cassava and trichanthera leaves

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Performance traits of finishing pigs fed graded levels of cassava roots and a mixed foliage meal of cassava and trichanthera leaves

Crossbred pigs were distributed at random into four treatments to study, during seven weeks, the effect of the introduction of graded levels of cassava root meal on performance and carcass traits... (with the permission of Livestock Research for Rural Development).

Introduction

Several experiments conducted to determine the use of cassava roots in the diet of pigs have indicated the potential of this product as animal feed (Maner et al 1978; Méndez and Zaragoza 1980; González et al 1997). However, the use of increasing levels of cassava roots for pigs creates a problem of diet formulation, since the roots are very poor in N (see Buitrago 1990; Ly 1998) and therefore, very little protein can be derived from this feed resource.

Another characteristic of cassava roots is the relatively low content of cell walls (Buitrago 1990; Ly 1998). This opens up the possibility of including foliages rich in protein in diets containing high levels of cassava roots. The foliar protein source to be employed could be cassava foliage (Garbati et al 2001), since this material has been successfully used in pig feeding (Rajaguru et al 1979; Parra 1987; Trómpiz et al 2000. The foliage from Trichanthera gigantea (Rosales 1997) could be another interesting possibility to explore for feeding pigs, since acceptable performance parameters have been reported (Sarría et al 1991), with relatively high digestibility indices (Ly et al 2001; Seijas et al 2003), in pigs fed trichanthera foliage.

The objective of the present experiment was to record the performance and carcass traits of finishing pigs fed graded levels of cassava root meal in diets containing a fixed amount of leaf meal derived from trichanthera and cassava foliage.

Materials and Methods

A total of 40 crossbred pigs of mean initial live weight 54 ± 3 kg were distributed at random into four treatments in groups of two pigs, to study, during seven weeks, the effect of the introduction of graded levels of cassava root meal (CRM) on performance and carcass traits. Four experimental diets contained a fixed amount of foliage meal of cassava and trichanthera leaves (1:1 in dry weight) and graded levels of CRM were compared to a control diet with neither cassava roots nor foliage meal. The diets were formulated to contain approximately 13.60 KJ of digestible energy/g DM as recommended for finishing pigs fed ad libitum on conventional diets (NRC 1998). The cassava and trichanthera mixed foliage meal contained crude protein 18.4 and NDF 34.8% in dry basis respectively, as determined by analysis.

Table 1. Characteristics of the diets (percent in dry basis)

	-	-	20	40
Ingredients				
Yellow maize	49.64	37.43	21.15	5.47
Sorghum	20.00	17.60	9.49	-
Sugar cane molasses	4.00	4.00	4.00	4.50
Crude palm oil	3.14	8.60	9.00	9.50
Cassava root meal	-	-	20.00	40.00
Soybean meal	18.65	5.90	8.21	13.40
Fishmeal	4.22	6.14	7.80	6.13
Cassava leaf meal	-	10.00	10.00	10.00
Trichanthera foliage meal	-	10.00	10.00	10.00
CaCO3	-	-	-	0.25
CaPO4H.2H2O	-	-	-	-
NaCl	0.15	0.13	0.15	0.15
Lysine	-	-	-	0.20
Methionine	-	-	-	0.20
Vitamins and minerals (1)	0.20	0.20	0.20	0.20
Analysis				
Dry matter	84.70	89.59	90.65	90.97
Ash	5.02	5.89	7.52	8.82
Organic matter	94.98	94.11	92.48	91.18
Crude fibre	3.18	6.67	6.12	6.34
Ether extract	1.43	8.03	8.18	7.71
Crude protein	17.59	18.09	17.98	18.08
Gross energy, KJ/ DM	17.15	19.92	19.99	19.25

(1) According to NRC (1998) recommendations.

The cassava and trichanthera leaves were harvested in the Experimental Station of the Faculty of Agronomy, at Maracay, and were dried according to the method described by Seijas et al (2003). In brief, both cassava and trichanthera foliage meals were prepared by dehydration of leaves, petioles and tender tops harvested after approximately 120 days of plant cultivation, in a closed room at 50oC during 48 hours. The dry foliage was ground through a 0.5 mm screen then mixed with the other ingredients of the diets. The cassava root meal was prepared from recently harvested roots as reported elsewhere (Garbati et al 2001).

The animals were housed in groups of two (one castrate male and one female), in pens of 2*1.8 m with sloping cement floor, in an open shed. Every pen was provided with drinking nipples and a feed trough. The animals were weighed at the start and end of the trial, and were fed ad libitum during seven weeks. Every day, feed refusals from each pen were recorded at 9:00 am after which new feed was offered to the pigs. At the end of the growth trial, the animals were weighed after 24 hours of fasting and then sacrificed. After evisceration, the hot carcass was weighed and expressed as percentage of slaughter weight. Back fat thickness was measured at the level of the last lumbar vertebra in carcasses refrigerated at 4oC during 24 hours.

Duplicate samples of feed were analyzed for DM, ash, crude fibre, ether extract and N content as outlined by AOAC (1990). The gross energy content of the samples was determined in an adiabatic bomb calorimeter, using benzoic acid as calorimetric standard.

Contrasts amongst means were made by the analysis of variance technique (Steel and Torrie 1980). The SAS (1992) computing package was used in all cases.

Results and discussion

There were no significant (P>0.05) differences for DM intake, live weight gain and feed conversion performance between the control treatment and those containing the mixed foliage meal and up to 40% CRM (Table 2). Carcass traits were similarly not affected by inclusion in the diet of the foliage meal and the CRM (Table 3).

Table 2. Performance traits of finishing pigs fed graded levels of cassava root meal in diets of cassava and trichanthera foliages 1

Cassava root meal, %	-	-	-	20	40
DM intake, kg/day	2.25	2.40	2.59	2.50	0.32
Mean daily gain, g	662	647	666	688	60
DM conversion, kg/kg	3.71	3.94	3.84	3.62	0.71

Table 3. Carcass traits of finishing pigs fed graded levels of cassava root meal in diets of cassava and trichanthera foliages

Cassava root meal, %		-	-	20	40
Slaughter weight, kg	90.5	85.2	88.5	90.6	2.6
Carcass yield, %	77.4	77.5	78.8	77.9	3.2
Backfat thickness, mm	15.3	14.8	15.5	17.7	2.4

Earlier studies in our laboratory have shown that up to 30% of leaf meal of either cassava or trichanthera can be included in pig diets with no depression in performance (Rangel et al 2001). This level of cassava leaf meal has also given good results in studies carried out in Vietnam (Bui Huy Nhu Phuc 2001). By contrast, this level of fresh leaves gave poor results in studies reported by Mahendranathan (1971) and Sarwat et al (1988).

Conclusions

It is concluded that pigs fed ad libitum with diets formulated to contain 40% of cassava root meal and 20% from mixed foliage of cassava and trichanthera leaves have similar performance and carcass traits as compared to those fed a conventional diet.

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