



## Growth Performance and Haematological Indices of Rabbits (*Oryctolagus cuniculus*) Fed Different Forms of *Mondia whitei* Root

By

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### Abstract

The paper compared haematological indices and growth performance of weaned rabbits (*Oryctolagus cuniculus*) that were fed on various types of *Mondia whitei* root. Eighty crossbred rabbits (40 males, 40 females; 11 weeks old) were allocated to eight treatments in a 2 (sex) 4 (forms of *Mondia whitei*) factorial design with a completely randomized design. The four preparations were; control (no additive), powdered root (PMw, 100g/25kg feed), aqueous extract (AMw, 1 ml/L drinking water), and ethanol extract (EMw, 1 ml/L drinking water). Eight weeks of data on weight gain, feed intake, feed conversion ratio (FCR) and haematological parameters (PCV, Hb, RBC, WBC, neutrophils, lymphocytes, MCV, MCH, MCHC) were obtained and subjected to two ways analysis of variance. The findings indicated that male rabbits gained weight and had better FCR in comparison to females ( $P < 0.05$ ). EMw had the largest weight gain (519.14g), best FCR (3.66), whereas AMw and EMw had significant PCV, Hb, and WBC, relative to control and PMw ( $P < 0.05$ ). There were considerable sex-by-form interactions in weight gain, feed intake, FCR, PCV, Hb, RBC, WBC, MCV and MCH ( $P < 0.05$ ). Ethanol extract of *Mondia whitei* is suggested as a phytogetic feed supplement with positive effects on growth and haematological conditions of rabbits especially in males.

**Keywords:** Phytogetic additive, Ethanol extract, Haematology, Feed conversion ratio, Weaned rabbits

## INTRODUCTION

The growing world population requiring animal protein especially non-conventional sources like rabbits has enhanced the need to attain sustainable, efficient and welfare-oriented production systems. Rabbit production has unique benefits, such as high ratio of feed, high rate of growth, early sexual maturity and production of high quality and low cholesterol meat (Dalle Zotte, 2002).

Nevertheless, intensive rabbit rearing is typically criticized due to stress, vulnerability to enteric diseases, and inefficient nutrient uptake, which, in combination, undermines growth performance and deteriorates overall health condition (Khadiga *et al.*, 2024). Historically, to reduce these problems, sub-therapeutic antibiotic growth promoters (AGPs) have been used. However, increasing concerns about antimicrobial resistance, as well as the existence of drug residues in animal products, have driven the exploration of effective, safe, and

natural alternatives to AGPs in numerous countries (Lillehoj *et al.*, 2018).

Phytogetic feed additives (PFAs) are the most promising options, as these are bioactive compounds of plant origin that can increase palatability, promote the release of digestive enzymes, have antioxidant and immunomodulatory effects, and antimicrobial effects (Onyebuchi *et al.*, 2025).

In this regard, one plant that has been greatly ethnopharmacologically relevant is *Mondia whitei*, a perennial climbing plant native to sub-Saharan Africa. It is also referred to as White ginger or African ginger and its roots and rhizomes have been traditionally been used to treat numerous ailments such as anorexia, gastrointestinal illnesses and as an overall tonic and aphrodisiac (Oketch-Rabah, 2012). Phytochemical screening of *Mondia whitei* has shown an abundance of bioactive compounds, such as saponins, flavonoids, tannins, alkaloids, triterpenes, steroids, and phenolics (Gbadamosi & Erinoso, 2015; Defo Deeh *et al.*,



2024). It is postulated that these compounds have anabolic, antioxidant, and erythropoietic effects.

*Mondia whitei* has a potentially huge potential as a performance-enhancing feed additive in livestock, whose potential is still untapped. Early experiments with monogastric species have been successful. As an example, *Mondia whitei* extracts supplementation has been linked to increased feed intake, weight gain, and feed conversion ratio in broiler chickens, which could be partially mediated by increased nutrient absorption and decreased oxidative stress (Sanwo *et al.*, 2020).

