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Research Article

Effects of Aqueous Extract of Chanca Piedra (*Phyllanthus niruri*) on Haematological Parameters and Blood Glucose Levels in Albino Mice

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ABSTRACT
This study aims to investigate the effects of the aqueous extract of Chanca Piedra (*Phyllanthus niruri*) on haematological parameters and blood glucose levels in healthy albino mice. Twenty mice were divided into four groups (A, B, C and D), each containing five mice. Group A, (control) were orally administered distilled water while groups B, C and D received oral gavage of graded doses of 200 mg, 400 mg, and 800 mg of aqueous extract of *Phyllanthus niruri* respectively for 28 days. Blood glucose levels of the mice in each group were measured prior to (pre-treatment), and at 0.5, 1, 2 and 4 hours after extract administration. Blood samples were collected from the tail vein using a capillary tube on day 1 (pre-treatment), 7, 14, 21 and 28 days. Samples were analyzed for haematological parameters (Hb, PCV, RBC and WBC) using standard procedures. The data generated were statistically analyzed and results were presented as mean ± SD. The results revealed that the aqueous extract of *Phyllanthus niruri* had a dose-dependent effect on reducing blood glucose levels in healthy albino mice. The 400 mg/kg and 800 mg/kg doses caused significant reductions across time points, with the highest dose showing the most potent effect at 4 hours (113.4±29.51 from 144.2 ± 38.04) post extract administration. The data revealed that *Phyllanthus niruri* has a dose-dependent effect on blood glucose levels and Hb, PCV, RBC and WBC count of the albino mice, with higher doses leading to greater reductions, particularly after a 4-weeks.

Keywords: Albino mice; Aqueous extract; Blood glucose; Chanca Piedra*i;* Haematological parameters; *Phyllanthus nirur*

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INTRODUCTION

Chanca piedra (*Phyllanthus niruri*) is a small, upright, annual herb that grows between 10 and 50 cm tall, fondly known as "stone breaker" (Micali *et al*., 2006; Lima *et al.,* 2010). It has a green to whitish stem and leaves that fall early, ascending herbaceous branching, smooth light green bark and tiny capsules that contain seeds beneath the leaves; hence the name "seed under the leaf plant" (Kumar *et al*., 2020). Its folkloric attributes in traditional medicine have been reported in tropical countries of Asia, Africa, and the Americas. *Phyllanthus niruri* belongs to the *Phyllanthus* genus with the following species namely: *Phyllanthus carolinianus*, *P. sellowianus, P. fraternus, P. kirganella, P. lathyroides and P. niruri.* It is a species of Niruriamarus and belongs to the Euphorbiaceae family (Gafar *et al.,* 2012). The plant is an indigenous flora of the rainforest of the Amazon and other tropical areas throughout the world, including Bahamas, Southern India, Africa and China (Gafar *et*

al., 2012). The prevalence of kidney stone is increasing globally, and it is one of the major causes of urinary track morbidity. The primary component of urinary stones is the calcium oxalate (CaOx) crystal, which can adhere to the urinary tract's lining and potentially harm cells. However, *Phyllanthus niruri* effects on the urinary system and its inhibitory action on numerous stages of stone formation interference is attributed to its folkloric claim as a stone breaker (Micali *et al*., 2006; Lima *et al.,* 2010). The plant's capacity to dissolve kidney stones is a well-known characteristic, since numerous studies have demonstrated its effectiveness in doing so and preventing the creation of new stones (Prabu *et al.,* 2011). Triterpenes, the bioactive phytochemical constituent of the plant suppresses crystal deposition in the urinary system and the toxicity of calcium oxalate (Boim *et al*., 2010). Ayurvedic and Chinese medicine, have traditionally used *Phyllanthus niruri*. It is mostly used to treat gastrointestinal problems, kidney stones, liver disorders, and jaundice (Mokhtar *et al*., 2014). Also, the herb is known for its diverse pharmacological effects, including hepatoprotective, anti-inflammatory, antioxidant, anti-diabetic properties and reduction of high blood pressure (Tiwari *et al.,* 2017; Oliveira *et al*., 2019). A potential anti-Hepatitis B virus agent, namely ellagic acid which was isolated from *P. niruri* showed cytotoxic effect against HepG2/C3A cells and the research also revealed that ellagic acid affects Hepatitis B virus replication (Yong *et al*., 2017).

