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RESEARCH ARTICLE
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ESTIMATE OF ETHANOLIC EXTRACT OF YOUNG SHOOTS OF *BAMBUSA ARUNDINACEA* FOR ANTIOXIDANT & ANTIDIABETIC ACTIVITIES

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Abstract

The Indian tribes of northwestern India have long employed the Poaceae plant *Bambusa arundinacea* to treat diabetes. Antioxidant substances contribute to good health by countering reactive oxygen species (ROS), which are involved in a variety of disease processes such as insulin resistance, atherosclerosis, cardiovascular disease and coronary heart disease. Diabetes Mellitus is biggest problem in now days in World and a big challenge for researcher and scientist, to overcome this problem by various medicines but not achieve good performance regarding treatment of diabetes. Researcher main focus on phytochemicals used in the treatment of diabetes with less adverse effect. The goal of the current study was to assess the young shoot of *Bambusa arundinacea*'s toxicity, antioxidant activity (In vivo) and antidiabetic activity (In vivo) in rats that had been given alloxan-induced diabetes. Rats given BAEE treatment demonstrated antioxidant (In vivo) qualities according to SGOT, SGPT, and ALP assessments. BAEE demonstrated the presence of b sitosterol and gallic acid. In alloxan-induced diabetic rats, administration of BAEE at 200 and 500 mg/kg resulted in a significant decrease in fasting blood glucose, whereas plasma insulin levels were raised in comparison to diabetic control. Comparing both doses to glibenclamide-diabetic rats revealed that they were equally effective. This study suggests that BAEE have both in vivo antidiabetic and in vivo antioxidant properties. The presence of putative antioxidants may be the cause of the overall action.

Conclusion- Ethanolic extract of young shoots of *Bambusa arundinacea* shows dose dependent therapeutic efficacy for anti oxidant and anti diabetic activity. Efficacy increases with increasing the dose.

Introduction

Herbal medicine has a long history in the Middle East. Ancient literature from Mesopotamia, Egypt, and India mention and provide examples of the use of numerous medicinal plant products. The most significant and well-preserved Egyptian manuscript, the Ebers Papyrus, dates to roughly 1500 B.C., but contains material from much earlier. There are 876 prescriptions in it, made up of more than

500 distinct ingredients, many of which are plants. To combat oxidative stress, plants have evolved a variety of defense mechanisms known as antioxidant systems. Numerous antioxidants, such as ascorbic acid, gluthione, uric acid, tocopherol, carotenoids, and (poly)phenols, are present in these systems. These antioxidants differ in terms of content, mechanism, and site of action[(1)]. Antioxidants play important roles in inhibiting tissue damage in a variety of human disorders, including inflammation, cancer, and atherosclerosis, as well as unfavorable changes in food's flavor and nutritional value. Furthermore, a unique function to produce multifunctional medications can be the presence of antioxidant activity in addition to pharmacological qualities like antidiabetic, ant carcinogenic, and anti alzheimeric activities. Finding natural antioxidants with minimal to no negative effects for use in preventative medicine and the food sector has garnered more attention recently on a global scale[(2)].

One of the most prevalent and dangerous metabolic diseases, noninsulin-dependent diabetes mellitus, also known as type II diabetes mellitus, is characterized by unusually high blood glucose levels, or hyperglycemia, brought on by deficiencies in insulin secretion, action, or both[(3)]. The main source of blood glucose is the hydrolysis of dietary carbohydrates like starch. Inhibitors of α-glucosidase and pancreatic α-amylase could potentially cure diabetes, HIV, cancer, Alzheimer's disease, and other conditions because these enzymes are essential for the digestion of carbohydrates and the processing of glycoprotein[(4)]. Acarbose, miglitol (a derivative of deoxynojirimycin), and voglibose are among the inhibitors that are frequently used in clinical settings in conjunction with diet to help patients control their blood glucose levels[(5, 6)].

It remains crucial to find novel α-glucosidase inhibitors for continued drug development in order to reduce or eliminate the negative effects of these medications and to offer additional drug possibilities. Glucosidase inhibitors derived from natural sources have been the subject of numerous attempts to treat diabetes in recent years[(7, 8)].

One of the main theories put up to explain how hyperglycemia triggers the start of diabetic problems is that it results from a disruption in the balance between antioxidant defense and reactive oxygen species capability[(9-11)]. Consequently, scavenging different reactive oxygen species and preventing diabetes mellitus can be achieved through the use of antioxidant medicines. In this study, we looked into the in vivo antioxidant and antidiabetic properties of *Bambusa arundinacea* young shoots.

Bambusa arundinacea

Bamboo is among the world's most valuable plant resources. *Bambusa arundinacea* is a graceful spinous bamboo found in moist parts of India, up to an altitude of 1,250m, particularly near river banks; native to South-East Asia, it is also cultivated in the plains of North-West India, such as Rajasthan, as well as on the hills of Andhra Pradesh, Tamil Nadu, and Karnataka. Thorny tree with many stems tufted on a strong rootstock that grows up to 30 miters. high; culms 15-18 cm across; nodes prominent, the lower generating horizontal almost naked shoots armed at the nodes with 2-3 stout recurved spines; internodes up to 45 cm long. Rhizomes are short, firm, and twisted; culms are thick, reaching heights of 24-30m and diameters of 15-17 cm. Flowers in large panicles, sometimes covering the entire culm; caryopsis oblong, 5-8mm long, grooved on one side. A bamboo culm is made up of hollow junctions (in most bamboo) and solid nodes that provide structural stability to the plant[(12-15)].

Selection of the Plant for Present Study

When selecting a plant for pharmacological activities, four basics methods are usually followed:

a) Random choice of plant species
b) Choice based on ethnomedical use
c) Follow up of existing literature on the use of the species

d) Chemotaxonomic approaches

Materials & methods

Material

Test sample

Bambusa arundinacea were collected in the month of September 2021. Young shoots of *Bambusa arundinacea* were used to carry out the experimental work[16].

Chemical and Consumables

Injections of ketamine, xylazine, picric acid, Savlon, ethanol, halothane, diethyl ether A 10% formalin solution Glycerin, Safranin Dilute ferric chloride, eosine, methylene blue, HCl, phenol, iodine solution, Molisch's reagent, Benedict's reagent, Barfoed's reagent, Fehling solution, Mayer's reagent, Dragondroff's reagent, Picric acid, nitric acid, ferric chloride, potassium dichromate, ninhydrine, chloroform, and ammonia solution Copper sulphate, sodium hydroxide, Millon's reagent, sulphuric acid, lead acetate, acetone, benzene, paraffin wax, xyline, urethane, etc. Biocon Pvt. Ltd., based in Bangalore, India, supplied insulin. In contrast to common chemicals, which Micro Technologies purchased in Ambala Cantt, Haryana and were analytical quality, all organic solvents were spectral grade.

Equipment's or Apparatus:

Glucometer, anesthesia chamber, polypropylene cages, digital balancing machine, oral feeding needles, common glass wear, The necessary surgical instrument, Microscope, Tissue Processor, Microtome, Muffels Furnace, Hot Air Oven, Moisture Meter, pH meter, Chromatography Camber, Soxhlet assembly, Clavinser assembly, UV/VIS Spectrophotometer, SGOT, SGPT ALP kits, and so on.

Animals

The investigation was done out on Albino Wistar rats weighing between 120 - 250 grams. They are collected from the animal home of B.N. College of Pharmacy in Udaipur, Rajasthan. The experimental protocol has been authorized by the IAEC of B.N. College of Pharmacy.

Strain Rat of albino Wistar
Weight range 120 - 250 grams
Age Range 2 - 3 month
Gender Both

Housing condition

Animals were housed in clear propylene cages with a 12/12 light-dark illumination pattern. The animal home is well ventilated, with proper humidity and temperature.

Methods

Pharmacognosy Study

The gathered sample was examined organoleptically using the naked eye and a magnifying lens, and pharmacognostical findings such as taste, odor, and color were noted.

Microscopy of powder

Powder microscopic examination of medicinal plant materials is required for the identification of broken or powdered materials, and the specimen must be processed with chemical reagents. Microscopy examinations do not always offer complete identification, but when combined with other analytical procedures, they can frequently provide vital supporting evidence. Comparison with a reference material will frequently uncover properties not stated in the specifications, which may otherwise be attributed to alien matter rather than regular elements[17].

Procedure

To examine the powder's characteristics, take an appropriate amount of sample and add several chemical reagents to a slide, then warm over a low flame for a short period of time. Put a drop of glycerin on the slide, cover it with a cover slip, and examine it under a microscope. The chemical reagents employed to dye the powder samples were as follows. Safranin, Dilute Ferric Chloride, Eosine, Methylene Blue, HCl, Phlorogucinol, and Iodine Solution[18].

Physiochemical Analysis[19-21]

Determination of Moisture Content

Water retention capacity of a sample is measured by its moisture content; a higher moisture content suggests that the sample might be unstable. For five hours, a weighted sample weighing five grams of medication was baked at 105^0C in order to measure its moisture content. Up until it became consistent and there was no longer any change, the sample's weight was determined every 30 minutes. Weighing this sample came after an hour of room temperature cooling in a desiccator.

Determination of pH

The pH value represents the acidity or alkalinity of an aqueous solution.

Determination of Extractive values

Any crude medicine extracted using a specific solvent produces a solution with various phytoconstituents; this is known as the gravimetric analysis (Maceration Process). The type of medication and solvent utilized determines the phytoconstituents' makeup in that specific solvent.

Determination of Total Ash

The purpose of the total ash method is to quantify the total amount of material that remains after ignition. This comprises both non-physiological ash, which is the remains of outside materials (such dirt and sand) sticking to the surface of the plant, and physiological ash, which is made from the plant tissue itself. The silica crucible was thoroughly cleaned, allowed to air dry, identified using glass pencils, and then regularly weighed. The silica crucible held five grams of powdered drug samples. A thin layer of the medication was equally distributed. After being placed in a muffle furnace, this crucible was ignited at 450°C for at least six hours, or until the ash was completely free of carbon. After the crucible containing the ash was allowed to cool in desiccators, its weight was measured consistently. It was estimated to find the proportion of ash in relation to the air-dried medication.

Determination of Acid insoluble Ash

Using 25 milliliters of 2M hydrochloric acid, boil the entire amount of ash for five minutes. Gather the insoluble material in a Gooch crucible or on ashless filter paper. Rinse with hot water, light, let cool in a desiccator, and weigh. Determine the acid-insoluble ash percentage using the medicine that has been air dried as a reference.

