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Performance of Broiler Chickens Fed on Cassave Peels and Rice Bran As Energy Substitute to Maize

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Abstract

Conventional livestock production like poultry, pigs, cattle and goats have maintained a steady dominance over the non-conventional species like snails and grass cutter. Despite this dominance, conventional livestock production is dependent on their nutrition which constitutes about 60 – 65 % of the total production cost. With the current trend of the Cameroon economy where the available feed ingredients especially maize are being over used by humans for their feeding, it becomes imperative that alternative feed ingredients be sorted for sustainable production. Cassava production so far has dominated the root and tuber sector in Cameroon. The varieties introduced by IRAD and grown in all the five agro-ecological zones produce 30-40 tons per hectar. Like cassava, the Nerica variety of rice introduced is equally accepted and grown in all the agro – ecological zones of Cameroon and beyond producing to the tune of 5 – 7 tons for irrigated low land variety and 3 – 4 tons for the upland variety. Rice like cassava processing produces large quantities of waste and is generally considered to contribute significantly to environmental pollution. This study was carried out to intensify the use of rice bran and cassava peels for efficient and sustainable broiler production. Rice Bran and Dried Cassava Peels were collected from Ndop and Mbalmayo respectively and were futher dried to minimum moisture less than 4 % and analyzed for their proximate nutritive content. The dried rice bran and cassava peels were used to formulate the rations and fed to a total of 258 chickens of arbor acre aged 30 days and weighing an average of 639 g. In a complete randomized design, the birds were distributed in 3 treatments of 86 chickens and each with 03 replicates of 29 birds. Animals fed T_2 diets consumed more feed than those fed on T_0 and T_1. Meanwhile, the final weight of chickens fed on the control diet was higher than the birds fed on T_1 and T_2 while the consumption index was higher in animals fed T_1 and T_2. At the end of this study, it was found that: The dried cassava peels and rice bran can substitute maize as energy source for sustainable broiler production. Their energy levels are comparable to that of maize. However, higher levels above 15% except fermented, would lead to a decrease in the performance of Broiler birds.

Keywords: Dried Cassa va Peels; Rice Bran; Agro – Industrial By Products; Broiler Chicken ;

Introduction

Processing of cassava produces large quantities of waste and is generally considered to contribute significantly to environmental pollution [12]. Cassava starch production unit processing 100 tons of tubers per day has a production of 47 tons of fresh by-products, which can cause environmental problems when left in the vicinity of plant treatment or negligently disposed of [2]. In Nigeria, for example, cassava waste is generally left to rot or burned to create space for the accumulation of even more heaps. The clusters emit carbon dioxide and produce a strong offensive odor [1, 2]. Cassava peels (large quantities of cyanogenic glucosides) and corks (large amounts of biodegradable organic matter) can cause surface water pollution, especially if stored in the rain or simply thrown into surface waters [7, 4]. The variability of rice bran, and in particular its fiber content, has a very high effect on its nutritional value for poultry [6]. High-lysine rice bran and the content of methionine [13]. Cameroon, like many African countries, is experiencing significant population growth. Ensuring food security depends on intensifying livestock production in general and poultry production in particular. However, this sector faces several constraints, as is the high cost of the ingredients used in the rations. These ingredients account for approximately 60-70% of the cost of poultry production.

Hence the study of the effect of cassava peels and rice bran on the growth performance of finely brown chickens.

Literature Review

Analytical methods

Cassava peels can be used for feeding poultry after sun drying, so processed peels contain HCN levels that are acceptable for poultry [17, 18]. The method of fermentation of cassava peels has been tested by several authors, whether to lower HCN or fiber content or to increase the crude protein content , but the results do not Are in conclusive [5].

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In some experiments, growth performance was maintained with flesh diets containing up to 15 % meal cassava peels [18]. Food intake is generally not very affected, but depends on the formulation of foods (isoenergetic diets or not). However, in some performance experiments decreased by 5 % of peel manioc flour in diets [9]. This may be due in part to problems in food formulation as it is proven that performance degrades with insufficient inclusion of proteins [9]. There may be an advantage in feeding fresh cassava peels to slow-growing chickens [19]. The recommendation of broiler chickens is to limit the incorporation of cassava meal peels to 5-10 % depending on its quality, with a suitable feed formulation. Higher levels of cassava meal peels might be required to slow down the growing chicken, or in situations where depression in growth performance is counterbalanced by a lower feed cost.