Because of its capacity to control blood glucose levels, *Phyllanthus niruri* has been shown in numerous trials to have anti-diabetic properties. Aqueous extract of *Phyllanthus niruri* lowered blood glucose levels in diabetic rats as reported by (Tiwari *et al*., 2017), suggesting that it may be used as an alternative remedy against diabetes. Lignans and flavonoids bioactive constituents of the plant improve insulin sensitivity and cell uptake of glucose (Akram *et al*., 2013).

The hepatoprotective properties of *Phyllanthus niruri* have been extensively researched. Its protective benefits against liver damage caused by toxic chemicals like alcohol and carbon tetrachloride have been shown in several *in-vivo* studies. That said, the antioxidant qualities of the herb aid in scavenging free radicals and lowering oxidative stress in liver cells (Ravichandran *et al*., 2015). Additionally, *Phyllanthus niruri* has been demonstrated to enhance liver enzyme levels known to aid regeneration of liver tissue (Lima *et al.,* 2010).

MATERIALS AND METHODS

Plant collection and identification

Fresh *Phyllanthus niruri* plants were collected from a garden in Dalori quarters and Geography Department, University of Maiduguri, Jere local government area, Borno state, Nigeria. The plant was identified as *Phyllanthus niruri* at the Department of Botany, University of Maiduguri. The plant was shade dried at room temperature and crushed using wooden mortar and pestle into fine particles.

Plant processing and extraction

The powdered plant material (300g) was boiled in distilled water (1:10 w/v) for 15 minutes. The decoction was allowed to cool, then filtered through muslin cloth and Whatman filter paper. The filtrate was concentrated under reduced pressure, lyophilized to form a dry extract (Sofowara, 1993).

Experimental animals

A total number of 20 Albino mice of both sexes were used for the experiment. They were obtained from a private breeder in Maiduguri, Borno state, Nigeria. The mice had no history of *in-vivo* exposure to any xenobiotic preparations. They were kept in aluminum cages and allowed to adjust to the laboratory environment for a period of seven days before commencement of the experiment. They were fed with commercial broiler's finisher (Ultima feed Nig. LTD) and water was provided ad-libitum. All the mice were maintained under standard laboratory conditions for temperature, humidity and light throughout the experiment and were allowed unhindered access to food and water.

Experimental design

The use of mice for the study was approved by animal use and ethics committee of Faculty of Veterinary Medicine, University of Maiduguri with an approval number FVM/UNIMAID/AUEC/2025/0019.

Twenty (20) mice of both sexes were divided into four groups comprising of 5 mice each and housed in separate plastic cages. They were fed with commercial broiler's finisher feed throughout the experiment. Group A, which was control group, were fed commercial broiler's finisher and water only. Group B, C and D, which represented experimental groups, were fed commercial broiler's finisher and extract daily. Group B was orally administered 200 mg/kg body weight dose of extract while group C received 400 mg/kg body weight dose of extract. Group D was given 800 mg/kg body weight dose of extract orally.

Collection of blood samples

Blood samples were collected from the tail vein using a capillary tube on day 1, day 7, day 14, day 21 and day 28. It was analyzed for haematological parameters (Hb, PCV, RBC, and WBC).

Determination of blood glucose level

The extract was given orally using feeding cannula and blood glucose level of animals in each group were measured prior to (pre-treatment) and at 0.5, 1, 2 and 4 hours after extract administration using a glucose test strips and glucose meter (Okoli *et al*., 2010).

Determination of haematological parameters

Haemoglobin concentration (Hb), Packed Cell Volume (PCV), Red Blood Cell count (RBC) and White Blood Cell count (WBC) were determined using method described by (Dacie and Lewis, 1993).

Haemoglobin estimation using Sahli's method

The Sahli's method involves the use of 1mL of hydrochloric acid (HCL) added into a calibrated tube. Using a glass rod, a 0.02 mL blood sample is pipetted into the calibrated tube and stirred by vortex. For ten minutes, the material was left undisturbed. After inserting the haemoglobinometer tube into the comparator, distilled water was added to the mixture drop by drop while stirring with a glass rod until the solution's colour matched that of the comparator glass. According to Dacie and Lewis (1993), the height of the diluted acid hematin was directly measured when the stirrer was removed.

Packed Cell Volume (PCV) Determination

The method outlined by Dacie and Lewis (1993) was used to determine the packed cell volume. Blood samples were drawn from the tail vein and placed into capillary tubes up to seventy-five percent (75%) of its length; the other end of the tube was sealed with plasticine to prevent leaks during centrifugation. The sealed capillary tube was then placed into a micro-haematocrit centrifuge machine with the plasticine side facing outward. To ensure total separation of the blood components, the blood samples were centrifuged for five minutes at 10,000 rpm. The capillary tube was inserted into a haemocytometer to determine the percentage of the packed cell volume.

