

Feeding restriction with cassava flour and carcass composition of broilers



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Abstract

Poultry subjected to a dietary restriction based on cassava flour for three weeks, has been able to fully replenish their body reserve previously affected, after a four-week re-feeding. Carcass yields no longer showed any significant difference after the re-feeding period. The digestive tract of chickens previously subjected to a restrictive diet experienced a development inversely proportional to the degree of restriction. It appears from the present study that cassava flour can partially replace maize corn under alternating restrictive feeding conditions in broilers.

Introduction

- Poultry requires a diet rich in energy, like corn, and protein with high digestibility, because their relatively short digestive tract, promotes rapid gastrointestinal transit.
- Massive use of corn in poultry feed is an insurmountable constraint for many breeders in Benin.
- Traditional breeders use genetically improved poultry strains with the aim of increasing the carcass yield of their local chickens.



- Partial and periodic replacement of maize by cassava flour, which is more available and more accessible.
- Periodic feed restriction in broiler chicken production offers the alternative of more efficient management of feed resources at the village level.
- **Research question:** Can broilers, previously subjected to a restrictive diet based on cassava flour for a certain period, compensate for their carcass yield if feeding conditions return to normal?

Materials and methods

75 one day old chicks of *hubbard* strain are used. The starting phase corresponds to the first four weeks. From the fifth week, the chicks are randomly grouped in 3 lots of 25 subjects at the rate of 20 chicks per m². Eight broilers are randomly chosen from each lot after each dietary phase and are fasted for twelve-hours prior to slaughtering. The experimental device is a Fisher's random block design whose treatments are described in Table 1.

Table 1: Experimental design of the study

Criteria for study	Test phases						
	Phase 1	Phase 2			Phase 3		
	Starting	Control	Restriction	Control	Refeeding		
	Lot I	Lot II	Lot III	Lot I	Lot II	Lot III	
Test duration (weeks)	4	3	3	3	4	4	4
Number of chicks at the beginning of each phase	75	25	25	25	17	17	17
Cassava flour in the diet (%)	0	0	10	30	0	0	0
Physiological needs of energy and protein in the diet (%)	100	100	85	70	100	100	100
Number of slaughtered chickens at the end of each phase	0	8	8	8	8	8	8
Number of chicks at the end of each phase	75	17	17	17	9	9	9

The composition of the feed ration for each batch and at each phase of the test is shown in Table 2.

Table 2: Composition of feed rations for the broilers

Ingredients	Starting regime		Finishing-growth regime			
	Regime I	Regime II (control)	Regime III	Regime IV	Refeeding diets	
Maize (%)	65	70	30	20	70	
Cottonseed cake (%)	7	0	4	6	0	
Soybean meal (%)	8	10	5	3	10	
Fishmeal (%)	6	4	4	2	4	
Cassava flour (%)	0	0	10	30	0	
Malt brewery residues (%)	0	0	6.5	6.5	0	
Maize bran (%)	0	0	25	20	0	
Wheat bran (%)	8	12	12	9	12	
Oystershell (%)	1.2	1.2	1.2	1.2	1.2	
Table Salt (%)	0.25	0.25	0.25	0.25	0.25	
Ironsulphate(%)	0.05	0.05	0.05	0.05	0.05	
CMV (%)	4.5	2.5	2	2	2.5	
Total	100	100	100	100	100	
ME (Kcal/kg DM)	3000.00	3100.00	2650.00	2170.00	3100.00	
CP (%)	20.00	18.76	16.40	13.10	18.76	

CMV: Concentrated Mineral Vitamin. ME: Metabolisable Energy. CP: Crude Protein.

Results

The partial substitution of maize by cassava flour in the diet of broilers may have affected weight growth and the carcass composition.

A substitution limited to 10% accompanied by a nutritional restriction of 15% was clearly not enough to widen the gap with the control subjects (figure 1).

When the nutritional restriction is increased to 30% in a ration of which 30% of the corn has been replaced by cassava flour, broiler chickens lose considerable weight.

Four weeks of re-feeding was not enough to fully compensate for the subsequent weight losses, despite a significantly more accelerated growth rate compared to the control subjects.

