Int. J. Poult. Sci., 2026, 25: 8-16 | DOI: 10.3923/ijps.2026.8.16

International Journal of Poultry Science

Check for updates

RESEARCH ARTICLE

Effect of Partial Replacement of Soybean Meal (*Glycine max* L. Merr, 1917) by Cashew Nut Meal (*Anacardium occidentale* L., 1753) on the Zootechnical and Economic Performances of Cobb 500 Broiler Chickens in Burkina Faso

[1]André Zongo, [2]René Tikwindé Zongo, [1]Arouna Ouedraogo and [1]Valerie Marie Christiane Bougouma-Yaméogo

[1]Université Nazi BONI, BP 1091, Bobo-Dioulasso 01, Burkina Faso
[2]Centre de Promotion de l'Aviculture et de la Multiplication des Animaux Performants (CPAMAP) BP 632, Bobo-Dioulasso 01, Burkina Faso

Key words:
Broiler chicken, Burkina Faso, cashew nut meal, soybean meal

Corresponding Author:
André Zongo,
Université Nazi BONI, BP 1091, Bobo-Dioulasso 01, Burkina Faso
Tel: +226 76 88 90 34

Cite this Article:
Zongo, A., R.T. Zongo, A. Ouedraogo and V.M.C. Bougouma-Yaméogo, 2026. Effect of partial replacement of soybean meal (*Glycine max* L. Merr, 1917) by cashew nut meal (*Anacardium occidentale* L., 1753) on the zootechnical and economic performances of Cobb 500 broiler chickens in Burkina Faso. Int. J. Poult. Sci., 25: 8-16.

Abstract

Background and Objective: In Burkina Faso, fluctuations in the availability and cost of soybean meal constitute major constraints for poultry farmers, particularly during certain periods of the year. This study therefore sought to identify alternative locally available protein sources capable of replacing soybean meal while sustaining or enhancing the production performance of broiler chickens.
Materials and Methods: The experiment followed a completely randomized block design comprising three dietary treatments with three replications, conducted in a henhouse partitioned into nine pens. A total of 225 one-day-old Cobb 500 broiler chicks were randomly assigned to three diets: A control diet Containing Soybean Meal (RSM), a diet containing 2% cashew nut meal (RCNM-2%) and a diet containing 2.5% cashew nut meal (RCNM-2.5%).
Results: Soybean meal exhibited a higher Total Nitrogen Matter (TNM) content (43%) compared with cashew nut meal (13.48%). Experimental results showed that birds fed the RSM diet had a significantly higher mean live weight (1,322.67±168.33 g) than those receiving RCNM-2% (1,169.00±177.25 g) and RCNM-2.5% (1,235.46±171.00 g). However, during the starter phase, the performance of birds fed RCNM-2.5% was statistically comparable to that of birds fed the RSM diet.
Conclusion: These findings indicate that cashew nut meal can partially substitute soybean meal in broiler diets, particularly during the starter phase.

INTRODUCTION

The demand for animal protein in Sub-Saharan Africa continues to rise; however, current livestock production remains insufficient to meet this growing need[1]. Poultry farming represents a strategic sector for development and poverty reduction in the region[2], yet its expansion is constrained by several factors, particularly nutritional limitations[3,4]. In Burkina Faso, the poultry sector contributes substantially to meeting national animal protein requirements through the supply of eggs and meat. Chicken is highly valued by consumers and is widely consumed in the urban centers of Ouagadougou and Bobo-Dioulasso, with estimated daily consumption of 80,000 and 50,000 birds, respectively[5].

Beyond its nutritional importance, poultry plays a significant socio-cultural and economic role, serving as a crucial asset in efforts to combat food insecurity and poverty among rural households[6].

The national poultry population is estimated at more than 47.5 million birds, comprising 37.9 million chickens and approximately 9.5 million guinea fowl[5]. This production originates from two main farming systems: a predominantly traditional system, which accounts for 90% of the national flock and a less developed intensive system representing the remaining 10%[7]. Despite its potential, poultry production faces numerous constraints, including dependence on imported chicks and production inputs, which substantially increase operational costs. Feed alone represents 70-80% of total production costs in broiler and layer operations and is a key determinant of both performance and product quality[8].

According to Guo *et al.*[9], soybean, peanut and cottonseed meals are the primary protein sources used in poultry feed formulation. However, high demand and rising costs of these ingredients constitute major technical and economic challenges for poultry producers[10]. In this context, cashew nut meal represents a promising locally available alternative. Cashew nut production in Burkina Faso increased markedly, rising from about 26,400 tons in 2008 to around 100,000 t by 2019[11]. Cashew nut meal, a by-product of cashew processing, has been evaluated in poultry diets and shown to serve as a viable protein source in broiler nutrition[12].

