



EFFECTS OF CASHEW (*Anacardium occidentale* L.) LEAF EXTRACT INCLUSION ON GROWTH PERFORMANCE AND HAEMATOLOGICAL INDICES OF BROILER CHICKENS

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ABSTRACT

This study investigated the effects of aqueous cashew leaf extract (ACLE) inclusion on growth performance and haematological indices of broiler chickens during the starter (1–21 days) and finisher (22–42 days) phases. A total of 120 one-day-old chicks were randomly allotted to four treatments, with three replicates of ten birds each, in a completely randomised design. Treatment 1 received 5% antibiotics (tetracycline) at 1 g per litre of water, while treatments 2, 3 and 4 received 20, 40 and 60 mL of 5% cashew leaf extract in one litre of water, respectively, without antibiotics. Birds were exposed to ACLE in drinking water for two hours daily, with feed and water provided ad libitum. Growth performance parameters and haematological indices were assessed at the end of each phase, while data obtained were subjected to ANOVA using SPSS. Growth performance was not significantly affected in either phase. In the starter phase, haemoglobin (8.27–10.13 g/dL), mean corpuscular volume (124.55–127.84 fL), white blood cells ($12.50\text{--}13.34 \times 10^9/\text{L}$), lymphocytes (66.13–68.75%) and monocytes (0.73–1.02%) differed significantly ($p < 0.05$). At the finisher phase, packed cell volume (31.25–33.61%) and mean corpuscular volume (140.62–162.88 fL) showed significant ($p < 0.05$) variation. All other haematological indices remained within normal physiological ranges. These findings indicate that ACLE inclusion up to 60 mL/L had no deleterious effects on the broiler chickens at both phases, maintaining growth performance and haematological indices. Moderate inclusion levels

(20–40 mL/L) are recommended to support optimal immune and physiological responses, highlighting the potential of cashew leaf extract as a safe alternative to synthetic antibiotic growth promoters.

Keywords: Broiler chickens; Cashew leaf extract; Growth performance; Haematology

INTRODUCTION

The use of antibiotics revolutionised poultry production by improving growth performance and preventing infectious diseases. The poultry industry has long relied on antibiotics as growth promoters to enhance feed conversion efficiency, growth rate, and disease resistance (Chattopadhyay, 2014; Lee *et al.*, 2012). However, continuous and indiscriminate use of synthetic antibiotics has led to serious public health concerns, including the accumulation of drug residues in poultry products (Carvalho and Santos, 2016; Gonzalez and Angeles, 2017). Antibiotic residues, such as tetracyclines, aminoglycosides, and macrolides, have been found in livestock products (Diarra and Malouin, 2014), which can cause allergic reactions and disturb gut microbiota (Kummerer, 2009; Diarra and Malouin, 2014). Synthetic antibiotics have also contributed to the development of antimicrobial resistance in animals and the transmission of resistance genes from animals to human beings; hence, they were outlawed in many countries, including Nigeria (Dialoke *et al.*, 2020).

The European Union's prohibition on the use of synthetic antibiotics as growth promoters in livestock feed, due to consumer pressure and concerns about their harmful effects, has shifted the global paradigm from synthetic to natural alternatives, which have been proven to be healthier, cheaper, and safer. Medicinal plants rich in phenolics, flavonoids, tannins, saponins, and alkaloids have been found to promote gut health and inhibit pathogenic bacteria in poultry. They are the cheapest form of pharmacologically active substances and are known to produce certain chemicals such as phytobiotics that naturally possess antimicrobial effects against pathogenic bacteria (Panda *et al.*, 2006). Phytobiotics are bioactive plant-derived compounds that enhance appetite, stimulate digestive enzyme secretion, improve feed utilisation and exhibit antimicrobial, antioxidant, coccidiostatic or anthelmintic activities and immunomodulatory properties, in monogastric animals (Wenk, 2003; Ghasemi *et al.*, 2014; Dhama *et al.*, 2015).

