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Utilization of Cassava in Poultry Feed in Guyana

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ABSTRACT

This study was initiated to determine the best ratio at which cassava meal could be incorporated in the diets of broiler chicks and the economic benefit of feeding cassava meal to broilers. For this investigation 1140 kg of fresh cassava tubers were sun-dried and converted to flour (composition determined). Eight hundred one day old chicks were selected for this trial. There were four treatments (0%, 5%, 10% & 15% Cassava meal) arranged accordingly to completely randomized design with two replicates. There were two hundred birds per treatment. All the chicks were given feed and water ad lib. The trial lasted for a period of six weeks. Body weights were taken weekly, mortality was recorded daily and the feed conversion ratio (FCR) was determined. The economic cost was calculated at the end of this trial. The results of this study indicated that cassava root meal canbe used as substitute for the rice or corn in conventional feed for poultry, provided that the cassava-based rations are balanced properly for all nutrients. The results of the study indicated that cassava can be included as an ingredient in poultry feed. The recommended amount is 15%.

INTRODUCTION

The agriculture sector in Guyana accounts for approximately 50% of foreign exchange earnings. This generates about 20.6% of the national GDP and employs approximately 40% of the labour force. The livestock sub-sector contributes approximately 13.6% of the agricultural GDP and 2.8% of the total GDP (N. Cumberbatch, National Agricultural Research & Extension Institute, Guyana, observation).

This sub-sector is responsible for the production of poultry meat, eggs, beef, pork, mutton and milk. Guyana could be considered self-sufficient in livestock with the exception of milk (N. Cumberbatch, National Agricultural Research & Extension Institute, Guyana, observation). Despite being food secure Guyana's livestock sub-sector especially poultry industry is not without problems. Some of the activities that limit the expansion of the poultry sector are modernized technologies and the cost of production for meat and eggs.

The major problem is the availability and import cost of raw materials. These raw materials account for more than 80% of the total feed materials used in the poultry industry. This sector depends heavily on imported agricultural products to produce animal feed. Some of the crops imported are corn and soybean meal. Corn is used as the energy source in animal feed and is used extensively in Guyana (P. DeGroot, Bounty Farm Limited, Guyana, observation). The importation of corn amounts to more than one billion Guyana dollars per year. This has led efforts to focus on alternative raw materials that can be grown locally in large quantities.

The use of cassava to substitute corn in feeds for animal is practiced in many countries (Eruvbetine et al., 2003). Approximately one quarter of the world cassava production is used in the animal feed industry (Prakash, 2006). Cassava, a staple crop used mainly in Guyana as food for the hinterland communities has the potential to replace corn in animal feed.

Consequently, a study was conducted to determine the best ratio at which cassava meal could be incorporated in the diets of broiler chicks and the economic benefits of feeding cassava meal to broilers.

METHODOLOGY

The variety of cassava utilized was Uncle Mack. Eleven hundred and forty kilograms cassava was washed to dislodge soil particles, chopped and dried on perforated trays according to Hahn *et al.* (1992). The fresh cassava chips took three days to dry. The dried chips were ground, nutritional analyses conducted and formulation done by Bounty Farm Limited (Tables 1 and 2).

The chicks selected for this trial were of the Cobb breed. Eight hundred one day old broiler chicks were placed in four treatments which were replicated twice. A population of one hundred chicks were randomly selected and placed in each treatment. The rations used include 0, 5, 10, and 15% of cassava meal. The completely randomized design was used for this trial. All the chicks were given feed and water *ad lib*. The trial lasted for a period of six weeks. Body weights were measured weekly, mortality was recorded daily and the feed conversion ratio (FCR) was determined.