The present study aimed to evaluate the effects of partially replacing soybean meal with cashew nut meal on the zootechnical performance of Cobb 500 broiler chickens.

MATERIALS AND METHODS

Study site: The study was conducted in the municipality of Bobo-Dioulasso, located in western Burkina Faso at 11°10′ N latitude and 4°18′ W longitude. This cosmopolitan city had an estimated population of 983,552 inhabitants in 2019[13]. The climate is tropical, characterized by an average annual temperature of 26°C and annual rainfall exceeding 1,100 mm. The dry season extends for approximately seven months, from October to April[14]. The choice of this study area was motivated by its strong potential for cashew nut production and the presence of cashew nut processing units.

Study materials: The study utilized both plant and animal materials. The plant material consisted primarily of cashew nut meal and soybean meal, while the animal material comprised 225 day-old Cobb 225 broiler chicks. The equipment included poultry feeders, drinkers and gas radiant heaters. The experiment was conducted in a 50 m^2 experimental henhouse oriented perpendicular to the east–west axis. The interior space was initially arranged to accommodate the chicks during the starter phase. Thereafter, the area was partitioned into nine pens of 3 m^2 each using wire mesh and wooden boards.

Experimental test: The experiment involved three dietary formulations designed to meet the nutritional requirements of broiler chickens at each developmental stage. The treatments included a control ration based on soybean meal (RSM) and two experimental rations incorporating 2% cashew nut meal (RCNM-2%) and 2.5% cashew nut meal (RCNM-2.5%), respectively. At the end of the starter phase, 225 chicks were randomly distributed among the three diets, with each treatment receiving 75 birds (25 birds per pen). During the first week, all chicks were fed a commercial starter feed ("Galdus"), after which they received the respective experimental diets. Water was provided ad libitum throughout the study.

From day 7 to day 35, daily feed and water intake were recorded. Feed refusals and water refusals were weighed using an electronic scale with a 40 kg capacity and 5 g precision. Birds were weighed weekly on days 7, 14, 21, 28 and 35, consistently in the morning. On day 35, 10% of the birds per treatment (seven birds) were randomly selected and slaughtered. The measured parameters included carcass weight; weights of the empty gizzard, wings, thighs, breast, feet, heart, liver, lungs, full intestines and head; as well as carcass yield. All weights were obtained using the same electronic scale.

Evaluation of zootechnical parameters: To assess the effectiveness of the treatments, the following zootechnical parameters were evaluated: Average live weight, individual feed intake, average daily gain, feed conversion ratio, mortality rate, carcass yield and organ yield.

Average live weight (ALW): Average live weight was calculated by dividing the total weight of all birds in a given batch by the number of birds within that batch.

$$\text{Average live weight (ALW)} = \frac{\text{Sum of live weight}}{\text{Size of the batch}}$$

Feed consumption (IFC): It was calculated by dividing the difference between the Quantity of Feed Distributed (QFD) and the Quantity of Feed Not Consumed (QFNC) by the size of the batch.

$$IFC=\frac{QFD / day - QFNC / day}{Size\ of\ the\ batch}$$

Average daily gain (ADG): Average daily gain was calculated as the ratio of the weight gained over a given period to the duration of that period.

$$ADG=\frac{Weight\ gain\ (g)\ over\ a\ period}{Length\ of\ the\ period\ (day)}$$

Conversion index (CI): The conversion index was defined as the ratio of the average quantity of feed consumed during a specified period to the corresponding average weight gain.

$$CI=\frac{Quantity\ of\ feed\ consumed\ during\ the\ period\ (g)}{Weight\ gain\ during\ the\ same\ period\ (g)}$$

Mortality rate per batch of chicken: The mortality rate was determined based on the number of deaths recorded daily in each pen. It was calculated by multiplying the ratio of the number of deaths in a batch to the initial batch size by 100.

$$Mortality\ rate\ (MR)=\frac{Number\ of\ deaths\ in\ each\ batch}{Size\ of\ batch\ at\ the\ start\ of\ experiment}\times 100$$

Carcass yield (CY): The carcass yield was calculated by multiplying the ratio of carcass weight to live weight by 100.

$$CY=\frac{Carcass\ weight}{Live\ weight}\times 100$$

Organ yield (OY): The organ yield was calculated by multiplying the ratio of organ weight to total organ weight by 100.

$$OY=\frac{Organ\ weight}{Total\ organ\ weight}\times 100$$

Evaluation of economic profitability: Economic profitability was assessed based on the feed cost per treatment, the cost of the formulated diets, the total production cost and the gross margin. Both production cost and gross margin were calculated for each ration tested.