The use of various herbs and medicinal plants has a long history in animal agriculture, particularly as natural remedies aimed at supporting animal health and performance. They have been used since ancient times as remedial measures against various animal ailments. Phytobiotics (natural growth promoters) are becoming more popular because of their natural, residue-free and non-toxic nature. One of these is the cashew plant leaves. Cashew (*Anacardium occidentale* L.) is widely cultivated in tropical regions, including Nigeria, and its leaves are rich in bioactive compounds such as flavonoids, anacardic acids, tannins, saponins, alkaloids and phenols (Akinpelu, 2001; Kubo *et al.*, 2006; Martinez *et al.*, 2012). These phytochemicals possess antimicrobial, antioxidant, and anti-inflammatory properties, making cashew leaves a potential natural phytobiotic in poultry nutrition. The cashew plant has assumed greater importance due to its pharmacological qualities (Farias dos Santos *et al.*, 2018). Cashew tree is a widely researched tree that has attracted worldwide recognition due to the content of its various bioactive compounds such as alkaloids 75.60 mg/g, flavonoid 8.57 mg/g, tannins 0.36 mg/g, saponins 277.7 mg/g, phenols 6.07 mg/g and phytate 2.04 mg/g which are responsible for its therapeutic properties, such as antioxidant, anti-inflammatory and immunomodulatory effects in animals (Martinez *et al.*, 2012).

Excessive concentrations of plant-derived metabolites can affect physiological processes, including disturbance in haematological indices (Mazzafera, 2002). Haematological parameters are important indicators of physiological status, reflecting erythropoiesis, oxygen transport, metabolic efficiency, and immune function (Ognik *et al.*, 2016). Although several studies have evaluated cashew leaf powder in broiler chickens, limited information exists on the use of aqueous cashew leaf extract administered through drinking water under tropical production conditions. Therefore, this study assessed the effect of graded levels of ACLE inclusion on growth performance and haematological indices of broiler chickens at the starter and finisher phases.

MATERIALS AND METHODS

Experimental Site

This experiment was carried out at the Poultry Section of the Livestock Unit, Value Addition Research Department, Cocoa Research Institute of Nigeria (CRIN), Ibadan (Latitude 7°30'N, Longitude 3°54'E; 200 m above sea level), Oyo State. Ibadan lies in a humid rainforest zone with annual rainfall of 2000 mm and mean solar radiation of 18 MJ/day.

Collection and Preparation of Cashew Leaf Extract

Young and mature cashew leaves were collected randomly from freshly pruned cashew trees (average age of 5 years) from the cashew plantation of Cocoa Research Institute of Nigeria, Ibadan. The leaves were rinsed under running tap water to remove dirt and foreign materials, and then air-dried for 12 days by placing the leaves on a dry, wide surface under shade, according to the methodology of Martinez *et al.* (2012). The air-dried leaves were milled into fine particles using a basic analytical grinding machine (IKA A11) equipped with a 1mm screen. The powder was stored in an airtight container and placed on a shelf. Fresh extracts were made daily by steeping fifty grams (50g) of the leaf powder in one litre of boiled (100°C) water and allowed to stand for one hour to attain 5% extract concentration. Subsequently, the mixture was filtered with a muslin cloth to obtain cashew leaf extract.

Experimental Birds, Housing and Management

A-day-old Arbor Acres broiler chicks (n=120) were purchased from a reputable hatchery in Ibadan, Nigeria. The birds were reared on deep litter spread on a concrete floor. The wood shavings used were at a depth of 12cm, and they were changed every fortnight. The chicks were brooded for the first two weeks. Vaccinations were administered following the standard protocol. Feed and water were provided *adlibitum*.

Experimental Design

The birds were randomly allotted to four treatment groups of three replicates, containing ten birds per replicate in a completely randomised design (CRD). The treatment groups were as follows: T2: 20 mL ACLE per litre of drinking water, T3: 40 mL ACLE per litre of drinking water, T4: 60 mL ACLE per litre of drinking water, while the control (T1) was offered 5% tetranor at 1g per litre of water. The experiment lasted 42 days, comprising a starter phase (1–21 days) and a finisher phase (22–42 days).

Data Collection

Growth performance

Body weights were obtained by collectively weighing the birds in a replicate and dividing the weight obtained by the number of birds in each replicate. Body weights were recorded weekly. Weight gain, feed intake, and feed conversion ratio (FCR) were calculated at each phase. Body weight gain was determined by subtracting the weight of the preceding week from the weight of the current week, while the feed conversion ratio was determined as described by Anaeto et al. (2009) as average weekly feed intake divided by average weekly weight gain. Mortality was monitored daily, and liveability was expressed as the percentage of birds that remained alive during a given production Period. Feed intake was obtained by the difference between the feed supplied and refused daily.