Determination of White Blood Cell

The technique described by Dacie and Lewis (1993) is used to calculate the white blood cell count. Turk's solution was used to dilute the blood sample after filling a milliliter (1 mL) WBC pipette to the 0.5 mL mark. Additionally, safety precautions were made to prevent air bubbles in the pipette. After carefully combining the reagent and the blood sample, two to three drops of the mixture were put to the Neubauer counting chamber and covered with a cover slip and the WBC was recorded.

Data Analysis

The data generated were analyzed using IBM-SPSS software version 23.0. The test for comparing means within and between groups was used and 95% confidence interval was considered significant through the study. Analysis of variance (ANOVA) was used to test between means and results were presented as mean ± standard deviation (mean ± SD).

RESULTS

Blood Glucose

Table 1 shows the effects of the aqueous extract of *Phyllanthus niruri* on blood glucose levels in normal albino mice across five time points (0, 0.5, 1, 2 and 4 hours) for varying doses (Control, 200 mg/kg, 400 mg/kg, and 800 mg/kg). The measurements are accompanied by standard deviations and post hoc superscripts to indicate statistical significance at the 0.05, 0.01, and 0.001 levels. Overall, the results reveal that the aqueous extract of *Phyllanthus niruri* has a dose-dependent effect on reducing blood glucose levels in normal albino mice. In the control group, blood glucose levels initially measured 117.0 ± 8.78 at 0 hour, and gradually decreased across the subsequent time points, with a statistically significant drop at 0.5 hour ($p < 0.01$) and 4 hr ($p < 0.01$). These changes suggest a natural fluctuation in blood glucose, but the decreases are not as pronounced as in the treatment groups. At 0.5 hr, the control group experienced a significant increase to 141.6 ± 18.36 ($p < 0.01$), indicating that some fluctuation in glucose occurs even in the absence of treatment. The subsequent measurements at 1 hr, 2 hr, and 4 hr showed smaller declines, suggesting a stabilizing effect as time progresses.

For the 200 mg/kg dose group, the blood glucose levels were higher than the control group at 0 hr (200.4 ± 57.14, $p < 0.05$) and showed significant decrease at 1 hr (186.2 ± 54.79, $p < 0.01$) and 4 hr (126.6 ± 58.92, $p < 0.001$). The 200 mg/kg dose displayed the most substantial reduction at 4 hr, indicating a potent effect on lowering blood glucose after a longer period.

In the 400 mg/kg dose group, the blood glucose level at 0 hr was 89.6 ± 9.27, showing a significant decrease ($p < 0.01$) when compared to the control group. This dose showed consistent reductions across the time points, with statistically significant decreases at 0.5 hr, 2 hr, and 4 hr ($p < 0.05$). The most remarkable effect was observed at 4 hr, where the glucose level

was 65.4 ± 28.19, showing a sustained and significant lowering effect.

The 800 mg/kg dose group demonstrated a substantial drop in blood glucose levels across all time points. At 0 hr, the glucose level was 144.2 ± 38.04, significantly higher than the control group, but decreased consistently over time. By 4 hr, the level was 113.4 ± 29.51, with statistical significance ($p < 0.01$) compared to earlier time points.

Packed Cell Volume

The packed cell volume (PCV) was measured in normal albino mice treated with various doses of *Phyllanthus niruri* over four weeks (Table 2). In the measurement of the PCV, the control group (Group A) showed a steady increase in PCV, from 37.94 ± 1.61 at week 1 to 41.48 ± 1.41 at week 4, suggesting normal physiological changes over time. In Group B (200 mg/kg), a gradual decline in PCV was observed, from 37.08 ± 1.56 at Week 1 to 34.60 ± 1.19 at week 4, with statistically significant reductions noted at weeks 2 ($p < 0.05$), 3 ($p < 0.05$), and 4 ($p < 0.05$). This suggests that the 200 mg/kg dose has a significant effect on lowering PCV over time. Group C (400 mg/kg) also showed a reduction in PCV, from 38.10 ± 1.42 at week 1 to 34.80 ± 1.48 at week 4. A significant drop was observed at weeks 3 ($p < 0.05$) and 4 ($p < 0.05$), indicating that the 400 mg/kg dose continues to have a lowering effect on PCV but to a lesser extent than the higher dose.

