normal glomerulus surrounded by the Bormann's capsule proximal and distal convoluted tubules without any inflammatory changes showed delegemated glomeruli infiltration by the inflammatory cells and thickening of the basement membrane.

Proximal convoluted fibulas exhibited oedemation changes with deposition of miscopy saccharine and hyaline substances. All these necrotic features of the proximal and distal convoluted tubules were not found in the group 1, 4, and 5 of the diabetic rat treated with the mongronema latifolium extract, slight necrotic features was identified in G.3, in these groups of diabetic rats treated with G. latifolium extracts there were features of healing of normal glomerulous, absent of inflammatory cells, normal basement membrane and capillaries these features in group 5 of diabetic rats treated with 0.6mls of the extract. Showed higher improvement of decreased mucopolysacharide and hyaline deposit. This was very high decrease in general neurosis of the kidney cells.

In the histology of the heart, the cells of the heart from the control group under the light microscope shows that the nuclei of the cardio-myocytes were single, oval, prominent and centrally located. In the diabetic rats of group ii the histological feature of the cardiac tissues were disturbed in alloxan-induced rats. Oxidative inflammatory histological alterations indicates myocardial injury as deformation of nuclei of cardiomyocytes and disarrangement of cardiac myofibrils. The structural cardiomyocytes changes could be due to the degeneration of the structural protein in mitochondria of the cytoplasm that occurred in protein degradation related to diabetes. The healing in the 0.6ml group 5 alloxan treated with G. Latifolium is highly prominent.

There was weight gain in the group 1, 4 and 5 of alloxan induced,G. Latifolium leave extract but slightly different in G.3 almost of the same weight, considerably though not higher than the normal control rats weights as the weight of the group II. Alloxan-induced untreated group is lower than that of the control. The weight of the rats of group ii. Alloxan group treated with 0.2mls of G. Latifolium extract was slightly higher than the alloxan untreated group with a slight difference.

Photomicrograph For The Heart

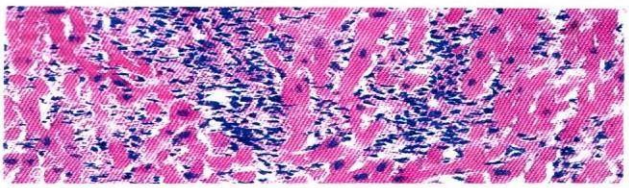


Plate 4.1.a: Heart Normal Control H&E STAIN x400

GROUP 1 CONTROL NORMAL

Tissue cells were normal, no inflammatory cells, no cell alteration, no disagreement of cardiac myofibrils. There is no damage

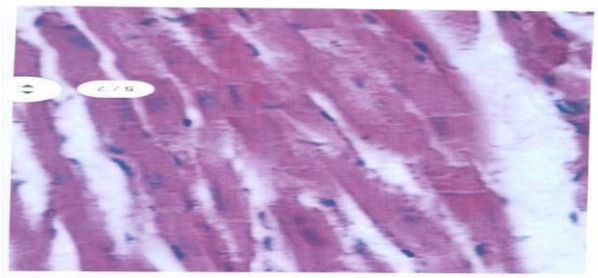


Plate 4.1.b: H&E STAIN x400

GROUP 2 ALLOXAN INDUCED RATS

In this group, due to the Alloxan drug, induction, there were heavy inflammation and cell alterations. There were damage to cardiomyocytes of the heart. High presence of necrosis present. There were abnormalities when compared with the normal control.

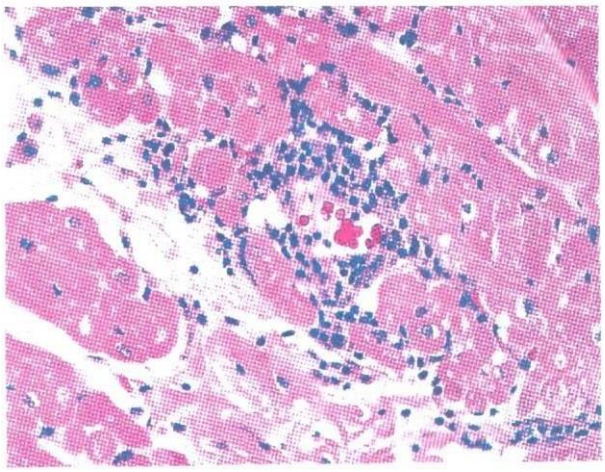


Plate 4.1.c: H&E STAIN x400

GROUP 3 ALLOXAN INDUCED RATS TREATED WITH MONGRONEMA LATIFOLIUM LEAF EXTRACT (200mg /kg)

Low Dose

In this group, after Alloxan induction, they were treated with 200mg/kg of mongronema Latifolium. There were no severe necrosis when compared with the group II of Alloxan induced group. Some areas of the cells are still noticeably damage though not as seen in group II.