Feed cost per treatment:

Feed cost per treatment=Total food intake per treatment × price per kg

Formulated feed cost:

Formulated feed cost = ∑Formulated feed cost/phase

Production cost: Production cost=∑Financial burden

Gross margin: Cross margin = Revenue-production cost

Data analysis: Data were entered in Excel 2016, which was also used to generate figures and tables. Statistical analyses were performed using R software version 4.3.3. Analysis of variance was conducted after verifying the assumptions of normality and homogeneity of variances using the Shapiro-Wilk and Levene tests, respectively. When these assumptions were not met, the non-parametric Kruskal-Wallis test was applied at a 5% significance level.

RESULTS

Physicochemical parameters of cashew nut meal and soybean meal: Table 1 presents the chemical composition of cashew nut meal and soybean meal. Soybean meal exhibited significantly higher crude protein and metabolizable energy contents (43% and 4710 kcal, respectively) compared to cashew nut meal (13.48% and 4561.09 kcal). In contrast, cashew nut meal showed a markedly higher mineral matter content (13.07%) relative to soybean meal (6.1%).

Zootechnical and economic performance

Feed consumption (FC): The average feed consumption of chickens fed the three experimental diets from week 1 to 5 did not differ significantly ($p\geq 0.05$), as shown in Table 2. Birds receiving the RSM, RCNM-2.5% and RCNM-2% diets consumed 65.27±2.15 g, 66.13±0.72 g and 67.03±4.85 g, respectively. Average daily feed intake per chick varied across treatments from 85.54±4.19 g (RCNM-2%) to 96.42±6.08 g (RSM) in Week 4. During the first week, daily feed intake values were statistically comparable among RSM (18±0.1 g), RCNM-2.5% (18.06±0.11 g) and RCNM-2% (17.93±0.11 g).

Table 1: Chemical composition of cashew nut meal and soybean meal

Nutrients	Soybean meal	Cashew nut meal
MM (%/DM)	6.1	13.07
TNM (%/DM)	43.0	13.48
CB (%/DM)	6.0	30.06
Fat (%/DM)	8.9	9.48
RE (Cal/g of DM)	4710.0	4561.09

MM: Mineral matter, TNM: Total Nitrogenous Matter, CB: WENDE crude cellulose, RE: Raw energy and DM: Dry Matter

Table 2: Feed consumption (g/subject/day) of subjects according to their age and per ration

	Feed ration			
Age (week)	RSM	RCNM-2%	RCNM-2.5%	p-value
FC W1	18.00±0,1[a]	18.06±0.11[a]	17.93±0.11[a]	0.43
FC W2	65.27±2.15[a]	66.13±0.72[a]	67.03±4.85[a]	0.73
FC W3	81.40±0.87[a]	75.27±1.74[a]	76.41±3.25[a]	0.06
FC W4	96.42±6.08[a]	85.54±4.19[a]	87.24±3.80[a]	0.18
FC W5	112.04±8.94[a]	106.55±4.57[a]	113.87±11.20[a]	0.20

The values of the same line assigned the same letter are not statistically different at the 5% threshold according to the Kruskal-Wallis test, W: Week, RSM: Ration incorporating soybean meal, RCNM-2 %: Ration incorporating 2% of Cashew nut meal, RCNM-2.5 %: Ration incorporating of 2.5 % of Cashew nut meal and FC: Feed consumption

Table 3: Evolution of feed conversion indices (CI) according to age and by diet.

	Feed ration			
Age (week)	RSM	RCNM-2%	RCNM-2.5%	p-value
CI W1	1.04±0.03[a]	1.00±0.05[a]	0.96±0.01[a]	0.113 NS
CI W2	2.16±0.04[a]	2.26±0.17[a]	2.31±0.09[a]	0.201 NS
CI W3	2.16±0.19[a]	2.29±0.10[a]	2.17±0.06[a]	0.429 NS
CI W4	1.97±0.06[a]	2.35±0.21[a]	2.02±0.11[a]	0.051 NS
CI W5	2.47±0.14[a]	2.39±0.15[a]	2.49±0.11[a]	0.561 NS

The values of the same line assigned the same letter are not statistically different at the 5% threshold according to the Kruskal-Wallis test, W: Week, RSM: Ration incorporating soybean meal, RCNM-2 %: Ration incorporating 2% of Cashew nut meal, RCNM-2.5 %: Ration incorporating of 2.5 % of Cashew nut meal, P: Probability, S: Significant, NS: No Significant and CI: feed conversion indices

Table 4: Changes in Average Daily Gain (ADG) of subjects (g) according to their age and per ration