Table 1: Percentage Composition of Experimental Diets

Premix* - Vitamin A–10,000,000IU, Vitamin D3–500IU, Vitamin E–40,000mg, Vitamin K–2,000mg, Vitamin B1–1,500mg, Vitamin B2–4,000mg, Vitamin B6–40,000mg, Vitamin B12–200mg, Niacin–40,000mg, Panthothenic–10,000mg, Folic–1,000mg, Biotin–100mg, Choline Chloride–300,000mg, Manganese–80,000mg, Zinc–60,000mg, Iron–40,000mg, Copper–80,000mg, Iodine–800mg, Selenium–200mg, Cobalt–300mg, Antioxidant–100,000mg

Haematological analysis

Two birds from each replicate were randomly selected for sample collection on the two occasions (starter and finisher phases). About 2.5 mL of blood was collected via wing vein

Experimental Diet

The diet was formulated with 23.08% crude protein (CP) and 2972.68kcal/kg for the birds from one-day old to 21 days, and 20.11% CP and 3043.05kcal/kg from 22- 42 days.

Ingredients	Starter	Finisher
Maize	48.00	58.00
Soybeans meal	19.50	18.00
Fish meal	2.00	1.00
Groundnut cake	16.50	11.00
Wheat offal	9.50	7.00
Bone meal	2.50	3.00
Oyster shell	1.00	1.00
Vitamin premix	0.25	0.25
Methionine	0.25	0.25
Lysine	0.25	0.25
Salt	0.25	0.25
Total	100.00	100.00
Calculated analysis		
Metabolisable energy (kcal/kg)	2972.68	3043.05
Crude protein (%)	23.08	20.11
Crude fibre (%)	3.74	3.50
Ether extract (%)	4.13	3.87

puncture using a 5mL needle and syringe. The blood was deposited into well-labelled tubes, including ethylene-diamine-tetra-acetic acid (EDTA). The samples were placed into a sample container with ice packs and delivered to the laboratory for assessment. Haematological

components such as packed cell volume (PCV), red blood cell (RBC), and haemoglobin (Hb) concentration were determined using the procedure described (AOAC, 2005). White blood cell (WBC) and its differentials (heterophils, lymphocytes, monocytes, eosinophils, and basophils) were measured, while mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were calculated (Natt and Herrick, 1952; Campbell, 2015). The heterophils-lymphocytes ratio was determined as heterophils divided by lymphocytes.

Data analysis

Data were subjected to one-way analysis of variance using SPSS. Duncan multiple range test (Duncan, 1955) was used to separate the means when the means were significant at $P < 0.05$.

RESULTS AND DISCUSSION

Starter phase

Growth Performance: The growth performance parameters presented in Table 2 describe the response of broiler chickens to aqueous cashew leaf extract (ACLE) during the starter phase. Initial body weights were similar (42.65–42.84 g). Weight gain (1005–1083 g), final body weight (1048–1126 g) and feed intake (1494–1545 g) were not significantly affected ($P > 0.05$). The absence of a significant difference ($P > 0.05$) observed in final body weight and weight gain suggests that ACLE inclusion up to 60 mL/L did not interfere with nutrient utilisation or metabolic processes essential for early growth. The similarity in feed consumption across treatments also indicates that ACLE did not negatively influence palatability or appetite in broiler chickens at the starter phase. Feed conversion ratio (FCR) was also not significantly ($P > 0.05$) affected and ranged from 1.43 to 1.55. This suggests that the efficiency of feed utilisation was maintained across treatments, implying that ACLE inclusion did not impair digestive efficiency or nutrient absorption during the starter phase. Liveability was not significantly ($P > 0.05$) affected by treatment and ranged from 96.67–100.00%. This indicates that ACLE inclusion had no adverse effect on the survivability of the broiler chickens at the starter phase. This implies

that ACLE did not negatively affect nutrient intake or utilisation, corroborating previous findings on plant-derived probiotics (Wenk, 2003; Martinez et al., 2012).

able 2: Growth Performance of Broiler Chickens Offered Aqueous Cashew Leaf Extract at the Starter Phase

Parameters	T1 (control)	T2 (20mL/L)	T3 (40mL/L)	T4 (60mL/L)	SEM	P- value
Initial Body Weight (g)	42.78	42.84	42.77	42.65	0.08	0.44
Final Body Weight (g)	1071.34	1125.53	1096.00	1048.12	23.89	0.20
Weight Gain (g)	1028.42	1082.69	1053.30	1005.47	23.85	0.20
Feed Intake (g/bird)	1502.37	1545.09	1537.94	1493.70	21.44	0.31
FCR (feed/weight)	1.55	1.43	1.45	1.49	0.15	0.31
Liveability (%)	96.67	96.67	100.00	96.67	2.89	0.80

Means are similar (P >0.05); FCR=Feed Conversion Ratio; SEM: Standard Error of Mean.

