

Results and discussion

The results from chemical analyses and *in vitro* digestibility summarized in Table 1 show as expected a generally lower nutritive value of grasses compared to dicots and especially legume species. With poor enzymatic digestibility and fermentability, *A. mangium* leaves must be advised against for use by farmers. Crop residues of *A. hybridus*, *I. batatas*, *M. esculenta*, *P. scandens* and *V. unguiculata* and herbaceous and woody forage species such as *M. pruriens* and *M. oleifera*, respectively, look promising. They combine high digestible energy, assessed through IVDMD, A and Rmax, high DP contents with high levels of minerals. Nevertheless, future work should assess the maximum levels of incorporation in diets as most of these ingredients contain anti-nutritional components reducing voluntary intake, digestibility or both.

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References

- Bidelle J, Buldgen A, Boudry C and Leterme P 2007. . Animal Feed Science and Technology 132, 111–122.
Groot JCJ, Cone J, Williams BA, Debersaques FD and Lantinga EA 1996. . Animal Feed Science and Technology 64, 77–89.

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Digestibility, metabolic utilization and nutritional value of *Cassia tora* (Linn.) leaf meal incorporated in indigenous Senegal chickens diets

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Introduction

Indigenous chicken production is confronted with various constraints in which feed is a major challenge. Besides the lack of dietary supplement, village chickens face quantitative and qualitative feed shortages particularly in a poor agricultural or household residue environment. Moreover, because of the increasingly cost of common protein ingredients (groundnut cake, soybean or fish meal) traditional stockholders often have little access to such resources. However, studies carried out on legumes reported that the leaves of *Cassia tora*, are rich in protein, essential amino acids and minerals. The prospect thus arises of using *Cassia tora* leaf meal as a protein ingredient source in Senegal indigenous chickens diets. This study was undertaken to determine their nutrient utilization and nutritional value.

Materials and methods

Cassia tora leaves were collected mainly in the region of Thies, 70 km from Dakar. They were dried for 1–2 days and processed into meal using a grinder mesh 4 mm in diameter. The leaf meal and the other common ingredients (yellow maize, white sorghum, millet, wheat bran, fish meal, and groundnut cake) were analysed for their composition using AFNOR technical. These ingredients were used to formulate four iso-nutrient calculated dietary treatments (CT₀, CT₅, CT₁₀ and CT₁₅) containing respectively 0, 5, 10 and 15% of *cassia tora* leaf meal. Experiments were undertaken from 15th to 27th, November 2009. Twenty adult indigenous chickens with an average weight of 1.16 kg were raised in metabolic cages and allocated into four dietary treatments groups of five birds each. During the experiment feed offered and fresh excreta collected were weighted daily for six days. The droppings were oven-dried at 60°C and ground for nutrient analysis per bird. Daily feed intake (DFI) and average daily weight gain (ADWG) were calculated. Apparent coefficients of nutrient utilization (ACNU) were determined according to the following formula: $ACNU = (NI - NF) \div NI$, where NI was nutrient intake and NF nutrient excreted. Data were analysed at 5% level by variance analysis (ANOVA) completed with t-test when ANOVA showed significant difference.

Results

The *Cassia tora* leaf meal was relatively rich in protein (27.44% DM), crude fiber (16.8% DM), NDF (25.7% DM) and ash (15.16% DM), particularly calcium (3.13%) and potassium (1.3% DM). It contained respectively 3.82% DM, 36.77% DM and 2050.47 kcal/kg DM of ether

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extract, nitrogen-free extract and metabolizable energy. The effects of cassia leaf meal inclusion in village chickens diets on the digestibility and metabolic utilization of different nutrients, FI, ADWG and FCR are shown in table 1.

Table 1 Effects of the incorporation of *Cassia tora* leaves meal in diets on FI, ADWG, FCR and nutrients utilization

Parameters	Dietary Treatments				SEM	P
	CT ₀	CT ₅	CT ₁₀	CT ₁₅		
Daily feed intake (g DM/bird)	62,13 ± 15,03	64,99 ± 14,40	60,83 ± 10,10	59,14 ± 8,13	2.56	0.89
ADWG (g/day)	12,65 ± 6,07	10,16 ± 7,11	12,64 ± 6,15	12,07 ± 5,47	1.29	0.91
FCR (g/g ADWG)	6,23 ± 2,76	8,88 ± 3,94	6,18 ± 2,82	5,96 ± 2,07	0.67	0.38
Daily excreta (g DM/bird)	19,41 ± 4,60	16,92 ± 2,71	16,84 ± 3,20	17,76 ± 0,91	0.68	0.55
ACNU-Dry Matter	0.685 ± 0.030	0.735 ± 0.029	0.721 ± 0.043	0.696 ± 0.034	0.84	0.13
ACNU-Organic Matter	0.719 ± 0.027	0.756 ± 0.027	0.7424 ± 0.040	0.717 ± 0.032	0.75	0.20
ACNU-Crude Protein	0.453 ± 0.052 ^a	0.530 ± 0.053 ^b	0.478 ± 0.081 ^{ab}	0.400 ± 0.068 ^a	1.71	0.04
ACNU-Ether extract	0.832 ± 0.016 ^a	0.864 ± 0.015 ^b	0.813 ± 0.029 ^a	0.779 ± 0.024 ^c	0.83	0.00
ACNU-Crude fiber	0.165 ± 0.080 ^a	0.426 ± 0.064 ^b	0.576 ± 0.065 ^c	0.528 ± 0.053 ^c	3.89	0.00
ACNU-Nitrogen Free Extract	0.835 ± 0.016	0.855 ± 0.016	0.850 ± 0.023	0.854 ± 0.016	0.41	0.34
ACNU-Ash	0.160 ± 0.081 ^a	0.483 ± 0.058 ^b	0.477 ± 0.081 ^b	0.462 ± 0.061 ^b	3.45	0.00
ACNU-Metabolisable Energy	0.786 ± 0.020	0.814 ± 0.021	0.782 ± 0.033	0.765 ± 0.026	2.99	0.06

Conclusions

Except for ether extract, the inclusion of *Cassia tora* leaf meal in indigenous chicken diets at 15% level has no significant adverse effect on nutrient and energy utilization, feed intake, ADWG, and FCR of these birds. It significantly improved the crude fiber and ash utilization for 5% dietary treatment.

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Digestibility, metabolic utilization and nutritional value of *Leuceana leucocephala* (Lam.) leaf meal incorporated in indigenous Senegal chickens diets

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