	Feed ration			
Age (week)	RSM	RCNM-2%	RCNM-2.5%	p-value
ADG W1	17.18±0.56[a]	18.08±1.04[a]	18.67±0.41[a]	0.128 NS
ADG W2	30.19±0.66[a]	29.34±2.24[a]	28.95±1.89[a]	0.732 NS
ADG W3	37.75±3.24[a]	32.93±2.27[a]	35.19±1.45[a]	0.201 NS
ADG W4	48.88±1.81[a]	36.51±3.63[b]	43.13±3.69[ab]	0.027 S
ADG W5	49.26±0.80[a]	44.62±2.07[a]	45.57±2.91[a]	0.099 NS

The values of the same line assigned the same letter are not statistically different at the 5% threshold according to the Kruskal-Wallis test, W: Week, RSM: Ration incorporating soybean meal, RCNM-2 %: Ration incorporating 2% of Cashew nut meal, RCNM-2.5 %: Ration incorporating of 2.5 % of Cashew nut meal, P: Probability, S: Significant, NS: No Significant and ADG: Average daily gain

Conversion index (CI): Across the 35-day experimental period, diet had no significant effect on the CI ($p \geq 0.05$), as reported in Table 3. The highest CI (2.49) was recorded in birds fed the RCNM-2.5% diet during week 5, followed by those fed the RSM diet (2.47). Over the entire study period, the RSM (1.97) and RCNM-2% (2.02) diets resulted in better CI values compared to the RCNM-2.5% diet (2.17).

Average daily gain (ADG): Analysis of variance indicated no statistically significant differences ($p \geq 0.05$) in ADG among the dietary treatments from weeks 3 to 5. However, a significant effect of diet was observed in week 4. The CNM-2.5% and RSM diets yielded higher ADG values between weeks 3 and 5 (Table 4).

Average live weight (ALW): Live weights at week 1 did not differ significantly among treatments. Statistical analysis confirmed that all chicks exhibited positive weight gain throughout the study period. The growth curves of birds fed the RCNM-2% and RCNM-2.5% diets were consistently lower than those of birds on the RSM (control) diet from week 1 through week 3 (Fig. 1). A highly significant difference in live weight was detected among rations during weeks 4 and 5, with the RSM curve remaining higher than those of the RCNM-2% and RCNM-2.5% groups. The highest body weight was recorded for the RSM ration (1,322.67 g), followed by the RCNM-2.5% ration (1,235.46 g).

Mortality rate (MR): No statistically significant differences ($p \geq 0.05$) in mortality rate were detected among the dietary treatments. Nevertheless, the RCNM-2.5% diet exhibited the highest mortality rate (6.36%), relative to the other diets (Table 5). The overall mortality rate across all treatments during the experiment was 6.22%.

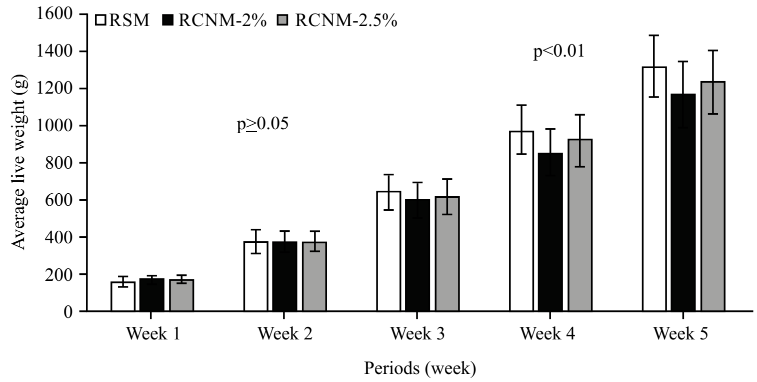

Fig. 1: Chickens live weight evolution according to the age

RSM: Ration incorporating soybean meal, RCNM-2 %: Ration incorporating 2% of Cashew nut meal, RCNM-2.5 %: Ration incorporating of 2.5 % of Cashew nut meal and P: Probability

Table 5: Mortality rate (%) according to rations and by age group

	Feed ration			
Age (week)	RSM	RCNM-2%	RCNM-2.5%	p-value
MR W1	4.00±0.00[a]	4.00±0.00[a]	4.00±0.00[a]	100.00 NS
MR W2	0.00±0.00[a]	0.00±0.00[a]	1.45±2.51[a]	0.367 NS
MR W3	0.00a±0.00[a]	0.00±0.00[a]	1.51±2.62[a]	0.367 NS
MR W4	1.44±2.51[a]	1.44±2.51[a]	6.36±5.53[a]	0.364 NS
MR W5	0.00±0.00[a]	1.51±2.62[a]	3.34±2.9[a]	0.198 NS

The values of the same line assigned the same letter are not statistically different at the 5% threshold according to the Kruskal-Wallis test, W: Week, RSM: Ration incorporating soybean meal, RCNM-2 %: Ration incorporating 2% of Cashew nut meal, RCNM-2.5 %: Ration incorporating of 2.5 % of Cashew nut meal, P: Probability, S: Significant, NS: No Significant and MR: Mortality rate