Table 1: Formulation of Cassava Meal Starter Diet

INGREDIENTS	DIET I	DIETII	DIET III	DIET IV
	STARTER	STARTER	STARTER	STARTER
	CONTROL	5% *	10%*	15%*
Broken Rice	720	650	580	500
Soyabean Oil Meal	340	345	350	360
Fish Meal	60	60	60	60
Promix	---	---	---	14
Cassava Meal	---	60	120	180
Broiler Premix 2174	20	20	20	20
Liquid Fat	30	34	38	40
BMD-60	200g	200g	200g	200g
Monteban	400g	400g	400g	400g
3-Nitro	115g	115g	115g	115g
Potassium Carbonate	2	2	2	2
Salt	5	5	5	5
Calcium Carbonate	2	3	3	----
MonoDical-Phosphate	18	18	18	16
Lysine	1	1	1	1
Methionine	1	1	1	1
Threonine	0.5	0.5	0.5	0.5
Ethoxyquin	0.5	0.5	0.5	0.5
Total	1201.5	1201.5	1201.5	1201.5

* Level of Cassava Meal in Diet

Table 2: Formulation of Cassava Meal Grower Diet

INGREDIENTS	DIET I	DIETII	DIET III	DIET IV
	STARTER	STARTER	STARTER	STARTER
	CONTROL	5% *	10%*	15%*
Broken Rice	720	630	615	550
Soyabean Oil Meal	300	300	285	275
Fish Meal	35	60	60	60
Promix	20	20	10	30
Cassava Meal	---	60	120	180
Broiler Premix 2174	20	20	20	20
Liquid Fat	55	56	56	56
Stafac 20	200g	200g	200g	200g
Monteban	400g	400g	400g	400g
3-Nitro	115g	115g	115g	115g
Potassium Carbonate	2	2	2	2
Sodium BiCarbonate	370	175	180	180
Salt	5	5	5	5
Calcium Carbonate	---	---	2	3
MonoDical-Phosphate	17.5	15	16	14
Lysine	1.5	0.5	1	2
Methionine	1	0.5	1	1
Threonine	0.5	---	0.5	0.5
Ethoxyquin	0.5	0.5	0.5	0.5
Total	1200.4	1201.4	1200.4	1200.4

* Level of Cassava Meal in Diet

RESULTS

The nutritional content of the cassava variety, Uncle Mack is shown in Table 3. Compared to rice and corn, cassava had lower protein content. When cassava is used in feed, the protein supplement added is almost double the quantity that is used for rice feed mixture.

Effects of weight gain and feed conversion ratio

Figures 1 and 2 show the performance of the broilers during the trials. It can be seen that all the treatments that contained cassava flour had weight gains and feed conversion similar or superior to that of treatment 1 (control) which was fed with the standard Bounty feed. Statistical analysis indicated there were no significant differences in body weights amongst the treatments. Broilers growth rates from all feeds followed a similar trend with approximately 2 kg (body weight) at 42 days of age. In general, broilers fed with rations containing cassava flour preformed equal or better than those fed with bounty feed.

Table 3: Nutritional Content of Cassava variety (Uncle Mack)

Nutritional Facts	Cassava (%)	Rice (%)	Corn (%)
Crude protein	3.1	7.3	7.9
Crude fiber	4.3	10	2.9
Fat	0.5	3.5	1.7
Calcium	0.08	0.04	0.01
Phosphorus	0.09	0.26	0.25
Sodium	0.01	0.02	0.03
Ash	1.66	4.5	1.5

