

## Haematological and Serum Biochemistry Indices of Broiler Chickens administered spotted pumpkin (*Lagenaria breviflorus*) Aqueous Extract

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### Abstract

Phytobiotics derived from plants contains bioactive compounds capable of improving animal health. *Adenopus breviflorus* fruit is one of the plants that have been identified to have phyto-genic properties based on the active compounds present in the fruit. Thus, there is need to explore the beneficial and medicinal effect of the fruit extract on broiler chickens. The fruit was harvested, washed and sliced into different proportions before soaking in water for 48 hours after which it was administered to the birds. The fruit extract was administered to the birds forth nightly from the first day of arrival of the birds. Treatments received 0g (Contains Antibiotics), 250g, 500g and 750g/L of *Adenopus breviflorus* aqueous extract respectively. One hundred and sixty day old arbor acre broiler chicks were randomly allotted into four treatments of four replicates having 10 birds per replicate. The experiment lasted for 8 weeks. Blood samples were collected on the 28<sup>th</sup> and 56<sup>th</sup> day for analysis. Results obtained showed that *Adenopus breviflorus* aqueous extract had no significant effect on haematological indices at both starter and finisher phases. Blood Serum indices showed that aspartate amino transferase (AST) was significantly higher ( $59.83 \pm 7.18$ ) in the control groups compared to significantly lower mean values ( $36.33 \pm 2.33$ ,  $28.67 \pm 4.51$ ) obtained from birds on 500g/L and 750g/L of extract at starter phase. Significantly lower triglyceride ( $230.30 \pm 15.65$ ,  $229.63 \pm 15.11$ ,  $223.78 \pm 7.05$ ) was obtained for the treatment groups compared to higher ( $243.65 \pm 22.94$ ) triglycerides obtained for the control groups at the finisher phase. Hence, *Adenopus breviflorus* fruit extract did not significantly influenced haematological indices but significantly improved AST at the starter phase while lowering blood triglycerides in broiler chickens at the finisher phase.

**Keywords:** *Adenopus breviflorus* fruit extract; Heamatology; Serum Indices; Broiler chickens; Phytobiotics

### Indices hématologiques et biochimiques sériques de poulets de chair ayant reçu un extrait aqueux de courge tachetée (*Lagenaria breviflorus*)

#### Résumé



Les phytobiotiques dérivés des plantes contiennent des composés bioactifs capables d'améliorer la santé animale. Le fruit d'*Adenopus breviflorus* est l'une des plantes identifiées comme ayant des propriétés phyto-géniques en raison des composés actifs présents dans le fruit. Ainsi, il est nécessaire d'explorer l'effet bénéfique et médicamenteux de l'extrait de ce fruit sur les poulets de chair. Le fruit a été récolté, lavé et coupé en différentes proportions avant d'être trempé dans l'eau pendant 48 heures, puis administré aux oiseaux. L'extrait de fruit a été administré aux oiseaux tous les quinze jours à partir du premier jour d'arrivée des oiseaux. Les traitements ont reçu respectivement 0g (contient des antibiotiques), 250g, 500g et 750g/L d'extrait aqueux d'*Adenopus breviflorus*. Cent soixante poussins de chair Arbor Acre d'un jour ont été répartis aléatoirement en quatre traitements avec quatre répétitions de 10 oiseaux chacune. L'expérience a duré 8 semaines. Des échantillons de sang ont été prélevés aux 28<sup>ème</sup> et 56<sup>ème</sup> jours pour analyse. Les résultats obtenus ont montré que l'extrait aqueux d'*Adenopus breviflorus* n'avait pas d'effet significatif sur les indices hématologiques, tant en phase de démarrage qu'en phase de finition. Les indices du sérum sanguin ont montré que l'aspartate amino-transférase (AST) était significativement plus élevée ( $59,83$

$\pm 7,18$ ) dans les groupes témoins par rapport aux valeurs moyennes significativement plus basses ( $36,33 \pm 2,33$ ,  $28,67 \pm 4,51$ ) obtenues chez les oiseaux recevant 500g/L et 750g/L d'extrait en phase de démarrage. Des triglycérides significativement plus bas ( $230,30 \pm 15,65$ ,  $229,63 \pm 15,11$ ,  $223,78 \pm 7,05$ ) ont été obtenus pour les groupes traités par rapport aux triglycérides plus élevés ( $243,65 \pm 22,94$ ) obtenus pour les groupes témoins en phase de finition. Ainsi, l'extrait de fruit d'*Adenopus breviflorus* n'a pas influencé significativement les indices hématologiques, mais a significativement amélioré l'AST en phase de démarrage tout en abaissant les triglycérides sanguins chez les poulets de chair en phase de finition.