Table 6 : Carcass and organ characteristics per ration

	Feed ration			
Parameters	RSM	RCNM-2%	RCNM-2.5%	p-value
Carcass weight (g)	934.28±107.52[a]	738.57±98.22[b]	821.42±174.01[ab]	0.041 S
Carcass yield (%)	68.40±1.74[a]	65.03±9.07[a]	66.10±1.83[a]	0.07 NS
Carcass (g)	151.42±12.15[a]	118.57±27.34[b]	137.14±14.30[ab]	0.045 S
Chicken breast (g)	214.28±29.92[a]	165.71±28.78[a]	182.85±44.23[a]	0.069 NS
Chicken leg (g)	451.42±54.60[a]	352.85±44.61[b]	398.57±90.26[ab]	0.048 S
Chicken wing (g)	117.14±14.96[a]	101.42±12.15[a]	102.85±18.9[a]	0.184 NS
Head (g)	101.42±10.69[a]	82.85±11.12[b]	88.57±15.73 [ab]	0.035 S
Chicken feet (g)	60.00±8.16[a]	47.14±9.51[a]	50.00±10[a]	0.059 NS
Gizzard (g)	42.85±7.55[a]	41.42±6.90[a]	40.00±8.16[a]	0.768 NS
Liver (g)	28.57±3.77[a]	30.00±5.77[a]	32.85±4.87[a]	0.257 NS
Intestine (g)	71.42±9.00[a]	70.00±14.14[a]	67.14±14.96[a]	0.782 NS

The values of the same line assigned the same letter are not statistically different at the 5% threshold according to the Kruskal-Wallis test, RSM: Ration incorporating soybean meal, RCNM-2 %: Ration incorporating 2% of Cashew nut meal, RCNM-2.5 %: Ration incorporating of 2.5 % of Cashew nut meal, P: Probability, S: Significant and NS: No Significant

Carcass yield and organ yield: A significant effect of diet ($p<0.05$) was observed on carcass yield, carcass weight, thigh weight and head weight. These parameters were highest in birds fed the soybean meal ration compared with the other two diets (Table 6).

Economic evaluation of the rations: As shown in Table 7, the soybean meal ration had the highest production cost (2,152.30 CFA francs), followed by the CNM-2.5% (2,146.60 CFA francs) and CNM-2% (2,120.80 CFA francs) rations. The soybean meal ration also generated the highest gross margin (135.69 CFA

Table 7: Estimation of the profitability of broiler chickens fed with different rations

	Feed ration		
Parameters	RSM	RCNM-2%	RCNM-2.5%
Quantity consumed (g)			
Pre-start	126	126.42	125.51
Start	456.89	462.91	469.21
Growth	1244.74	1125.67	1145.55
finishing	784	742	791
Total	2611.63	2457	2531.27
Price per kg of ration (F CFA)			
Pre-start	740	740	740
Start	389.45	385.02	384.82
Growth	370.8	382.37	381.67
Finishing	343.85	362	361.5
Cost of the ration (F CFA)			
Pre-start	93.24	93.55	92.87
Start	177.93	178.22	180.56
Growth	461.54	430.42	437.22
Finishing	269.57	268.60	285.94
Total cost of the ration consumed/chicken	**1002.30**	**970.80**	**996.60**
Cost of chick	750	750	750
Veterinary care	250	250	250
Liter	50	50	50
Gas for heating	100	100	100
Cost of other charges (F CFA)	1150	1150	1150
Production cost (F CFA)	**2152.30**	**2120.80**	**2146.60**
Average live weight (g)	**1144**	**1050**	**1066**
Price per kg of live weight (F CFA)	2000	2000	2000
Chicken price (F CFA)	**2288**	**2100**	**2132**
Gross margin per chicken	135.69	-20.80	-14.60
ANM versus RSM		156.50	150.30

ANM: Additional net margin

francs), whereas the CNM-2.5% and CNM-2% rations yielded negative margins (-14.60 CFA francs and -20.80 CFA francs, respectively). Overall, the sale of one chicken fed the soybean meal ration provided an additional profit of 156.50 CFA francs compared with the CNM-2% ration and 150.30 CFA francs compared with the CNM-2.5% ration.

DISCUSSION

Physicochemical parameters of cashew nut meal and soybean meal: The cashew nut meal analyzed in this study had an average TNM content of 13.48%, which is markedly lower than the values reported in Côte d'Ivoire by Costa *et al.*[15] and in Nigeria by Rashmi *et al.*[16] (29.5% and 25.3%, respectively). This reduced level may be attributable to the high proportion of rice husk incorporated during the cashew oil extraction process (approximately 1/3 of a 100-kg bag of downgraded nuts to 5×100-kg bags of rice husk), as well as the quality of the raw nuts used.