Moreover, the quality of blood, red blood cell count, haemoglobin, haematocrit, and the profile of leukocytes directly indicate the carrying capacity of oxygen to the animal, its immune ability, and general metabolism (Katuromunda *et al.*, 2024). The desirable phyto-genic additive must not only stimulate growth, but also retain or even improve blood quality, which implies increased stress and disease resistance. The recent study on broiler chicken has shown that dietary supplementation with *Mondia whitei* can have an important effect in enhancing haemoglobin, red blood cell count, lymphocyte, indicating a positive effect on haematological indices (Elnaggar *et al.*, 2024; Ssekatawa *et al.*, 2025).

Thus, it is of utmost importance to study how this locally available, underutilised medicinal plant affects rabbit production so that low cost and sustainable feed additive can be developed in particular with the African smallholder farming system.

## MATERIALS AND METHODS

### Experimental Location

The experiment was conducted at the Rabbitry Unit of the Federal Polytechnic Ilaro, Nigeria. It is located in the humid tropical zone of south-western and lies in altitude of 141m above sea level and falls within latitude of 8°55'50"N and longitude 2°97'167"E (GPS display, 2026).

### Source and preparation of *Mondia whitei*

Fresh roots of *Mondia whitei* was obtained from local market in Ilaro. The roots were rinsed thoroughly to remove dirt and debris and were cut into small pieces and air dry at room temperature for seven days until a constant weight was obtained. Some of the dried roots were grounded into powder (PMw) using an electric blender and stored in airtight container for future use. 100g each were also soaked in; 500 ml of water and 500 ml of ethanol respectively for 48 hours, aqueous extract of *Mondia whitei* (AMw) and ethanol extract of *Mondia whitei* (EMw) were sieved from the mixture afterwards and used for the experiment.

### Housing and management of experimental animals

The rabbits were housed individually in a well ventilated, galvanized battery cage hutches equipped with concrete feeders and nipple drinkers. Routine management practices such as regular cleaning of feeders and drinkers were strictly observed throughout the experimental period.

### Experimental Animals and Management

A total of 80 crossed breed weaned rabbits comprising of 40 males and 40 females aged (11 weeks) were used for this study. Each treatment was replicated 5 times with 2 rabbits per replicate. Prior to dietary treatment, the animals were acclimatized to the experimental environment for a period of one week, during which they were fed a basal diet and provided clean water *ad libitum*, and afterwards introduced to the experimental diets for eight weeks.

### Experimental design

The experimental layout will be a 2 (sex of rabbit) by 4 (0, powder, water, and ethanol) forms of inclusion factorial arrangement. The design of the experiment was Completely Randomized Design. The treatment groups are presented below.

Treatment 1(control): male rabbit fed with basal diet without *Mondia whitei* and ordinary drinking water.

Treatment 2: male rabbit fed with basal diet with powder *Mondia whitei* in the feed and ordinary drinking water (100g of PMw mixed with 25 kg of feed).

Treatment 3: male rabbit fed with basal diet with aqueous extract of *Mondia whitei* (AMw) administered at 1 ml per liter of drinking water.

Treatment 4: male rabbit fed with basal diet with ethanol extract of *Mondia whitei* (EMw) administered at 1 ml per liter of drinking water.

Treatment 5 (control): female rabbit fed with basal diet without *Mondia whitei* and ordinary drinking water.

Treatment 6: female rabbit fed with basal diet with powder *Mondia whitei* in the feed and ordinary drinking water (100g of PMw mixed with 25 kg of feed).

Treatment 7: female rabbit fed with basal diet with aqueous extract of *Mondia whitei* (AMw) administered at 1 ml per liter of drinking water.