**Mots-clés** : Extrait de fruit d'*Adenopus breviflorus* ; Hématologie ; Indices sériques ; poulets de chair ; Phytobiotiques

## **Introduction**

Medicinal properties of plants make them highly valuable resources that can be used in maintaining the gut health (Julian Flores *et al.*, 2025). Among medicinal plants and their parts that have beneficial effect is *Adenopus breviflorus*. *Adenopus breviflorus* (spotted pumpkin) is a seasonal creeping plant of the Gourd family found in several African countries (Islam, 2021). In West Africa, the fruit is commonly employed in traditional medicine as a natural remedy for various health issues, including measles, digestive problems, and wound care (such as umbilical cord incisions), due to its antiseptic properties. The fruit has also been used by livestock farmers in treating Newcastle disease and coccidiosis in various animal species, with a particular focus on poultry (Adedapo *et al.*, 2013). The fruit extract contains different phytochemicals such as phenols, alkaloids, carotenoids, and flavonoids (Ekunseitan *et al.*, 2016) capable of preventing cell damage and improving animal health. Research findings by Elujoba *et al.*, 1990; 1991; Banjo *et al.*, 2013; Balogun *et al.*, 2014 further confirmed that *Adenopus breviflorus* contain diverse range of bioactive compounds in the fruit, including triterpenoids, saponins, phenols, alkaloids, anthraquinones, flavonoids, tannins, and terpenoids (Oyedeki and Aderibigbe 2019). The fruit extracts have shown to possess potent anti-inflammatory properties, as reported by (Elujoba *et al.*, 1985, Onasanwo *et al.*, 2011, and Oridupa and Saba 2012). The presence of

qualitative and quantitative secondary metabolites makes the fruit extract a potential antibacterial and phytobiotic agent (Osuntokun *et al.*, 2019). Administration of *Adenopus breviflorus* extract has been reported to be safe, as evidenced by normal serum liver and kidney indices, and is capable in stimulating an immune response and enhancing the overall health of pullet chicks (Ekunseitan *et al.*, 2019). The presence of bioactive compounds in the fruit extract makes it a potential agent for anti-helminthic property which is capable of eradicating and suppressing oocyst count in the gut of broiler chickens (Adeyemo *et al.*, 2024). Despite the abundant beneficial effect of the fruit extract there is paucity of information on the phytobiotic effect on the haematological and serum biochemistry of broiler chickens. Hence, this study aims to evaluate the effect of *Adenopus breviflorus* aqueous extract on the haematological and serum biochemistry indices of broiler chickens.

## **Materials and Methods**

**Ethical Approval:** All procedures guiding animal welfare were strictly adhere to following the rules and regulations of Animal welfare committee of College of Animal Science and Livestock Production, Federal University of Agriculture, Abeokuta.

### **Experimental Site**

The experiment was carried out at the Poultry Unit of Teaching and Research farms, Federal University of Agriculture, Abeokuta, Ogun State.

The site is located in the rain forest vegetation zone of South-Western Nigeria on latitude 7° 13' 49.46' N, longitude 3° 26 11.98' E and altitude 76m above the sea level. The climate is humid with a mean annual rainfall of 1037mm and mean temperature and humidity of 34.7°C and 83%, respectively (Google Earth, 2022).

**Experimental animals and management**

A total of one hundred and sixty day old broiler chicks (*Arbor-Acre*) were purchased from a reputable hatchery in Nigeria. The experimental birds were raised in a deep litter management system. The pen was washed and disinfected two weeks before the arrival of the birds. The birds were fed with commercially produced broiler starter having (22% Crude protein and 2900kcal/kg Metabolizable Energy) while the broiler finisher had (19% CP, 3000Kcal/ kg Metabolizable Energy). The treatment consists of four groups of four replicates having 10 birds per replicates. The administration of the *Adenopus breviflorus* aqueous extract started on first day of the experiment. The experiment lasted for 8weeks. The birds have access to feed and water *adlibitum*.