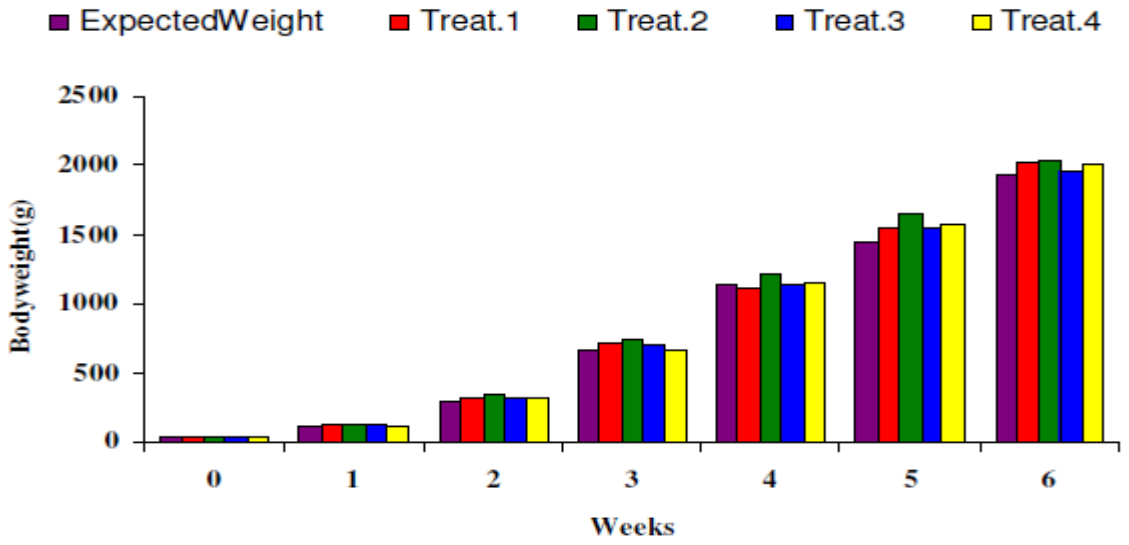

Figure 1: The Growth Rate Chicken

T_1- Control or 0% cassava, T_2- 5% cassava, T_3- 10% cassava, T_4-15% cassava
The expected body weight for week 1 was 3 times the birth weight
The expected body weight for week 2 was 2.4 times the expected first week weight.
The expected body weight for week 3 was 0.34kg and for week 4, 5 and 6 is 0.45 kg.

