

Intake and digestibility of four rations with different fiber levels in alpacas (*Vicugna Pacos*)

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Introduction

Peru has approximately 56% of the global population of South American Camelids (SAC) with an estimated 4.500.000 animals (INEI, 2012). Breeding of SAC is performed by Andean communities and it is one of the most important economic and productive activities in the area.

The aim of this study was to evaluate the effect of different dietary fiber levels on intake and apparent nutrient digestibility of nutrients in alpacas, and to estimate the digestibility of organic matter (OMD) from the content of crude protein (CP) in feces.

Material and methods

The experiment was performed at the Center of Investigation and Production "Quimsachata", located on the district of Santa Lucía, in the department of Puno, Perú.

The study was carried out with twelve alpacas (36.7 ± 6.4 kg body weight) which were offered 4 treatments with different neutral detergent fiber content.

Table 1. Chemical composition of diets offered to alpacas (% of dry matter).

Treatment	Composition	DM (%)	CP (%)	NDF (%)
T1	100% INIA 902-African Oat + common vetch	92.3	7.3	40.3
T2	100% INIA 904-Vilcanota Oat + common vetch	93.7	9.2	62.1
T3	50% Stipa ichu + 50% INIA 904-Vilcanota Oat + common vetch	94.1	6.1	67.7
T4	80% Stipa ichu + 20% INIA 904-Vilcanota Oat + common vetch	94.7	5.4	71.5

The study was conducted with a Switch Back design for 4 treatments, which uses the same animals in 3 different experimental periods and where a treatment is tested on the animal in both the initial and final periods, and then compared with the second (Jones and Kenward, 2003).

Each measurement period had 8 days of adaptation of the animals to the diets, plus 5 days where the voluntary intake of feed and water was evaluated (supply-rejection) and another 5 days to perform an apparent digestibility test (controlled feed supply and total fecal collection methodology. Tapia, 1993).