Treatment 8: female rabbit fed with basal diet with ethanol extract of *Mondia whitei* (EMw) administered at 1 ml per liter of drinking water

### Data collected

#### Body weight gain

The rabbit in each replicate will be weighed at the beginning of the experiment and weekly thereafter. The weight gains for each week will be obtained as the difference in the body weight of the rabbits weekly

**Weight gain (g) = Final weight (g) – Initial weight(g)**

#### Feed Intake

A known quantity of feed will be given to each rabbit while the leftover of feed will be weighed to determine daily feed intake and consequently weekly feed intake. The feed intake will be calculated by;

**Feed intake(g) = Feed supplied(g) – Feed leftover(g)**

**Feed conversion ratio (FCR)**

The feed conversion ratio of each rabbit will be determined by calculating the ratio of feed intake to weight gain and thus calculated as;

$$FCR = \frac{\text{Feed Intake}}{\text{Weight Gain}}$$

### Blood Sample Collection

At the end of the feeding trial, blood samples were collected from the rabbit through the marginal ear vein using sterile needle and syringe. The blood samples were collected into EDTA samples bottles. The samples were transported to the laboratory for haematology parameters evaluation in cold temperature.

### Statistical Analysis

All Data obtained were subjected to two ways analysis of variance. using the General Linear Model (GLM) procedure of SAS Institute (2015). Significant means were separated using Duncan's Multiple Range Test.

## RESULT AND DISCUSSION

### Results

Males recorded significantly higher ( $p < 0.05$ ) weight gain (503.2 g) and better FCR (3.83) than females (386.3 g; FCR 5.46), although feed intake and final

body weight were statistically similar as shown in table 1. Male rabbits exhibited better growth efficiency, likely due to higher anabolic hormonal activity and feed utilization efficiency. The superior FCR indicates that males converted feed to body mass more effectively.

Table 2 showed that Dietary form of *M. whitei* significantly affected weight gain and FCR ( $p < 0.05$ ). Rabbits fed the ethanol extract (EMw) had the greatest weight gain (519.14 g) and lowest FCR (3.66), indicating optimal feed efficiency. Aqueous extract (AMw) also improved performance over control and powdered forms.

Table 3 showed the interactions of sex and Dietary form of *M. whitei* on growth performance of weaners rabbit. were significant ( $p < 0.01$ ) for weight gain, feed consumed, and FCR. Male rabbits fed EMw exhibited the best growth performance and feed efficiency (weight gain = 610.67 g; FCR = 2.93). The superior male  $\times$  ethanol extract interaction highlights a synergistic effect between physiological factors (sex hormones) and phytochemical potency of EMw. Enhanced digestibility and better nutrient use likely contributed to this effect

**Table 1. effect of sex on growth performance of weaned rabbit fed *Mondia whitei***

TREATMENT	Initial Weight (g)	Final Weight (g)	Weight Gained (g)	Feed Consumed (g)	FCR
1 (Male)	2192.90±65.40	2696.10±67.40	503.20 <sup>a</sup> ±8.00	1926.50±83.90	3.83 <sup>a</sup> ±0.23
2 (Female)	2188.1 ± 56.60	2574.40 ± 58.40	386.30 <sup>b</sup> ±6.90	2058.30±72.60	5.46 <sup>b</sup> ±0.20
P-value	0.95	0.18	0.002	0.24	0.003

**Table 2. effect of forms of *Mondia whitei* on growth performance of weaned rabbit**

TREATMENT	initial weight (g)	final weight (g)	weight gained (g)	feed consumed (g)	FCR
1	2221.43±61.27	2615.86±68.06	394.43 <sup>c</sup> ±10.39	1978.29±167.02	4.99 <sup>ab</sup> ±0.32
2	2308.57±45.84	2719.71±40.82	411.14 <sup>b</sup> ±9.86	1812.00±194.11	4.47 <sup>b</sup> ±0.55
3	2094.29±110.14	2515.14±137.72	420.86 <sup>ab</sup> ±58.53	2361.29±231.52	5.91 <sup>a</sup> ±0.50
4	2136.43±98.26	2655.57±113.42	519.14 <sup>a</sup> ±32.86	1855.57±133.34	3.66 <sup>c</sup> ±0.37
P-value	0.29	0.52	0.05	0.17	0.01

