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Parkia biglobosa (Jacq.) R. Br. Ex G. Don Fruit Pulp Supplementation in the Diet of Local Chickens in Burkina Faso: Effects on Growth Performance and Carcass Characteristics

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Abstract

This work aimed to evaluate the effects of supplementation of *Parkia biglobosa* fruit pulp flour in the CPAVI chicken ration on the growth performance and carcass characteristics of local chickens. This study involved 50 local chicks of eight weeks of age. Chickens were divided into 5 groups of 10 chicks corresponding to five experimental rations containing 0%, 1%, 2%, 3% and 4% pulp from fruits of *P. biglobosa*. The nutritional composition of *P. biglobosa* fruit pulps were analyzed, then growth parameters and carcass characteristics were measured. The results showed that the fruit pulps of *P. biglobosa* were rich in metabolizable energy (4015.02 ± 0.21 Kcal/kg), crude fiber (16.88% ADF and 19.81% NDF) and potassium (2.45% ± 0.01%). Thus, the group of local chickens fed the diet containing 1% supplementation had a significantly higher live weight (1200.85 g) and carcass yield (91.99 g) ($P < 0.005$) than the other levels supplementation. Additionally, individual feed consumption and average daily gain of the group at 1% supplementation were higher. In short, the flour from the pulp of the fruit of *Parkia biglobosa* can be supplemented up to 1% in the CPAVI pullet type feed for local chickens.

Keywords

Local Chicken, *Parkia biglobosa*, CPAVI, Growth Performance, Burkina Faso

1. Introduction

In Burkina Faso, poultry products represent 6% of the Gross Domestic Product [1]. According to national statistical data, the national production of local hens reached a record 71,816,000 heads in 2013 before dropping to 36,794,000 heads in 2019, a drop of more than 48% in the space of 5 years. This drop in production accelerated from 2017, dropping from 62,475,000 heads to 36,794,000 heads in 2019, dizzying drop of more than 40% [2]. This drop in production of local chickens would be linked to several zootechnical and health constraints, the main one being food. The qualitative and quantitative shortage of local poultry feed is a serious challenge this sector [2]. The availability of cereals and protein raw materials for poultry farming are low and prices high, hence a strong impact on the quality and cost of production [3]. The sustainable development of poultry farming in Burkina Faso could go through the formulation of economically more profitable feed rations based on available and inexpensive local resources [4]. Many local plants are widely regarded as potential sources of energy in human and animal nutrition [5]. This is the case of *Parkia biglobosa*, which is a particularly abundant tree in Burkina Faso and the pulps of these fruits are known to be mainly rich in energy but also in raw proteins, minerals, amino acids and carotene [6]. It is therefore necessary to develop other feeding systems, based on the fruit pulp of *Parkia biglobosa*. The objective of this present work is to supplement the flour of the pulps of the fruits of *Parkia biglobosa* as feed additives in poultry farming in order to improve the food and the productivity of the local chicken.

2. Material and Methods

2.1. Study Site

The study was conducted at the Nazi BONI University animal facility in the village of Nasso located about 15 km northwest of the city of Bobo-Dioulasso (economic capital of Burkina Faso). The climate in Bobo-Dioulasso is of the south-Sudanian type and characterized by a dry season (October to April) and a rainy season (May to september). The dry season is characterized by a cold period (November to January) and a hot period (February to April). The rains are relatively abundant with about 1100 mm of water per year, but unevenly distributed in time and space. The vegetation consists of wooded, treed and shrubby savannahs. The relief is not very rugged and is characterized by a rocky range to the south, lowlands and developable plains. The soils are very favorable for agriculture. The network hydrographic, presents about twenty sources, the most important of which is that of the Guinguette in the village of Nasso [4] [7].

2.2. The Housing Facility

The 16 m long, 10 m wide and 4.5 m height building has been fitted out with 3 compartments and two food storage magazines. The compartment used for this study measured 1.5 m in length, 1.5 m in width and 1.6 m in height and was subdivided into 5 enclosures. Each enclosure had a length and width of 1.5 m and a height of 1.6 m. The enclosures were equipped with feeders, drinkers and natural lighting. The various mesh enclosures were covered with a thick layer (about 15 cm) of bedding consisting of rice bran.