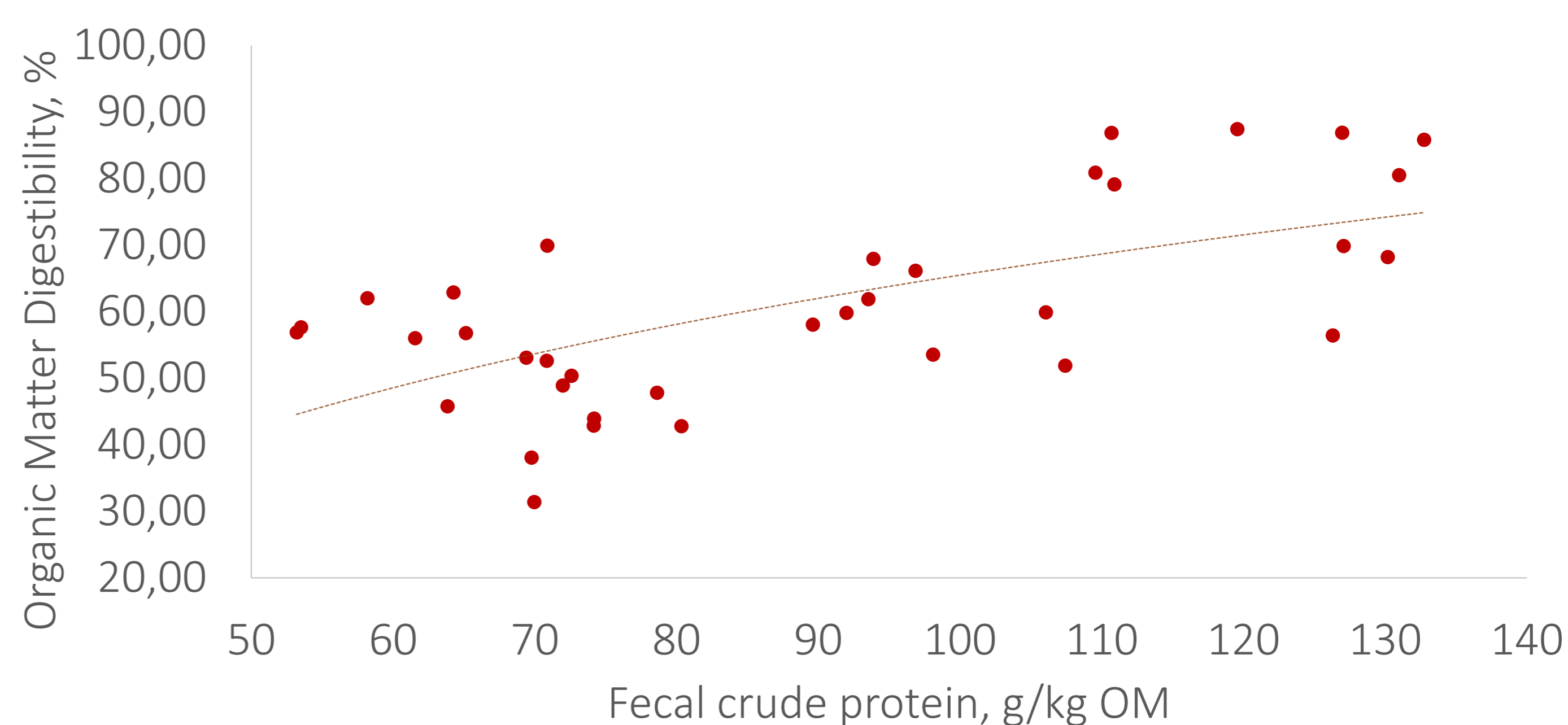
Results

Table 2. Dry matter intake, Neutral detergent fiber intake, water intake, apparent digestibility coefficients for the parameters of DM, OM, CP and NDF in alpacas

Treatment	DMI g/day	NDFI BW ¹ , (%)	WI ¹ (L/day)	FCP (%)	DMd (%)	OMd (%)	CPd (%)	NDFd (%)
T 1	613 ^a	1.0	1.8 ^a	5.78	66.4 ^a	68.5 ^a	61.1 ^a	60.7
T 2	554 ^{ab}	1.0	1.6 ^b	6.29	56.1 ^{ab}	58.2 ^b	52.0 ^{ab}	54.6
T 3	550 ^{ab}	1.0	1.6 ^b	8.94	56.0 ^b	58.2 ^b	51.3 ^{ab}	54.1
T 4	470 ^b	0.8	1.4 ^c	10.4	50.3 ^b	53.4 ^c	41.5 ^b	50.4
<i>p-value</i>	0.04	0.16	0.02	nd	0.02	0.003	0.042	0.265
SEM	25.4	0.4	0.3	nd	4.12	3.86	4.87	2.83

^{a,b} Superscripts with different letters within columns are statistically different from each other ($p < 0.05$). ¹ Intake based on body weight (expressed as percentage). Abbreviations: DMI: dry matter intake; NDFI: neutral detergent fiber intake; WI: Water intake; DMd = dry matter digestibility; OMd = Organic matter digestibility; CPd = crude protein digestibility; NDFd = neutral detergent fiber digestibility; FCP = fecal crude protein; SEM: standard error of mean; nd: not determined

Figure 1. Equation proposal for Organic Matter Digestibility (OMD, %) estimation using the fecal crude protein (g/kg OM) on alpacas



By adjusting the prediction equation of Wang et al. (2009), originally for sheep, the following equation was developed to estimate the digestibility of the ration OM based on the content of CP in the fecal OM in alpacas: $Y = 0.07635 - (-0.33866 * \exp(-(-0.4484) * \text{fecal CP (g/kg OM)} / 100))$. Where: y = ration OM digestibility (%)

Conclusion

Under the conditions in which the present study was carried out, it was concluded that dry matter intake (DMI, g/d) in alpacas was lower as the level of fibrosity of the rations increased, while the intake of neutral detergent fiber (NDFI) did not vary according to fibrosity. The digestibility of dry matter (DMD), organic matter (OMD) and crude protein (CPD) in alpacas was significantly lower as the level of fibrousness of the rations increased, while the digestibility of NDF did not vary as the level of fibrousness increased.

Acknowledgements

The authors would like to acknowledge PhD. Jose Velarde Guillen for reviewing the manuscript. We also thank to "CIENCIAACTIVA- CONCYTEC- FONDECYT" for granting the scholarship in Nutrition studies to MV. Ana Belén Obregón Cruz in UNALM.

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