Table 3. interaction effect of sex and forms of *Mondia whitei* on growth performance of weaned rabbit

Treatment (SEX×DIET)	Initial weight (g)	Final weight (g)	Weight gained (g)	Feed consumed (g)	FCR
1	2190.00 ± 17.32	2576.67 ± 27.82	386.67 ± 12.81 <sup>b</sup>	1667.00 ± 4.04 <sup>b</sup>	4.32 ± 0.15 <sup>b</sup>
2	2196.67 ± 12.02	2630.33 ± 15.25	433.67 ± 3.53 <sup>b</sup>	1271.00 ± 4.04 <sup>c</sup>	2.93 ± 0.03 <sup>a</sup>
3	2186.67 ± 17.64	2768.33 ± 18.32	581.67 ± 1.45 <sup>a</sup>	2978.00 ± 4.04 <sup>a</sup>	5.12 ± 0.02 <sup>c</sup>
4	2198.33 ± 11.67	2809.00 ± 11.15	610.67 ± 3.71 <sup>a</sup>	1790.00 ± 4.04 <sup>b</sup>	2.93 ± 0.01 <sup>a</sup>
5	2245.00 ± 112.06	2645.25 ± 23.11	400.25 ± 16.42 <sup>b</sup>	2211.75 ± 235.02 <sup>a</sup>	5.49 ± 0.40 <sup>c</sup>
6	2392.50 ± 42.50	3186.75 ± 47.14	394.25 ± 10.61 <sup>b</sup>	2217.75 ± 61.87 <sup>a</sup>	6.31 ± 0.15 <sup>c</sup>
7	2025.00 ± 196.41	2350.25 ± 95.37	325.25 ± 26.06 <sup>c</sup>	1898.75 ± 145.64 <sup>ab</sup>	5.12 ± 0.79 <sup>c</sup>
8	2090.00 ± 179.03	2540.50 ± 86.19	450.50 ± 10.41 <sup>b</sup>	1904.75 ± 245.65 <sup>ab</sup>	4.22 ± 0.50 <sup>b</sup>
P-values	0.52	0.15	0.00	0.00	0.00

Table 4 showed that both male and female rabbits maintained comparable physiological and immune profiles suggesting that *M. whitei* supplementation does not induce sex-dependent haematological changes.

In Table 5, Significant differences ( $p < 0.05$ ) were observed in PCV, Hb, WBC, MCV, and MCH. Rabbits fed AMw and EMw exhibited higher PCV (36–37%), Hb (12–12.3 g/dl), and WBC ( $6.6 \times 10^9/L$ ) compared to control (PCV 28.5%; Hb 9.7 g/dl).

The interactions table 6 showed Significant ( $p < 0.05$ ) difference across PCV, Hb, WBC, and differential counts. Male rabbits treated with AMw and EMw had the highest PCV (37–40%) and Hb (12.5–13.4 g/dl), indicating optimal red blood cell function.

Table 4. Effect of sex on haematological indices of weaned rabbit fed *Mondia whitei*

TREATMENT	PCV (%)	Hb (g/dl)	RBC ( $\times 10^{12}/L$ )	WBC ( $\times 10^9/L$ )	Neut (%)	Lym (%)	MCV (fl)	MCH (pg)	MCHC (g/dl)
1	33.00 ± 2.34	11.15 ± 0.80	5.80 ± 0.43	5.50 ± 0.34	44.00 ± 3.34	55.25 ± 3.22	56.48 ± 1.13	19.12 ± 0.41	33.87 ± 0.27
2	31.38 ± 1.84	10.56 ± 0.58	5.50 ± 0.28	5.70 ± 0.47	37.38 ± 3.05	61.63 ± 3.00	56.79 ± 1.12	19.17 ± 0.35	33.79 ± 0.20
P-VALUE	0.59	0.55	0.56	0.73	0.15	0.16	0.84	0.92	0.79