2.3. Experimental Birds

A total of 50 subjects aged 8 weeks with an average weight of 575.4 ± 18.11 g were distributed between the boxes. The experimental chickens were produced at the Nazi Boni University farm. They have been vaccinated against the main avian diseases (Newcastle and Gumboro disease), and have also been dewormed (internal and external parasites).

2.4. Collection of *Parkia biglobosa*

Parkia biglobosa fruit pulps were harvested in Nasso located 15 km from Bobo-Dioulasso (Burkina Faso). After drying in the shade, the samples were then ground and stored for the various analyses.

3. Experimental Rations

3.1. Nutritional Composition of *Parkia biglobosa* Fruit Pulp

Solids and ash contents were determined using official methods of analysis [8]. Crude fat was extracted with anhydrous diethyl ether using the Soxtec TM 2050 apparatus [9]. Crude protein and nitrogen amounts were determined with the Kjeldahl method using lock digestion and the Foss 8400 system [10]. Acid Detergent Fiber (ADF) and Neutral Detergent Fiber (NDF) contents were analyzed using Ankom Fiber Analyzer 2000. Gross energy was measured with Parr 6300 calorimeter. For this, pellets solids were fabricated and introduced into the calorimeter to determine the energy value. The energy of each sample was calculated directly in relation to its weight. The ash was mixed with 5 mL of concentrated HNO_3 and 12.5 mL of 50% HCl. The mixture was boiled at low temperature on a hot plate, then allowed to cool. After cooling, the samples were filtered in and calibrated to 100 mL with distilled water. The different mineral salts were determined by atomic absorption or by spectrophotometer for phosphorus [11]. Finally, the fatty acid profile was determined by the direct methylation method as described by Sukhija and Palmquist [12] with some modifications.

3.2. CPAVI Chicken Feed Formula

Table 1 presented the food formula of the CPAVI rations used to feed the different subjects. The Village Center for the Promotion of Poultry (CPAVI) is a state structure in Burkina Faso which works to promote village poultry farming by providing poultry farmers with a wide range of avian services.

3.3. Food Ration

Five feed rations namely PBO, PB1, PB2, PB3 and PB4 were formulated. The

Table 1. CPAVI pullet feed ration.

Ingrédients	Pullets (% of ration)
Corn	56.37
Windmill sound	14.46
Blue sound	14.45
Cottonseed meal	6.93
Soybean meal	0.71
Fish	2.05
Shell	3.37
Salt	0.14
Premix	0.25
Lysine	0.28
Methionine	0.08
Dicalcium phosphate	0.85
Iron sulphate	0.11
Total	100

four treatments (PB1, PB2, PB3 and PB4) used had the same feed composition (CPAVI pullet feed) apart from the amount of flour from *Parkia biglobosa* fruit pulp which varied from 1% to 4%. The control batch (PBO) consisted solely of CPAVI pullet feed.

3.4. Experimental Apparatus

The 50 chickens were randomly distributed among the 5 boxes representing 5 treatments (4 test boxes and control box). Each box consisted of 10 chicks (5 males and 5 females). Water was available ad libitum. A quantity of food of 60 g per chick per day was offered. Food refusals were weighed and recorded daily. Monitoring of the subjects' growth lasted 6 weeks and the chicks were weighed every weekend.

3.5. Collection of Data

Valuation of growth performance the growth parameters were calculated according to the calculation methods of [13].

3.6. Consumption Index (CI)

It is the ratio between the average quantity of food consumed over a given period and the average weight gain corresponding to this period.

CI: Average amount of food consumed (in g)/Average weight gain (in days).

3.7. The Average Daily Gain (ADG)

The weekly measurements of the weights listed, made it possible to calculate the average gain daily by reporting weight gain for a period over time corresponding.

ADG = (PVf − PVi)/number of days. (PVi: initial average live weight and PVf: final average live weight).

3.8. Individual Food Consumption (IFC)

Individual Food Consumption is used to assess the quantities of food consumed per animal over a specified period of time. It is calculated from the quantity of food distributed and that refused.

CAI (g/subject/day) = QAD(g) − QAR(g)/Duration of period (d) × number of subjects.

QAD: Quantity of feed distributed; QAR: Quantity of food refused.