Feed consumption: Overall feed intake did not differ significantly among diets, indicating that RSM can be partially substituted with RCNM-2% or RCNM-2.5% without adversely affecting consumption. The mean daily feed intake across diets over the 35-day period was 110.82 g/chick, which is slightly lower than the intakes reported by Daouda *et al.*[17] (115 g/day and 118.23 g/day). This discrepancy may be related to the rearing period, which coincided with high ambient temperatures, transport-induced stress due to use of a non-adapted vehicle, prolonged travel time to the farm and heterogeneity in initial chick weights.

Conversely, the recorded average was higher than the values reported by Tossou *et al.*[18] in Benin (96.12 g/day) and by earlier studies in Burkina Faso[5,19] (99.8 and 89.69 g/day). This slight increase may be linked to the housing conditions and feed quality. Chickens on the soybean meal diet exhibited numerically higher consumption (96.42 g/day) than those on the cashew-based diets. This value exceeds those reported by Daouda *et al.*[17] in Côte d'Ivoire (93.8 g/day) and in France (95 g/day) at four weeks of age but remains lower than the value reported in Senegal (106.75 g/day)[8,20], possibly due to differences in rearing period and environmental conditions.

Consumption index: The Feed Conversion Ratio (FCR) did not differ significantly across treatments ($p \geq 0.05$), indicating that ration type did not positively influence FCR during the experimental period. The mean FCR over the 35-day study was 2.45, which is higher than the 1.65 reported by Hoffmann *et al.*[21], likely due to variations in feed quality and climatic conditions. However, this value is lower than the 3.00 reported by Daouda *et al.*[17], a difference that may also be attributed to feed quality.

Throughout the study, the RSM diet produced the lowest FCR (1.92), which is still slightly higher than the 1.88 reported by Daouda *et al.*[17]. Factors such as feed quality, chick quality, housing conditions and environmental stressors may explain these differences.

Average daily gain: No significant effects of diet on ADG were observed during the five-week trial ($p \geq 0.05$). For the soybean meal ration, ADG increased steadily from 17.18 g in week 1 to 49.26 g in week 5. During the finishing phase, the overall ADG for all chicks was 46.48 g/day-lower than the 60 g/day reported previously. This discrepancy may be related to suspected pathologies (e.g., coccidiosis, respiratory infections), chick quality, feed characteristics and environmental conditions[8].

In week 4, the RSM diet yielded the highest ADG (48.88±1.81), surpassing earlier reported values of 36.57 g/day. This improvement may reflect differences in feed quality and rearing conditions[8].

Average live weight: The average live weight recorded on the first day was 39.4 g, which is slightly lower than the 42 g reported by Hien *et al.*[22]. However, this value falls within the standard range of 38-45 g for day-old chicks[23]. Chicks weighing less than 40 g at hatch are considered lightweight, a factor that may influence final body weight at the end of the rearing period[24].

At the end of the experiment, the mean live weight across all treatments was 1,242.37 g. This value is lower than that reported by Hoffmann *et al.*[21] in Switzerland (2,194 g at 37 days), which may be due to the lower initial chick weight, as well as climatic and management conditions. Conversely, the live weights obtained in the present study exceeded those reported in France (1,159.02 g after 42 days) and the 1,300–1,500 g range typically observed at five weeks[20,23]. This superiority may be attributed to the rearing period and environmental factors.

Comparative statistical analysis revealed that birds fed the soybean meal ration achieved significantly higher final weights (1,322 g) than those receiving the RCNM-2% and RCNM-2.5% diets. The soybean meal diet produced weight advantages of 153 g and 87 g, respectively, over the cashew-based diets. This enhanced performance may be attributed to the superior nutritional quality of soybean meal. Laboratory analyses indicated that cashew nut meal contained 9.48% fat and 13.48% protein, whereas soybean meal contained 8.9% fat and 43% protein. These differences reflect the inherent nutritional composition of the meals and may also relate to differences in processing methods[25].

Mortality rate: Statistical analysis showed no significant effect of diet on mortality ($p \geq 0.05$), with an overall mortality rate of 2.42% at week 5. This value is lower than the 3.21% reported by Hoffmann *et al.*[21] at 37 days, a difference that may be explained by variations in rearing conditions.

The RCNM-2.5% diet exhibited the highest cumulative mortality rate (6.36%) across the 35-day period, exceeding the rate reported by Hien *et al.*[26] (3.21% at 37 days). Elevated temperatures during the study, leading to respiratory challenges, likely contributed to this increased mortality.

Carcass yield: At 35 days of age, birds fed the soybean meal ration exhibited superior carcass characteristics compared to those receiving the RCNM-based diets. Carcass weight (934.28 g), thigh weight (451.42 g), head weight (101.42 g) and overall carcass mass (151.42 g) were all significantly higher in this group, reflecting the nutritional benefits associated with soybean meal.