The 800 mg/kg dose (Group D) led to the most substantial decline in PCV, from 36.80 ± 1.45 at week 1 to 30.20 ± 1.03 at week 4, with significant reductions observed at week 2 ($p < 0.05$), week 3 ($p < 0.01$), and week 4 ($p < 0.001$).

The pronounced decrease in PCV, especially by week 4, suggests a strong dose-dependent effect of *Phyllanthus niruri* on reducing PCV.

Table 1: Effect of Aqueous Extract of *Phyllanthus niruri* on Blood Glucose Level in Albino Mice with Time

Dose	0 hr	0.5 hr	1 hr	2 hr	4 hr
Control	117.0 ± 8.78	141.6 ± 18.36	123.0 ± 21.79	111.0 ± 22.24	103.6 ± 26.25
200 mg/kg	200.4±57.14*	194.8 ± 26.94*	186.2 54.79**	161.4±58.29*	126.6±58.92***
400 mg/kg	89.6 ± 9.27**	122.0 ± 43.83*	106.6 ± 51.25*	97.0 ± 45.18*	65.4 ± 28.19*
800 mg/kg	144.2±38.04*	163.0±28.42**	132.0±18.47**	130.6±20.87*	113.4 ± 29.51**

Key for Post Hoc Superscripts:

* $p < 0.05$: Statistically significant difference along the column.

** $p < 0.01$: Statistically significant difference along the column.

*** $p < 0.001$: Statistically significant difference along the column.

Table 2: Effect of Aqueous Extract of *Phyllanthus niruri* on Packed Cell Volume (PCV) in Normal Albino Mice

Group	Week 1	Week 2	Week 3	Week 4
A (Control)	37.94 ± 1.61	39.12 ± 1.56	40.38 ± 1.79	41.48 ± 1.41
B (200 mg/kg)	37.08 ± 1.56	35.80 ± 1.29*	34.10 ± 1.43*	34.60 ± 1.19*
C (400 mg/kg)	38.10 ± 1.42	37.00 ± 1.63	35.00 ± 1.22*	34.80 ± 1.48*
D (800 mg/kg)	36.80 ± 1.45	34.87 ± 1.29*	33.60 ± 1.22**	30.20 ± 1.03***

Key for Post Hoc Superscripts:

* $p < 0.05$: Statistically significant difference along the column.

** $p < 0.01$: Statistically significant difference along the column.

*** $p < 0.001$: Statistically significant difference along the column.

RBC Count

In Table 3, the red blood cell (RBC) count was measured over four weeks for four groups: the control group (Group A) and three treatment groups receiving different doses of *Phyllanthus niruri* (200 mg/kg, 400 mg/kg, and 800 mg/kg). In the RBC measurement, the control group (Group A) maintained relatively stable RBC counts across the four weeks, with values fluctuating slightly but showing no significant differences across the weeks. For the treatment groups, Group B (200 mg/kg) showed a statistically significant decrease in RBC count at week 4 ($p < 0.01$), which indicates that even at a moderate dose, *Phyllanthus niruri* may reduce RBC count over time. A similar trend was observed in Group C (400 mg/kg), with a significant reduction in RBC count at week 3 ($p < 0.01$) and week 4 ($p < 0.01$), suggesting that higher doses have a more pronounced effect on RBC count. The 800 mg/kg dose (Group D) showed a marked decline in RBC count by week 4 ($p < 0.001$), indicating a dose-dependent reduction with the highest dose.

WBC Count

In Table 4, the white blood cell (WBC) count was measured over four weeks for the control and treatment groups. The control group (Group A) showed relatively stable WBC counts across the four weeks, suggesting that no significant change occurred in the absence of treatment. Group B (200 mg/kg) showed a reduction in WBC count from 5800 ± 600 at week 1 to 5000 ± 500 at week 4, with statistical significance observed at weeks 3 ($p < 0.05$) and 4 ($p < 0.05$). This indicates that the aqueous extract of *Phyllanthus niruri* at this dose causes a gradual decline in WBC count over time. Group C (400 mg/kg) exhibited a similar reduction, with the WBC count dropping from 6440 ± 400 at week 1 to 4900 ± 300 at week 4, and a statistically significant decrease at week 4 ($p < 0.05$). In Group D (800 mg/kg), the WBC count decreased from 5600 ± 550 at week 1 to 3600 ± 250 at week 4, showing a significant reduction across all time points. A significant drop was observed by week 2 ($p < 0.05$) and reached $p < 0.01$ by week 3. The most pronounced decrease ($p < 0.001$) occurred by week 4, indicating that the highest dose of *Phyllanthus niruri* causes a substantial reduction in WBC count over time.