Determination of Water soluble Ash

Placed the entire amount of ash in a Gooch's Crucible or on ash-less filter paper, and boiled it for five minutes with 25 milliliters of water. Use hot water to wash, then ignite at a temperature of no more than 450^0C for 15 minutes. Calculate the difference in weight between the ash and the insoluble matter to determine the amount of water-soluble ash. With respect to the air-dried medication, determine the percentage of water-soluble ash.

Phytochemicals Analysis

Plant compounds with protective or illness-preventive qualities are known as phytochemicals. Two classes of metabolites are produced by plant cells: primary metabolites, which are directly involved in growth and metabolism (carbohydrates, lipids, and proteins); secondary metabolites, which are

not involved in metabolic activity but function as defensive chemicals (alkaloids, phenolics, sterols, etc.).

Qualitative analysis of extracts to evaluate general phytochemical profile[22]

Carbohydrates test

1. Molisch's
2. Benedict's
3. Barfoed's
4. Fehling solution's
5. Red Ruthenium's
6. Starch's

Proteins & Amino acids test

1. Biuret's
2. Millons's
3. Xanthoprotic's
4. Ninhydrin's

Oils & fats test

Spot's

Heavy metals test

Alkaloids test

1. Mayer's
2. Dragondroff's
3. Wagner's
4. Hager's

Glycosides test

For Cardiac glycosides

Legal's
Killer-Kilani's

For Anthraquinones glycosides

Borntragor's

For Cyanogenic glycosides

Ferriferrocyanide's

Tannins & Phenolic acids test

Vanillin Hydrochloride's
Ferric Chloride's

Flavonoids test

Shinoda's
Zinc Hydrochloride's Reduction

Saponins test

Foam's

Phytosterols test
Liebermann Burchard's
Lignin's
Phloroglucinol-HCl's

Thin Layer Chromatography[23]
Thin layer Chromatography is a technology for separating and identifying chemical constituents. Thin-layer chromatography is a technique in which a solute is distributed between two phases: a stationary phase that acts via adsorption and a mobile phase that takes the form of liquid. An adsorbent is a thin, uniform layer of dry finely powdered substance placed to a glass, plastic, or metal sheet or plate. Glass plates are most usually used. Separation can also be done through partition or a mixture of partition and adsorption, depending on the type of support, its preparation, and use with various solvents.

Observing spots of comparable R_f value and almost equal magnitude obtained with an unknown and a reference sample chromatographed on the same plate can aid in identification. A visual comparison of the size and intensity of the spots is typically used for semi-quantitative estimate.

R_f Value
Each spot's distance from the place of application was measured and recorded, and the Rf value was computed by dividing the distance travelled by the spots by the distance travelled by the front of the mobile phase.

Calculation of R_f Value

$$\frac{\text{Distance travelled by solute from origin line}}{\text{Distance travelled by solvent from origin line}}$$

Acute oral toxicity study
Toxicological observations for a crude extract of *Bambusa arundinacea* are presented. All behavioral observations were normal, and the prescribed medicine dose was deemed safe. Hematological and histopathological analyses are tabulated. According to hematological and histological studies, the prescribed amount is safe, with no morbidity or death seen. There were no alterations identified in hematological and histological observations[24].

Evaluate the antioxidants activities (*In vivo*) of young shoots of *Bambusa arundinacea*[25]
Thioacetamides Induce acute livers injuries
Twenty-five male Wistar rats were divided into five groups. The first group served as a normal control, with saline administered orally, while the second group served as a toxicant control. The third group received Silymarin (25 mg/kg i.p.) as normal treatment. The fourth and fifth groups were given Ethanolic Extract orally in doses of 100 and 200 mg/kg daily, respectively. On the seventh day, all groups except the normal control group were given a single dose of thioacetamide (100mg/kg s.c). After 48 hours of Thioacetamide administration, blood samples were taken through the retro-orbital plexus for biochemical examination, and the rats were killed under light ether anesthesia. Liver samples from all groups were stored in 10% neutral buffered formalin and forwarded for histopathological examination.

Experimental designing (Grouping)
1: Controls (Salines)
2: Thioacetamides 100mg/kg, s.c.
3: Silymarins 25mg/kg. i.p
4: Ethanolic extract of *Bambusa arundinacea* young shoots (100mg/kg)

5: Ethanolic extract of *Bambusa arundinacea* young shoots (200mg/kg)

Estimation of biochemicals[26]

1.) SGOT

Procedure

1. Two test tubes were labeled as blank (B) and test (T).
2. 0.5 ml of buffered substrate in each test tube was added.
3. These test tubes were incubated at 37ºC for 3 minutes.
4. 0.1 ml of serum in test tube labelled as test was added.
5. The test tube was mixed well and incubated at 37ºC for 1 hr
6. 0.5 ml of DNPH colour reagent in test tubes was added.
7. Test tubes were mixed well and allowed to stand at room temperature for 10 minutes.
8. 0.1ml of distilled water in test tube labelled as blank was added.
9. 5.0 ml of working NaOH solution in test tubes was added.
10. The test tube was mixed well and allow to stand at room temperature for 10 minutes.
11. Absorbance of test against blank on UV spectrophotometer at 505± 10 nm was read.
12. Calculation: Absorbance of test from the calibration curve plotted earlier was read.

2.) SGPT

Procedure

1. Two test tubes were labeled as blank (B) and test (T).
2. 0.5 ml of buffered substrate in each test tube was added.
3. These test tubes were incubated at 37ºC for 3 minutes.
4. 0.1 ml of serum in test tube labelled as test was added.
5. The test tube was mixed well and incubated at 37ºC for 30 minutes
6. 0.5 ml of DNPH colour reagent in test tubes was added.
7. Test tubes were mixed well and allowed to stand at room temperature for 20 minutes.
8. 0.1ml of distilled water in test tube labelled as blank was added.
9. 5.0 ml of working NaOH solution in test tubes was added.
10. The test tube was mixed well and allows to stand at room temperature for 10 minutes.
11. Absorbance of test against blank on UV spectrophotometer at 505± 10 nm was read.
12. Calculation: Absorbance of test from the calibration curve plotted earlier was read.

3.) ALP

Procedure

1. Four test tubes were labeled as standard, control, blank and test.
2. Distilled water 1.05 ml in blank test tube was added.
3. 1 ml distilled water in remaining test tube was added.
4. 1 ml buffer reagent was added in all the four test tubes.
5. 0.10 ml substrate reagent was added in all the test tubes.
6. They were mixed well and allowed to stand at 37^0C for 3 minutes.
7. 0.05 ml of serum was added in the test tube labelled as test.
8. 0.05 ml of phenol Standard was added in the test tube labelled as Standard.
9. They were mixed well and allowed to stand at 37^0C for 15 minutes.
10. 1 ml of colour reagent was added in all the four test tubes.
11. 0.05 ml of sample was added in test tube labelled as control.
12. They were mixed well and the absorbance of the Blank (Abs. B), Standard (Abs. S), Control (Abs. C), and Test (Abs. T) was measured against distilled water at 510 nm.

Histopathology

The liver samples were cut into sections and stained with haematoxylin-eosin (H&E) before being studied under a light microscope (Olympus, Japan) for general histology[27].

Evaluate the antidiabetics activities (*In vivo*) of young shoots of *Bambusa arundinacea*
Alloxans induce antidiabetics activities[28]
Diabetic animals are tested for glucose tolerance. The glucose tolerance test protocol used in normal animals was replicated in diabetic animals, with the inclusion of a diabetic control group and a reference drug (glibenclamide) treatment group. Glibenclamide (5 mg/kg body weight) was utilized as a reference medication. The animals were chosen, weighed, and then marked for individual identification. Alloxan monohydrate in saline (0.9% NaCl) was given intraperitoneally at a concentration of 120 mg/kg b.w. to induce diabetes in 8-hour fasting male albino wistar rats weighing 180-200 g. Following an hour of alloxan administration, the animals were fed ad libitum.

To alleviate the early hypoglycemia phase, a 5% dextrose solution (10 g) was administered in a feeding bottle for one day. Animals having blood glucose levels more than 220 mg/dL at 72 hours were classified as diabetic and included in the study.

Blood samples were drawn from the tail vein one, seven, fourteen, twenty-one, and twenty-eight days following glucose treatment. A glucometer was used to estimate the level of blood glucose.
Number of animals- 25 rats

Experimental designing (Grouping)
1: Normals Controls
2: Diabetic controls (Alloxans monohydrates)
3: Glibenclamides (5mg/kg)
4: Ethanolic extract of *Bambusa arundinacea* young shoots (200mg/kg)
5: Ethanolic extract of *Bambusa arundinacea* young shoots (500mg/kg)

Parameter to be Evaluated[29]
1. Blood glucose level
2. Histopathological parameter

Body Weight Determination
Rats in each group had their body weight measured on the first day of therapy as well as on days 7, 14, 21, and 28 of the intervention. An electronic balance with the correct settings was used to determine the body weight of the experimental rat[30].

Data Analysis
The Statistical Package for Social Sciences application was used to clean, organize, and export the data into a Microsoft Excel spreadsheet for analysis. The way of displaying the data was mean ± standard deviation (SD). ANOVA and post-ANOVA statistical analysis was used to compare the means of diabetic rats treated with saline, diabetic rats treated with standard medications, and diabetic rats treated with plant extract at doses of 100, 200, and 500 milligrams per kilogram of body weight. Every decision was made three times.

Results
Pharmacognostical evaluation
Macroscopic properties
A morphological research of *Bambusa arundinacea* was conducted, and it was discovered that the color of the shoot was green, the odor was mild greasy, and the taste was characteristics.

Microscopic properties
T.S. shows cuticle, epidermis, hypodermis, vascular bundle, ground tissue, & powder microscopy shows calcium oxalate crystals, trichomes, phloem vessels, fibers, starch grains, pitted vessels.

Phytochemical evaluation

1. It shows pH 7.4 in 1% solution and pH 8 in 10% solution.
2. Total ash content was 5%, water soluble ash is 1.25% and acid insoluble ash is 0.8%.
3. Extractive values is evaluated in different solvents and it was found that drug has 27% water soluble extractive value, 35% Ethanol soluble extractive value, 21.3% Chloroform soluble extractive values and 6.5% Petroleum ether soluble extractive values.