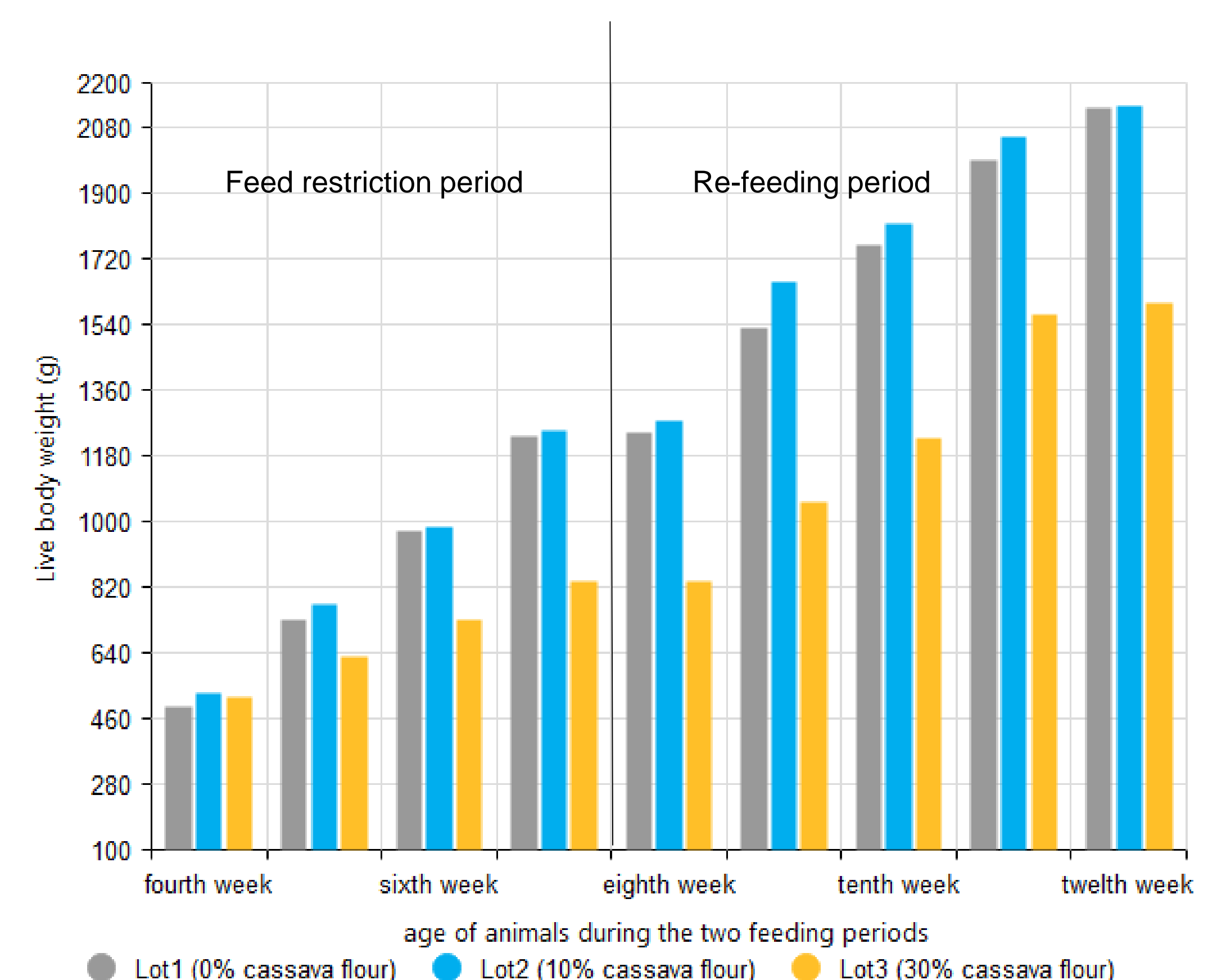


Figure 1: Weight changes in broilers during the period of food restriction and re-feeding

Between the two phases of feeding, the gastrointestinal tract experienced a weight increase in subjects previously subjected to a nutritional restriction. It was nearly 38% among the subjects of lot 3 against 6.33% in those of lot 2. Subjects in the control group (lot 1) had almost no change (-0.11%) in their digestive tract. (figure 2)

