# Growth parameters and Haematological profile of rabbits fed graded levels of potato vines silage

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**Target audience**: Rabbit farmers, feed millers, and nutritionist.

## Abstract
The study evaluated the growth parameters and haematological profile of rabbit feed graded level of potato vine (*Solanum Tuberosum*) and elephant grass (*Pennisetum Purpureum*) silage at the Rabbitry Unit, University of Port Harcourt Teaching and Research farm, Choba, Rivers State. Thirty grower rabbits of mixed breed *(New Zealand white and Chinchilla*) with initial weights of 1.3±0.2 kg (mean ±SD) and aged six (6) months were randomly assigned to five dietary treatment groups (n=6 per group, three replicates) in a completely randomized design (CRD). The treatments were: T1 (100% elephant grass silage, control), T2 (90% elephant grass + 10% potato vine silage), T3 (80% elephant grass + 20% potato vine silage), T4 (70% elephant grass + 30% potato vine silage), and T5 (60% elephant grass + 40% potato vine silage). Growth parameters, and Haematological profile were evaluated. Data was analyzed using SPSS 13 software and treatment means was differentiated using the Duncan. Result showed significant ($P<0.05$) differences in growth parameters, and haematological parameters among treatments. The study revealed that treatment T4 (70% Elephant grass + 30% Potato vine silage) was optimal with superior growth and haematological outcome. Thus, further research should be carried out to validate the findings of the current study in large scale rabbit production.

**Key words:** Growth Parameters, Haematological Profile, Rabbit, Silage.

## Description of the Problem
Rabbit farming provides income and animal protein to meet population demands (1). Feed quality and management practices are crucial for rabbit performance (2). Despite the flexibility in feedstuffs, formulating cost-effective and nutritious diets remains challenging (3). Haematological studies are essential for assessing animal health and nutritional quality of diets (4, 5). These studies help determine the safety of feed ingredients (6, 7) and their impact on livestock health (8). This study therefore aimed to evaluate the growth performance and haematological characteristics of rabbits fed elephant grass (*Pennisetum purpureum*) silage supplemented with varying levels of potato vine (*Solanum tuberosum*) silage.

### Materials and Methods
The study was conducted at the Rabbitry Unit, University of Port Harcourt Teaching and Research Farm, Choba, Rivers State, Nigeria. Elephant grass (*Pennisetum purpureum*) and potato vine (*Solanum tuberosum*) were harvested at the nutritive stage in Rivers State, wilted for 24 hours, chopped into 2cm fragments, mixed with molasses to enhance palatability, compressed into buckets, sealed, and ensiled for 30 days. Five experimental diets were formulated to meet the nutritional requirements of grower rabbits, based on NRC (1977) guidelines. Diet (T1) is Elephant grass (100%) which served as control while diets T2 (90% Elephant grass + 10% Potato vine silage), T3 (80% Elephant grass + 20% Potato vine silage), T4 (70% Elephant grass + 30% Potato vine silage) and T5 (60% Elephant grass + 40% Potato vine silage). Thirty grower rabbits (New Zealand White × Chinchilla, initial

weight 1.3 ± 0.2 kg, aged 6 months) were acclimatized for 7 days, balanced for weight, and randomly assigned to five treatment groups (n=6 per group, three replicates) in a completely randomized design (CRD). Rabbits were individually housed in hutches (60 × 43 × 43 cm) with *ad libitum* access to diets and clean water for 6 weeks. The experiment was approved by the University of Port Harcourt Animal Ethics Committee.

**Data Collection**

**Growth Parameters**

Growth performance parameters (initial weight, final weight, daily weight gain, total feed intake, feed conversion ratio) were measured over 6 weeks. Feed intake was recorded daily by weighing offered and residual feed and rabbits were weighed weekly using a Camry scale (precision ±0.01kg) to calculate ADG and FCR.

**Haematological profile**

At the end of the 6th week trial, blood samples were collected from one rabbit per replicate for hematological analysis. 2.5mL of blood was collected via jugular vein puncture into EDTA bottles, following methods described by (10), (11), and (12).

**Statistical analysis**

Data were analyzed using SPSS Version 23 with one-way analysis of variance (ANOVA). Significant differences among treatment means were determined using Duncan's Multiple Range Test at a 5% probability level.

**Results and Discussion**

Growth performance parameters (Table 1) showed significant ($P<0.05$) differences in final weight, average daily gain, and feed conversion ratio among treatments, consistent with findings by Ekwe et al. [13]. The improved final weight in T4 (70% elephant grass + 30% potato vine silage) and T5 (60% elephant grass + 40% potato vine silage) may be attributed to the silage quality as in tandem with (14) who confirmed that ensiling likely enhanced digestibility and palatability.

Haematological parameters (Table 2) showed significant ($P<0.05$) differences in red blood cell (RBC) count, white blood cell (WBC) count, platelet count, mean corpuscular haemoglobin concentration (MCHC), mean corpuscular haemoglobin (MCH), mean corpuscular volume (MCV), eosinophils, and monocytes, consistent with Olafadehan [15]. Elevated RBC and MCH in T4 suggest improved erythropoiesis, possibly due to enhanced nutrient absorption [16]. Increased WBC counts may reflect an immune response, though signify the presence of foreign materials in the system, [17]. Higher platelet counts indicate improved clotting potential [16]. Variations in MCV, eosinophils, and monocytes suggest dietary impacts on blood cell dynamics [17], though anti-nutritional factors (e.g., glycoalkaloids) in potato vines warrant further investigation.