Qualitative evaluation of extracts of *Bambusa arundinacea*

Table: Preliminary qualitative tests for *Bambusa arundinacea* extracts

S. N.	Name of the Tests	Extract of Petroleums Ethers	Extract of Chloroforms	Extract Of Ethanols	Extract of Aqueous
Carbohydrates					
01.	Molisch's	Abs	Abs	Pr	Pr
02.	Benedict's	Abs	Abs	Pr	Pr
03.	Barfoed's	Abs	Abs	Pr	Pr
04.	Fehling solution's	Abs	Abs	Pr	Pr
Mucilages					
01.	Red Ruthenium's	Abs	Abs	Abs	Pr
Starch					
01.	Starch's	Abs	Abs	Abs	Pr
Proteins & Amino acids					
01.	Biuret's	Abs	Abs	Abs	Pr
02.	Millon's	Abs	Abs	Abs	Pr
03.	Xanthoproteic's	Abs	Abs	Abs	Pr
04.	Ninhydrin's	Abs	Abs	Abs	Pr
Fats & Oils					
01.	**Spot test**	Abs	Abs	Abs	Abs
Alkaloids					
01.	Dragendroff's reagent	Pr	Abs	Pr	Abs
02.	Mayer's reagent	Pr	Abs	Pr	Abs
03.	Wagner's	Pr	Abs	Pr	Abs
04.	Hager's	Pr	Abs	Pr	Abs
Glycosides: **Cardiac Glycosides**					
01.	Legal's	Abs	Abs	Pr	Pr
02.	Keller-kiliani's	Abs	Abs	Pr	Pr
Anthraquinones Glycosides					
01.	Borntragor's	Abs	Abs	Abs	Abs
Cyanogenic Glycosides					
01.	Ferriferrocyanide's	Abs	Abs	Pr	Abs
Tannins & Phenolic acids					
01.	Vanillin Hydrochloride's	Abs	Abs	Pr	Pr
02.	Ferric Chloride's	Abs	Abs	Pr	Pr
Flavonoids					
01.	Shinoda's	Abs	Pr	Pr	Abs
02.	Zinc-Hydrochloride's Reduction	Abs	Pr	Pr	Abs
Saponins					
01.	Foam's	Abs	Abs	Pr	Pr
Phytosterols					
01.	Libermann-	Abs	Abs	Pr	Pr

	Burchard's				
Lignin					
01.	Phloroglucinol-HCl's	Abs	Abs	Pr	Abs

Pr: Present, Abs: Absent

Tab. 1: Initial qualitative assessments of several extracts from young shoots of *Bambusa arundinacea*

Chromatography of Thin Layer

Distance travelled by solute	**Distance travelled by solvent**	**value of R_f**
2.30	5.60	.41
2.90	5.60	.51
3.20	5.60	.57
3.70	5.60	.66
3.90	5.60	.69
4.10	5.60	.73

Tab. 2: Thin Layer chromatography spots

Acute oral toxicity study

Toxicity-related behavioral observations for *Bambusa arundinacea* crude extract are tabulated. All behavioral observations were judged to be normal, and the medicine dose provided was deemed safe. The hematological and histological analyses are shown in a table. Hematological and histological analyses revealed that the prescribed amount is safe, with no morbidity or death. Hematological and histological observations showed no alterations[24].

Ethanolic extract of *Bambusa arundinacea* toxicity at dose 2000mg per kg

Observation	**2 hr**	**12 hr**	**7 day**	**14 day**	**21 day**	**28 day**
Skin and Fur	N	N	N	N	N	N
Eyes	N	N	N	N	N	N
Mucous Membrane	N	N	N	N	N	N
Salivation	N	N	N	N	N	N
Lethargy	Ab	Ab	Ab	Ab	Ab	Ab
Sleep	N	N	N	N	N	N
Coma	Ab	Ab	Ab	Ab	Ab	Ab
Convulsions	Ab	Ab	Ab	Ab	Ab	Ab
Tremors	Ab	Ab	Ab	Ab	Ab	Ab
Diarrhoea	Ab	Ab	Ab	Ab	Ab	Ab
Morbidity	N	N	N	N	N	N
Mortality	Ab	Ab	Ab	Ab	Ab	Ab

N = Normal, Ab = Absent

Tab. 3: Acute toxicity at 2000 miligram per kilogram

Hematological test report

Hematologic Parameters	**Ethanolic extract of *Bambusa arundinacea* (2000 mg per kg)**	**Normal Ranges**
Haemoglobins	14.5±0.67	10.7-17.7 (g/DL)
WBCs	6.90±1.22	1.96-8.25 $x10^3$/ mm^3
RBCs	7.7±1.58	6.76-9.75 $x10^6$/ mm^3
Neutrophils's	2.44±1.23	1.77-3.38 $x10^3$/ mm^3
Lymphocytes's	5.2±1.12	1.41-7.11$x10^3$/ mm^3

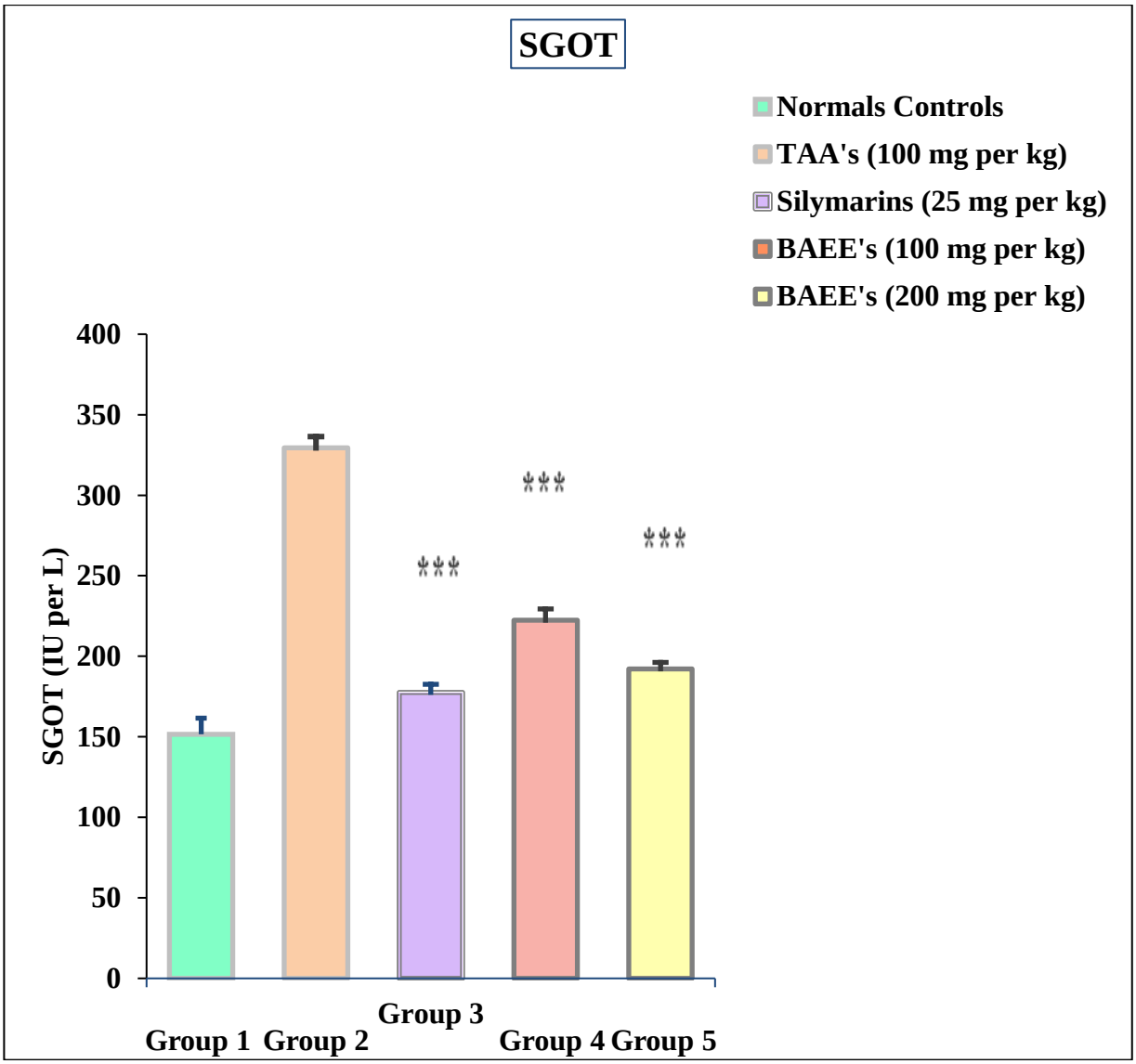
Eosinophils's	0.05±0.62	0.01-0.016x10^3/ mm^3
Monocytes's	0.03±0.01	0.02-0.18 x10^3/ mm^3
Basophils's	0.01±0.12	0.00-0.05 x10^3/ mm^3
Platelets's	398±9.16	315-540 x10^3/ mm^3

Tab. 4: Study of hematological at 2000 mg per kg

Evaluation of the antioxidants activities (*In vivo*) of young shoots of *Bambusa arundinacea*
Estimation of biochemicals