3.9. Live Weight

The average live weight is nothing other than the ratio of the sum of the weights of the individuals of a same batch by their number.

Live weight = ΣWI/Nb.

ΣWI: Sum of the weights of the individuals of the same batch Nb: Number of the batch.

The mortality rate is the number of deaths on the workforce of the batch × 100.

3.10. Carcass Characteristics

At the end of the experiment, 20 subjects (4 subjects/batch) were slaughtered for the study of the characteristics of the carcass. The animals were bled by section of the jugular vein of the neck, scalded with hot water and manually plucked. The live weights of the chickens before slaughter were measured as well as the weights of the carcasses. The abdominal and thoracic cavity organs were then dissected, removed and weighed separately.

RC = Empty carcass weight (in g)/Live weight at slaughter (in g) × 100.

3.11. Skin Color and Abdominal Fat

The possible yellow coloring of the skin and fat in yellow was assessed thanks to a scoring technique similar to that of [14]. Ranging from grade 1 to 4 independing on the intensity of the yellow color observed (1: absence of yellow color, 2: light to medium yellow color, 3: fairly well yellow color and 4: yellow color intense to dark). The carcass yield (%) is calculated by taking the ratio of the carcass weight to the live weight of the subject at slaughter, expressed as a percentage.

3.12. Ethics Committee

This work has been submitted and approved by an ethics committee under the number CEEA-UJKZ/2021-07.

3.13. Statistical Analyzes

The Tables were produced by the Excel 2021 software. The software R version 4.2.1 was used for the statistical processing and the calculation of means and deviations.

4. Results

4.1. Nutritional Composition of *Parkia biglobosa* Fruit Pulp

The nutritional values of *Parkia biglobosa* fruit pulp were presented in **Table 2**. *Parkia biglobosa* fruit pulp was low in protein (5.11% ± 0.131%), in lipids (1.12% ± 0.094%) and minerals such as iron (0.14% ± 0.05%), phosphorus (0.05% ± 0.00%), zinc (0.10% ± 0.03%), magnesium (0.28% ± 0.06%) and calcium (0.18% ± 0.01%). On the other hand, it was rich in energy (4015.02% ± 0.21% Kcal/Kg), ADF (16.88% ± 0.06%) and NDF (19.81% ± 0.19%)) and in potassium (2.45% ± 0.01%). Concerning the fatty acid contents of the pulps of *Parkia biglobosa*, they varied from 0.08% to 40.99% (**Table 3**). Of the nineteen fatty acids quantified, there were eight saturated, two omega-3s, three omega-6s, one omega-7, two omega-9s and two omega-11s. Palmitic and stearic acids were the most abundant saturated fatty acids. Regarding the omega series, linoleic acid (24.64%), oleic acid (15.47%) and α-Linolenic acid (5.66%) were the most abundant fatty acids.

Table 2. Nutritional value of *Parkia biglobosa* fruit pulp.

Nutrients	*Parkia biglobosa* fruit pulp
Dry matter	87.07 ± 0.009 (%)
Ash	4.80 ± 0.017 (%)
Humidity	12.93 ± 0.009 (%)
Protein	5.11 ± 0.131 (%)
Nitrogen	0.82 ± 0.021 (%)
Lipids	1.12 ± 0.094 (%)
ADF	16.88 ± 0.06 (%)
NDF	19.81 ± 0.19 (%)
Energy	4015.02 ± 0.21 Kcal/Kg
Potassium	2.45 ± 0.01 (%)
Iron	0.14 ± 0.05 (%)
Phosphorus	0.05 ± 0.00 (%)
Zinc	0.10 ± 0.03 (%)
Magnesium	0.28 ± 0.06 (%)
Calcium	0.18 ± 0.01 (%)

Values were Mean ± standard deviation (n = 3).

Table 3. Fatty acids contents of *Parkia biglobosa* fruit pulp.