According to Junior *et al.*[27], optimal carcass yield ranges between 70% and 72%. The overall carcass yield obtained in this study (66.51%) was below this benchmark, which may be attributable to the relatively modest average live weight at slaughter (1,249 g)[23].

Economic assessment: The economic assessment conducted at the end of the study enabled an evaluation of the profitability of the tested rations. Production costs for chickens fed the soybean meal ration were higher than those for the two cashew nut meal-based rations, likely due to the greater feed intake observed in this group. Despite the higher costs, the soybean meal ration generated the highest revenue, amounting to 2,288 CFA francs per chicken and produced a superior gross margin compared with the RCNM-2% and RCNM-2.5% rations.

Overall, the economic analysis indicates that the soybean meal ration was the most cost-effective and efficient protein source for broiler production under the conditions of this study. It is important to note, however, that some variables-such as water, electricity, communication and fuel costs-were not included in the economic evaluation and their incorporation may influence the final profitability estimates.

CONCLUSION

This study aimed to contribute to the improvement of poultry production in Burkina Faso. The physicochemical analyses demonstrated that cashew nut meal contains substantially lower total nitrogen matter than soybean meal. Nevertheless, the zootechnical and economic outcomes indicate that rations incorporating cashew nut meal can, in several cases, yield performance comparable to those based on soybean meal. Overall, the findings confirm that both soybean meal and cashew nut meal are viable plant protein sources for poultry feeding. However, soybean meal remains the superior option, as it consistently supports better growth and finishing performance under the conditions of this study.

ACKNOWLEDGMENT

The authors gratefully acknowledge the staff of the Centre de Promotion de l'Aviculture et de Multiplication des Animaux Performants for their valuable technical support during the execution of this study. The authors also appreciate the financial support provided by the Centre through its regular budget, which made this research possible.

REFERENCES

1. Tacher, G. and L. Letenneur, 2000. Le secteur des productions animales en Afrique subsaharienne des indépendances à 2020. III. prospectives de la demande et de l'offre pour 2020 et voies de réponse au nécessaire développement de l'élevage. Rev. D'élevage Med. Vet. Pays Tropicaux, 53: 365-375.
2. Food and Agriculture Organization of the United Nations, 2014. Family poultry development – Issues, opportunities and constraints. Rome, Italy. https://www.fao.org/4/i3595e/i3595e.pdf
3. Ouedraogo, A, 2017. Contribution à l'étude de l'élevage de poulets de chair dans la ville de Bobo-Dioulasso. Master's Thesis. Université Nazi BONI.
4. Pousga, S., F. Sankara, K. Coulibaly, J.P. Nacoulma, S. Ouedraogo and G.A. Ouedraogo *et al*, 2019. Effets du remplacement de la farine de poisson par les termites (*Macrotermes* sp.) sur l'évolution pondérale et les caractéristiques de carcasse de la volaille locale au Burkina Faso. Afr. J. Food, Agric. , Nutr. Dev., 19: 14354-14371.
5. Ouedraogo, B., J.S. Zoundi and L. Sawadogo, 2017. Caractéristiques de l'élevage avicole en zone sahélienne du Burkina Faso. Rev. Ivoirienne Sci. s Technologie, 30: 263-280.
6. Ayssiwede, S.B., A. Dieng, M.R.B. Houinato, C.A.A.M. Chrysostome, Issay and A. Missohou *et al*, 2013. Élevage des poulets traditionnels ou indigènes au Sénégal et en Afrique subsaharienne : État des lieux et contraintes. Ann. Med. Vet., 158: 101-117.
7. Pindé, S., A. Tapsoba, F. Traoré, R. Ouédraogo, S. Ba and J. Simporé *et al*, 2020. Caractérisation et typologie des systèmes d'élevage de la poule locale du Burkina Faso. J. Anim. Plant Sci., 46: 8226-8239.
8. Leclercq, B. and M. Larbier, 1991. Nutrition et alimentation des volailles. 1st ed., Éditions Quae, Paris, France, ISBN: 978-2-7592-3863-7, Pages:366.
9. Guo, B., L. Sun, S. Jiang, H. Ren, R. Sun and L.-J. Qiu *et al*, 2022. Soybean genetic resources contributing to sustainable protein production. Theor. Appl. Genet., 135: 4095-4121.
10. Ouattara, A, 2023. Effets du tourteau de cajou (*Anacardium occidentale* L.) sur les performances zootechniques, économiques et qualité des œufs de pondeuses (ISA Brown). Ph.D. Thesis. Université Jean Lorougnon Guédé.
11. Dakuyo, R., K. Konaté, A. Sanou, K. Kaboré, H. Sama and M.H. Dicko *et al*, 2022. Comparison of proximate and phytonutrient compositions of cashew nuts and apples from different geographical areas of Burkina Faso. Biomed Res. Int., Vol. 2022. 10.1155/2022/1800091
12. Freitas, E.R., M.D.F.F. Fuentes, A.D.S. Júnior, M.E.F. Guerreiro and G.B. Espíndola, 2006. Cashew nut meal in broiler diets. Pesqui. Agropecu. Bras., 41: 1001-1006.
13. Institut National de la Statistique et de la Démographie (INSD), 2022. Rapport de Synthèse des Résultats Définitifs, 5e Recensement Général de la Population et de l'Habitation 2019 (2e édition). Ouagadougou, Burkina Faso: INSD. t.ly/NcQKE
14. Institut National de la Statistique et de la Démographie (INSD), 2021. Monographie de la ville de Bobo-Dioulasso. Ouagadougou, Burkina Faso: INSD. t.ly/c0z7E
15. Costa, J.B., M.C.P. Rogério, M.S.S. Carneiro, L.C. Muniz, E.P. Brasil and N.J.M. Batista *et al*, 2021. Cashew nut meal as feed supplement for lambs. Animal, Vol. 15. 10.1016/j.animal.2021.100203
16. Rashmi, K.M., T.M. Prabhu, N.M. Soren, H.M. Yathish and M.S. Mahesh, 2025. Cashew (*Anacardium occidentale* L.) nut meal could be a promising alternative protein feedstuff for lambs. Small Ruminant Res., Vol. 248. 10.1016/j.smallrumres.2025.107501
17. Daouda, F., O. Abdoulaye, D. Masse, O. Adama, B.G.A. Maxwell and B.L. Guichard *et al*, 2023. Effet des tourteaux de cajou (*Anacardium occidentale*) sur les performances de croissance de poulet de chair Cobb 500 en Côte d'Ivoire. IOSR J. Agric. Vet. Sci., 16: 31-46.
18. Tossou, L.M., M.F. Houndonougbo, F.A. Abiola and C.A.A.M. Chrysostome, 2014. Étude comparée des performances de production et de la qualité organoleptique de la viande de trois souches de poulets chair (Hubbard, Cobb et Ross) élevés au Bénin. Sci. la vie, la Terre Agron., Vol. 2.