**Preparation and administration test ingredient**

Whole fruit *Adenopus breviflorus* was sourced from nearby environment around the university and neatly washed to remove dirt; it was sliced

into smaller sizes and weighed into different proportions of (250, 500 and 750g/L of Water). The weighed *Adenopus breviflorus* fruit was soaked in clean water for 48hr to allow the release of the fruit nutrient into water. After soaking hours, the bark (Epicarp) of the fruit was removed as the fleshy portion inside the fruit has totally dispersed into the water after the soaking hours. The aqueous extract was administered orally through drinking water *adlibitum* to the birds on treatment basis for five days. The aqueous extract was prepared 48hr before usage daily for each other week (new aqueous extract prepared four times throughout the experiment) and administered every other week to the birds till the end of the experiment, while the 20% Enrofloxacin® antibiotics for the control was given orally for 5days as recommended by the manufacturer (Enrocare). Treatment groups were arranged thus:

Treatment 1: (Control : Enrofloxacin Antibiotics 20%), Treatment 2: 250g/L concentration of *Adenopus breviflorus* aqueous extract, Treatment 3: 500g/L concentration of *Adenopus breviflorus* aqueous extract, Treatment 4: 750g/L concentration of *Adenopus breviflorus* aqueous extract. Nutrient composition and phytochemical composition of the *Adenopus breviflorus* is shown in tables 1 and 2, respectively.

**Table 1. Nutrient composition of (*Lagenaria breviflorus*)**

<b>Parameters</b>	
Moisture (%)	84.33
Crude protein (%)	0.33
Crude fat (%)	0.03
Crude fibre (%)	4.75
Total ash (%)	1.06
Nitrogen free extract (%)	9.53

Adeyemi *et al.* (2015)

**Table 2: Phytochemical analysis of (*Lagenaria breviflorus*)**

Parameters	Values
Terpenoids (mg/100g)	146.67
Flavonoids (mg/100g)	222.00
Tannin ( mg/100g)	30.00
Alkaloids (mg/100g)	628.00
Phytate (mg/100g)	72.67
Phenols (mg/100g)	2800.00
Antioxidants (mg/100g)	12.00
Saponin (mg/100g)	138.00
Oxalate (mg/100g)	150.00
Carotenoids (ug/100g)	248.00

Adeyemi *et al.* (2015)

**Data Collection**

**Blood collection**

Blood samples were collected from four chickens per replicate for haematological and serum biochemical indices study on day 28 (end of starter phase) and day 56 (end of finisher phase) of the experiment. Blood was collected through the wing vein using a 5mL disposable syringe. 3ml of blood was dispensed into well labeled sterile anticoagulant bottles for haematological analysis and the remaining 2mL of the blood was dispensed into well labeled plain bottle for serum biochemical indices.

**Determination of haematological Indices**

The Packed cell Volume and Haemoglobin were determined using microhemacrit and cytomethaemoglobin methods respectively as outlined by Jain (1986). Red blood cells count was determined using haemocytometry method has outlined by Jain (1986).

White blood cell was determined using Neubauer counting chamber according to (Jain 1986).

The Mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and the mean corpuscular haemoglobin concentration were calculated using standard formulae (Samour 2015).

**Determination of Serum Parameters**

Serum protein was determined using Biuret method according to the procedures of (Lanzarote *et al.*, 2015). Albumin concentration

were carried out using the method described by Buckley *et al.* (1976) using Biuret method. Alanine and Asparate Aminotransferase were determined with the aid of spectrophotometer using commercial Randox kit. Serum globulin was estimated by subtracting the result of serum albumin from serum total protein.

**Statistical Analysis**

All data obtained were subjected to One-way Analysis of Variance (ANOVA) in a completely randomised design. Significant (P<0.05) means were separated using Duncan multiple Range Test using SAS (2001).

**Statistical model**

$$\sum x_{ij} = \mu + T_i + e_{ij}$$

Where,  $\sum x_{ij}$  = Observed response on ij

$\mu$  = Overall mean

$T_i$  = effect of treatment ith (*Adenopus breviflorus*)

$e_{ij}$  = residual error

**Results**

The effect of *Adenopus breviflorus* aqueous extract on haematological indices of broiler chickens at starter phase is shown in Table 3, there were no significant differences (p>0.05) observed in packed cell volume, haemoglobin, white blood cells, red blood cells, heterophils, lymphocytes, eosinophils, basophils, monocytes, mean corpuscular volume, mean corpuscular haemoglobin and mean corpuscular haemoglobin concentration.