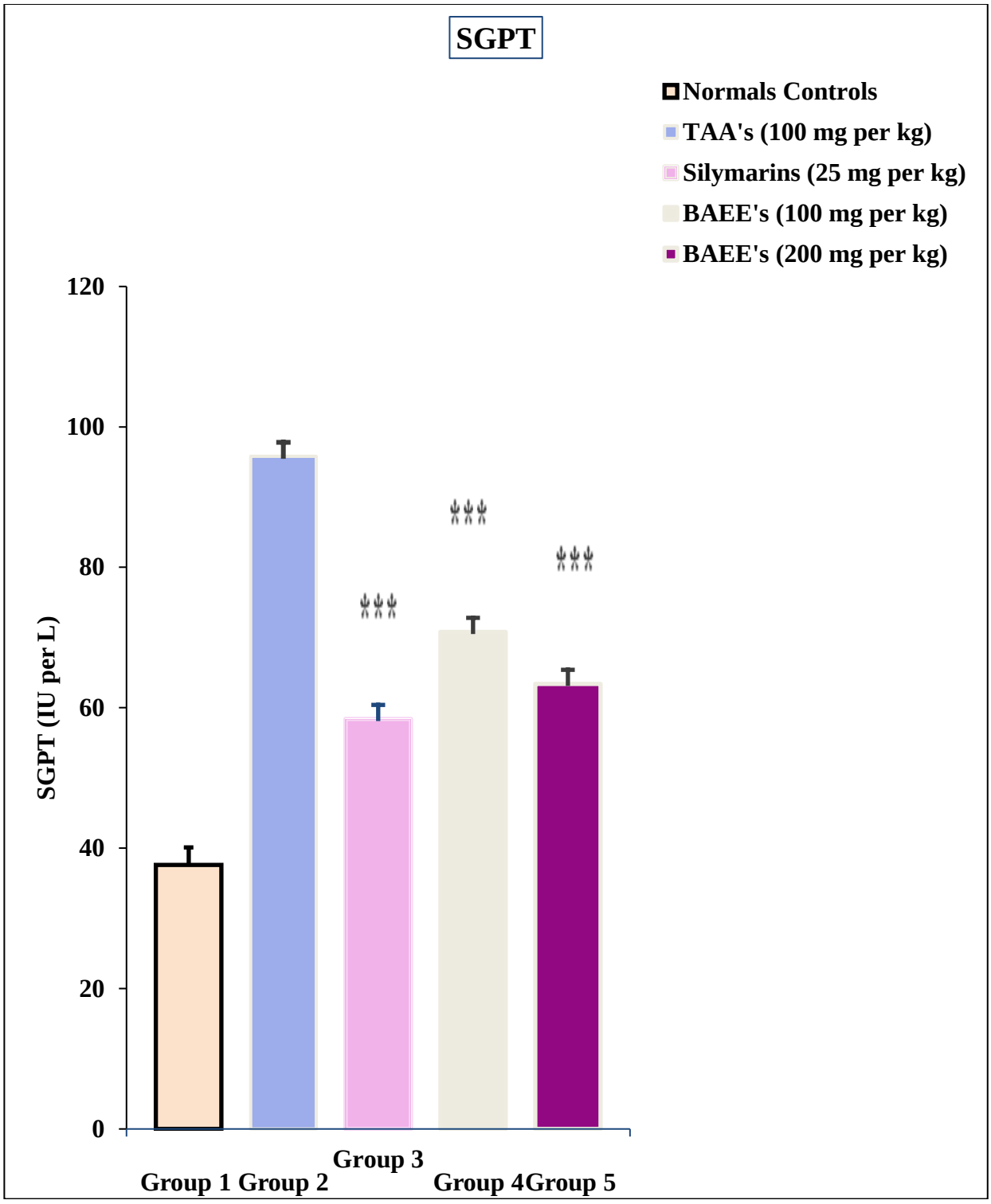
Group	SGOTs (IU per L)	SGPTs (IU per L)	ALPs (IU per L)
1	151.6 ± 8.96	37.6 ± 5.55	160.8 ± 4.70
2	329.4 ± 7.57	95.8 ± 7.08	453.8 ± 6.58
3	177.6 ± 5.23***	58.4 ± 4.82***	181.2 ± 3.86***
4	222.4 ± 7.08***	70.8 ± 6.14***	220.2 ± 5.67***
5	192.2 ± 5.49***	63.4 ± 4.67***	196.8 ± 5.23***

Tab. 5: The influence of the ethanolic extract of the young shoots of *Bambusa arundinacea* on indicators of liver function in rats suffering from thioacetamide-induced liver injury. The mean ± SEM data for the n = 5 group were analyzed using ANNOVA, with a ***p < 0.001 compared with TAA group.

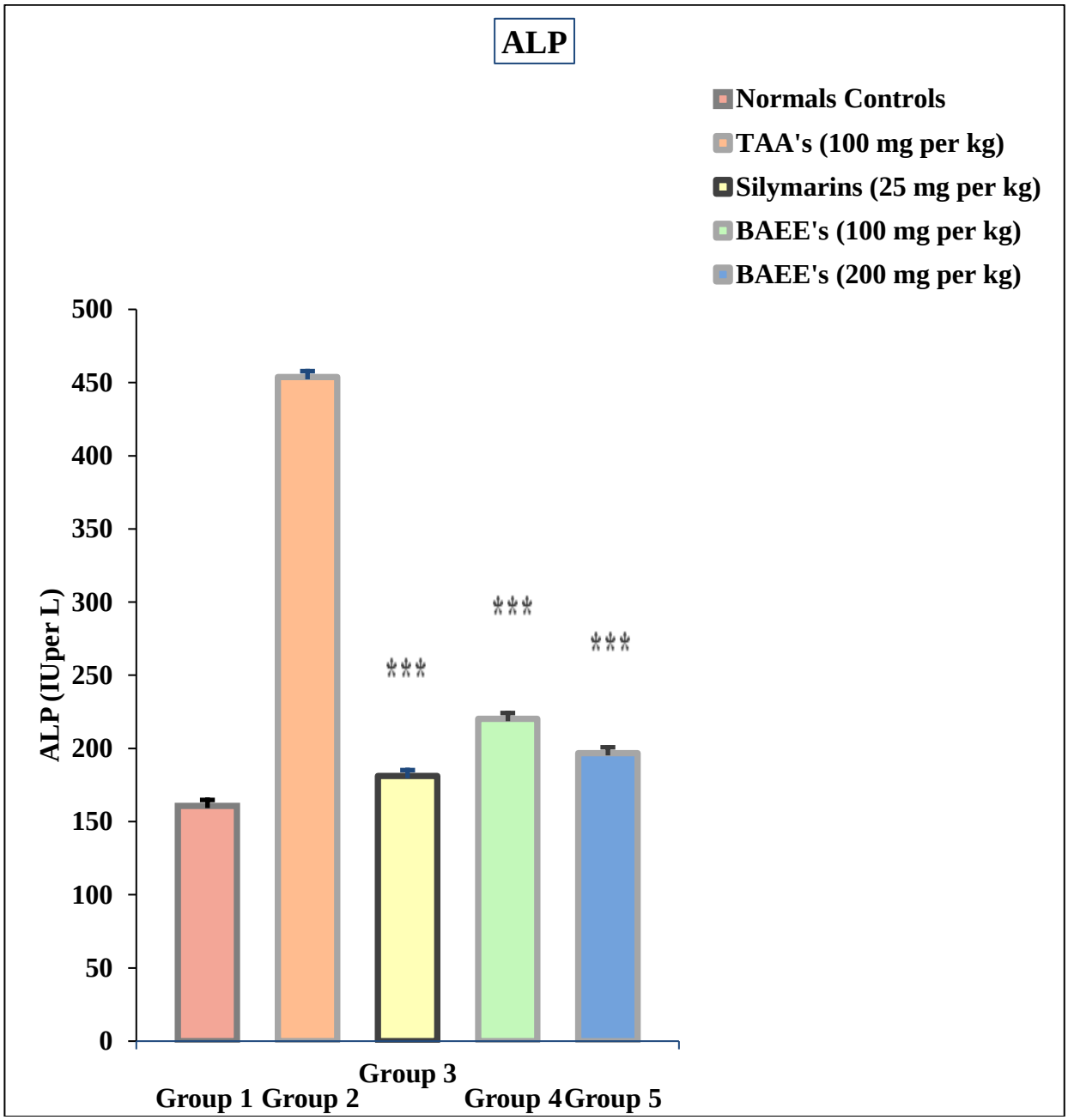


Diag. 1: Effectiveness regarding SGOT degree in rat models of acute liver injury generated by thioacetamide, silymarin, and the ethanolic extract of *Bambusa arundinacea* young shoots

(100 mg per kg & 200 mg per kg). Ethanolic extract of *Bambusa arundinacea* is BAEE, while thioacetamide is TAA. group means for five rats each group. *** P less than 0.001 in contrast to the thioacetamide group. The mean ± SD is shown in the columns.



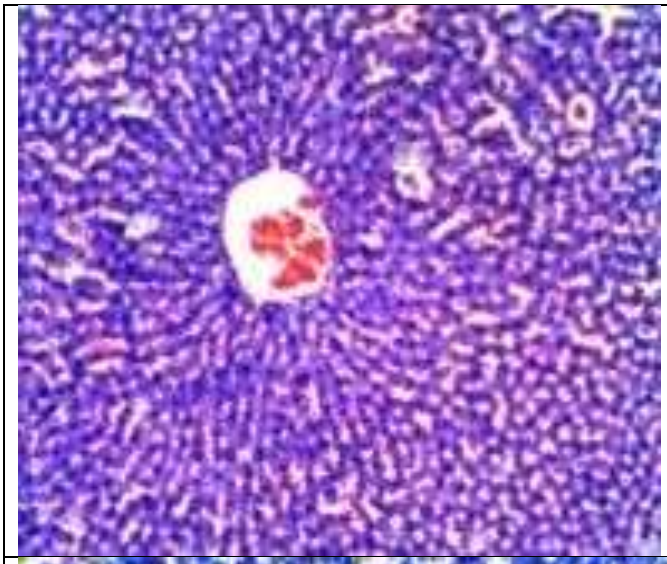
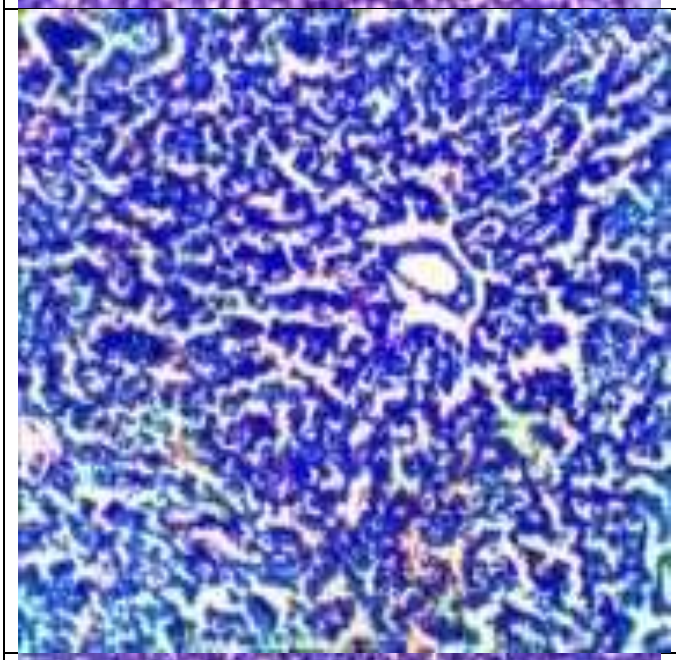
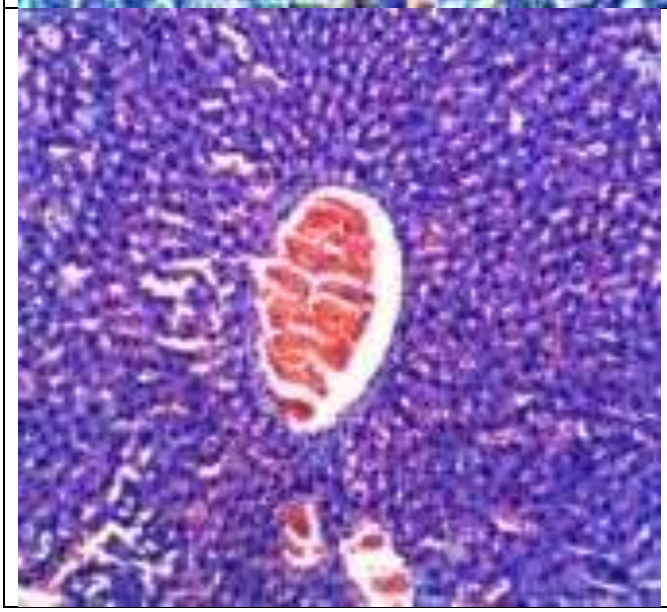
Diag. 2: The study examined the effects of silymarin, *Bambusa arundinacea* young shoot ethanolic extract (100 mg per kg & 200 mg per kg) on SGPT degree in rats with acute liver damage produced by thioacetamide. Ethanolic extract of *Bambusa arundinacea* is BAEE, while thioacetamide is TAA. group means for five rats each group. *** P less than 0.001 in contrast to the thioacetamide group. The mean ± SD is shown in the columns.