Classification	Symbol	Name of compounds	*Parkia biglobosa* (%)
Saturated fatty acids	C14:0	Myristic acid	2.63
	C15:0	Pentadécanoïc acid	0.31
	C16:0	Palmitic acid	40.99
	C17:0	Margaric acid	0.27
	C18:0	Stearic acid	4.36
	C20:0	Arachidic acid	1.28
	C22:0	Docosanoïc acid	1.13
	C24:0	Tétracosanoïc acid	0.77
Omega-3	C18:3n3	α-Linolenic acid	5.66
	C20:3n3	*cis*-11,14,17-Eicosatrienoic acid	0.00
	C22:6n3	Docosahexaenoic acid	0.14
Omega-6	C18:2n6	Linoleic acid	24.64
	C18:3n6	γ-Linolenic acid	0.08
	C22:2n6	Docosadienoic acid	0.14
Omega-7	C16:1n7	Palmitoleic acid	0.51
Omega-9	C18:1n9	Oleic acid	15.47
	C22:1n9	Erucic acid	0.09
Omega-11	C18:1n11	Vaccenic acid	1.05
	C20:1n11	Gadoleic acid	0.20

4.2. Effect of *Parkia biglobosa* Fruit Pulp Supplementation on Growth Performance of Local Chickens

Consumption index (CI)

The effects of *Parkia biglobosa* fruit pulp supplementation on the feed conversion ratio (CI) of chickens are summarized in Table 4. Overall, the consumption index (CI) ranged from 7.25 to 9.65. Supplementation with *Parkia biglobosa* fruit pulp led to a reduction in the consumption index of 1% of supplementation.

Average daily gain (ADG)

The average daily gains (ADG) obtained per batch or from different food treatments are reported in Table 5. It appears that the supplementation of flour from *Parkia biglobosa* fruit pulp in the CPAVI diet had led to an increase in the average daily gain of batch PB1 compared to the other batches of the treatment (PB0; PB2; PB3 and PB4). However, the difference was not significant between the different values obtained ($P > 0.05$).

Table 4. Effect of the feed supplementation on the consumption index.

		Inclusion level					
Parameter	Age in week	PB0	PB1	PB2	PB3	PB4	P-value
CI	1	7.49	5.72	8.76	9.93	9.22	0.22
	2	7.39	6.96	7.99	8.73	8.39	0.90
	3	6.31	7.49	8.19	9.60	8.97	0.63
	4	7.53	6.61	9.83	8.98	9.34	0.47
	5	8.54	8.83	9.10	8.99	9.39	0.99
	6	8.32	9.16	9.65	7.88	8.79	0.92
	1 to 6	7.60	7.25	8.92	9.02	9.02	0.21

PB0 (*Parkia biglobosa* 0%), PB1 (*Parkia biglobosa* 1%), PB2 (*Parkia biglobosa* 2%), PB3 (*Parkia biglobosa* 3%) et PB4 (*Parkia biglobosa* 4%). $P < 0.05$.

Table 5. Effect of the feed formulations on average daily gain.

		Food processing					
Parameter	Age in week	PB0	PB1	PB2	PB3	PB4	P value
ADG (g/d)	1	6.57	10.57	6.57	5.43	6.29	0.08
	2	8.00	10.00	8.14	8.86	8.86	0.88
	3	10.86	10.71	8.86	8.00	9.29	0.88
	4	9.86	9.29	8.71	8.14	9.43	0.93
	5	9.29	9.29	9.14	8.29	9.86	0.90
	6	9.14	10.00	8.57	9.29	10.57	0.96
	1 - 6	8.95	9.98	8.33	8.00	9.05	0.9

PB0 (*Parkia biglobosa* 0%), PB1 (*Parkia biglobosa* 1%), PB2 (*Parkia biglobosa* 2%), PB3 (*Parkia biglobosa* 3%) et PB4 (*Parkia biglobosa* 4%). $P < 0.05$.

Individual Food Consumption (IFC)

The effect of the experimental rations on the evolution of individual food consumption as a function of time is presented in Table 6. The results showed a significant increase in the food consumption of batch PB1 compared to the other test batches (PB2; PB3 and PB4) and the control batch PB0 throughout the experiment ($P < 0.05$).

4.3. Live Weights

The effect of the inclusion of flour from the pulp of the fruit of *Parkia biglobosa* in the feed ration on the weight of local chickens according to their ages is illustrated in Table 7. A significant improvement ($P < 0.05$) in weight was observed in chickens from the PB1 treatment compared to the other batches (PB0, PB2, PB3 and PB4) during the first week up to the third week of age. However, from the fourth to the sixth week no significant difference was observed between the weights of the animals ($P > 0.05$).