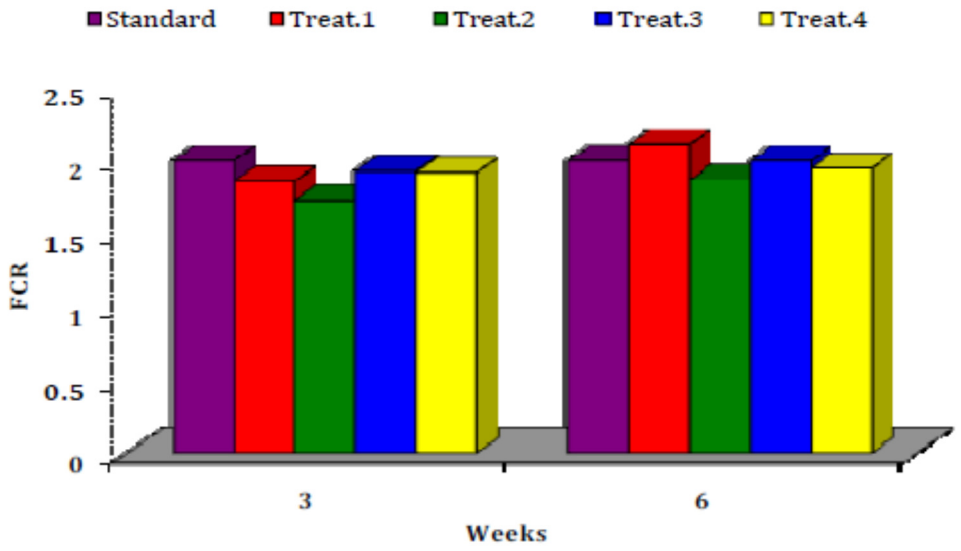

Figure 2: The Feed Conversion Ratio of Chicken

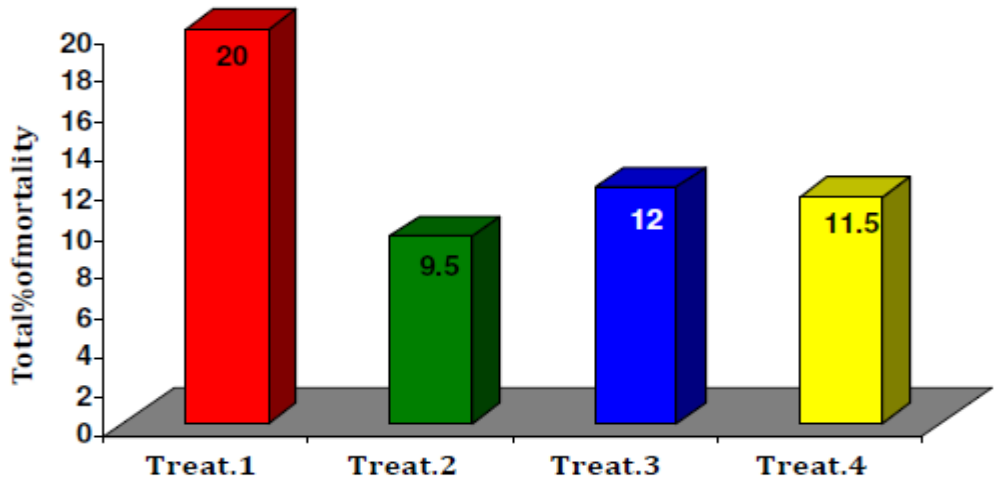

Figure 3: The Mortality Rate of Chicken

Effects on Mortality

Figure 3 shows the mortality rate of the broilers at the end of the trial. There were no significant difference among the treatments. All treatments exceeded the average standard mortality of 8%. The lowest mortality was recorded for treatment 2 (5% cassava). Deaths were related to those of spiking mortality syndrome, mainly in the third and sixth week.

Feasibility of using cassava in the feed industry

DISCUSSION

The results of the study indicated that cassava can be included as an ingredient in poultry feed. The recommended amount is 15%.

From the studies conducted locally, it was found that 1.37 kg (3lb) of fresh cassava produce 0.46 kg (1lb) of cassava flour. At the current prices of corn (G$80/kg) and rice (G$88/kg), the cost of 1kg of cassava flour must be within the range for it to be competitive. This means that the farm gate price for fresh cassava tubers must be approximately G$28/kg (G$13/lb).

Ngiki et al. (2014) indicated that there were no significant differences between growth for weight gains and feed

conversion ratio for birds fed on maize-based feeds and these fed with cassava substitute. Oyebimpe et al. (2006) pointed out that there was no reduction in growth performance when cassava peel meal substituted maize in broiler diets. According to Buitrago et al. (2007), boilers were fed with 50% cassava flour and integral soybeans had no difference or superior weight gains when compared to those fed with maize and integral soybeans.

Tathawan et al. (2002) and Saentaweesuk et al. (2000) demonstrated that broilers fed on cassava diets showed better health status and required less or no antibiotic treatment when compared to those fed on cereal or grains.

Based on this recommendation and the computation by DeGroot (2009), the total cassava

The other study by Blair (2010b) analyzed the status of risk management and finance along the cassava value chain and suggested ways for the enhancement of the existing risk management mechanism in view of the likely development in the industry.

The first study by Blair (2020a) revealed that yields were relatively low (7,808 lb/A compared to 8,922 lb/A for Latin American and Caribbean Countries) and

requirement for the local poultry feed industry would be 13,560 tons. Blair (2010a) estimated the area under cultivation to be 1924 ha (4,752A) with an average yield of 8,754 kg/ha (7,808 lb/A). The annual production was extrapolated to be 16,225 tons. Blair (2010a) also found that 45% of all cassava production was consumed by the household. This translates to 7301 tons.

The remainder is sold to the local market. No estimate could have been made at this time on the local market demand. Blair (2010a) conducted a study on profiling the actual and potential market for cassava in Guyana. The study sought to assess and quantify the demand for cassava and the main cassava products and current production volumes.

was a severe constraint to the sector. The second study by Blair (2010b) identified marketing and production risks faced by farmers. With regards to production risks, the most prominent were attacks from pests. Based on the above considerations, it is imperative that appropriate actions be undertaken to nullify the constraints identified to enhance production and productivity in Guyana.

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