Haemoglobin Concentration

In Table 5, haemoglobin concentration was measured in normal albino rats treated with varying doses of *Phyllanthus niruri* over four weeks. The control group (Group A) showed a gradual increase in hemoglobin concentration, from 12.46 ± 0.40 at week 1 to 13.70 ± 0.31 at week 4, which is a natural progression of hemoglobin levels in healthy rats. Group B (200 mg/kg) exhibited a small decrease in hemoglobin concentration from 12.36 ± 0.56 at Week 1 to 11.56 ± 0.50 at week 4. A significant reduction was observed at weeks 3 ($p < 0.05$) and 4 ($p < 0.05$), suggesting that this dose of *Phyllanthus niruri* may slightly reduce hemoglobin concentration over time. Group C (400 mg/kg) showed a similar trend, with a decrease from 12.50 ± 0.49 at week 1 to 11.42 ± 0.50 at week 4. Statistical significance was observed at weeks 3 ($p < 0.05$) and 4 ($p < 0.05$), indicating that the 400 mg/kg dose also lowers hemoglobin levels as treatment progresses. In Group D (800 mg/kg), there was a more substantial decline in hemoglobin concentration, from 12.08 ± 0.49 at Week 1 to 10.60 ± 0.31 at week 4. Significant reductions were noted from week 2 ($p < 0.05$) onward, with the most pronounced drop at week 4 ($p < 0.001$).

Table 3: Effect of Aqueous Extract of *Phyllanthus niruri* on Red Blood Cell Count in Albino Mice

Group	Week 1	Week 2	Week 3	Week 4
A (Control)	6.46 ± 0.32	6.58 ± 0.30	6.40 ± 0.26	6.46 ± 0.31
B (200 mg/kg)	6.02 ± 0.60*	5.76 ± 0.43*	5.58 ± 0.37*	5.00 ± 0.60**
C (400 mg/kg)	6.74 ± 0.50	6.04 ± 0.43	5.59 ± 0.35*	5.00 ± 0.60**
D (800 mg/kg)	6.13 ± 0.46	5.74 ± 0.34	5.21 ± 0.34*	4.40 ± 0.31***

Key for Post Hoc Superscripts:

*****$p < 0.05$: Statistically significant difference along the column.

**$p < 0.01$: Statistically significant difference along the column.

***$p < 0.001$: Statistically significant difference along the column.

Table 4: Effect of Aqueous Extract of *Phyllanthus niruri* on White Blood Cell Count in Albino Mice

Group	Week 1	Week 2	Week 3	Week 4
A (Control)	5800 ± 580	5760 ± 420	5400 ± 480	5660 ± 520
B (200 mg/kg)	5800 ± 600	5500 ± 350	4800 ± 400*	5000 ± 500*
C (400 mg/kg)	6440 ± 400	5700 ± 400	5400 ± 300	4900 ± 300*
D (800 mg/kg)	5600 ± 550	4800 ± 380*	4500 ± 350**	3600 ± 250***

Key for Post Hoc Superscripts:

***** $p < 0.05$: Statistically significant difference along the column.

** $p < 0.01$: Statistically significant difference along the column.

*** $p < 0.001$: Statistically significant difference along the column.

Table 5: Effect of Aqueous Extract of *Phyllanthus niruri* on Haemoglobin Concentration in Albino Mice

Group	Week 1	Week 2	Week 3	Week 4
A (Control)	12.46 ± 0.40	12.64 ± 0.42	13.07 ± 0.52	13.70 ± 0.31
B (200 mg/kg)	12.36 ± 0.56	12.16 ± 0.42	11.86 ± 0.52*	11.56 ± 0.50*
C (400 mg/kg)	12.50 ± 0.49	12.26 ± 0.42	11.92 ± 0.48*	11.42 ± 0.50*
D (800 mg/kg)	12.08 ± 0.49	11.68 ± 0.50*	11.18 ± 0.50**	10.60 ± 0.31***

Key for Post Hoc Superscripts:

