

Effects of chitosan extracts at different doses on in vitro ruminal degradation and fermentation of a fat rich ration.

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Introduction

Chitosan is a non-toxic and biodegradable carbohydrate polymer that has received much attention as a functional biopolymer for diverse applications in medicine and food preservation, due to its antimicrobial properties. The objective of this work was to study the **dose-response effects** of chitosans, with different molecular weights and deacetylation degrees, **on ruminal digestion and fermentation parameters of a fat rich ration.**

Material and methods

— Additives and Ration

- ☑ Three different doses: 0 (control), 750 and 1500mg/l of culture fluid
- ☑ 38:38:24 alfalfa hay: concentrate: linseed ration (10% FAT, DM basis)

Table 1. Physical characteristics of the tested additives

Additives				
Abbreviation	Commercial name	Deacetylation degree (%)	Viscosity (m Pa s)	Source
CHI1	75-200	75	200	Biolog. S:A
CHI2	85-200	85	200	Biolog. S:A
CHI3	Fg 95	>95	<500	Trades S.A.

— Procedures and Statistics

- ☑ Gas production technique. 24h incubations, in triplicate in two different periods.
- ☑ Parameters analyzed with PROC MIXED procedure of SAS with day as random effect.
- ☑ Differences between means were declared at $P < 0.05$.

Results and conclusions

	Treatments							
	CTR	CHI1		CHI2		CHI3		s.e.m
		750	1500	750	1500	750	1500	
<i>Dose, mg/l</i>								
<i>Item</i>								
pH	6.48	6.53**	6.45	6.55**	6.49	6.55**	6.48	0.03
True digestibility, g/kg	684.73	568.1*	500.6**	587.8*	576.7*	691.2	641.3	80.22
Fat of the residue of incubation, mg	8.0	8.0	14.0**	10.0	14.0**	7.0	13.0**	1.0
Total VFA, mmol/gDM	2.79	2.60	2.81	2.68	2.58	2.44	2.64	0.18
<i>Individual, mmol/100mmol</i>								
Acetate	66.7	61.2*	64.4	60.5*	63.2	60.4	63.7*	1.77
Propionate	16.8	24.0***	25.6***	25.8***	26.3***	27.2***	27.0***	1.20
Butirate	10.1	9.9	6.8**	9.0	7.0**	8.5	6.7**	0.80
Valerate	1.71	0.85***	0.92**	0.99**	1.27*	1.02**	1.31	0.14
BCVFA	4.55	3.92	2.26***	3.56**	2.13***	2.81***	1.35***	0.25
C3:C2	0.26	0.39**	0.40**	0.43**	0.42**	0.46***	0.43**	0.03
CH ₄ , mmol	0.96	0.77	0.82	0.77	0.73*	0.68**	0.75*	0.07

✓ Chitosan modified rumen fermentation pattern of a fat rich ration, shifting fermentation to energetically more efficient routes in a dose-dependant manner.

✓ CHI3 (95% deacetylation degree) exerted the most promising results.