Table 5. Effect of forms of *Mondia whitei* on haematological indices of weaned rabbit

TREATMENT	PCV (%)	Hb (g/dl)	RBC ( $\times 10^{12}/L$ )	WBC ( $\times 10^9/L$ )	Neut (%)	Lym (%)	MCV (fl)	MCH (pg)	MCHC (g/dl)
1	28.50 ± 2.96 <sup>a</sup>	9.70 ± 0.99 <sup>a</sup>	5.23 ± 0.55	4.03 ± 0.32 <sup>a</sup>	49.00 ± 5.82	50.50 ± 5.60	54.26 ± 1.25 <sup>a</sup>	18.51 ± 0.42 <sup>a</sup>	34.15 ± 0.34
2	27.25 ± 3.55 <sup>a</sup>	9.23 ± 1.14 <sup>a</sup>	5.00 ± 0.64	5.10 ± 0.37 <sup>b</sup>	36.00 ± 2.74	63.25 ± 2.88	54.08 ± 0.73 <sup>a</sup>	18.41 ± 0.29 <sup>a</sup>	34.06 ± 0.39
3	36.25 ± 1.70 <sup>b</sup>	12.15 ± 0.62 <sup>b</sup>	5.95 ± 0.34	6.63 ± 0.38 <sup>c</sup>	36.00 ± 1.83	62.75 ± 1.74	60.91 ± 1.31 <sup>c</sup>	20.43 ± 0.54 <sup>c</sup>	33.52 ± 0.28
4	36.75 ± 0.48 <sup>b</sup>	12.35 ± 0.32 <sup>b</sup>	6.43 ± 0.29	6.65 ± 0.33 <sup>c</sup>	41.75 ± 5.59	57.25 ± 5.43	57.28 ± 1.08 <sup>b</sup>	19.25 ± 0.45 <sup>b</sup>	33.59 ± 0.31
P-values	0.02	0.02	0.16	0.00	0.14	0.15	0.00	0.01	0.44

Table 6. Interaction effect of sex and forms of *Mondia whitei* on haematological indices of weaned rabbit