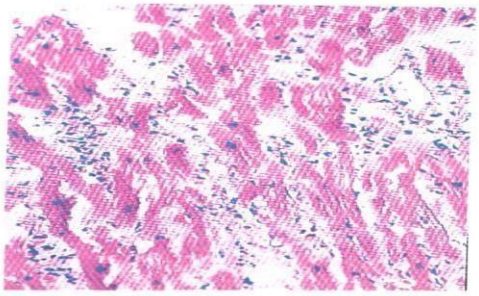
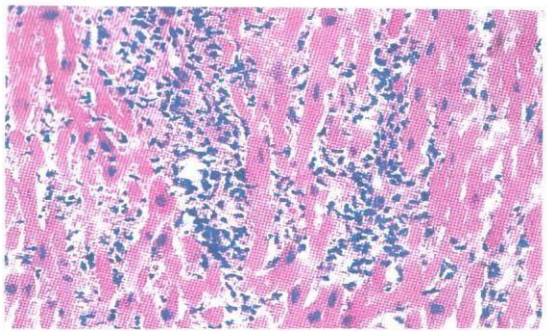


Plate 4.1.d: H&E STAIN x400

GROUP 4 ALLOXAN INDUCED RATS TREATED WITH 600mg/kg OF MONGRONEMA LATIFOLIUM LEAF EXTRACT

Medium Dose

In this group of (IV) after the Alloxan induction, there was treatment with 600mg/kg of Mongronema Latifolium Extract. The healing was very significant when compared with group II and III. The cardiomyocytes are almost normal when compared with group 1. There was no nuclear / cytoplasmic ratio alteration



Group 5 Alloxan Induced Rats Treated With 800mg/Kg Of Mongronema Latifolium Leaf Extract
Higher Dose

This group is (V). In this group alloxan was induced before administration of extract of Mongronema Latifolium. The dose in this group of very high is 800mg/kg. There was no aberration, no necrosis and injury to the cardiomyofibrils. There was significant healing when compared with the rats in group II.

PHOTOMICROGRAPH OF KIDNEY

4.2a

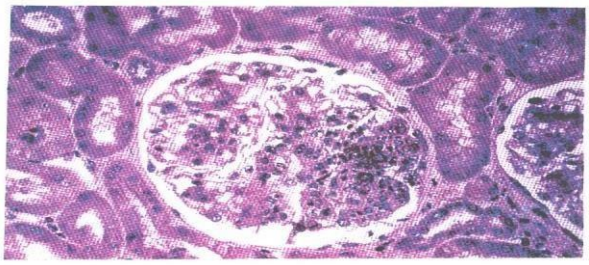


Plate 4.2.a: H&E STAIN x400

Group 1 (Normal Control Rats)

Group 1 of normal control in kidney.

The group was only feed with food and water, no Alloxan drug. The Bonman's capsulse, distal and proximal convoluted tubules were normal without any injury.

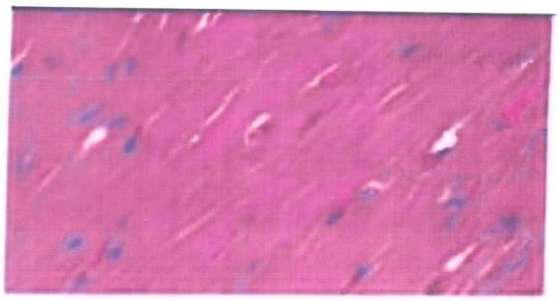


Plate 4.2.b: H&E STAIN x400

Group 2 Alloxan Induced Rats.

In this group, the rates were induced with Alloxan drug. Heavy necrosis identified here. There were abrasions in the distal and proximal tubules, there was significant injuries when compared with group (II). The nephrotic cells were heavily injured.