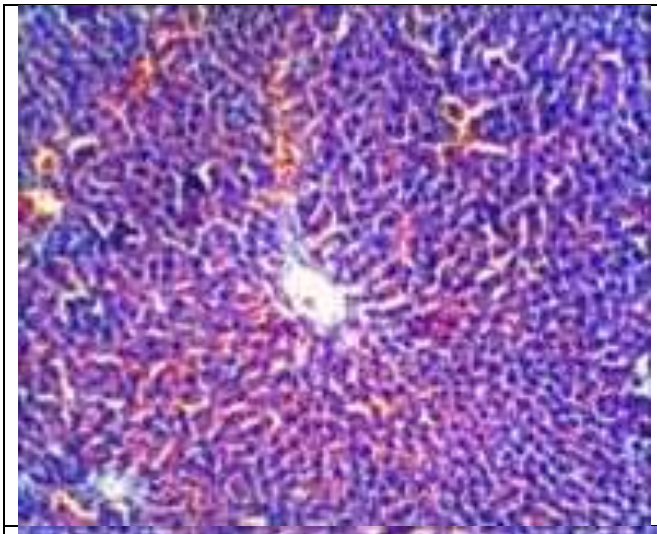
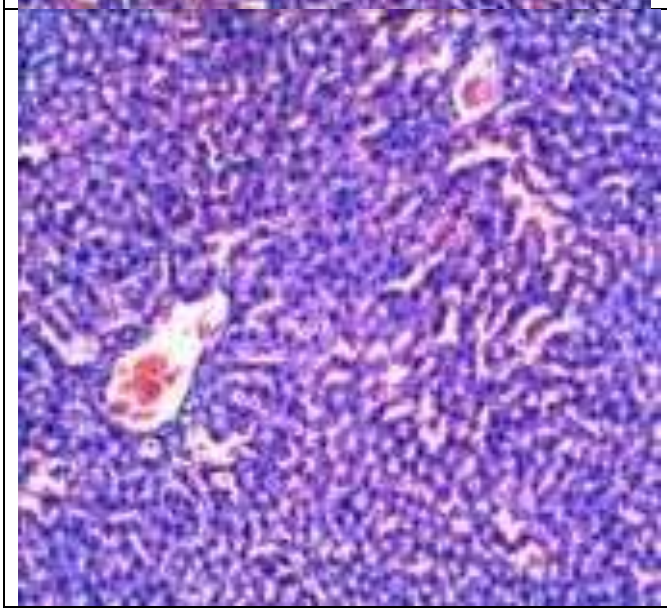


Diag. 3: Ethanolic extracts from *Bambusa arundinacea* young shoots (100 mg/kg & 200 mg/kg) and silymarin were effective in reducing the degree of acute liver injury in rats induced with thioacetamide. TAA is thioacetamide, and BAEE is the ethanolic extract of *Bambusa arundinacea*. groups' averages for five rats each. The difference with the Thioacetamide group is *** P < 0.001. The column means ± standard deviation.

Histopathology

The normal saline-treated group displays an intact liver structure with a central vein, identifiable hepatic cells, and sinusoidal gaps. The thioacetamide-treated group showed a disturbed structure with necrosis. Group four has higher cell disruption than Group 5. It demonstrates that the efficacy of a medicine rises with increasing dose. Sylimarin-treated group exhibits intact structure.

	**Group 1** It shows intact liver structure
	**Group 2** It shows disrupted structure with necrosis
	**Group 3** It shows comparative more intact structure then remaining test group

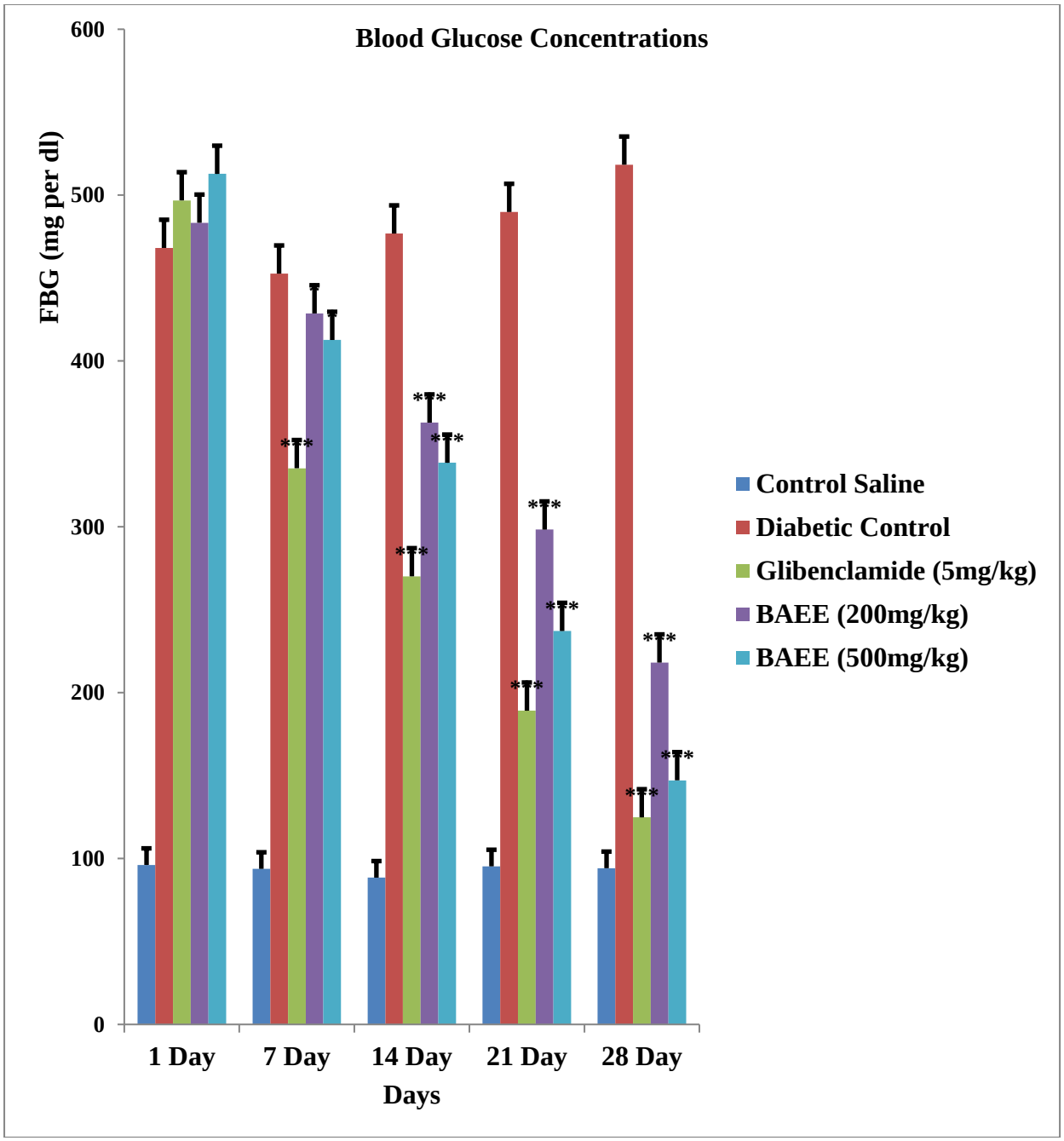
	**Group 4** It shows mild necrosis
	**Group 5** **It shows intact structure similar to Silymarin treated**

Diag. 4: The histology of rats treated with *Bambusa arundinacea* ethanolic extract shows evidence of thioacetamide-induced liver damage (10x). (i) A liver with a central vein that was normal; (ii) a liver treated subcutaneously with 100 miligram/kilogram of thioacetamides, which resulted in structures of necrosis and disruption; (iii) a liver treated intraperitoneally with 25 miligram/kilogram of silymarin, which demonstrated structures of less necrosis, less eosinophilic infiltration, and more intact; (iv) a liver treated with 100 miligram/kilogram b.p. and (v) a liver treated with 200 miligram/kilogram b.p. rats that displayed a dose-dependent decrease in necrosis and a greater degree of intact structure in comparison to the silymarin treatment.