**Table 3: Effect of *Lagenaria breviflous* aqueous extract on the haematological parameters of broilers chicken at starter phase**

Parameters	Control	250g/L	500g/L	750g/L	P-Value
Packed cell volume (%)	32.83 ± 1.49	33.50 ± 0.62	34.17 ± 1.01	35.0 ± 0.63	0.48
Haemoglobin (g/L)	10.95 ± 0.41	11.27 ± 0.34	11.62 ± 0.30	11.70 ± 0.65	0.39
Red blood cells (×10 <sup>12</sup> /L)	2.72 ± 0.22	2.85 ± 0.09	2.97 ± 0.12	2.92 ± 0.17	0.71
White blood cells (×10 <sup>9</sup> /L)	16.40 ± 0.41	17.37 ± 0.29	16.90 ± 0.48	17.83 ± 0.92	0.15
Heterophils (%)	24.33 ± 0.76	26.50 ± 1.06	25.67 ± 1.23	26.0 ± 1.21	0.54
Lymphocytes (%)	70.65 ± 1.58	71.67 ± 1.00	72.67 ± 1.20	72.50 ± 1.67	0.59
Eosinophils (%)	0.50 ± 0.27	0.67 ± 0.21	0.66 ± 0.24	0.67 ± 0.21	0.29
Basophils (%)	0.67 ± 0.21	0.65 ± 0.17	0.50 ± 0.22	0.45 ± 0.14	0.21
Monocytes (%)	0.67 ± 0.21	1.00 ± 0.26	1.00 ± 0.26	0.67 ± 0.33	0.68
Mean corpuscular Volume (fl)	123.04 ± 6.28	118.09 ± 4.17	115.97 ± 4.81	121.59 ± 5.54	0.77
Mean corpuscular haemoglobin (pg)	41.04 ± 1.91	39.67 ± 1.39	39.53 ± 2.09	40.58 ± 1.64	0.92
MCHC (g/L)	33.42 ± 0.48	33.61 ± 0.51	34.05 ± 0.60	33.43 ± 0.44	0.80

MCHC : Mean corpuscular haemoglobin concentration

The effect of *Adenopus breviflorus* aqueous extract on serum indices of broiler chickens at starter phase is presented in table 4. There were no significant differences ( $p > 0.05$ ) observed in total protein, albumin, globulin, alanine transferase and triglycerides. However, aspartate amino transferase (AST), was significantly

( $p < 0.05$ ) influenced by the levels of *Adenopus breviflorus* aqueous extract. Higher AST was obtained from the control groups ( $59.83 \pm 7.18$ ) compared to lower mean values ( $36.33 \pm 2.33$  and  $28.67 \pm 4.51$ ) obtained for birds on 500g/L and 750g/L of *Adenopus breviflorus* aqueous extract.

**Table 4: Serum biochemical indices of broiler chickens administered *Lagenaria breviflorus* aqueous extract at starter phase**

Parameters	Control	250g/L	500g/L	750g/L	P-value
Total Protein	5.45 ± 0.85	4.38 ± 0.16	4.78 ± 0.71	5.13 ± 0.93	0.76
Albumin (g/L)	4.00 ± 0.74	3.18 ± 0.17	3.10 ± 0.44	3.70 ± 0.77	0.66
Globulin (g/L)	1.45 ± 0.15	1.20 ± 0.10	1.18 ± 0.54	1.43 ± 0.20	0.39
Aspartate amino transferase (u/L)	59.83 ± 7.18 <sup>a</sup>	48.17 ± 10.45 <sup>ab</sup>	36.33 ± 2.33 <sup>b</sup>	28.67 ± 4.51 <sup>b</sup>	0.02
Alanine amino transferase (u/L)	20.00 ± 2.30	22.00 ± 5.41	18.67 ± 3.08	15.67 ± 3.61	0.09
Triglycerides (mg/L)	129.45 ± 29.12	119.35 ± 9.12	126.52 ± 9.60	146.78 ± 27.00	0.46

<sup>a, b</sup>: Means in the same row with different superscripts differ significantly ( $p < 0.05$ )

The influence of *Adenopus breviflorus* aqueous extract on haematological indices of broiler

chickens at finisher phase in table 5 showed that there were no significant ( $p>0.05$ ) differences in all the indices measured at the finisher phase.