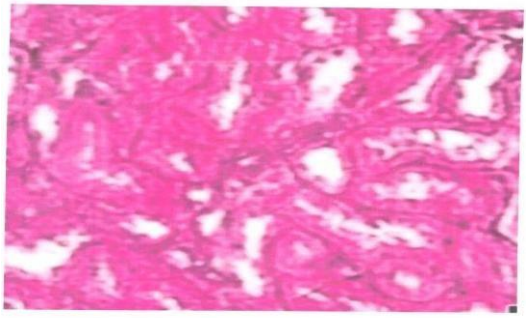


Plate 4.2.c: H&E STAIN x400

Group 3 (Low Dose)

In this group III of low dose, (600mg/kg). These group was of rats were treated with mongronema Latifolium leaf extract after Alloxan induction drug. There was healing though not very significant when compared with the rats in group I. The necrosis were not as in group II.

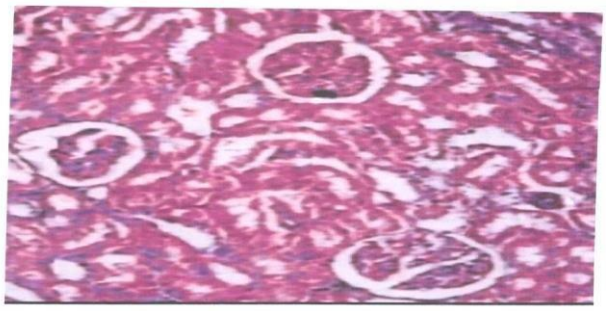


Plate 4.2.d:H&E STAIN x400

Group 4 (Medium dose)

In this group IV, there was treatment with 600mg/kg of mongronema Latifolium Leaf Extract after Alloxan induction. There was significant healing features were signifcant and noticeable when compared with the rats in group II. The Bowman capsule and convoluted tubules were free from inflammation and necrosis.

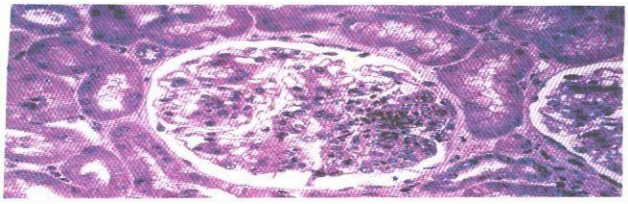


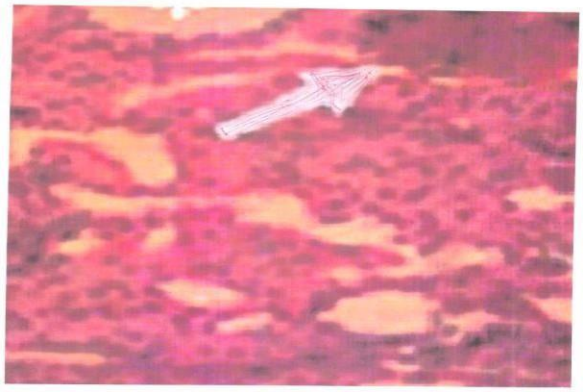
Plate 4.2.e: H&E STAIN x400

Group 5 (Very High Dose of 800mg/kg)

In this group V, the rats here were treated with 800mg/kg of the extract after alloxan induction. There was healing normal placement of nuclear / cytoplasmic ratio. No inflammation present as when compared with the rats in group II.

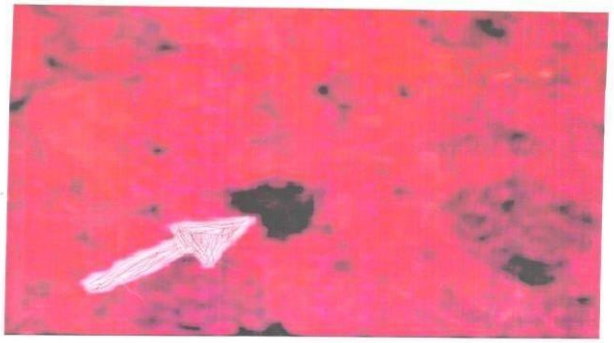
VEOHEOFF & WEIGHERT VANGIESON STAIN(x400)