Table 6. Effect of the experimental rations on individual food consumption.

		Inclusion level					
Parameter	Age in week	PB0	PB1	PB2	PB3	PB4	P-value
IFC (g/d)	1	34.44	42.32	40.28	37.72	40.57	0.42
	2	41.39	48.72	45.54	54.11	52.04	0.07
	3	47.97	56.19	50.76	53.74	58.30	0.01
	4	51.97	42.95	59.99	51.19	61.63	0.001
	5	55.53	57.40	58.24	52.14	64.77	0.20
	6	53.25	64.09	57.93	51.24	65.01	0.03
	1 - 6	47.43	67.78	52.12	50.02	57.05	0.001

PB0 (*Parkia biglobosa* 0%), PB1 (*Parkia biglobosa* 1%), PB2 (*Parkia biglobosa* 2%), PB3 (*Parkia biglobosa* 3%) et PB4 (*Parkia biglobosa* 4%). P < 0.05.

Table 7. Effect of the experimental rations on live weight.

		Food processing					
Parameter	Age in week	PB0	PB1	PB2	PB3	PB4	P-value
live weight (g)	1	46.00	74.00	46.00	38.00	44.00	0.001
	2	56.00	70.00	57.00	62.00	62.00	0.04
	3	76.00	75.00	62.00	56.00	65.00	0.001
	4	69.00	65.00	61.00	57.00	66.00	0.23
	5	65.00	65.00	64.00	58.00	69.00	0.41
	6	64.00	70.00	60.00	65.00	74.00	0.12
	1 - 6	62.67	69.83	58.33	56.00	63.33	0.12

PB0 (*Parkia biglobosa* 0%), PB1 (*Parkia biglobosa* 1%), PB2 (*Parkia biglobosa* 2%), PB3 (*Parkia biglobosa* 3%) et PB4 (*Parkia biglobosa* 4%). P < 0.05.

4.4. Characteristic of the Carcass

The characteristics of the carcass and organs of local chickens from the different dietary treatments were recorded in Table 8. Carcass yield ranged from 1065.18 ± 82.51 to 1200.85 ± 80.69 (g). The highest value was recorded in chickens from the PB1 treatment (P < 0.05). The supplementation of *Parkia biglobosa* fruit pulp flour in the CPAVI pullet ration of local chickens resulted in a better yield of the carcass of batch PB1 (91.99% ± 2.78%) compared to the control batch PB0 (91.45% ± 3%) and the other PB2 test batches (63.15% ± 2.38%); PB3 (90.37% ± 1.33%) and PB4 (89.91% ± 44.96%) (P < 0.05). There was no change in coloring of the skin of the carcass of chickens from the test batches (PB1, PB2, PB3 and PB4) compared to the control batch (PB0) (Figure 1). The supplementation of *Parkia biglobosa* fruit pulp flour resulted in a yellow coloring of the abdominal fat of batches PB2, PB3 and PB4 compared to batch PB1 and the control batch

PB0 (Figure 2). As for pH and temperature, they were similar to that of the control (P > 0.05).

Table 8. Effect on carcass characteristic.