**Table 5: Effect of *lagenaria breviflorus* aqueous extract on Heamatological Parameters of broiler chickens at finisher phase**

Parameters	Control	250g/L	500g/L	750g/L	p-value
Packed cell volume (%)	31.83 ± 1.05	34.00 ± 0.93	33.00 ± 0.78	36.00 ± 2.68	0.31
Haemoglobin (g/L)	10.83 ± 0.39	11.47 ± 0.37	11.25 ± 0.33	12.08 ± 0.93	0.42
Red blood cell ( $\times 10^{12}/L$ )	2.65 ± 0.09	2.82 ± 0.09	2.75 ± 0.07	3.12 ± 0.24	0.14
White blood cells ( $\times 10^9/L$ )	10.92 ± 0.24	12.85 ± 1.05	11.93 ± 1.04	12.32 ± 0.73	0.43
Heterophils (%)	36.33 ± 2.42	31.83 ± 3.23	31.67 ± 3.08	30.83 ± 1.62	0.35
Lymphocytes (%)	63.00 ± 2.57	69.00 ± 3.55	66.50 ± 3.05	68.33 ± 1.56	0.44
Eosinophils (%)	0.67 ± 0.21	0.50 ± 0.22	0.17 ± 0.17	0.00 ± 0.00	0.05
Basophils (%)	0.33 ± 0.21	0.17 ± 0.17	0.50 ± 0.22	0.50 ± 0.34	0.74
Monocytes (%)	0.00 ± 0.00	0.50 ± 0.34	1.17 ± 0.54	0.33 ± 0.21	0.13
MCV (fl)	119.80 ± 0.14	120.83 ± 0.96	119.27 ± 0.54	115.97 ± 3.21	0.24
MCH (pg)	40.83 ± 0.38	40.73 ± 0.37	40.57 ± 0.34	38.93 ± 0.96	0.09
MCHC (g/L)	34.07 ± 0.30	33.68 ± 0.22	34.05 ± 0.41	33.55 ± 0.29	0.57

MCV: Mean corpuscular Volume, MCH: Mean corpuscular haemoglobin, MCHC: Mean corpuscular haemoglobin concentration.

The result at finisher phase in table 6 showed that *Adenopus breviflorus* aqueous extract had no significant ( $p>0.05$ ) effect on all serum biochemistry indices of broiler chickens except for triglyceride. Higher triglycerides was

obtained from the control groups (243.65± 22.94) compared to similar statistical lower mean values obtained for 250g/L, 500g/L and 750g/L of *Adenopus breviflorus* aqueous extract, respectively.

**Table 6: Effect of *Lagenaria breviflorus* aqueous extract on serum biochemistry indices of broiler chickens at finisher phase**

Parameters	Control	250g/L	500g/L	750g/L	P- value
Total Protein	5.75 ± 0.21	6.03 ± 0.36	6.30 ± 0.38	5.73 ± 0.20	0.50
Albumin(g/L)	3.30 ± 0.15	3.47 ± 0.37	3.68 ± 0.36	3.12 ± 0.24	0.58
Globulin (g/L)	2.43 ± 0.15	2.57 ± 0.04	2.65 ± 0.09	2.60 ± 0.15	0.59
AST (u/L)	63.50 ± 14.16	74.33 ± 24.44	77.67 ± 25.71	75.17 ± 26.91	0.82
ALT (u/L)	31.50 ± 6.09	30.83 ± 11.26	32.33 ± 13.83	24.67 ± 8.02	0.86
TRIG (mg/L)	243.65± 22.94 <sup>a</sup>	230.30± 15.65 <sup>b</sup>	229.63 ± 15.11 <sup>b</sup>	223.78 ± 7.05 <sup>b</sup>	0.03

AST – Aspartate amino transferase, ALT- Alanine amino transferase, TRIG- Triglycerides

## Discussion

The effect of *Adenopus breviflorus* aqueous extract on haematological indices of broiler

chickens at starter phase showed that there were no significant differences ( $p>0.05$ ) observed in all the indices measured. The non-significant

differences obtained in this study might be attributed to the level of concentration used and soaking hours compared to other earlier research findings about the fruit aqueous extract. The result obtained in this study is in contrast with the findings of Nworgu et al. (2018) and Irivboje and Olufayo (2023) who reported significant differences in broiler birds offered fermented *Adenopus breviflorus* fruit extract. The result obtained in this study though not significant is within the ranges for healthy broiler chicken. This shows that the aqueous extract of *Adenopus breviflorus* was able to confer required immunity on the immune system of broiler chickens as it competed favorably with conventional antibiotics. The significant difference obtained by Nworgu et al. (2018), Irivboje and Olufayo (2023) can be attributed to longer soaking 72hr and fermentation days of the fruit extract which ensured deposition of nutrients and phytochemicals (Alkaloids and flavanoids) that altered haematological parameters compared to 48 hours used for this study.