TREATMENT	PCV (%)	Hb (g/dl)	RBC ( $\times 10^{12}/L$ )	WBC ( $\times 10^9/L$ )	Neut (%)	Lym (%)	MCV (fl)	MCH (pg)	MCHC (g/dl)
1	35.00 $\pm$ 0.58 <sup>c</sup>	11.80 $\pm$ 0.54 <sup>c</sup>	6.30 $\pm$ 0.52 <sup>c</sup>	4.40 $\pm$ 0.60 <sup>a</sup>	62.00 $\pm$ 0.54 <sup>c</sup>	38.00 $\pm$ 0.57 <sup>a</sup>	55.56 $\pm$ 0.58	18.73 $\pm$ 0.61	33.71 $\pm$ 0.59
2	20.00 $\pm$ 0.56 <sup>a</sup>	6.90 $\pm$ 0.56 <sup>a</sup>	3.80 $\pm$ 0.58 <sup>a</sup>	5.20 $\pm$ 0.53 <sup>b</sup>	42.00 $\pm$ 0.57 <sup>c</sup>	57.00 $\pm$ 0.58 <sup>b</sup>	52.63 $\pm$ 0.58	18.16 $\pm$ 0.56	34.50 $\pm$ 0.55
3	40.00 $\pm$ 0.62 <sup>d</sup>	13.40 $\pm$ 0.60 <sup>d</sup>	6.40 $\pm$ 0.54 <sup>c</sup>	6.00 $\pm$ 0.52 <sup>c</sup>	40.00 $\pm$ 0.68 <sup>c</sup>	59.00 $\pm$ 0.58 <sup>c</sup>	62.50 $\pm$ 0.45	20.94 $\pm$ 0.59	33.50 $\pm$ 0.58
4	37.00 $\pm$ 0.52 <sup>c</sup>	12.50 $\pm$ 0.68 <sup>c</sup>	6.70 $\pm$ 0.40 <sup>c</sup>	6.40 $\pm$ 0.43 <sup>c</sup>	32.00 $\pm$ 0.58 <sup>b</sup>	67.00 $\pm$ 0.62 <sup>d</sup>	55.22 $\pm$ 0.60	18.66 $\pm$ 0.44	33.78 $\pm$ 0.54
5	22.00 $\pm$ 1.15 <sup>a</sup>	7.60 $\pm$ 0.35 <sup>a</sup>	4.15 $\pm$ 0.03 <sup>a</sup>	3.65 $\pm$ 0.20 <sup>a</sup>	36.00 $\pm$ 0.00 <sup>b</sup>	63.00 $\pm$ 0.00 <sup>d</sup>	52.96 $\pm$ 2.41	18.30 $\pm$ 0.71	34.59 $\pm$ 0.24
6	34.50 $\pm$ 3.18 <sup>c</sup>	11.55 $\pm$ 0.89 <sup>c</sup>	6.20 $\pm$ 0.52 <sup>c</sup>	5.00 $\pm$ 0.58 <sup>b</sup>	30.00 $\pm$ 1.15 <sup>b</sup>	69.50 $\pm$ 1.44 <sup>c</sup>	55.53 $\pm$ 0.47	18.66 $\pm$ 0.12	33.61 $\pm$ 0.50
7	32.50 $\pm$ 0.29 <sup>b</sup>	10.90 $\pm$ 0.17 <sup>b</sup>	5.50 $\pm$ 0.17 <sup>b</sup>	7.25 $\pm$ 0.09 <sup>d</sup>	32.00 $\pm$ 0.58 <sup>b</sup>	66.50 $\pm$ 0.87 <sup>d</sup>	59.32 $\pm$ 2.39	19.91 $\pm$ 0.94	33.54 $\pm$ 0.23
8	36.50 $\pm$ 0.87 <sup>c</sup>	12.20 $\pm$ 0.40 <sup>c</sup>	6.15 $\pm$ 0.03 <sup>c</sup>	6.90 $\pm$ 0.40 <sup>c</sup>	51.50 $\pm$ 7.79 <sup>d</sup>	47.50 $\pm$ 7.22 <sup>a</sup>	59.34 $\pm$ 1.13	19.83 $\pm$ 0.57	33.41 $\pm$ 0.31

### Discussion

The fact that male rabbits showed a much higher weight gain (503.20 g vs. 386.30 g) and better FCR (3.83 vs. 5.46) than females (Table 1) is consistent with the existing information about rabbit physiology. Differences in hormones (androgenic effects on protein synthesis), especially in endocrine systems, mean that male rabbits have higher rates of muscle deposition and more efficient feed utilization (Dalle Zotte, 2002). This growth efficiency sexual dimorphism highlights the significance of sex-specific analysis in phyto-genic additive trials (Khadiga *et al.*, 2024).

The ethanol extract (EMw) of *Mondia whitei* yielded the highest weight gain (519.14 g) and the highest FCR (3.66) and was much better compared to the control, the powder, and even aqueous extract (Table 2). This observation indicates that ethanol is a better solvent to extract the bioactive compounds that are known to promote growth. Ethanol is said to extract a wider range of non-polar and moderately polar phytochemicals, like flavonoids, triterpenes, steroids, and alkaloids, potentially having anabolic and digestive enzyme-stimulating activities (Gbadamosi & Erinoso, 2015; Defo Deeh *et al.*, 2024). The fact that EMw is better than PMw means that the addition of powdered root to feed might not release enough bioactive compounds because of inadequate bioavailability or breakdown during digestion. This agrees with the findings by Sanwo *et al.* (2020), who indicated an improved growth of broilers fed on *Mondia whitei* extracts compared to that of broilers fed on raw powder.

