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Estimation of protein rumen degradability by SDS-PAGE

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The nylon-bag technique allows *in vivo* analysis of rumen degradability of food proteins consisting of heterogeneous subfractions varying in amino-acid composition and structure and with different rumen degradability (Nocek, 1988). The aim of this study was to investigate the possibility of evaluating rumen degradability using electrophoretic techniques in order to get separation and molecular characterization of protein fractions.

Materials and methods. Residues of bovine rumen degradation of a group of feeds (corn gluten meal, cotton cake, linseed meal, sunflower seed) were defatted and the protein fraction was quantified after solubilization in 0.125 M Tris-HCl pH 7.0, 2 mM EDTA, 2% (w/v) SDS, 1,5% (v/v) β-mercaptoethanol. Samples containing 10 µg nitrogen were electrophoresed according to Laemmli (1970). Fractional protein degradation was monitored by densitometric scanning of Coomassie-blue-stained bands with a Kem-Antec camera and was refined by Cream 4.0 software.

Results. Table I reports the nitrogen degradability of examined feeds after 8 and 16 h rumen incubation. For each feed we observed a characteristic pattern of breakdown of the major protein components extracted with a wide range of susceptibilities to degradation. Data show in table II indicate that sunflower protein fractions isolated were characterized by higher ruminal degradability probably owing to their globulin nature, evidencing a very different range of degradability compared with total nitrogen. On the contrary, corn gluten meal showed a reduced ruminal degradability of both the total nitrogen and the protein fractions, probably due to the presence of hydrophobic zein fractions. Amino-acid composition of the major protein fractions is underway.

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Nocek JE (1988) *J Dairy Sci* 71, 2051-2069

Laemmli UK (1970) *Nature (Lond)* 227, 680-685

Table I. Percentage disappearance of nitrogen from nylon bags incubated in the rumen.

	8 h	*16 h*
Corn gluten meal	9.0	39.6
Cotton cake	29.8	43.5
Linseed meal	49.5	69.8
Sunflower seed	36.0	55.1

Table II. Kinetics of rumen degradability of various feeds.

M_r (kDa)	*Relative % of the protein fractions*		
	Before	*After*	
		8 h	*16 h*
Corn gluten meal			
43	100	50	24
27	100	100	68
22	100	100	72
Cotton cake			
50	100	44	36
44	100	49	64
33	100	68	94
20	100	100	100
14	100	87	70
Linseed meal			
35	100	100	82
30	100	21	21
23	100	78	79
Sunflower seed			
50	100	23	13
40	100	8	4
34	100	7	7
21	100	64	7
18	100	24	9

Protein fractions were analysed by SDS-PAGE and the major protein bands were characterized before and after rumen infusion.