Parameters		Food processing					P-value
		PBO	PB1	PB2	PB3	PB4	
Carcass	Lw (g)	1185.40 ± 137.49	1200.85 ± 80.69	1134.87 ± 185.72	1065.18 ± 82.51	1086.27 ± 39.72	0.001
	Cw (g)	1082.57 ± 108.10	1106.18 ± 106.51	1039.53 ± 194.38	961.95 ± 64.01	976.50 ± 28.75	0.001
	Cy (%)	91.45 ± 3	91.99 ± 2.78	63.15 ± 2.38	90.37 ± 1.33	89.91 ± 44.96	0.001
	Skin color	1.00 ± 0	1.00 ± 0	1.00 ± 0	1.00 ± 0	1.00 ± 0	Ns
	Belly fat color	1.00 ± 0	1.00 ± 0	2.00 ± 0	2.00 ± 0	2.00 ± 0	Ns
Internal organs (g)	Liver	24.23 ± 6.43	27 ± 2.41	25.87 ± 2.91	19.93 ± 1.71	23.10 ± 0.4	0.28
	Heart	5.33 ± 0.40	6.93 ± 0.82	6.70 ± 3.86	4.80 ± 0.49	4.53 ± 0.25	0.49
	Rat	2.63 ± 0.50	2.23 ± 1.05	1.70 ± 0.46	1.85 ± 0.47	2.73 ± 0.55	0.82
	Gizzard	46.90 ± 14.25	48.9 ± 0.69	43.40 ± 15.72	40.93 ± 9.66	44.60 ± 11.98	0.50
	Testicles	4.40 ± 2.62	1.95 ± 13.24	3.80 ± 5.83	3.75 ± 3.04	3.47 ± 1.29	0.36
Physicochemical parameters	pH	5.80 ± 0.36	6.345 ± 0.58	6.25 ± 0.37	6.25 ± 0.37	6.125 ± 0.33	0.99
	Temperature	31.57 ± 0.32	31.175 ± 0.85	31.30 ± 0.66	31.23 ± 0.88	32.175 ± 0.72	0.90

PB0 (*Parkia biglobosa* 0%), PB1 (*Parkia biglobosa* 1%), PB2 (*Parkia biglobosa* 2%), PB3 (*Parkia biglobosa* 3%) et PB4 (*Parkia biglobosa* 4%). Values were Mean ± standard deviation (n = 3). P < 0.05. Lw: live weight, Cw: carcass weight; Cy: carcass yield.

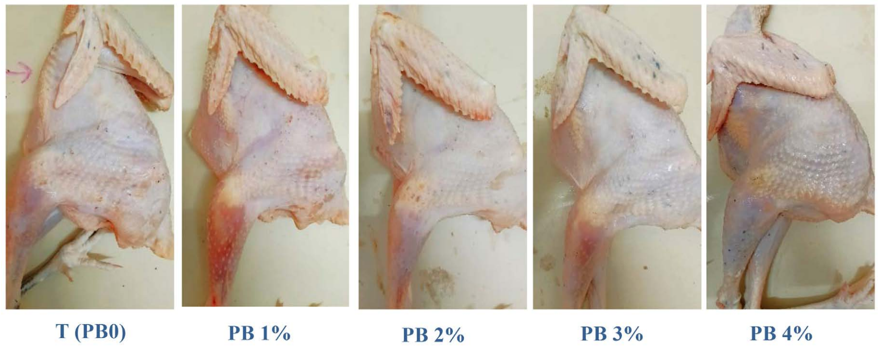

Figure 1. Photo of the skin color of the different test batches. PB0 (*Parkia biglobosa* 0%), PB1 (*Parkia biglobosa* 1%), PB2 (*Parkia biglobosa* 2%), PB3 (*Parkia biglobosa* 3%) et PB4 (*Parkia biglobosa* 4%).

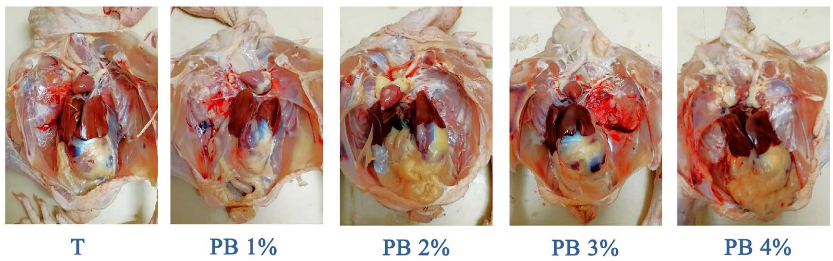

Figure 2. Photo of the yellow color of abdominal fat from the different test batches. PB0 (*Parkia biglobosa* 0%), PB1 (*Parkia biglobosa* 1%), PB2 (*Parkia biglobosa* 2%), PB3 (*Parkia biglobosa* 3%) et PB4 (*Parkia biglobosa* 4%).