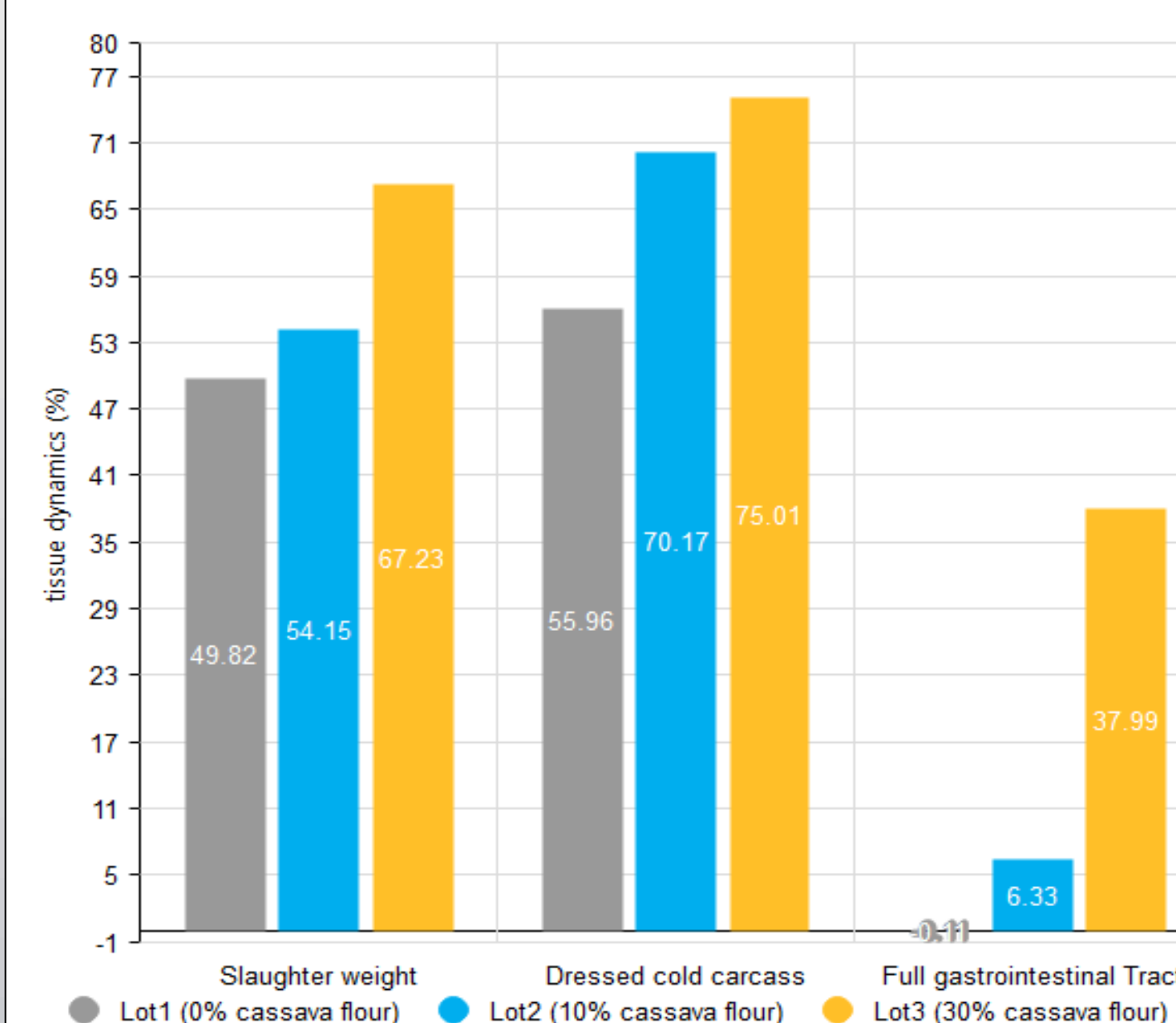


Figure 2: Dynamics of the body tissues of broilers subjected to a restrictive diet then re-fed

The increase in the weight of the gastrointestinal tract in chickens previously subjected to the dietary restriction based on cassava flour is probably due to the high vegetable fiber content of cassava flour. The poor digestibility of plant fibers, particularly in poultry, has therefore resulted in a slowing down of the food transit which has resulted in an excessive filling of the digestive tract. This clearly illustrates the extent of the metabolic activity that led to the intensification of the synthesis of organic tissues during the re-feeding period. Indeed, the weight increase of cold carcass of broilers in lot 1 (control) was 14.21% less than broilers in lot 2 and 19.05% less than of broilers in lot 3.

The significant superiority of tissue gain observed in subjects in Lot 2 and 3 compared to those in Lot 1 (control) is certainly due to better feeding efficiency, due to the phenomenon of compensatory growth.

Conclusion

- A short period of qualitative food restriction with cassava flour in poultry was found to be an alternative for local breeders with insufficient maize corn.
- The use of cassava flour in the diet of broilers submitted to dietary restriction has clearly affected the development of the carcass and its composition.
- The substitution of 10% maize with cassava flour in the diet over a period of three weeks may be considered in broilers aged four weeks, without any significant change in their final carcass productivity. A level of substitution of 30% turns out to be too high and does not allow for complete compensation even after four weeks of re-feeding.

Acknowledgments

Our thanks are addressed to the Competitive Fund of the University of Parakou who financially supported this work.