Rice bran

In broiler chickens, rice bran can become rancid and reduce the growth and stability of meat lipids (Chae et al., 2002). It is suggested that it be included at relatively low levels (up to 15 % only) in broiler chickens diets [14]. Higher levels may result in poor calcification [3]. Decreased food consumption and increased mortality can occur with more than 80 % inclusion [6]. In order to mitigate the adverse effects of phytate, enzyme inhibitor and oxidative rancidity as well as high fiber content, enzymes such as phytase, xylanase or lipase can be added to the rice bran, allowing T_0 include higher levels of rice bran in the broiler chicken diet and resulting in better performance of the animal. Technological treatments can alter the nutritional value of rice bran for broiler chickens. Heating decreased nutritional value, but cooking by extrusion of rice makes its possible inclusion at 20 %. Combinations of rice bran with other fillers may be beneficial for broiler chickens: 10 % rice bran + 5 % palm oil yielded results comparable to those of commercial concentrates [16]. Rice bran and meal peanut blends gave higher gross margins than corn soy meal diets . Rumen liqueur can also be added to the rice bran to solubilize P content in phytates, which makes P supplementassions decreased possible. Although rice bran does not compare favorable with maize, it can replace up to 25% of maize in food and be economically efficient [11, 15].

Problem

In poultry farming, the cost of food accounts for about 70 % of the cost of production.

Lower production costs would mean finding new sources of low-cost, abundant, local and available food.

Hypothesis

The use of cassava barks and rice bran as an alternative source of energy would improve the growth performance of finely brownchickens

activity has the under listed as general and specific objectives.

General objective:

1. Intensify the use of rice bran and cassava peels for efficient and sustainable broiler production.

Specific objective

1. To increase the use of agro-industrial by-products (rice bran and cassava peels) for good quality broiler production.

2. Reduce environmental pollution through careless dumping of the rice bran and cassava peels following rice and cassava processing.

3. To improve on the income of the rural farmer and strengthen the capacity of poultry farmers.

Material And Methods

Collection of the feed samples (ingredients) :

Rice Bran and Dried Cassava Peels were collected from Ndop and Mbalmayo respectively. The rice bran is a major by-product of the rice factory managed by UNDVA program. It produces over 15.000 tons of rice bran per anum. The Dried cassava peels were collected from an Innovation Platform group whose one activity is cassava processing. The rice bran and dried cassava peels were futher dried to minimum moisture less than 4% and analysed for their proximate nutritive content.

Study Site

The study was carried out at the experimental farm of the Agricultural Research Institute for Development (IRAD) in Nkolbisson, in the western suburbs of Yaoundé, a forest region in central Cameroon. This center is located at $3^0$86 of Longitude North and 11 ^{0} 5 of Latitude East. This agro-ecological zone is characterized by an average temperature varying between 23 and 25 ^{0} C, a bimodal rainfall of 1500 to 2500 mm / year and a relative humidity ranging between 70 and 90%. The climate is of the subequatorial type marked by four seasons (2 dry seasons and 2 seasons of rain) [10].

Animals, experimental rations and experimental design

A total of 258 chickens of arbor acre stature aged 30 days and weighing an average of 639 g were distributed in 3 treatments of 28 chickens each. The chickens were housed in groups of 3 in boxes, which made 3 experimental units per treatment. They were reared on deep litter at a density of 10 chickens / m2. Each of the experimental rations T_0 (free from rice bran and cassava bark), T_1 (containing 5% rice bran) and T_2 (containing 4% cassava bark) were assigned to these experimental units completely randomized (Table 1, 2). The test was completed when the chickens were 46 days old. Food and water were served ad libitum.

1. Proximate analysis of the feed ingredients

Table 1: Proximate composition of Dried cassava peel and Rice bran (% dry weight)

Sample	Ash	Moisture	Protein	Fat	Crude Fibre	Carbohydrate
Cassava peels	9.82b ± 0.4	90.01c ± 0.3	18.49c ± 0.1	3.43a ± 0.4	6.5a ± 0.2	3160.3
Rice bran	7.76 ± 04	90.33 ± 02	18.95 ± 03	4.42 ± 02	6.84 ± 04	3268.1

Values with the same alphabet along the same column are not significantly different (P > 0.05).
Values are mean ± S.E (n = 3).