Haematological Parameters: The haematological indices presented in Table 3 show the response of broiler chickens at the starter phase to aqueous cashew leaf extract (ACLE). Haematological indices are reliable indicators of health status, oxygen transport efficiency, immune competence, and the ability of the bone marrow to sustain erythropoiesis in growing broiler chickens. Packed cell volume (PCV) was not significantly (P> 0.05) affected by ACLE supplementation; values ranged from 31.25% in birds administered 20 mL/L ACLE (T2) to 34.12% in birds administered 40 mL/L ACLE (T3). This is within the normal physiological range of 25–45% reported by Mitruka and Rawnsley (1977), and demonstrates that ACLE did not hinder blood volume or red cell mass. Haemoglobin concentration differed significantly (P< 0.05) among treatments and ranged from 8.27 to 10.13 g/dL. All values fell within the normal physiological range of 7.0–13.0 g/dL reported by Mitruka and Rawnsley (1977), indicating that the oxygen-carrying capacity of the blood was maintained. The reduction in haemoglobin at T4 (8.27 g/dL) suggests that excessive inclusion may not further enhance haematological performance, reinforcing the concept that phytogetic additives are most effective at optimal rather than maximal doses. Red blood cell (RBC) count was not significantly (P> 0.05) influenced by ACLE and ranged from 2.55–2.82 × 10¹²/L. The consistency of RBC values across the treatments indicates that bone marrow activity and red blood cell production were not impaired by ACLE inclusion.

Mean corpuscular volume (MCV) was significantly ($P < 0.05$) influenced by ACLE, with values ranging from 124.55 fl in birds administered 40 mL/L ACLE to 127.84 fl in birds administered 20 mL/L ACLE. This suggests that ACLE affected the average size of red blood cells, likely reflecting subtle changes in erythrocyte maturation. However, mean corpuscular haemoglobin (MCH; 36.19–38.00 pg) and mean corpuscular haemoglobin concentration (MCHC; 29.17–31.08%) were not significantly ($P > 0.05$) affected, indicating that haemoglobin content and concentration within red blood cells remained stable. White blood cell (WBC) count was significantly ($P < 0.05$) affected by ACLE inclusion. Birds administered 20 mL/L ACLE recorded the lowest ($12.50 \times 10^9/L$) WBC count, while birds in the other treatment groups had comparable values. Considering the role of WBCs in immune defence, the reduced values observed with

Table 3: Haematological Parameters of Broiler Chickens Offered Aqueous Cashew Leaf Extract at the Starter Phase

Parameters	T1(control)	T2 (20mL/L)	T3 (40mL/L)	T4 (60mL/L)	SEM	P- value
Packed Cell Volume (%)	32.55	31.25	34.12	32.85	0.69	0.09
Haemoglobin (g/dL)	9.47 ^{ab}	10.13 ^a	9.57 ^{ab}	8.27 ^b	0.29	0.01
Red Blood Cells $\times (10^{12}/L)$	2.61	2.82	2.75	2.55	0.13	0.50
Mean Corpuscular Volume (fl)	125.02 ^{ab}	127.84 ^a	124.55 ^b	126.05 ^{ab}	0.72	0.05
MCH (pg)	37.42	36.19	38.00	36.75	0.47	0.10
MCHC (%)	30.25	29.17	29.84	31.08	0.44	0.08
White Blood Cells ($\times 10^9/L$)	13.34 ^a	12.50 ^b	13.09 ^{ab}	12.76 ^{ab}	0.15	0.02
Heterophil (%)	33.54	32.96	33.17	32.71	0.33	0.39
Lymphocyte (%)	68.75 ^a	66.13 ^b	67.28 ^{ab}	66.54 ^b	0.42	0.01
Heterophil/Lymphocyte	0.49	0.50	0.49	0.49	0.00	0.77
Monocyte (%)	0.73 ^c	0.98 ^a	0.85 ^b	1.02 ^a	0.03	0.00
Eosinophil (%)	0.32	0.34	0.34	0.31	0.02	0.55
Basophil (%)	0.19	0.27	0.21	0.21	0.02	0.12

Means within the same row bearing different superscripts differ significantly ($P < 0.05$). MCH = Mean Corpuscular Haemoglobin; MCHC = Mean Corpuscular Haemoglobin Concentration; SEM = Standard Error of Mean.