The effect of *Adenopus breviflorus* aqueous extract on serum biochemical indices of broiler chickens at starter phase showed that there were no significant differences ( $p>0.05$ ) observed in all the serum indices measured except for (AST) that was significantly ( $p<0.05$ ) influenced by the phytobiotic extract. The result obtained on AST at the starter phase in this study supports the findings of Irivboje and Olufayo (2023) who reported significant ( $p<0.05$ ) differences in AST in broiler chickens administered *Adenopus breviflorus* aqueous extract 7days post hatch. This result showed that the level of AST was decreasing as the level of aqueous extract of *Adenopus breviflorus* increases. This findings showed that the *Adenopus breviflorus* was able to reduce or control the damage to tissues, plasma membrane and cells in the system which implies that aqueous extract of *Adenopus breviflorus* is capable of protecting and maintaining the plasma membrane and cell systems in broiler chickens at

the early stage of life which further confirms that the extracts of *Adenopus breviflorus* contains some bioactive compounds that are capable of protecting the immune system of the birds thereby acting as a phytobiotic

The effect of *Adenopus breviflorus* on haematological indices of broiler chickens at finisher phase showed that there were no significant ( $p>0.05$ ) differences in all the indices measured. The non-significant effect obtain on the haematological indices might be attributed to reduced soaking and fermentation hours compared to what was reported by other authors. The result obtained in this study is contrary to the findings of Nworgu et al. (2018) who reported significant differences in broiler birds offered fermented *Adenopus breviflorus* fruit extract at the end of finisher phase. The result obtained at finisher phase further ascertain the effectiveness of *Adenopus breviflorus* as a phytogetic plant capable of conferring necessary immunity on broiler chickens at finisher phase of the experiment as the result shows that the immune system of the birds was not challenge nor the test ingredient toxic to them.

Effect of *Adenopus breviflorus* aqueous extract on serum biochemistry indices of broiler chickens at finisher phase showed that triglyceride was significantly influenced by the levels of *Adenopus breviflorus*. Higher triglyceride was obtained from the control groups compared to other dietary treatment groups. Triglyceride was decreasing as the levels of *Adenopus breviflorus* aqueous extract increases. This result could be attributed to the presence of some bioactive compound present in the test ingredient capable of lowering triglycerides thereby preventing excessive accumulation of triglycerides in the blood stream and body of the broiler chickens. This result is contrary to the findings of Ekunseitan et al. (2019) who reported no significant differences in triglycerides when *Adenopus breviflorus* was administered to pullets at 8 weeks of age.

The result obtained on total protein, albumin and globulin though not significant supports the findings of Nworgu et al (2018) who reported no significant differences when fermented *Adenopus breviflorus* fruit aqueous extract was administered to broiler chickens at 8 weeks of age. This result further proves the phytobiotic activity of the *Adenopus breviflorus* as serum indices mentioned above were not altered by the levels of administration. The results obtained on Alanine Aminotransferase at the finisher phase in this study is contrary to the findings of Nworgu et al. (2018) who reported significant difference when broiler chickens were administered fermented *Adenopus breviflorus* fruit extract. The result obtained in this study might be attributed to dose dependency and level of concentration of the aqueous extract that did not influence the serum indices.

#### **Conclusion**

This present study demonstrated that aqueous extract of *Adenopus breviflorus* fruit at 250g/L, 500g/L and 750g/L could be administered to broiler chickens either at the starter phase or finisher phase without any deleterious effect on the haematological and serum biochemistry indices of broiler chickens as this study showed that all indices measured were within normal ranges for healthy chickens. Liver and kidney indices showed that the dosage of the aqueous extract did not cause plasma membrane damage to the organs and the aqueous extract is capable of preventing excessive accumulation of triglycerides in the blood stream of chickens.

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