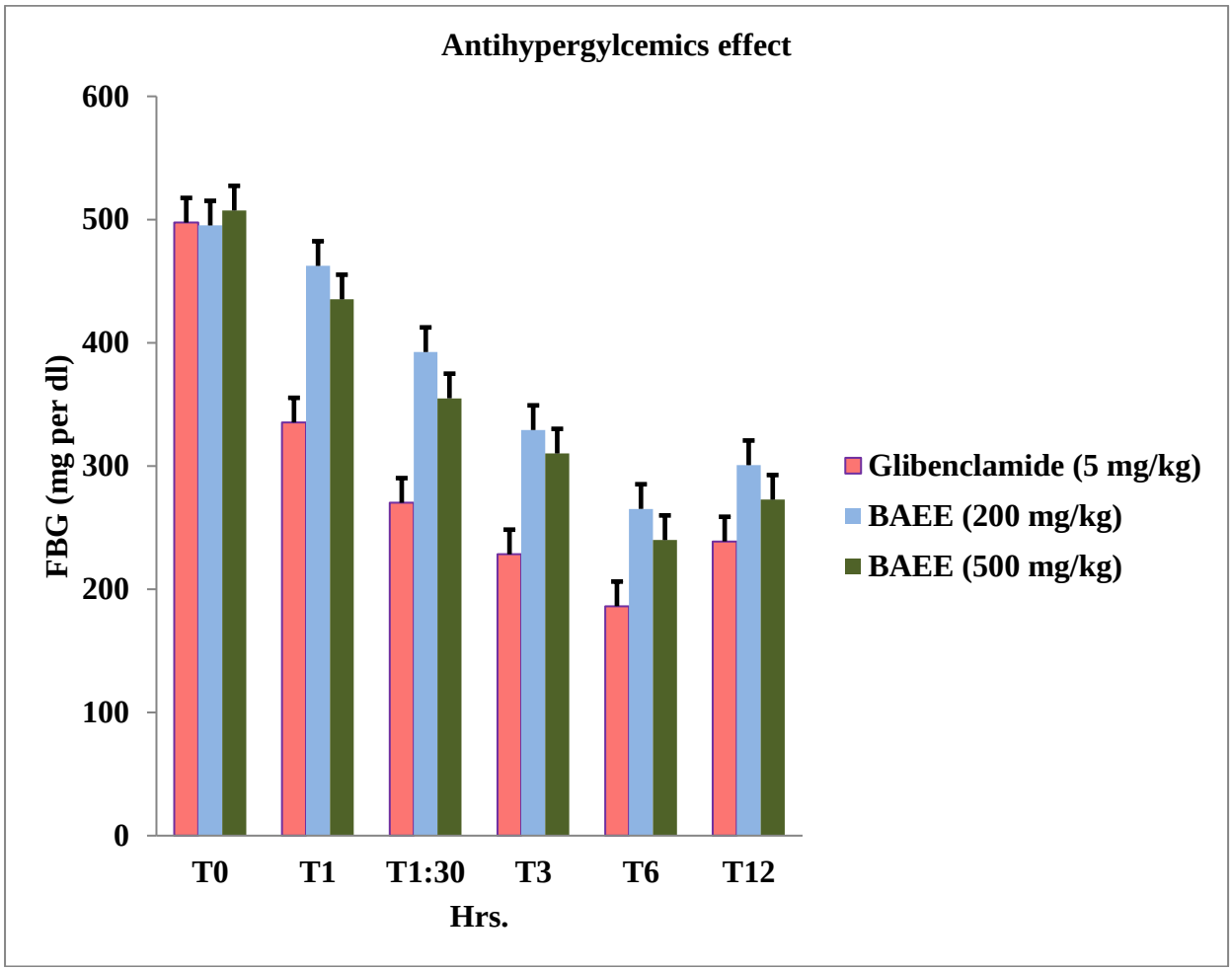
Evaluation of the antidiabetics activities (*In vivo*) of young shoots of *Bambusa arundinacea*
Concentration of Blood Glucose

Time / Group	1 Day	7 Days	14 Days	21 Days	28 Days
1	96.16±9.80	468.16±5.34	496.83±7.78	483.33±5.60	512.80±5.60
2	93.8±5.68	452.66±5.39	335.33±6.15	428.66±8.23	412.66±8.23
3	88.5±3.93	476.83±4.40***	270.16±5.15***	362.83±4.26***	338.63±4.26***
4	95.33±3.39	489.83±4.44*	189.16±4.70***	298.34±3.71***	237.20±4.70***
5	94.2±4.14	518.33±4.13*	124.83±6.30***	218.16±4.66***	147.18±6.30***

Tab. 6: The four-week diabetes-induced fasting blood glucose in rats treated with *Bambusa arundinacea* young shoot ethanolic extracts was observed. groups' averages for five rats each. * P < 0.05, *** P < 0.001 in relation to the control group of diabetes.

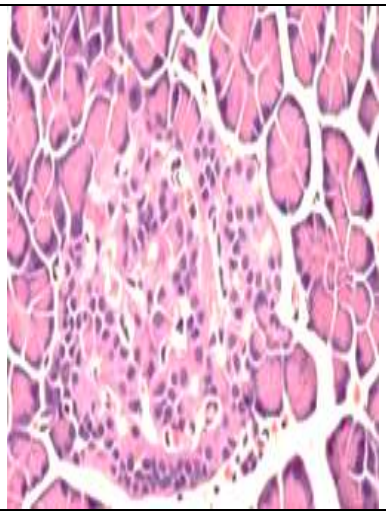
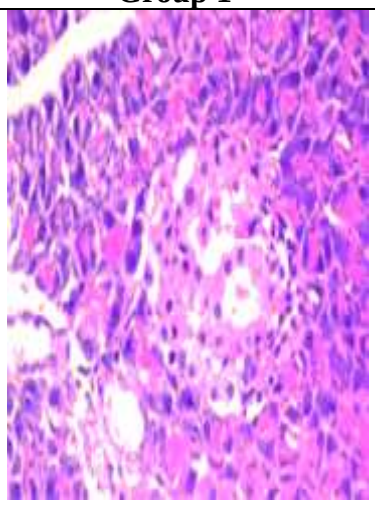
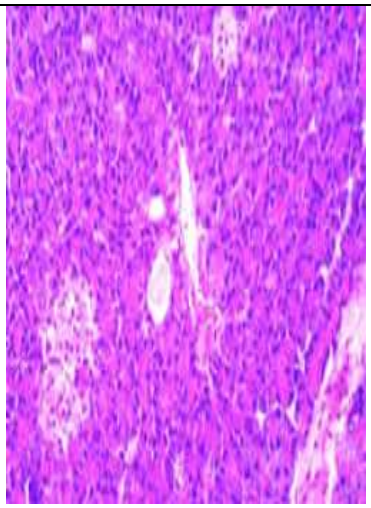


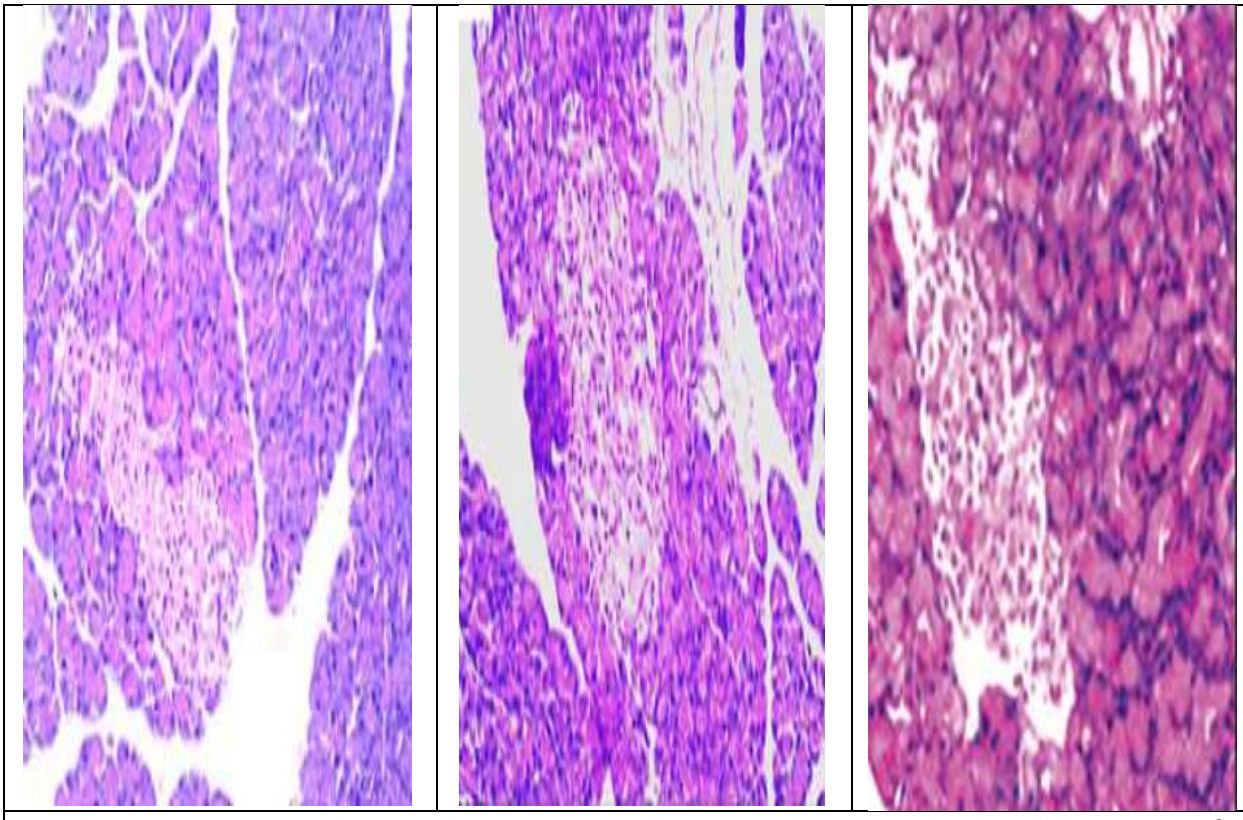
Diag. 5: The four-week effect of continuously administering ethanolic extracts from *Bambusa arundinacea*'s young shoots on FBG in rats with alloxon-induced diabetes. group means for five rats each group. In contrast to the diabetes control group, *p < 0.05 and ***p < 0.001 were found.



Diag. 6: Rats with diabetes induced by alloxan showed an antihyperglycemic effect for approximately 12 hours after ethanolic extracts from young shoots of *Bambusa arundinacea* were added. (n: five rats).