ACLE inclusion suggest a lowered immunological challenge, possibly reflecting the antimicrobial properties of cashew leaf extract. These findings suggest that ACLE may exert mild immunomodulatory effects and influence red blood cell size without compromising overall

health. Heterophil percentage was not significantly ($P > 0.05$) affected by ACLE and ranged from 32.71–33.54%, while lymphocyte percentage showed significant ($P < 0.05$) variation but remained within normal physiological limits, ranging from 66.13–68.75% as reported by Aiello and Mays (1998). The heterophil-to-lymphocyte (H/L) ratio remained stable (0.49–0.50), indicating the absence of stress-induced immune responses. Monocyte percentage was significantly ($P < 0.05$) influenced by ACLE, with higher values recorded in birds administered 20 mL/L (1.02%) and 60 mL/L (1.02%) ACLE, ranging from 0.73–1.02%. Monocytes are involved in phagocytosis and immune regulation; thus, their increase suggests that ACLE possesses immunomodulatory properties capable of enhancing innate immune activation. Basophil (0.19–0.27%) and eosinophil (0.31–0.34%) percentages were not significantly ($P > 0.05$) affected, indicating that ACLE did not provoke inflammatory or hypersensitivity reactions.

Finisher phase

Growth performance: The growth performance of broiler chickens offered aqueous cashew leaf extract during the finisher phase is presented in Table 4. Final body weight did not differ significantly ($P > 0.05$) across treatments and ranged from 2198.46 – 2333.70 g, while weight gain ranged from 1113.91–1247.79 g. The absence of significant ($P > 0.05$) differences suggests that ACLE inclusion did not impair growth performance during the finisher phase. The numerical increase observed at moderate inclusion levels indicates that ACLE did not negatively affect physiological processes associated with muscle accretion and growth at this stage. Total feed intake was not significantly ($P > 0.05$) influenced by ACLE and ranged from 1439.97–1536.52 g/bird. This indicates that feed consumption patterns remained consistent across treatments and that ACLE did not affect feed palatability during the finisher phase.

Feed conversion ratio (FCR) was not significantly ($P > 0.05$) affected and ranged from 1.23 to 1.30. The similarity in FCR values suggests that feed utilisation efficiency was maintained and that ACLE inclusion did not disrupt nutrient conversion into body tissue. Liveability was similar ($P > 0.05$) across groups at 100.00%, indicating that ACLE inclusion did not exert lethal or toxic effects on the broiler chickens during the finisher phase and that birds were able to tolerate the extract throughout the production cycle physiologically.

Haematological parameters: The haematological response of broiler chickens at the finisher phase to aqueous cashew leaf extract is presented in Table 5. Packed cell volume (PCV) was significantly ($P < 0.05$) affected by ACLE inclusion and ranged from 31.25–33.61%. These values, though below the physiological range of 35.00–55.00% reported by Kokore (2021), suggest that the narrow variation observed suggests that ACLE did not compromise blood volume at the finisher phase. The observed variation suggests that ACLE inclusion affected PCV in a dose-related manner, with moderate supplementation supporting better red cell concentration than larger inclusion. This improvement observed in T3 (33.61%) may be attributed to the vitamin and mineral composition of cashew leaves, including phosphorus, calcium, zinc, and copper, which are essential for blood formation (Martínez *et al.*, 2020).

Table 4: Growth Performance of Broiler Chickens Offered Aqueous Cashew Leaf Extract at Finisher Phase

Parameters	T1(control)	T2 (20mL/L)	T3 (40mL/L)	T4 (60mL/L)	SEM	P- value
Initial Body Weight (g)	1085.74	1084.12	1085.91	1084.55	0.61	0.18
Final Body Weight (g/bird)	2247.83	2312.19	2333.70	2198.46	57.39	0.39
Weight Gain (g/bird)	1162.09	1228.07	1247.79	1113.91	57.66	0.39
Total Feed Intake (g/bird)	1482.08	1509.31	1536.52	1439.97	31.08	0.23
FCR (feed/weight)	1.28	1.23	1.23	1.30	0.04	0.58
Liveability (%)	100.00	100.00	100.00	100.00	0.00	0.10

Means are similar ($p > 0.05$). FCR=Feed Conversion Ratio; SEM= Standard Error of Mean.