5. Discussion

Increasing the productivity of local chickens in Burkina Faso requires improving the diet rich in nutritional elements [15]. For this, the effect of flour from the fruit pulp of *Parkia biglobosa* on growth performance and carcass characteristics of local hens from Burkina Faso were evaluated in this study. After analysis of the nutritional composition, the fruit pulps of *Parkia biglobosa* were rich in energy, crude fiber (ADF and NDF), and potassium. Indeed, energy, and potassium are very important for the development of the chicken because they are responsible for the maintenance of organic tissues, growth and the production of food such as eggs [16]. The supplementation of 1% of *Parkia biglobosa* pulp flour in feed formulas (CPAVI feed) for local chickens had an improvement in the feed consumption index and in the average daily gain of batch PB1 even if this improvement was not significant compared to the other batches (PB0, PB2, PB3 and PB4). This improvement could be explained by the acceptable concentration of metabolizable energy of batch PB1 compared to batches PB0, PB2, PB3 and PB4. Regarding individual food consumption (IFC), it was high for batch PB1 during the experiment compared to the other test batches PB2, PB3 and PB4 and to the control batch (PB0). This could be explained by an increase in the energy concentration of the PB2, PB3 and PB4 regime, resulting in a decrease in consumption. The main dietary factor that affects food consumption is the concentration of energy present in food: an increase in food energy causes a decrease in consumption [17]. In addition, the concentration of nutrients other than energy has no impact on appetite as long as this concentration remains within acceptable limits for the normal maintenance of health and the production of the bird [18]. The supplementation of *Parkia biglobosa* fruit pulp in the feed ration had improved the live weight in chickens of the PB1 treatment and this significantly compared to the other batches (PB0, PB2, PB3 and PB4) during the first week until the third week of age ($P < 0.05$). Effect the PB1 feed ration (1% of *Parkia biglobosa* pulp and CPAVI feed) could contain enough metabolizing energy and less crude fiber compared to PB2, PB3 and PB4. Indeed, feeds rich in crude fiber have been shown to negatively affect ingestion and digestion due to their minor roles in the energy intake of chickens [19]. The supplementation of *Parkia biglobosa* pulp meal had no adverse effect on carcass yield, organ weight, skin color and abdominal fat compared to the control lot. On the other hand, the yield of the carcass of PB1 (91.99%) is higher than that of other batches (PB0 91.45%; PB2 63.15%; PB3 90.37% and PB4 89.91%) with $P < 0.05$. Considering the level of vitamin A in the flour from the pulp of the fruit of *Parkia biglobosa* [20], we can therefore attribute this variation in the level of coloring of the abdominal fat of the PB2 batches to it; PB3 and PB4 compared to batch PB1 and PB0 (control). The supplementation therefore probably had an effect on the coloring of the abdominal fat of the affected groups [21]. pH and temperature are part of the quality parameters of poultry meat. The pH of chicken meat is 6.5 to 6.7, its reduction therefore results in paler meat and its low water retention capacity. Consequently, it leads to excessive hardening of the meat and less flavor [22]. In this study, the pH and temperature of the test batches (PB1; PB2; PB3 and PB4) were similar to that of the control ($P > 0.05$) and the standard (6.5 and 6.7).

6. Conclusion

In this study, considered preliminary, CPAVI pullet feed was supplemented with *Parkia biglobosa* fruit pulp, taking into account only the quality aspect (by varying the proportion of *Parkia biglobosa* pulp) to carry out a practical study. The possibilities for improvement in terms of energy balance are very important since the two materials differ both in terms of quantity and quality. The analysis showed that the pulp of the fruit of *Parkia biglobosa* can be supplemented up to levels of 1% to 4%, in the ration of CPAVI pullets without lowering the performance of the chickens. However, supplementation of *Parkia biglobosa* fruit pulp at 1% showed better results. Faced with insufficient production and a high purchase cost of maize, a maize-pulp association of *Parkia biglobosa* would help poultry entrepreneurs not only to reduce the cost price of feed, but also to reduce the cost of production and obtain culled hens that are salable.

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Authors' Contributions

H. Belem, R. N. T. Meda, B. K. Koama were involved in the design of the manuscript, in the laboratory analysis and in writing the first drafts of the manuscript, A. Traoré and G. A. Ouédraogo and C. N. Ncobela were involved in the revision and critical review of the manuscript. Kagambéga, S. N. Da, A. F. Drabo contributed to the collection of samples. All authors participated in writing and revising the manuscript.

Data Availability

Data will be available from the corresponding author upon request.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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