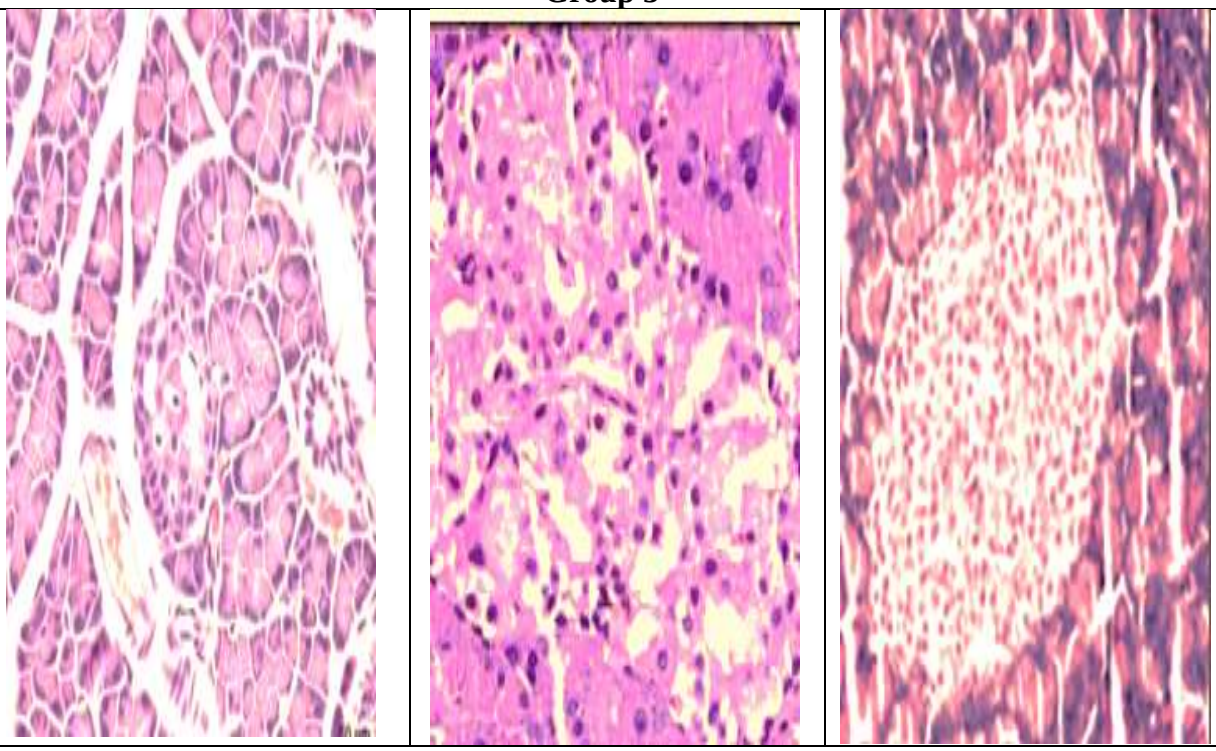
Histopathology of Pancreas

Group 1		
		
Diabetic rats slightly improvement of Islets of Langerhans		
Group 2		



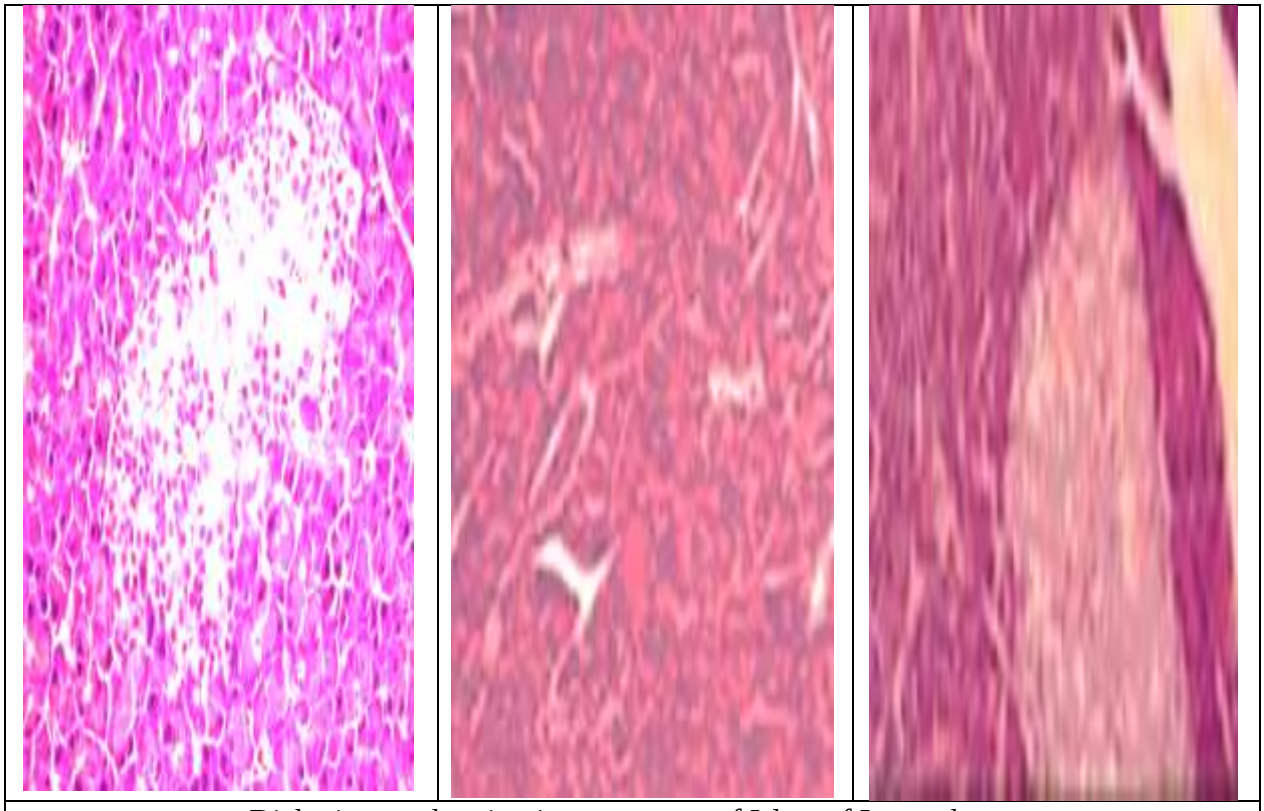
Diabetic rats pancreas showing degenerative and necrotic changes and reduced dimension of Islets of Langerhans.

Group 3



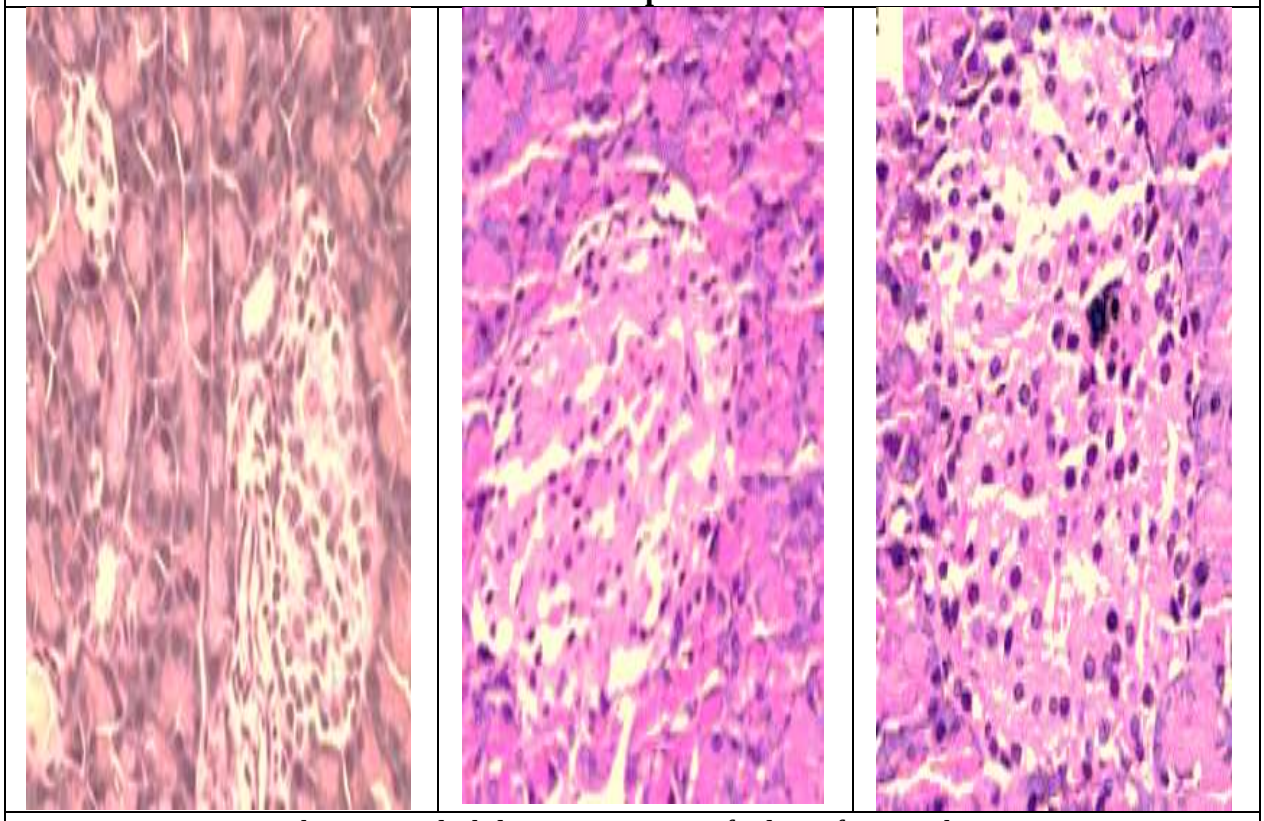
Diabetic rats slightly improvement of Islets of Langerhans

Group 4



Diabetic rats showing improvement of Islets of Langerhans

Group 5



Diabetic rats slightly improvement of Islets of Langerhans

Diag. 7: Rat pancreatic histological changes as shown by photomicrographs. (1) Normals controls: Average-sized islets and normal-sized β cells were observed in the normal histological structure of the rat pancreas. (2) Diabetics controls: The diabetic control rat has a tiny pancreas without an enlarged β cell. Third, glibenclamides (5 mg per kg): the pancreatic histological structure of rats treated with glibenclamide showed normal-sized β cells and

