

# 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  $54 \pm 3$  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.

|  |   |   |    |    |
|--|---|---|----|----|
|  |   |   |    |    |
|  | - | - | 20 | 40 |

|   |           |           |           |           |
|---|-----------|-----------|-----------|-----------|
| <b>Ingredients</b>                                |           |           |           |           |
| Yellow maize                                      | 49.6<br>4 | 37.4<br>3 | 21.1<br>5 | 5.47      |
| Sorghum   | 20.0<br>0 | 17.6<br>0 | 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                                 | -         | -         | 20.0<br>0 | 40.0<br>0 |
| Soybean meal                                      | 18.6<br>5 | 5.90      | 8.21      | 13.4<br>0 |
| Fishmeal  | 4.22      | 6.14      | 7.80      | 6.13      |
| Cassava leaf meal                                 | -         | 10.0<br>0 | 10.0<br>0 | 10.0<br>0 |
| Trichanthera foliage meal                         | -         | 10.0<br>0 | 10.0<br>0 | 10.0<br>0 |
| CaCO <sub>3</sub>                                 | -         | -         | -         | 0.25      |
| CaPO <sub>4</sub> H <sub>2</sub> H <sub>2</sub> O | -         | -         | -         | -         |
| 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      |
| <b>Analysis</b>                                   |           |           |           |           |
| Dry matter  | 84.7<br>0 | 89.5<br>9 | 90.6<br>5 | 90.9<br>7 |
| Ash   | 5.02      | 5.89      | 7.52      | 8.82      |
| Organic matter                                    | 94.9<br>8 | 94.1<br>1 | 92.4<br>8 | 91.1<br>8 |
| Crude fibre                                       | 3.18      | 6.67      | 6.12      | 6.34      |
| Ether extract                                     | 1.43      | 8.03      | 8.18      | 7.71      |
| Crude protein                                     | 17.5<br>9 | 18.0<br>9 | 17.9<br>8 | 18.0<br>8 |
| Gross energy, KJ/ DM                              | 17.1<br>5 | 19.9<br>2 | 19.9<br>9 | 19.2<br>5 |

(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 50°C 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 4°C 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).

|                      |      |      |      |      |      |
|----------------------|------|------|------|------|------|
|                      |      |      |      |      |      |
| 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 |

|                       |      |      |      |      |     |
|-----------------------|------|------|------|------|-----|
|                       |      |      |      |      |     |
| 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 |

# 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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## References

1. AOAC 1990 Official Methods of Analysis. Association of Official Analytical Chemists. 15th edition (K Helrick, editor) Arlington pp 1305
2. Bui Huy Nhu Phuc, Ogle B and Lindberg J E 2001 Nutritive value of cassava leaves for monogastric animals. In: Proceedings of International Workshop on Current Research and Development on Use of Cassava as Animal Feed. Khon Kaen University, Thailand.  
<http://www.mekarn.org/procKK/phuc.htm>
3. Buitrago A J 1990 La yuca en la alimentación animal. Centro Internacional de Agricultura Tropical. Cali pp 446
4. Garbati E, González C, Díaz I, Tepper R and Hurtado E 2001 Rasgos de comportamiento y canal en cerdos en finalización con dietas de raíz y follaje de yuca. Revista Computadorizada de Producción Porcina 9 (suplemento 1):15-23
5. González C, Vecchionacce H, Díaz I and Ortiz V 1997 Utilización de harina cruda de raíz de yuca (*Manihot esculenta* Crantz) y harina cruda de cormos de ócumo chino (*Colocasia esculenta*) en la alimentación de cerdos. Archivos Latinoamericanos de Producción Animal 5 (suplemento 1):277-279
6. Ly J 1998 Raíces de yuca (*Manihot esculenta* Crantz) para cerdos: una reseña corta sobre el contenido de nutrientes. Revista Computadorizada de Producción Porcina 5(2):1-17
7. Ly J, Chhay Ty, Chiev Phiny and Preston T R 2001 Some aspects of the nutritive value of leaf meals of *Trichanthera gigantea* and *Morus alba* for Mong Cai pigs. Livestock Research for Rural Development 13(3): <http://www.cipav.org.co/lrrd/lrrd13/3/ly133.htm>
8. Mahendranathan T 1971 The effect of feeding tapioca (*Manihot utilissima* Pohl) leaves to pigs. Malaysian Agricultural Journal 48:60-68
9. Maner J H, Buitrago J A, Portela R and Jiménez I 1978 La yuca en alimentación de cerdos. Informe del Centro Internacional de Agricultura Tropical. Cali pp 113
10. Méndez A and Zaragoza L 1980 Sustitución de sorgo por harina de yuca en la alimentación de cerdos. Agricultura Técnica Mexicana 6(2):83-91
11. NRC 1998 Nutrient Requirements of Swine. National Academy of Science. 9th edition. National Academy Press. Washington D C
12. Parra N 1987 Utilización del follaje de yuca en el engorde de cerdos. Boletín de la Sociedad Venezolana de Especialistas en cerdos. 2(1):38-39
13. Rajaguru A S B, Ravindran V and Ranaweera R 1979 Manioc leaf meal as a source of protein for fattening pigs. Journal of the National Scientific Council of Sri Lanka 7:105-110
13. Rangel G, González C, Novoa L, Hurtado E and Vecchionacce H 2001 Estudios de

- aceptabilidad de harina de follajes tropicales como recursos alternativos en dietas de cerdos. Revista Computadorizada de Producción Porcina 9 (suplemento 1):24-31
14. Rosales M 1997 Avances en la investigación en el valor nutricional del nacedero (*Trichanthera gigantea*, Humboldt et Bonpland Nees). In: Arboles y arbustos forrajeros utilizados en la alimentación animal como fuente proteica. CIPAV. Cali p 127-144
  15. Sarría P, Villavicencio E and Orejuela L E 1991. Utilización de follaje de nacedero (*Trichanthera gigantea*) en la alimentación de cerdos de engorde. Livestock Research for Rural Development 3(2):51-58 <http://www.cipav.org.co/lrrd/lrrd3/2/cipav1.htm>
  16. Sarwat S R, Katak S N and Kategile J A 1988 Performance of growing-finishing pigs when given diets containing fresh cassava leaves and roots. East African Agriculture and Forestry Journal 53:111-115
  17. SAS 1992 SAS/Laboratory software user's guide: Statistics. SAS In Company, Cary pp 291
  18. Seijas Y, González C, Vecchionacce H, Hurtado E and Ly J 2003 The effect of palm oil on total tract digestibility of pigs fed trichanthera (*Trichanthera gigantea* H.B.K. Stend) foliage meal. Livestock Research for Rural Development 15(8): <http://www.cipav.org.co/lrrd/lrrd15/8/seij158.htm>
  19. Steel R G D and Torrie J A 1980. Principles and Procedures of Statistics: a Biometrical Approach. McGraw-Hill Book Company (second edition) Toronto pp 481
  20. Trómpiz J, Ventura M, Esparza D, Del Villar A and Aguirre J 2000 Utilización de la harina de follaje de yuca (*Manihot esculenta* Crantz) en cerdos en crecimiento. Revista de la Facultad de Ciencias Veterinarias (Maracay) 10:315-320

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