2. Formulation of rations

Table 2: Formulated Rations for the study using rice bran and dried cassava peels as energy substitute for maize

Feed formulation for the trial			
Ingredient/ Level of inclusion	T_o	T_1- PRB	T_2- PDCP
Maïs	55.68	51,68	52,68
Rice Bran (9% Maize)	0	5	0
Dried Cassava peels (7.2% Maize)	0	0	4
Tourteau de soja	22	23	23
Tourteaud'arachide	7	7	7
Farine de poisson	5	5	5
Coquillage	2	2	2
Os	1	1	1
Méthionine	0,15	0,15	0,15
Lysine	0,15	0,15	0,15
CMAV 5 %1	5	5	5
Sulfate de fer	0,02	0,02	0,02
TOTALS	98	100	100
CP - %	21.45	21.82	21.84
Energy – K.Cal/g	2834	2808	2772
Number of birds/ Replicates	60 (20x3)	60 (20x3)	60 (20x3)

Data collection on the performance of the performance of the animals

Data was collected on performance indicators such as feed intake, growth rate, from which feed efficiency and feed conversion ratrion will be collected ; mortality and cost efficiency (Figure 1).

Data collection and analysis

Feed consumption

The previously weighed feed was distributed to the birds and at the end of each week, the remains were weighed. Weekly food consumption was assessed by distinguishing between the quantities served and the rejections collected in each experimental unit.

Live weight and weight gain

At the beginning of the test and every 7 days thereafter, the chicks from each experimental unit were weighed. The weekly weight gain was obtained by making the difference between 2 consecutive weekly weights.

Consumption index (I.C.)

The consumption index was obtained by comparing the amount of food consumed and the weight gain during the same week:

$$\text{I.C.} = \frac{\text{Amount of feed consumed per animal } (g)}{\text{Average weekly gain. } (G).}$$

Results and discussion

Food consumption:

In general, food consumption has been affected significantly by the different treatments, but it appears to be higher in T_2. Animals fed T_2 food consumed more food than those subjected to T_0 and T_1 treatment. This high consumption could be due to the fact that the 4 % level of skin incorporation was far from the incorporation limits obtained by Which was 15 %. More interesting results have been obtained with the feeding of fresh cassava peels to slow-growing chickens [19] (Table 3).

Dried Cassava Peels energy based Ration	Rice Bran based energy Ration	Weighing of the animals

Figure 1:

Table 3 : Effect of Cassava peels and Rice bran on growth parameters

Growth Parameters	Treatments		
	T_0	T_1	T_2
Average feed consumption (g)	3768	3714	3801
Initial average live weight (g)	604	645	668
Final average weight (g)	2082	1701	1795
Weight gain (g)	1472	1056	1105
Consumption Indix	2,71	3,55	3,50

Live weight:

The final weight of chickens fed by the control treatment was higher than the birds fed on T_1 and T_2 test treatments. This would mean that cassava peels and rice bran would lead to a decrease in weight gain during growth with respect to the control.

Weight gain: weight gain is higher (P> 0.05) for animals that consumed the food T_0 control

Consumption Index (CI)

CI is higher in animals fed T_1 and T_2. This higher consumption index is due to the high feed consumption of T_1 and T_2 treatments and the low weight gain of the animals fed with the granulated feed. These results corroborate those of Egbunike et al., 2009 which observed a decrease in growth performance has for a diet 5 % rate of incorporation of manioc peel flour [9]. In broiler chickens, rice bran can become rancid and reduce the growth and stability of meat lipids [8]. However, in contrast to authors such as El-Full et al., 2000, which states that rice bran can replace up to 25 % of maize in the diet and be economically effective in broiler chickens [11].

Recommendation

Though the cassava peels used were not too friendly on the performance of the animals due to poor processing method. However, for subsequent and effective usage, the cassava peels should come from good and edible variety of cassava, which upon peeling should be washed and dried to minimum moisture (lessthan 4 %) and included up to 15 – 25 % in the finisher diet.

