

CONSTRUINDO SABERES, FORMANDO PESSOAS E TRANSFORMANDO A PRODUÇÃO ANIMAL

## INTAKE AND NUTRIENT APPARENT DIGESTIBILITY IN LAMBS FED AMAZONIAN OILSEED CO-PRODUCTS

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**Abstract:** O objetivo do trabalho foi avaliar o consumo e a digestibilidade aparente dos nutrientes de co-produtos amazônicos em cordeiros confinados. Utilizou vinte e quatro cordeiros distribuídos em delineamento inteiramente casualizado, com quatro tratamentos e seis repetições. O alimento volumoso foi silagem de milho (400 g kg<sup>-1</sup> com base na MS) mais concentrado (600 g kg<sup>-1</sup> com base na MS). Os tratamentos foram Controle, PAL (torta de dendê), CUP (torta de cupuaçu) e TUC (torta de tucumã). O período experimental consistiu de 14 dias de adaptação e 5 dias para avaliação. A excreção fecal foi estimada utilizando a FDN indigestível (FDNi) como marcador interno. A inclusão de coprodutos influenciou o consumo e a digestibilidade da matéria seca (MS), fibra em detergente neutro (FDN), proteína bruta (PB) e extrato etéreo (EE). O consumo da matéria seca apresentou variação de 1,240 a 0,590 kg dia<sup>-1</sup>, o consumo do extrato etéreo foi de 0,100 a 0,020 kg dia<sup>-1</sup>. A digestibilidade aparente da matéria seca variou de 81 a 69% e do extrato etéreo foi de 91 a 76%. Os coprodutos têm potencial como fonte alternativa na nutrição animal, mas precisam de estudos para determinar o melhor nível de inclusão na dieta de ruminantes.

**Keywords:** Lipids, nutrition, sheep, small ruminant

### Introduction

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Brazil is one of the largest consumers of sheep meat in Latin America, with regard to the significant volume of meat imported from other countries to meet domestic demand. From 2000 to 2016, the sheep herd increased from 14,8 to 18,5 million (IBGE, 2017). This representative increase is due to the high demand for meat and products from a chain of lambs, modifying the small and rudimentary production chain, for research and investment target. The Amazon Forest has a high biodiversity of flora, highlighting in the industry the tons of fruits that go through the extraction to obtain oils. These residues have acceptable nutritional value for use in the feeding of ruminants, due to their high amount of energy and protein capable of meeting their nutritional requirements. Considering the numerous oilseeds like cupuaçu, dendê and tucumã processed and the amount of waste that is discarded, one way of using such co-products is in the inclusion in animal nutrition.

Intake and digestibility are considered to be the most important parameters of nutritional value in the development of adequate nutritional management. Therefore, the objective of this work was to evaluate the intake and apparent digestibility of lambs fed with Amazonian co-products.

### **Material and Methods**

The protocol used in this experiment was approved by the Ethics Committee on Animal Use, Federal University of Pará, Faculty of Veterinary Medicine/Campus Castanhal (protocol number 8694141217). Twenty-four castrated lambs with crossbreeding Dorper x Santa Inês with an average weight of  $30.05 \pm 2.45$  kg, were used in a completely randomized design, with four treatments and six replicates. Experimental diets were formulated to have 7% ethereal extract in dry matter (DM) and to be isonitrogenous. The roughage feed was maize silage ( $400 \text{ g kg}^{-1}$  on a DM basis) plus concentrate ( $600 \text{ g kg}^{-1}$  on a DM basis). At the onset of the experiment, lambs were distributed at random into the following treatments: Control, PAL (palm

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kernel cake), CUP (cupuaçu cake) and TUP (tucumã cake). The experimental period lasted 84 days, the first 14 days were for adaptation, and the last 70 days were feedlot and data collection. Diets were supplied daily at 07h30 and 16h30, to allow 20% as leftovers, the weights of feed supplied, and leftovers were recorded to estimate the dry matter intake (DMI). The experimental period consisted of 14 days of adaptation and 5 days to evaluate. Fecal excretion was estimated by using the indigestible NDF (iNDF) as internal marker. The samples of silage, concentrates, Orts, feces, processed by passing through a 2 mm screen sieve, were evaluated with regard to iNDF content using nonwoven fabric bags (100 g m<sup>2</sup>) in duplicate (20 mg DM cm<sup>2</sup>), in within the rumen of two buffalo and an *in situ* incubation procedure for 288 h. After this period, the material left from the incubation was extracted with neutral detergent according to the methodology by Van Soest (1994) for the quantification of iNDF levels.

The contents of dry matter (DM), neutral detergent fiber (NDF), crude protein (CP) and etheral extract (EE) were quantified according to the standard analytical procedures of the Brazilian National Institute of Science and Technology in Animal Science (INCT-CA; Detmann et al., 2012). Intake and apparent digestibility data were submitted to analysis of variance considering effect of initial body weight (kg) as a covariate ( $\alpha = 0.05$ ). The means were compared using a Tukey test at 5% significance.

## Results and Discussion

The inclusion of co-products influenced the intake and digestibility DM, NDF, CP, and EE ( $P < 0.05$ ) (Table 1).

The alternative oleaginous source evaluated evidences their energetic capacity, their use when not offered correctly can compromise the intake of all the nutrients, determining how the animal will use it for growth.

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Rodrigues et al. (2015), evaluated the intake and digestibility of nutrients in lambs using different levels of cupuaçu cake, in which DMI of 430 g day<sup>-1</sup> was observed, lower than that analyzed in the present study.

The cupuaçu cake may present variation in the bromatological composition, due to several factors, one of them is its non-standardized processing. Therefore, it is important to normalize the processing of cupuaçu, in order to guarantee responses from animals in a standardized way, and with that to spread the use of this co-product in the productive system.

Table 1 – Intake and nutrient apparent digestibility in lambs fed with experimental diets

Variáveis	Treatment			
	Control	CUP	PAL	TUC
	Intake (Kg dia <sup>-1</sup> )			
DM	1.039a	1.240a	0.960a	0.590b
NDF	0.296ab	0.329a	0.310ab	0.195b
CP	0.244a	0.221ab	0.177bc	0.153c
EE	0.069b	0.100a	0.075b	0.020c
	Digestibility (%)			
DM	81.90a	76.19ab	70.40b	69.52b
NDF	78.13a	54.36b	54.34b	46.23b
CP	88.55a	76.48c	81.37bc	85.31ab
EE	84.82ab	88.85ab	91.02a	76.68b

Means followed by the same letters on the lines do not differ significantly by the Tukey test (P<0.05).

Santos et al. (2016), working with lambs, observed that DMI and digestibility were compromised as the palm kernel cake inclusion in the concentrate increased. In the present study, the use of palm kernel cake also compromised the intake and



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digestibility of nutrients, including CP and NDF, which were lower in relation to the control treatment.

The animals fed with tucumã cake showed lower intake and digestibility of all nutrients. There are few studies that have used tucumã cake in ruminant nutrition, so new studies are important to characterize this co-product in order to analyze the best way and level of inclusion of tucumã cake in lamb's diets.

### Conclusion

Animals fed the co-products showed differences in nutrient intake and digestibility. Co-products have potential as an alternative source but need studies to determine the best level of inclusion in the ruminant diet.

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