**Table 1 Performance parameters of rabbits fed graded levels of the test diet**

| Parameters | $T_1$ | $T_2$ | $T_3$ | $T_4$ | T5 |
|---|---|---|---|---|---|
| Initial weight (g) | 1541.66±31.79 | 1380.00±31.79 | 1580.00±31.79 | 1683.33±31.79 | 1265.00±31.79 |
| Final weight (g) | $2055.00^{ab}$±74.88 | $1938.33^{b}$±74.88 | $2143.33^{ab}$±74.88 | $2305.00^{a}$±74.88 | $2298.33^{a}$±74.88 |
| Av. Weight gain (g/d) | $85.56^{b}$±9.11 | $93.05^{b}$±9.11 | $93.89^{b}$±9.11 | $103.61^{b}$±9.11 | $172.22^{a}$±9.11 |
| Feed intake (conc) (g) | $340.89^{b}$±12.61 | $343.28^{b}$±12.61 | $343.16^{b}$±12.61 | $354.55^{ab}$±12.61 | $376.72^{a}$±12.61 |
| Feed intake (silage) (g) | $354.61^{b}$±2.44 | $359.88^{ab}$±2.44 | $370.55^{ab}$±2.44 | $364.55^{ab}$±2.44 | $377.55^{a}$±2.44 |
| Total feed intake (g) | $695.50^{b}$±14.93 | $703.16^{b}$±14.93 | $713.72^{b}$±14.93 | $719.11^{b}$±14.93 | $754.22^{a}$±14.93 |
| Feed efficiency | $0.12^{b}$±0.01 | $0.13^{ab}$±0.01 | $0.14^{ab}$±0.01 | $0.14^{ab}$±0.01 | $0.22^{a}$±0.01 |

[a,b] Means across rows showing significant ($P<0.05$) difference among the treatment groups.

**Table 2: The effects of feeding varying levels of ensiled materials on Haematological parameters in rabbits**

| Parameters | $T_1$ | $T_2$ | $T_3$ | $T_4$ | $T_5$ |
|---|---|---|---|---|---|
| PCV | 32.00±1.15 | 35.66±1.15 | 33.66±1.15 | 35.66±1.15 | 32.33±1.15 |
| Hb | 11.10±0.58 | 11.20±0.58 | 11.43±0.58 | 12.50±0.58 | 10.93±0.58 |
| RBC | $4.73^{b}$±0.23 | $4.73^{b}$±0.23 | $4.96^{b}$±0.23 | $6.16^{a}$±0.23 | $4.70^{b}$±0.23 |
| WBC | $4.00^{bc}$±0.11 | $3.60^{c}$±0.11 | $3.96^{bc}$±0.11 | $4.86^{a}$±0.11 | $4.53^{ab}$±0.11 |
| Platelet | $197.33^{c}$±16.79 | $417.66^{a}$±16.79 | $382.66^{ab}$±16.79 | $419.66^{a}$±16.79 | $230.60^{bc}$±16.79 |
| MCHC | $32.16^{b}$±0.32 | $33.60^{a}$±0.32 | $32.90^{ab}$±0.32 | $33.43^{a}$±0.32 | $32.86^{ab}$±0.32 |
| MCH | $22.36^{b}$±0.31 | $22.06^{b}$±0.31 | $21.93^{b}$±0.31 | $23.50^{a}$±0.31 | $21.96^{b}$±0.31 |
| MCV | $65.33^{b}$±0.88 | $67.60^{ab}$±0.88 | $69.43^{a}$±0.88 | $66.16^{ab}$±0.88 | $66.80^{ab}$±0.88 |
| N | 38.66±0.88 | 46.30±0.88 | 46.53±0.88 | 42.00±0.88 | 47.33±0.88 |
| L | 56.00±0.57 | 43.00±0.57 | 50.00±0.57 | 47.00±0.57 | 45.33±0.57 |
| E | $1.66^{b}$±0.33 | $5.66^{a}$±0.33 | $2.33^{b}$±0.33 | $3.00^{b}$±0.33 | $3.66^{ab}$±0.33 |
| M | $4.33^{c}$±0.33 | $9.00^{a}$±0.33 | $5.33^{c}$±0.33 | $8.00^{ab}$±0.33 | $6.33^{bc}$±0.33 |

$^{a,b,c}$Means across rows showing significant (P<0.05) difference among the treatment groups, PCV= Packed cell volume, Hb=Haemoglobin, RBC=Red blood cell, WBC=White blood cell, MCHC=Mean corpuscular haemoglobin concentration, MCH=Mean corpuscular Haemoglobin, MCV=Mean corpuscular volume, N=neutrophile, L=Lymphocyte, E=Eosinophil, M=Mononcyte.

**Conclusion and Application**

Incorporating potato vine silage with elephant grass improved rabbit growth performance and haematological parameters. A diet of 70% elephant grass + 30% potato vine silage (T4) is recommended for optimal growth and haematological outcomes, pending further analysis of anti-nutritional factors and cost-effectiveness.

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