19. Zongo, T.R, 2016. Etude comparée de la valeur nutritive et économique de rations comprenant des ingrédients industriels ou locaux dans l'alimentation des poulets de chair. Université Polytechnique de Bobo-Dioulasso (UPB), Institut du Développement Rural (IDR), Burkina Faso.
20. Dooko, C.L.B.A, 2006. Evaluation des performances zootechniques et économiques en période post réforme d'élevage de poulets de chair (souches COBB 500 et Jupiter) dans la région de Dakar. Ph.D. Thesis. École Inter-États des Sciences et Médecine Vétérinaires, Université Cheikh Anta Diop de Dakar.
21. Hoffmann, C., A. Grub, D. Albiker and R. Zweifel, 2013. Poulets de chair: Performances d'engraissement, qualité des carcasses et de la viande. Recherche Agronomique Suisse, 4: 348-351.
22. Hien, O.C., I. Salissou, A. Ouedraogo, L. Ouattara, B. Diarra and J.D. Hancock, 2018. Effets comparés de rations à base des variétés de maïs « ESPOIR » et de maïs « SR21 » sur la productivité du poulet de chair de souche cobb-500. Int. J. Biol. Chem. Sci., 12: 1557-1570.
23. CIRAD, GRET and Ministère des Affaires étrangères, 2003. Mémento de l'agronome. https://bi.chm-cbd.net/sites/bi/files/2021-06/memento-agronome_cirad.pdf
24. Tarek, B. and O. Derradji, 2017. Effet du poids du poussin d'un jour sur les performances zootechniques du poulet de chair. Nat. Technol., 18: 18-21.
25. Gasmi, S. and C. Achour, 2019. Essai de formulation d'un aliment pour poulet de chair, en incorporant des ressources alimentaires locales en Algérie. Master's Thesis. Université Saad Dahlab Blida, Algérie.
26. Hien, O.C., I. Salissou, B. Diarra, P.P. Sanon and J.D. Hancock, 2010. Étude comparée de la valeur nutritive du maïs et du sorgho blanc dans l'alimentation des poulets de chair. Sci. Nat. Appl., 3: 7-20.
27. Junior, N.R., G.R. Perin, C. Eyng, C. Polese, G.L.S. Tesser and R.V. Nunes *et al*, 2024. Choice of sample sizes for carcass yield and chicken cuts. J. Appl. Poult. Res., Vol. 33. 10.1016/j.japr.2024.100451.