Haemoglobin concentration was not significantly ($P > 0.05$) affected by ACLE and ranged from 10.37–10.85 g/dL. These values fall within the normal physiological range reported by Mitruka and Rawnsley (1977), indicating that haemoglobin synthesis and oxygen-carrying capacity were maintained. Red blood cell (RBC) count was not significantly ($P > 0.05$) influenced by ACLE and ranged from $1.89\text{--}2.34 \times 10^{12}/\text{L}$. This stability suggests that erythropoietic activity remained unaffected by ACLE inclusion during the finisher phase. Mean corpuscular volume (MCV) differed significantly ($P < 0.05$) across treatments and ranged from 140.62 to 162.88 fl, indicating that ACLE influenced erythrocyte size. This variation suggests that ACLE influenced the

average size of red blood cells, reflecting changes in erythrocyte maturation rather than pathological alteration. However, mean corpuscular haemoglobin (MCH; 49.36–53.72 pg) and mean corpuscular haemoglobin concentration (MCHC; 30.41–31.87%) were not significantly ($P > 0.05$) affected, suggesting that haemoglobin content per cell and concentration remained stable.

White blood cell (WBC) count was not significantly ($P > 0.05$) affected by ACLE and ranged from $10.81\text{--}11.13 \times 10^9/\text{L}$. Differential leukocyte counts, including heterophils (16.72–17.25%), lymphocytes (74.75–76.22%), monocytes (1.07–1.30%), eosinophils (1.17–1.47%), and basophils (0.73–1.05%), were also not significantly affected. The heterophil-to-lymphocyte (H/L) ratio remained stable ($P > 0.05$) (0.22–0.23), indicating the absence of stress-related immune alterations. The stability of leukocyte profiles suggests that ACLE did not induce stress or immune suppression, consistent with its reported antimicrobial and antioxidant properties (Kubo *et al.*, 2006; Martinez *et al.*, 2012).

CONCLUSIONS AND RECOMMENDATIONS

Aqueous cashew leaf extract (ACLE) inclusion in drinking water up to 60 mL/L did not adversely affect growth performance, survivability, or haematological indices of broiler chickens at starter and finisher phases. Growth parameters remained similar ($P > 0.05$) across treatments, indicating that ACLE did not impair feed intake, feed efficiency, or weight gain. Haematological profiles were largely within normal physiological ranges, demonstrating that erythropoiesis, oxygen-carrying capacity, and immune status were not affected. The observed variations in selected blood parameters were mild and non-pathological, suggesting that broiler chickens were able to tolerate ACLE throughout the production cycle physiologically. It is therefore inferred that aqueous cashew leaf extract can be safely administered to broiler chickens in drinking water at levels up to 60 mL/L, with moderate inclusion levels of 20–40 mL/L being preferable as they support stable growth and favourable haematological responses. ACLE may serve as a potential natural additive without adverse effects on broiler performance. Further studies are recommended to evaluate its effects on biochemical, antioxidant and gut health indices.

Table 5: Haematological Parameters of Broiler Chickens Offered Aqueous Cashew Leaf Extract at Finisher Phase

Parameters	T1(control)	T2 (20mL/L)	T3 (40mL/L)	T4 (60mL/L)	SEM	P value
Packed Cell Volume (%)	32.56 ^{ab}	33.12 ^{ab}	33.61 ^a	31.25 ^b	0.32	0.04
Haemoglobin (g/dL)	10.68	10.37	10.85	10.56	0.27	0.66
Red Blood Cells × (10 ¹² /L)	2.34	2.09	1.89	1.92	0.13	0.14
Mean Corpuscular Volume (fl)	159.25 ^a	140.62 ^b	162.88 ^a	154.37 ^a	2.86	0.00
MCH (pg)	53.72	49.36	51.23	51.45	1.93	0.50
MCHC (%)	31.87	30.62	31.85	30.41	1.05	0.66
White Blood Cells (× 10 ⁹ /L)	11.13	11.00	10.81	10.96	0.31	0.90
Heterophil (%)	17.25	16.72	17.14	16.85	0.35	0.69
Lymphocyte (%)	76.22	74.75	76.06	75.12	0.72	0.45
Heterophil/Lymphocyte	0.23	0.22	0.23	0.22	0.00	0.98
Monocyte (%)	1.30	1.07	1.26	1.13	0.11	0.46
Eosinophil (%)	1.47	1.28	1.24	1.17	0.08	0.15
Basophil (%)	0.73	0.96	1.02	1.05	0.10	0.20

Means within the same row bearing different superscripts differ significantly ($P < 0.05$). MCH = Mean Corpuscular Haemoglobin; MCHC = Mean Corpuscular Haemoglobin Concentration; SEM = Standard Error of Mean.

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