Group 4 (600m



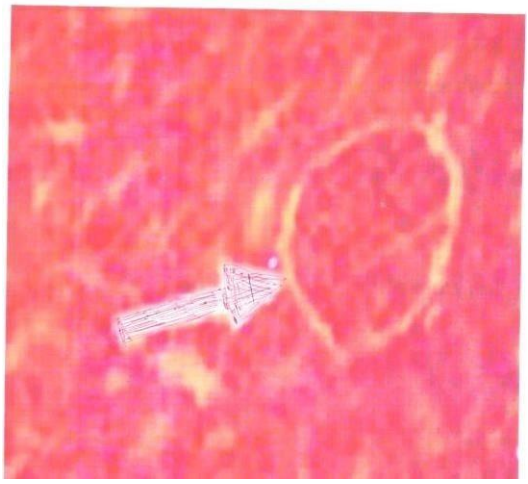
VEOHEOFF & WEIGHERT VANGIESON STAIN(x400)

Group 1 (200mg/kg)



VEOHEOFF & WEIGHERT VANGIESON STAIN(x400)

Group 2 (Alloxan Drug Induced Rats)



Group 5 (800mg/kg)

Histopathological Scoring of Rat heart after Alloxan induction with plant extract treatment.

Group	No. Of Rats	Histopath. Report After Induction	No of Death Of Rats	Histopath. Report After Treatment, 6th Week
	12	Nulei of cardiomyocyte significant prominent and centrally placed.	None	Established central nucleus and central located nuclear / cytoplasmic cells.
Alloxan induction group 2	12	Found were oxidation inflammatory and cell alteration dis arrangement of cariac myofibroide.	None	Severe inflammation, deformation of nuclei of cardiomyocytes and myocardial injuries observed.
Mongronema Latifoliumlow dose	12	There was not clearly seen of any changes from groups 2.	None	Mild- inflammation careful observation revealed healing of myocardial injuries and deformed nucleus.
Medium dose (High dose)	12	Disappearance of the inflammatory cells and clearly seen cardiomyocyte	None	Visible improvement of healing of this myocardial injuries
Higher dose	12	No aberration seen reappearance of centrally placed muscleus presence of cardian mytobrils	None	Total healing of deformed injuries cells.

Histopathological scoring of Rat kidney after Alloxan induction with plant extract Treatment.

	No. Of Rats	Histopath. Report After Induction	no of death of rats	Histopath. Report After Treatment. 6th Week
Normal control	12	Normal glomerulus surrounded by normal Borromas's capsule.	None	No inflammatory changes of the proximal and distal tubules
Alloxan induction group 2	12	There was degerated glomerulus infiltrated inflammatory cells.	None	There was heavy aberration with thickening of basement membrane
Gongroenema Latifolium low dose	12	Degenerated glomerulus features still present proximal distal tubules observed	None	Gradual absence of the necrotic features observed
High dose	12	Necrotic features of proximal ad distal tubules repaired not clearly observed	None	Repair of the nephrotic features observed.
Higher dose	12	Features of basement membrane and capillaries	None	Complete repair of inflammatory cells. Very high improvement and decreased mucophoysachride and hyaline deposit

Body weight of Rats before and after Treatment

Weight variation in grams

Group	Treatment	Week 1	Week2	Week 3	Week 4	Week 5	Week6
Consist 1 control	Control	156.00 ± 1.02	165.20 ± 100	180.00 ± 1.20	200.00 ±0.67	210.00 ±1.70	220.00 ±1.86
II	Alloxan induced	160.00 +1.02[a]	165.00 +1.03[a]	162.00 +1.00[a]	162.00 +1.02[a]	161.00 +0.25[a]	158.00 +0.58[a]
III	Alloxan induced treatment with G.L Extract (Low Dose)	168.01 ±2.00[ab]	170.01 ± 2.01 [ab]	172.08 ±2.00[ab]	172.06 ±1.25[ab]	173.04 ±2.00[ab]	175.04 ±1.25[ab]
IV	Alloxan induced + Treatment High Dose	168.00 ±2.04[ab]	178.00 ±2.60[ab]	180.00 ±3.00[ab]	186.08 ±3.40[ab]	200.00 ±3.40[ab]	230.00 ±2.04[ab]
V	Alloxan induced + Treatment Higher Dose	167.003 ±3.40[ab]	176.00 ±3.20[ab]	182.00 ±3.00[ab]	188.00 ±3.62[ab]	220.00 ±3.80[ab]	220.00 ±3.00[ab]

Values are expressed on Mean +SD, n=12, where n = number of rats in each group
aValues are significantly difference from control (P<0.05)
bValues are significantly difference from diabetic alloxan induced group (P<0.05)
G. Lat = Gongronema Latifolium.