Conclusion

At the end of this study, which evaluated the effect of cassava peels and rice bran on the performance of finished broiler chickens, it was found that: The cassava and rice husk peels can substitute maize as energy source for sustainable broiler production. Their energy levels are comparable to that of maize. However, higher levels above 15 % except fermented, would lead to a decrease in the performance of Broiler growths in the respective finishes.

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References

1. Adebayo AO. The use of cassava waste to raise goats. Project from 2008 to 4345. World Bank Development Market. 2008.

2. Aro SO, Aletor VA, Tewe OO, Agbede JO. Potential nutritional cassava tuber waste: A study of a starch cassava processing plant in southwest Nigeria case. Livest. Res. Rural Dev. 2010 ;22(11).

3. Aruna Tomar, Singh KS. Femoral bone mineralization in chickens fed rice bran. Indian J. Poult. Sci. 1999;34(3):332-336.

4. Barana AC,Cereda MP. Cassava wastewater (manipueira) treatment with the aid of an anaerobic biodigestor two phases. Ciencia e Tecnologia de Alimentos. 2000;20 (2):183-186.

5. Buitrago JA. The use of cassava in animal feed. Centro Internacional de Agricultura Tropical (CIAT), Cali (Colombia). 1990;446.

6. Carrion JG, Lopez J. The total sound of rice as a substitute for corn in the feeding of broiler chickens. 2. Carcass yield and chemical composition. Rev. Soc. Arms. . Zootec.1989;18(4):327-333.

7. Cereda MP, Takahashi M. Cassava waste: their characterization and use and treatment in Brazil. Cassava flour and starch: progress in research and development.1996:221-232.

8. Chae BJ,Lee KH, Lee SK. The effects of rancid rice feed on the growth performance and quality of chicken meat from broiler chicken. Asian-Aust. J. Anim. Sci.2002;15(2):266-273.

9. Egbunike GN, Agiang EA, Owosibo AO,Fatufe AA. Effect of protein on the performance and hematology of chickens fed cassava bark. Camber. Zootec. 2009;58:655-662.

10.Ekalle NM, Mongo BG1, Ghomsi MOS, Tientcheu BL, Tchakounte J, Hakoue F, et al. Substitution of Groundnut Cake with Palm Kernel Cake on the Growth Agriculture. 2016;2(1):1-7.

11.El-Full EA, Asker AEN, Ali MMM, Abdel Wahed HM, Omar EM. The use of rice bran in flesh and diet diet with reference to enzyme supplementation. Poult egyptienne. Sci. J. 2000;20(3):517-543.

12.FAO. Strategic Environmental Assessment. An assessment of the impact of cassava production and processing on the environment and biodiversity. Proceedings of the Validation Forum on the Global Cassava Development Strategy. FAO, Rome, 26-28 April 2000. 2001;5.

13.Fialho FB, Lopez J, Bellaver C. Effect of rice and manganese sound levels on performance characteristics and bone in broiler chickens. Rev. Soc. Arms. Zootec. 1993;22 (5): 830-838.

14.Gallinger CI, Suarez DM, Irazusta A. The effects of rice sound inclusion on performance and bone mineralization in broiler chickens. J. Appl. Poult. Res. 2004;13(2):183-190.

15.Gupta JJ, Singh KS. Effect of dietary autoclaving of bran and rice oils on their dietary value in broiler chicken diets. Indian J. Poult. Sci. 1988;23(1):29-34.

16.Ibiyo OVM, Atteh JO. Response of broiler chickens to diets containing graduated levels of rice bran with or without palm oil. Nigerian J. Anim. Prod. 2005;32(1-2):39-45.

17.Kratzer FH, Earl L, Chiaravanont C. Factors influencing the nutritional value of rice bran for chickens. Poult. Sci. 1974;53(5):1795-1800.

18.Nwokoro SO, Ekhosuehi. Employment Insurance. Replacement effect of corn with cassava peels in the cockerel feed on performance and carcass characteristics. Too much. Anim. Health Prod. 2005;37(6):495-501.

19.Ogbonna JV, Dredein AO. Effect of wet feed on the performance of chicks of a cock. Too much. Agric. Trinidad. 2000;77(4):262-264.