***** $p < 0.05$: Statistically significant difference along the column.

** $p < 0.01$: Statistically significant difference along the column.

*** $p < 0.001$: Statistically significant difference along the column.

DISCUSSION

The study revealed that single oral administration of aqueous extract of *Phyllanthus niruri* to normal mice reduced blood glucose, suggesting an inherent hypoglycemic effect. The data imply that the highest dose resulted in a more sustained and potent reduction in blood glucose over time compared to the other doses. The result indicates the potential of *Phyllanthus niruri* as a therapeutic agent for managing blood glucose levels. Several researchers have documented the glucose-lowering capacity of *Phyllanthus niruri* noting variations based on the physiological states of the subjects (normoglyceamic vs diabetic) and the dosage applied. Okoli *et al*. (2010) demonstrated that a single dose of *Phyllanthus niruri* extract in albino rats reduced fasting blood sugar and suppressed postprandial rise in blood glucose in normal rat following a heavy glucose meal with maximum suppressive effect coinciding with the time of peak of blood glucose after meal. This agrees with the findings of this study. Similarly, this also concurs with the study by Nwanjo and Oze (2009) which revealed that in rats with streptozotocin-induced diabetes, an aqueous extract of *Phyllanthus niruri* leaf given at dosages of 120 and 240 mg/kg considerably reduced blood glucose levels. Additionally, this extract restored lipid abnormalities such as increased LDL-cholesterol and triglycerides and helped reduce weight loss associated with diabetes, indicating positive effects on glucose metabolism and lipid profiles. Correspondingly, Michel *et al*. (2016) found that acute oral administration of *Phyllanthus niruri* aqueous extract to normoglycaemic subjects caused a mild to moderate reduction in blood glucose levels that was not strictly dose related. In alloxan induced diabetic models, the extract was significantly more potent, reducing elevated glucose levels by approximately 44.29%. The plant's anti-hyperglycemic and antioxidative qualities were further supported by the fact that methanolic extract administration over a 21-day period in diabetic rats dramatically reduced blood glucose and triglyceride levels and improved oxidative stress markers in critical tissues like the liver, kidney, pancreas and muscle as reported by Kumar *et al*. (2019).

For haematological parameters, the findings in this study indicate that the chronic administration of *Phyllanthus niruri* extract daily for 28 days has a suppressive effect on haematological parameters in mice, with mild decrease in red blood cell count, white blood cell count, haemoglobin concentration and packed cell volume. This finding agrees with the one reported by Ahmed *et al*. (2025) who stated a significant dose-dependent alterations in haematological parameters after 28 days with decrease in packed cell volume (PCV) and red blood cell (RBC) counts. Similarly, Singh *et al*. (2015) reported haematological and biochemical alterations primarily at high doses (>2500 mg/kg). On the contrary, Asare *et al.* (2011) reported that there is no significant difference in full blood count or haemoglobin concentration at doses of up to 2000 mg/kg. For the RBC count, findings from this study indicates that even at a moderate dose, *Phyllanthus niruri* reduces RBC count over time. This study is consistent with the findings of Sachin *et al*. (2025), who also reported a decrease in RBC following administration of crude extract of *Phyllanthus nururi* in mice. For the WBC count, a significant decrease was observed by week 2 and week 3 and the most pronounced decrease occurred by week 4, indicating that the highest dose of *Phyllanthus niruri* causes a substantial reduction in WBC count over time. This finding disagrees with the report by Adedapo *et al*. (2005) in which a significant increase in neutrophils, monocytes and eosinophils was reported. Likewise, findings in this study is also in contrast with Ahmed *et al*. (2025) who reported an increase in white blood cell (WBC) counts, hemoglobin concentration, and mean corpuscular volume (MCV). Haemoglobin concentration results present that the highest dose of *Phyllanthus niruri* has the most significant effect on lowering hemoglobin concentration over time. This

study agrees with the report of Adedapo *et al.* (2005) who reported a decrease in hemoglobin concentration in rats treated with *Phyllanthus niruri.* On the contrary, this finding is not in agreement with Abubakar *et al*. (2020) who reported a dose dependent significant increase in PCV, Hb and RBC ($P \leq 0.001$) at 500 mg/kg and 1000 mg/kg but shows no significant increase at 250 mg/kg.

CONCLUSION

In conclusion, this study provides evidence that administration of *Phyllanthus niruri* aqueous extract significantly lower the fasting blood glucose level in normal albino mice. The significant differences observed across time points in all groups further underscore the potential of this extract as a modulator of blood glucose levels. Also, long term administration of the extract significantly alters haematological parameters by reducing the RBC count, WBC count, PCV and Hb concentration. The results could be relevant in understanding the plant's potential adverse effects on blood parameters in clinical or therapeutic settings, particularly in managing conditions related to red blood cell production or volume.

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Conflict of interest

The authors declare that there is no conflict of interest whatsoever with this work.

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