Effect of Gongronema Latifolium Extract on Serum glucose level of control, Alloxan induced and Alloxan Induced with Gongronema Lat. Treatment.

Group	Treatment	Glucose (control / 2) mmol/L
I	Control	4.26 ± 0.52[ab]
II	Diabetic induced with Alloxan Drug	8.00 ± 0.42[ab]
III	Diabetic induced + Gongronema Latifilium Extract (Low Dose) (200mg/kg)	7.00± 0.42[ab]
IV	Diabetic Induced + Extract Treatment (600mg/kg) (High Dose)	6.40± 0.60[ab]
V	Diabetic induced + Gongronema Latifolium Extract (Higher Dose) (800mg/kg)	5.12± 0.46[ab]

Values are on Mean +SD, n=12, where n = number of rats in each group
[a]Values are significantly difference from control (P<0.05)
[b]Values are significantly difference from diabetic alloxan induced group (P<0.05)
G. Lat = Gongronema Latifolium

Group	Treatment	Lipid Profile (Mmol/L)			
		TC	TG	LDL	ADL
I	Control	5.46±0.23	3.16±0.20	1.46±0.21	2.50±0.15
II	Diabetic induced with Alloxan Drug	6.40±0.34[ab]	4.15±0.20[ab]	3.12±0.36[ab]	1.30±0.38[ab]
III	Diabetic induced + Gongronema Latifilium Extract (Low Dose) (200mg/kg)	5.80±0.36[ab]	3.6±0.24[ab]	2.20±0.20[ab]	2.48±0.30[ab]
IV	Diabetic Induced + Extract Treatment (400mg/kg) (High Dose)	5.10±0.36[ab]	2.10±0.24[ab]	1.15±0.24[ab]	3.00±0.36[ab]
V	Diabetic induced + Gongronema Latifilium Extract (Higher Dose) (800mg/kg)	4.50±0.28[ab]	1.20±0.01[ab]	0.64±0.62[ab]	3.60±0.30[ab]

Values are on Mean +SD, n=12, where n = number of rats in each group
[a]Values are significantly difference from control (P<0.05)
[b]Values are significantly difference from diabetic alloxan induced group (P<0.05)
G. Lat = Gongronema Latifolium

Discussion

Insulin production and receptor interactions are disrupted in diabetes mellitus, a complex illness affecting multiple organs due to hereditary and environmental causes [18]. Diabetes is one of the main causes of death worldwide and is frequently linked to co-morbidities including obesity and hypertension [19]. It also poses a significant risk to public health.Recent research suggests that diabetes may be a separate risk factor for cardiac failure because it is associated with a higher frequency and severity of heart dysfunction and lesions [20]. The molecular causes of decreased insulin production have been linked to oxidative stress, as evidenced by the lower cardiac catalase activity observed in diabetic rats, which is responsible for free radical detoxification [20]. Important organs sustain severe damage as a result of metabolic imbalances brought on by diabetes, underscoring the tissue's vulnerability to oxidative stress [21].

The study's results show a notable weight loss in untreated diabetic rats, consistent with WHO reports on rapid weight loss in diabetes leading to [22]. Prolonged hyperglycemia is recognized as a major causal factor for diabetic complications, promoting changes in vascular tissues and accelerating atherosclerosis [23]. Treatment with G. Latifolium leaf extract significantly reduced blood glucose levels in diabetic rats, highlighting its potential antidiabetic effects [24, 25].
Additionally, the extract showed improvement in serum lipid profiles, reducing elevated levels of LDL, triglycerides, and cholesterol while raising HDL in diabetic rats. Histological analysis of the cardiac tissues of diabetic rats showed structural abnormalities that were progressively restored upon administration of G. Latifolium extract, indicating a possible protective function against oxidative damage.
Rats with diabetes produced by alloxan showed increased kidney weight and histological damage, which is indicative of diabetic nephropathy. Improvements in kidney histology following treatment with G. Latifolium extract suggest a possible therapeutic benefit for diabetic nephropathy.

Conclusion

Different dosages of Gongronema Latifolium leaf extract preserved the histological integrity of the kidney and heart while boosting antioxidant enzymes and lessening myocardial deterioration. Potential antioxidant qualities in the extract helped to lessen oxidative damage to kidney microstructures. More research is necessary, especially at larger dosages.

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