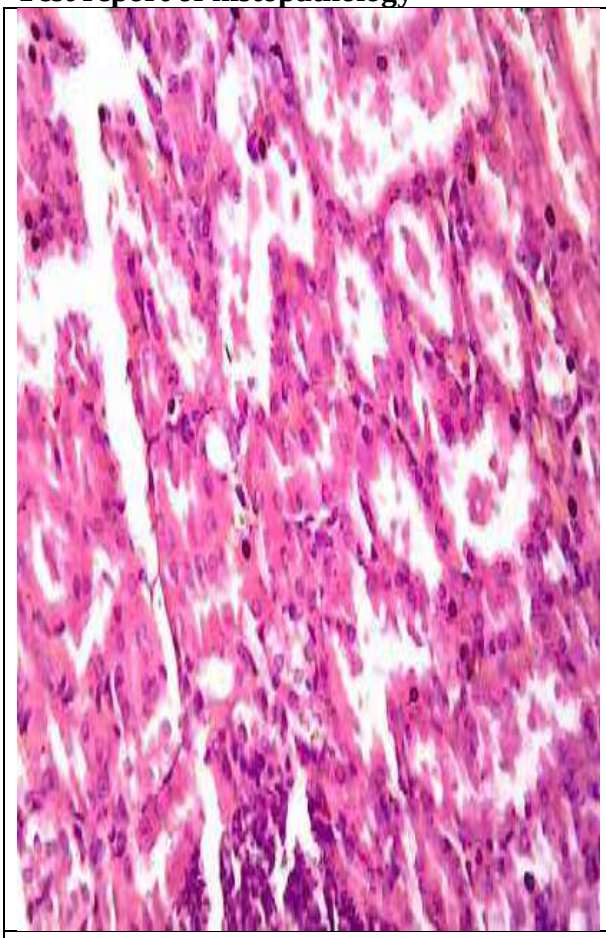
average-sized islets. The drug BAEE's 200 mg per kg was examined and showed that the rat pancreas was tiny and did not have any β cell expansion. (5) BAEE's (500 mg per kg): medication in test that enlarged rat β cells. For each group, five rats were examined and fifty pictures were collected. The photograph at the top of each group was chosen at random. original magnification of 40 times.

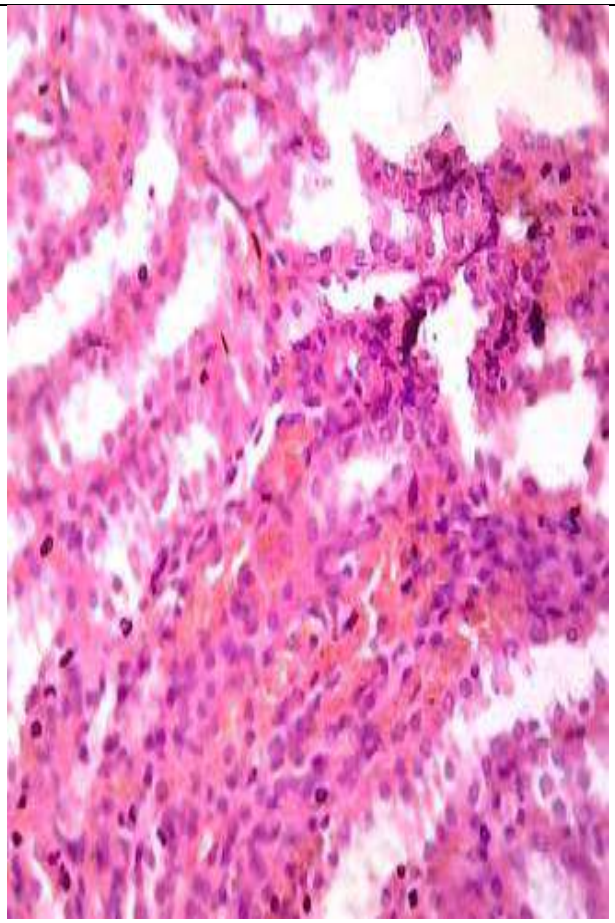
Management of body's weight

Strategies	1 day	7 day	14 day	21 day	28 day
Normal's Control's	23.3±3.2	24.8 ±2.4*	25.3±2.3***	26.8±2.2***	27.3±2.5***
Diabetic's Controls	23.7±2.2	21.6 ± 3.1	20.2 ± 2.6	19.1 ± 2.3	17.6 ± 2.3
Glibec.5 miligram per kilogram	24.2 ±2.5	23.2 ± 1.5	24.1 ± 2.2**	25.7±2.4***	25.8±1.78***
BAEE's 200 mg per kg	24.7 ±1.8	24.2 ± 2.1	24.8 ± 1.9*	25.9±2.2***	26.8 ± 1.9***
BAEE's 500 mg per kg	23.8 ±2.2	23.2 ± 2.1	24.6 ± 1.8*	26.7±2.2***	27.4 ± 2.3***

Tab. 7: Body weight growth as influenced by the ethanolic extract of young shoots from *Bambusa arundinacea*. (n -> 5 per group). In comparison to the diabetes controls, *p < 0.05, **p < 0.01 & ***p < 0.001 Diab. Diabetics Group's: Glibenc.

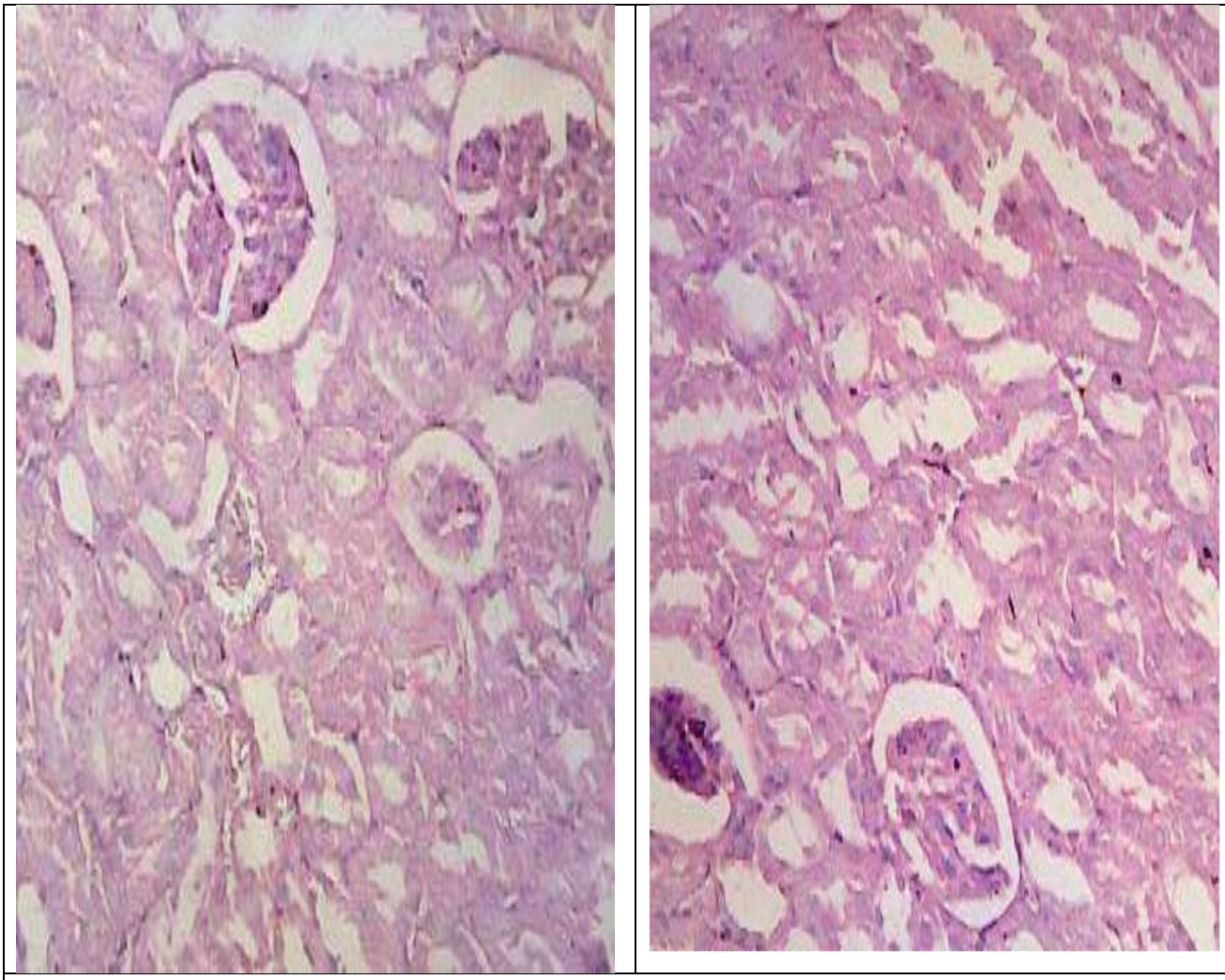
Test report of histopathology





Ethanolic extract of *Bambusa arundinacea* (2000 miligram/kilogram)

Kidney: It shows normal architecture of renal glomeruli with intact bowman's capsule. Brush bordered cuboidal epithelium lining the proximal convoluted tubules. Simple cuboidal epithelium lining the distal convoluted tubules. Macula densa is very prominent.



Ethanolic extract of *Bambusa arundinacea* (2000 miligram/kilogram)

Liver: It was observed that the sections conformed to normal histological features. The sinusoids in the sections of the treated rats are devoid of occlusions and are not distorted.

Diag. 8: The ethanolic extract of young shoots from *Bambusa arundinacea* (2000 mg/kg) was tested for histopathology (Kidney & Liver).

Discussion

The aim of this study was to assess the antioxidant and antidiabetic properties of young shoots of *Bambusa arundinacea*. Young shoots of *Bambusa arundinacea* with an ethanolic extract exhibit dose-dependent therapeutic efficaciousness for antioxidant and antidiabetic properties by presence of flavanoids & phenolic compounds(12). As the dosage is increased, efficacy rises.

Conclusion

A more affordable and efficient option for the general public to combat diabetes and inflammatory illnesses is *Bambusa arundinacea*, which is widely and inexpensively available throughout India. It are efficient antioxidative & also antidiabetics agents. Ethanolic extract from *Bambusa Arundinacea* will need more research in the future. The *Bambusa Arundinacea* plant also has an isolated active component. In order to boost a drug's effectiveness, polyherbal formulations can also be created.

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