It is a more complicated picture as shown by the interaction effects (Table 3). The weight gains (581.67 g and 610.67 g

respectively) in male rabbits fed AMw and EMw were very high with a good FCR (2.93 in both EMw and PMw in males). Nonetheless, the AMw females exhibited the lowest weight gain (325.25 g), and those on PMw had the highest FCR (6.31) which means that females were ineffective in response to the aqueous extract and powder form (Katurumunda *et al.*, 2024). This sex-specific reaction can be connected with the variations in the metabolism of phytochemicals or hormonal interactions. The presence of female rabbits on EMw that still achieved a reasonable performance (450.50 g gain, FCR 4.22) indicates that the ethanol extraction produces a formulation that is both effective between the sexes.

Haematological parameters are vital signs of animal health, oxygen carrying capacity and immunity. The findings revealed that AMw and EMw significantly enhanced PCV, Hb and WBC in comparison to control and PMw (Table 5). Rabbits fed EMw contained the highest number of RBCs (6.431  $12/L$ ) and the highest level of Hb (12.35 g/dl) whereas control animals contained the lowest values (PCV 28.50%, Hb 9.70 g/dl). These results are in line with Gbadamosi & Erinoso, (2015), who indicated improved haematological conditions in broiler chickens fed *Mondia whitei*. The increase in PCV and Hb indicates that it was an erythropoietic action, probably caused by the high levels of flavonoids and saponins in the extracts. These substances can either enhance the production of erythropoietin or enhance the use of iron (Bentaher, 2024).

The high increase of WBC levels in rabbits in AMw ( $6.63 \times 10^9/L$ ) and EMw ( $6.65 \times 10^9/L$ ) in respect to control ( $4.03 \times 10^9/L$ ) is a pointer of immunostimulatory effects. This is especially crucial in the situation of intensive rabbit

production, where stress and enteric diseases are prevalent (Lillehoj *et al.*, 2018). The percentage of lymphocytes tended to be higher in the treated groups indicating the presence of better adaptive immunity. The decreased neutrophil proportions of certain treated groups (e.g., males on EMw: 32%) compared to control males (62%) could be a marker of decreased inflammatory conditions because neutrophils normally increase in proportion to bacterial infection or stress. This is a desirable characteristic of phyto-genic additives, which is a kind of anti-inflammatory effect (Wasman & Alnaqshabandi, 2025).

The interaction effects (Table 6) revealed that male rabbits in control had high neutrophils (62%) and low lymphocytes (38) which suggests a potential subclinical stress or inflammation. In contrast, males on EMw had a balanced profile (32% neutrophils, 67% lymphocytes), suggesting immunomodulation. The haematological responses of female rabbits were better in response to AMw and EMw, but their growth performance was poor. This growth-haematology dissociation indicates that *Mondia whitei* has several independent actions; one on erythropoiesis and immunity (evident in both sexes) and the other on anabolic growth (more so in males).

MCV and MCH values were also substantially greater in AMw and EMw groups (Table 5), which demonstrates that red cells are normocytic (or slightly macrocytic) and have normal haemoglobin levels (Wasman & Alnaqshabandi, 2025). This eliminates the possibility of iron deficiency anaemia and proves the idea of an increased bone marrow activity. There was no difference in the MCHC between treatments, which supported the idea that the red cell size was proportional to haemoglobin synthesis.

## CONCLUSION

The study has conclusively shown that the weighed variety of *Mondia whitei* root supplementation can have significant impacts on the growth performance and haematological indices in weaned rabbits with significant sex-specific responses. Ethanol extract (EMw) proved to be the most effective form, with the greatest weight gain (519.14 g), the optimal feed conversion ratio (3.66), and much better PCV, Hb, RBC, and WBC counts than control and powder forms. The male rabbits had better growth parameters than their female counterparts but haematologically both sexes had benefits of the extracts.

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